

OPTIONS BOOK

A SUPPORTING DOCUMENT FOR VICTORIA'S 30-YEAR INFRASTRUCTURE STRATEGY

December 2016



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Introduction

This is the third and final version of the options book. It is a supporting document for *Victoria's 30-year infrastructure strategy*. The summary assessments outlined in this book have informed the recommendations in the strategy.

There have been two earlier versions of the book. The first supported our consultation phase on options through the document *All things considered* between May and June 2016. Version two of the book was updated on the basis of the consultation outcomes, new evidence that was brought forward and further technical assessments. It supported consultation on the draft strategy.

This version of the book presents the final set of options that have been considered in the development of the strategy. It makes clear those options which have been included in the strategy and those which have not. The book has been updated to reflect changes made to the recommendations during the draft strategy consultation phase, as well as new information brought forward on the options during October 2016.

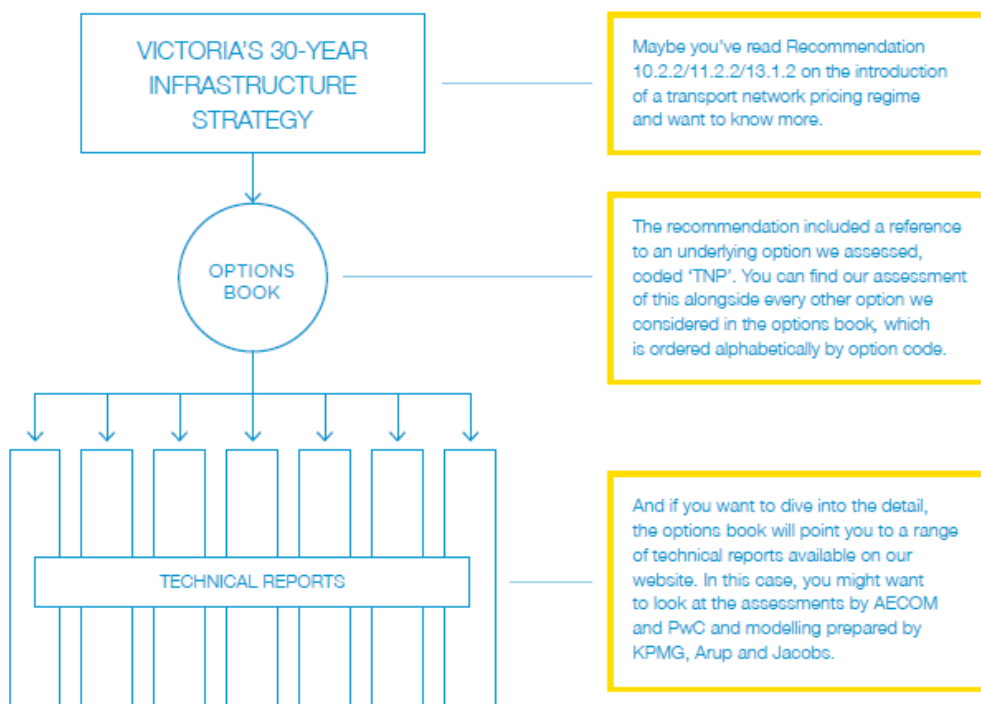
Summary assessments of all the options (policies, reforms, projects) we considered in developing recommendations for the strategy constitute the bulk of this large document. The front section includes the methodology for developing and assessing options and an overview of how we formed and finalised the recommendations.

If you want to understand why we are recommending some things and not others, this book is for you.

It's important to remember, however, that options are not recommendations. In some cases, the recommendations will be basically the same as the options upon which they were based, whereas in others, options will have only been recommended in part or recommended for further investigation. Many will not have been recommended at all. You might like to think of the options as ingredients for the recommendations.

The summary assessments for all the options included within this book have been informed by technical documents, which are available at infrastructurevictoria.com.au. Figure 1 provides a visual of how these documents all fit together in support of the strategy.

Figure 1: Strategy architecture





How to navigate this book

The most important section of this book is the one containing summary assessments of options we've considered in making recommendations in the strategy.

There are 285 options included within this book, which are sorted alphabetically by their unique three to four character alpha-numeric code. This code will assist in cross-referencing where these options have been recommended in the strategy.

For example, the code related to our Central city tram extension option (**CCT**), is indicated in the related recommendation from the strategy shown below.

1.2.1   **Fishermans Bend tram link.** Extend the tram network to Fishermans Bend to stimulate high density major urban redevelopment within 5-10 years. This tram extension would have a city-shaping and catalytic impact of opening up Australia's largest urban renewal precinct and enable housing for 80,000 people and 60,000 jobs to be located adjacent to central Melbourne (ref. CCT).

We have also provided two ways to search for options in the book that are of interest to you:

- Options by sector (page 57)
- Options by need (page 64)

If you're interested in the different ways options have been assessed, see the section on options assessments (page 17).

If you're interested in how we formed recommendations out of the options, see the section on forming recommendations (page 39).

If you are interested in how we have thought about potential funding mechanisms for the major projects, policies and reforms with a significant cost to government, see the section on funding and financing (page 44).

What you will find in the summary assessments

The options book explains the assessment of options and how these assessments have informed our recommendations. We hope that this approach makes it easy for you to get a clear snapshot of the assessment we've undertaken for each option and how the option has been treated in the strategy.

The book is intended to show a 'paper trail' of how our thinking about the options has evolved as the strategy has progressed. You will see how the options and our assessments of them have changed over the different consultation phases. For example, some options were consulted on, but did not progress for further assessment or were bundled into other options, while others were re-scoped and have undergone further development and assessment. It is an important objective of this book that the progression in our thinking can be seen, including where options have not been recommended. This approach will be familiar to you, if you have read earlier versions of the book.

The names of options may have changed through different versions of the book, but the unique codes have remained the same. To make it easier to find these options, we have ordered this book alphabetically by code.

Where you might notice some differences

There are some subtle differences in how this information is presented and the extent of assessments undertaken in comparison to earlier versions of the options book. This occurs particularly where the evidence base is different, but generally these templates are uniform.

In a few cases, there will be only one page. Generally this indicates that the option did not progress to further assessment. In the vast majority of cases, detailed summary assessments, running over three or more pages, are provided.

You'll also see that some **earlier versions of options** have been addressed by other options. In practice, this means that two or more options were so closely linked, that they were better scoped and assessed under a single option. Rather than omitting these completely, we have provided a page to show you what's happened and refer you to the option that either incorporates or supersedes this option.

How we got to here and what happens next

Preparing the options book has been a year-long process of generating different options, consulting on them, synthesising the outcomes and testing these options again.

In February 2016, Infrastructure Victoria released a discussion paper entitled *Laying the foundations*, which set out the strategy's draft objectives and needs. This was followed by a month of consultation with the community and stakeholders. We presented the outcomes of this consultation and the final strategic framework in *We hear you* (a summary of the framework is on the next two pages).

In May, Infrastructure Victoria released an options paper entitled *All things considered*, which outlined a range of options to meet Victoria's infrastructure needs. This was accompanied by the *Draft options book version one*, which contained the preliminary summary assessment of each of the options. Following the release, we undertook another month of consultation with the community and stakeholders to test these options, seeking feedback on the scope of options, the assessments and whether there was anything we had missed. We also convened two citizen juries over a number of months to deliberate on options and propose new ones. Our response to this public consultation and the citizen juries' recommendations are summarised in *Your considered opinion*.

In October, Infrastructure Victoria released *Victoria's draft 30-year infrastructure strategy*, which was accompanied by the *Draft options book version two*. The second version of the book included new options developed during consultation, those that had been re-scoped and further technical assessments of many options. It made clear those options that were being included in the draft strategy, and those that were not. A final month of consultation followed this release, which focused on the how the strategy worked as a whole. The outcomes of this consultation were outlined in our third consultation report, *What we learned*.

The submission of *Victoria's 30-year infrastructure strategy* to Parliament, supported by this, the final version of the options book, is the culmination of a year-long journey of defining the objectives, identifying the infrastructure needs, assessing options and forming recommendations. Much of the content of the options book hasn't changed since the second draft, but we have used the outcomes of consultation on the draft strategy to clarify the scope of some options and next steps for implementation, as well as outlining how and why related recommendations have changed.

Over the next 12 months, government will develop a response to these recommendations and a five-year infrastructure plan. The final strategy will help set the direction of infrastructure planning in Victoria for the next 30 years.

Infrastructure Victoria is required to refresh the strategy within three to five years and we are intending to do so in three years' time.

The framework

The strategic framework

VISION

By 2046, we see a thriving, connected and sustainable Victoria where everyone can access good jobs, education and services.

Guiding principles

- Consult and collaborate
- Drive improved outcomes
- Integrate land use and infrastructure planning
- Draw on compelling evidence
- Consider non-build solutions first
- Promote responsible funding and financing
- Be open to change

Objectives

1. Prepare for population change
2. Foster healthy, safe and inclusive communities
3. Reduce disadvantage
4. Enable workforce participation
5. Lift productivity
6. Drive Victoria's changing, globally integrated economy
7. Promote sustainable production and consumption
8. Protect and enhance natural environments
9. Advance climate change mitigation and adaptation
10. Build resilience to shocks

Needs

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Address infrastructure demands in areas with high population growth 2. Address infrastructure challenges in areas with low or negative population growth 3. Respond to increasing pressures on health infrastructure, particularly due to ageing 4. Enable physical activity and participation 5. Provide spaces where communities can come together 6. Improve accessibility for people with mobility challenges 7. Provide better access to housing for the most vulnerable Victorians 8. Address increasing demand on the justice system 9. Provide access to high-quality education infrastructure to support lifelong learning 10. Meet growing demand for access to economic activity in central Melbourne | <ol style="list-style-type: none"> 11. Improve access to middle and outer metropolitan major employment centres 12. Improve access to jobs and services for people in regional and rural areas 13. Improve the efficiency of freight supply chains 14. Manage threats to water security, particularly in regional and rural areas 15. Manage pressures on landfill and waste recovery facilities 16. Help preserve natural environments and minimise biodiversity loss 17. Improve the health of waterways and coastal areas 18. Transition to lower carbon energy supply and use 19. Improve the resilience of critical infrastructure |
|--|--|

How we came up with the options

Developing options

Victoria's infrastructure needs cannot be met through one solution. The needs are of national or state significance, impact a wide range of people and usually have long-term implications. These complex issues cannot be considered in isolation. Our cross-sectoral perspective means that we have considered how different sectors can play a role in addressing these needs. For example, when thinking about how to open up more public spaces, we looked at how schools and other facilities can be used by the community. This cross-sectoral perspective extends across levels of government, as well as between government and the private and community sectors.

We developed and assessed a range of options that can credibly address the infrastructure needs with a focus on the following:

- Managing the demands put on infrastructure, including through changing behaviour
- Getting better use out of existing assets, including through maintenance
- Expanding and building new assets

Importantly we developed possible options in that order, consistent with our principle to 'consider non-build solutions first. This is explained below.

Changing behaviour, managing demand

Many of the needs can be addressed by changing behaviour to manage the demands placed on infrastructure. These solutions are appropriate where use of the infrastructure is heavy at different times or across particular parts of a network, but much lower at other times or locations or where demand could be avoided or diverted. In other words, these solutions channel the use of infrastructure to its highest value. Rather than building something new and providing additional capacity at peak periods and locations, the intention of these types of options is to shift demand for the infrastructure, either by spreading it more evenly or reducing it overall.

Obviously just telling people to do something differently is not the answer and there can be good reasons why many people choose to use infrastructure the way they do. There is a range of tools available that can provide incentives or disincentives to how people use infrastructure. These include:

- Regulatory changes that enable or prohibit certain choices, such as reducing regulations to open up the use of public spaces, or setting energy efficiency standards for new developments.
- Pricing to influence decision-making, for example pricing of household waste to encourage people to recycle more.
- Providing better information to help people make informed choices, such as real-time information across the public transport network to help people plan their journey.

Getting better use from existing assets

There are many opportunities to manage and operate infrastructure in better, more efficient ways. It's easy to become complacent about how infrastructure functions because it has worked well enough in the past – why fix something that's not broken? Yet as the population grows and changes, how people prefer to access or use a service also changes. Most of the infrastructure Victoria will have in the future is the infrastructure it has now. This means government needs to

be smart about how it manages, operates and maintains the state’s existing infrastructure to ensure it lasts and is responsive to changing needs. Better use of infrastructure means changing the way the asset operates to be more efficient and responsive to user demands. These changes can be achieved through:

- Better coordination and governance processes so an asset can be used for different purposes, such as shared use agreements that allow for joint use of facilities.
- Technological innovations to adapt to changing service delivery models, for example delivering health services through digital platforms to improve access to these services.
- Refurbishments, modifications or whole-of-life maintenance that improves the operation and efficiency of the infrastructure, such as maintenance of school facilities.

Expanding assets or building new ones

Infrastructure Victoria’s guiding principles state that we will consider non-build solutions first, but for many of our needs we know expanding or building assets will be required. Choosing to build new infrastructure is only appropriate when the non-build solutions have been exhausted or found not to be viable. There are two primary responses:

- Expansion of existing infrastructure, such as extending the rail network to high growth areas.
- Building a new asset, where there is no existing infrastructure, or the current assets are unable to meet the projected demand, for example investing in new social housing.

Table 1 provides an indicative list of some of the different tools we considered.

Table 1: Tools that we considered in generating options

	Changing behaviour	Better use	New/expanded assets
Regulation	Y	Y	
Land use and planning controls	Y	Y	
Licensing	Y	Y	
Safety and environmental standards	Y		
Public service delivery and approval processes		Y	
Coordination processes		Y	
Contractual processes		Y	
Subsidies		Y	
Funding agreements		Y	
Economic charging	Y		
Information	Y	Y	
Technological innovations	Y	Y	
Refurbishment of existing assets		Y	
Incremental expansion of existing assets		Y	Y
New assets			Y

Drawing from existing work

The development of the options within this book was not undertaken in a void. There is already a significant amount of work underway across all levels of government and the private sector to plan for Victoria's future infrastructure needs. Many of the options presented here draw upon existing strategies, plans and frameworks, as well as work from other jurisdictions.

For example, Infrastructure Australia's work has been an important input to our options. Appendix 1 provides a summary of Infrastructure Australia's Infrastructure Priority List as it relates to Victoria, along with links to the options Infrastructure Victoria has considered and comments on alignment between the list and the strategy. We have also had regard to policy framework in the *Transport Integration Act 2010* (see Appendix 2: Aligning with the *Transport Integration Act 2010*) and drew from recent transport plans, such as Public Transport Victoria's *Network Development Plan- Metropolitan Rail* from 2012.

Some of these are projects you will be familiar with as they have been raised in previous strategies and plans but have yet to be committed and funded. Others are new, drawing from examples across Australia and internationally, responding to future trends or building on contemporary research.

New options generated through consultation

Following the release of *All things considered*, we consulted with the community and stakeholders about the options, what they supported or opposed, what evidence we had missed, and if they believed any options were missing. In addition to this broad public consultation we also convened two citizen juries to respond to the question: 'What should we do to meet Victoria's infrastructure needs?' Through both channels we received a range of new ideas for options that people wanted to see included in the 30-year infrastructure strategy.

Where we thought an option was within the scope of the strategy (see the next section - *Determining the scope of assessments*) and aligned with the strategic framework these were assessed. In some cases, these suggestions also led us to re-scope existing options.

To read Infrastructure Victoria's analysis of, and responses to, consultation over 2016, the citizen juries' recommendations, and independent reporting from our consultation facilitators, visit infrastructurevictoria.com.au.

Determining the scope of assessments

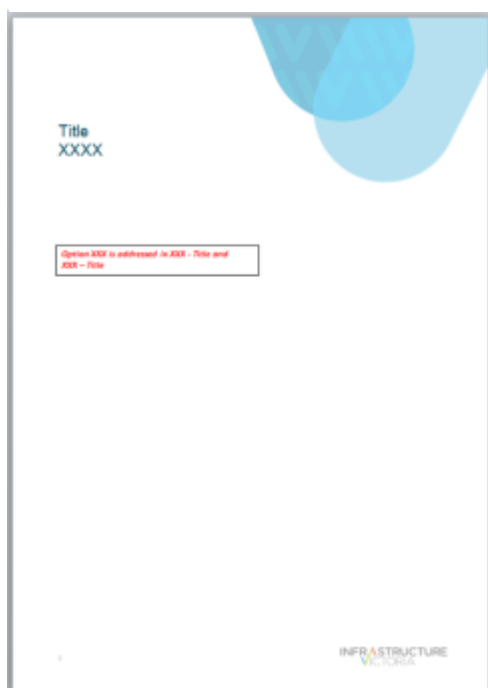
All things considered and version one of the *Draft options book* put 236 options forward for public consultation. These were intended to put a range of options on the table and test ideas with the community and stakeholders early in the process. Preliminary assessments of these options were undertaken by Deloitte/Aurecon and AECOM/PwC. In preparing version two of the *Draft options book*, we conducted a review of all these options to focus the scope of further assessments by AECOM/PwC and consolidate options where this made sense.

Some options were not progressed for further assessment because the link between the option and infrastructure did not seem strong enough. For example, in *All things considered* and version one of the book, we included some options for preventative measures that could minimise demands on infrastructure, such as **Health education programs (HEP)**. However, these did not proceed for further assessment in version two of the book because we determined that the infrastructure strategy could not be a strategy for everything and that such measures, while worthy considerations in the broader policy context, were out of scope.

Other options were not progressed for further assessments by consultants because the evidence gathered in the first stage was deemed to be adequate to draw conclusions on the strength, or otherwise, of an option. For example, some regulatory changes, such as **Active lifestyle regulation (ALR)**, were deemed to be in scope for the strategy, but sufficiently straightforward and low cost as to not warrant further technical assessment.

Finally, some options were bundled with others on the basis that they were very closely related and/or deemed to be very small scale, with only a limited contribution to meeting a need. For example, the option **Social housing flexible use (SHF)** was incorporated into a larger option that looked more broadly at **Public social housing asset management (SHA)**. Where options were merged you will see the template (Figure 2) below to direct you to the option that now addresses this issue.

Figure 2: Merged template



Options assessment

Assessing the options involved consideration of a number of different factors, which are detailed in the following section. We have provided an image of the template alongside the overview of each assessment tool, so you can see at a glance the section we are talking about.

For a limited number of major transport projects, we commissioned additional demand modelling and preliminary cost benefit analysis. As part of Infrastructure Victoria’s research program, we are undertaking research on how cost benefit analysis can be applied more broadly to other sectors and how to better value social and environmental, as well as economic, benefits. Our first paper on this topic, *From evaluation to valuation* was released on 30 November. For our current work, we’ve used the existing cost benefit analysis methodology.

Our approach to options assessment has developed throughout the different versions of the options book. In earlier phases, we applied a filter based on the cost and contribution factors. This provided us with a list of options that we could present as possible solutions to meet the infrastructure needs.

As we further developed the strategy, we augmented this analysis with a more detailed breakdown of the cost and contribution factors and extra assessment tools to look at the different impacts of an option. This allowed for more holistic assessments, as it’s important to consider the options through different lenses to ensure that all impacts are fully captured and understood.

Option type

The option type refers to whether it is about changing behaviour, getting better use or building new/expanded assets, and the means by which this would be achieved. The table on page 14 provides an overview of these categories. Often, options cover more than one of these types or categories.

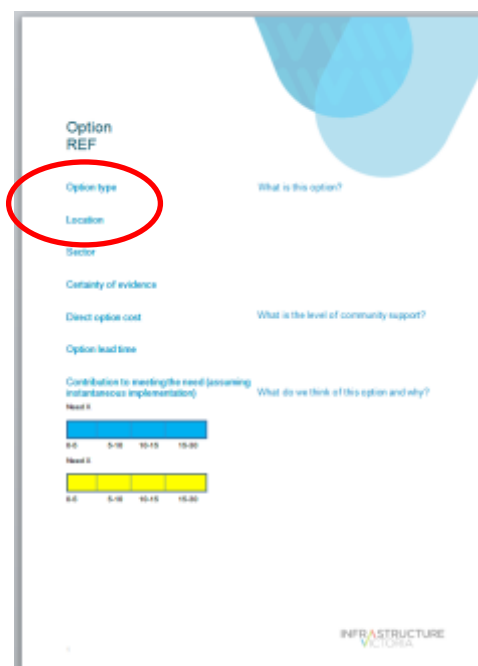
Location

We have looked at the location for where an option would be implemented. At a high level these have been broken down into:

- Statewide
- Melbourne
- Regional and rural Victoria.

For a number of options there is more detailed location information to help understand where an option might have a specific localised impact. For transport options, where they would be located in a specific corridor, we have identified these:

- Melbourne east-west orbital state-significant transport corridor
- Melbourne north-south orbital state-significant transport corridor
- Melbourne north-east state-significant transport corridor
- Melbourne north state-significant transport corridor



- Melbourne Airport – north-west state-significant transport corridor
- Melbourne western state-significant transport corridor
- Melbourne south-western state-significant transport corridor
- Melbourne eastern state-significant transport corridor
- Melbourne south-eastern state-significant transport corridor
- Melbourne southern state-significant transport corridor
- Melbourne City Bypass state-significant transport corridor
- Hume state-significant transport corridor
- West Gippsland state-significant transport corridor
- Melbourne – Geelong state-significant transport corridor
- Melbourne – Ballarat state-significant transport corridor
- Melbourne – Bendigo state-significant transport corridor
- Grampians western state-significant transport corridor.

It's important to remember that while an option might be located in one area its impact can be felt more broadly. For example, an upgrade to a metro rail line can also improve access for V/Line services, and vice versa.

Sector

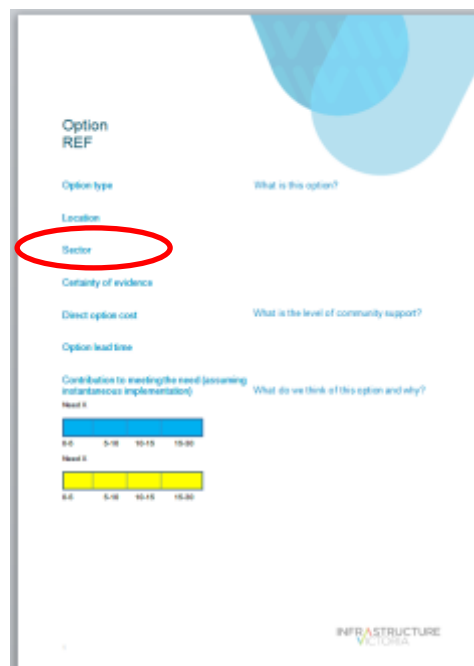
We have indicated which of the nine infrastructure sectors specific options relate to:

- Cultural, civic, sporting, recreation and tourism
- Education and training
- Energy
- Health and human services
- Information and communications technology (ICT)
- Justice and emergency services
- Science, agriculture and environment
- Transport
- Water and waste.

In some cases more than one sector has been identified.

In a few cases, where the option relates to 'all' sectors this has been indicated.

You can search for options by sector on page 57.

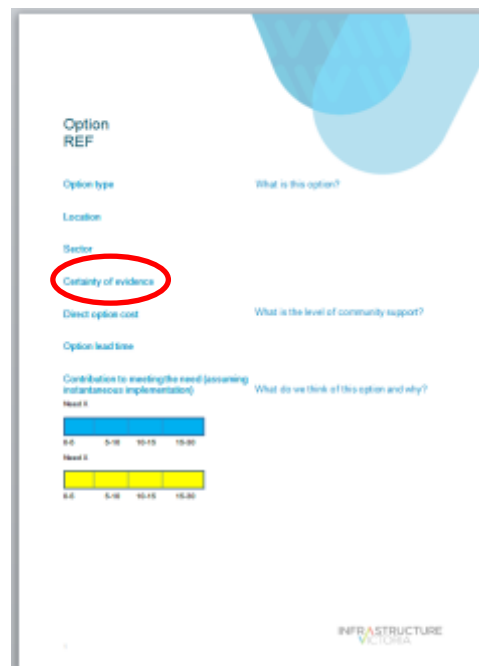


Certainty of evidence

Certainty of evidence indicates how much is known about an option, in particular its scope, cost and benefits. This rating has been used to inform how much confidence or caution should be exercised in considering the assessments, and to determine what we think the reasonable next steps might be to progress an option.

Table 2 - Certainty of evidence classification

Evidence level	Description
Low	General information relevant to the proposed option; policy or project proposals and information discovered during the options generation process.
Medium	Considerable volume of detailed information relevant to the proposed option; preliminary business case or feasibility study with a high level of confidence; must be relatively recent.
High	Full business case, regulatory impact statement or policy proposal including impact assessment; must be relatively recent and include a strong level of confidence in the assumptions made.



The evidence base for the options book draws primarily from three technical reports (summarised in the table below), though you'll see from our assessments that we have drawn on a wide range of sources, including some additional commissioned research.

Table 3: Technical reports

Report	Description
Deloitte/Aurecon, Assessment: 1 Options analysis report	Preliminary assessment of cost and contribution as well as evidence base for options developed in April 2016.
AECOM/PwC, Assessment 2: Economic, social and environmental assessments and option relationship mapping	Preliminary triple bottom line assessments and relationship mapping for options developed in April 2016.
AECOM/PwC, Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy	Assessment of new or further assessment of options that were re-scoped during public consultation. Assessments of options featured in this report supersede assessments of the same options included in the earlier AECOM/PwC report and Deloitte/Aurecon reports.

These reports indicate the certainty of evidence for each option, but in some cases in this book we have indicated a different level of certainty, based on what we know about the option. All of these reports are available at infrastructurevictoria.com.au.

Option lead time

Option lead time indicates how long we expect it would take for an option to be implemented. This is mostly applicable for new build infrastructure projects, which have significant lead times including to design, build and commission the asset into service. Understanding the option lead time is important, when considering cost over time and the relationship between different options and their interdependencies. See ‘How does this option work with others?’ later in this section.

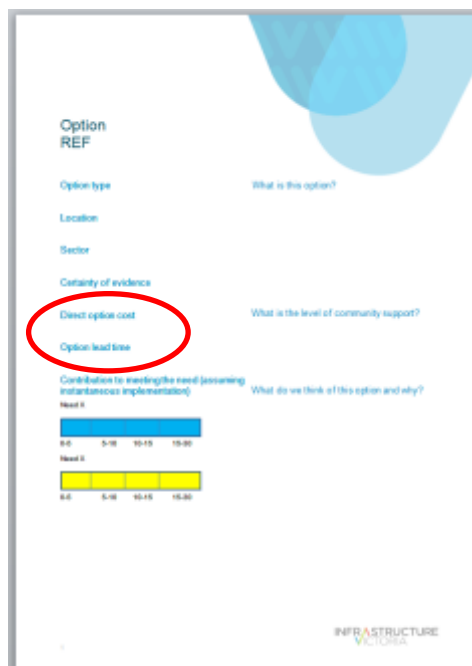
Direct option cost

In keeping with our guiding principle to promote responsible funding and financing (and more specifically, getting value for money), we have included ‘Direct option cost’ in our evaluation (called ‘Whole-of-life cost’ in version one of the *Draft options book*). Direct option cost is defined as the capital or implementation cost of the option, plus the cost to the asset manager to operate and maintain the option for 30 years. It does not include costs to the broader community or businesses. For the purposes of calculating direct option costs, we are currently constraining the ‘entire life’ to a horizon of 30 years. While this will not capture the whole life of some assets (e.g. new tunnels), it provides a consistent basis for comparing options.

Each option has been given a direct option cost range rather than an absolute number to reflect the inherent uncertainty. This also allows us to more effectively compare options over 30 years. The ranges are:

- <\$1 million
- \$1 million to \$10 million
- \$10 million to \$25 million
- \$25 million to \$50 million
- \$50 million to \$100 million
- \$100 million to \$250 million
- \$250 million to \$500 million
- \$500 million to \$750 million
- \$750 million to \$1 billion
- \$1 billion to \$3 billion
- \$3 billion to \$5 billion
- \$5 billion to \$10 billion
- >\$10 billion

In some cases the ranges are broader where the scope of the option is less clear. The direct option cost does not specify which level of government incurs the cost, or if it is incurred by the private sector – either way it is an important consideration. However, our recommendations (‘What do we think of this option?’ section) sometimes propose a scope different to what has been costed. In some cases, the cost of an option has effectively been scaled-down by the recommendation, and will not reflecting the direct option cost shown in the assessment.



This means that the direct option cost often cannot be used as a basis to understand the cost of what has been recommended in the strategy. While we don't always state exactly what we think the appropriate level of investment would be, the 'What do we think of this option?' section is essential reading if you want to understand whether we are recommending full implementation of the option as scoped, a more targeted proposal, or simply that further planning work be undertaken to confirm the way forward.

Direct option costs include:

- Costs to develop a proposal, procure it and manage its implementation
- Construction costs
- Capital-related operating costs needed to run the new service, capability or asset so that it remains fit for purpose over a 30-year lifecycle (e.g. rental or lease payments, running costs such as utilities and maintenance)
- Expenditure required to refurbish or upgrade an asset during its lifecycle (which may result in extension of the lifecycle).

Direct option costs do not include:

- Depreciation expenses
- Most non-infrastructure operating costs (e.g. for a hospital, the cost of the extra doctors and nurses required to deliver the service that this infrastructure enables is not included)
- Costs that will be incurred regardless of whether investment is made or option selected (such as corporate overheads and sunk costs).

The cost considered is the direct cost only, meaning that it only takes into account the cost to undertake the option, but not any secondary effects that arise from undertaking the option. For each reform initiative, where there are likely to be substantial costs beyond the implementation cost (e.g. borne by individuals or businesses), these are outlined in the economic and social impacts sections of our summary assessments as relevant. Many of the broader costs beyond the scope described here are picked up in the economic, social and environmental (ESE) assessment (explained later in this section).

All of the direct option costs are expressed as a real cost estimate (in today's dollars), because to apply a nominal cost estimate (i.e. in dollars of the day for future years) we would have to have pre-determined in which years the option would be implemented – which we couldn't do prior to developing the strategy. It's important to note that converting real cost estimates into nominal cost estimates means these figures would increase – so the actual cost of implementing options will always be higher than what is shown in this document.

The costs for demand or better use options that focus on reform, particularly those which result in changes to the way we use infrastructure including through pricing, are hard to cost in the terms described above. This is because the approach adopted to implement these reforms can result in different costs to government, the private sector and users, which need to be understood separately in terms of their impacts. We have sought to undertake a reasonable assessment of the implementation costs for these options.

It is important to note that the direct option cost relates to the option as scoped and assessed. It does not necessarily reflect the cost of a related recommendation in the strategy.

Contribution to meeting the need

We do not expect that any one option will fully meet each infrastructure need, which is why we needed to think about a broad range of credible solutions and their different impacts. However, we do expect that some options will be more effective than others, which is why our assessments evaluate how well each option contributes to one or more infrastructure needs. This was carried out by using one or more metrics for each infrastructure need against which each option's contribution can be measured.

For all options that progressed for further assessment by AECOM/PwC after the release of version one of the *Draft options book*, which constitute the vast majority of options in this book, contribution assessments were made over time. In many cases, this information is important as some options might make a low contribution to meeting the need now, but may make a significant contribution in the medium to longer term depending upon future trends such as population growth.

In undertaking this further assessment of the contribution, we also revisited the metrics themselves and made minor adjustments where necessary to reflect our better understanding of the needs and underlying data sources. For example, under Need 16, we previously discussed habitat hectare results for Victoria's national parks. We received feedback that this need should be about more than national parks as other areas, such as urban parks and waterways, are also home to Victoria's biodiversity. Therefore we have expanded the metrics to look at increases in the volume and quality of Victoria's natural habitat.

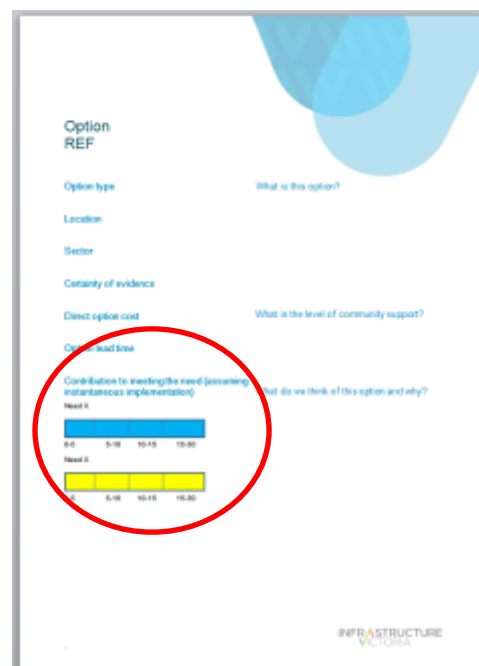
Wherever possible the assessment of an options contribution to meeting a need is grounded in quantitative information about both the metrics and the performance of options against these metrics. However, professional judgement has almost always been required and some assessments have relied on more qualitative information. More detailed information to explain the contribution ratings is available in the Deloitte/Aurecon assessment 1 report and AECOM/PwC assessment 3 technical report.

Understanding contribution over time

Each option has been given a rating in terms of its broad contribution to an infrastructure need (ratings below) rather than an absolute number against the metric. This allows us to more effectively compare options and is appropriate given some assessments are more qualitative.

The contribution ratings are:

- Very low (sometimes listed as negative)
- Low
- Moderate
- Significant.

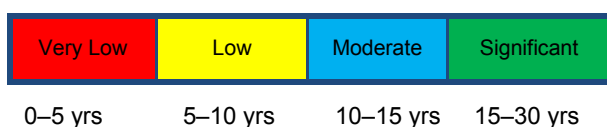


The contribution of most options has been considered over four time periods:

- 0–5 years (2016–2021)
- 5–10 years (2021–2026)
- 10–15 years (2026–2031)
- 15–30 years (2031–2046)

To assess each option’s contribution over time, this contribution was assessed on the basis that it would be fully operational or implemented tomorrow. Some options, particularly large-scale infrastructure options, may have a long construction period, such that they are unlikely to realise their maximum contribution to the needs immediately. However, this approach provides consistency in evaluation across options, and assisted us to determine the appropriate phasing of related recommendations over time.

The contribution rating over time is reflected by the following bar:



For example, **Melbourne airport heavy rail link (MAH)** has an anticipated lead time of 5–10 years, however the contribution assessment in the 0–10 year period reflects the moderate contribution this option would make if it were in existence instantaneously.

Figure 3: MAH contribution rating over time



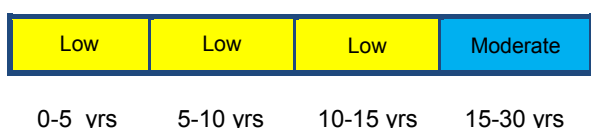
It’s also important to remember that some options meet several infrastructure needs. Therefore, an option might have multiple contribution ratings for the needs it has been assessed against. While an option might not contribute much to one infrastructure need, it may perform much better in relation to another infrastructure need or its contribution might be amplified when combined with another option (the latter point is further explored under *How this option works with others*). For example, an option that has been assessed as low against two needs might be more beneficial than an option that meets one need moderately.

Where an option has been assessed against multiple needs, a different bar will be provided for each need, except where the contribution rating is the same over time.

For example, **City Loop reconfiguration (CLR)** has been assessed across two needs and receives the same contribution rating over time, so this is shown as:

Need 1: Address infrastructure demands in areas with high population growth; and

Need 10: Meet growing demand for access to economic activity in central Melbourne



If an option has been assessed against three or more needs, the top three are shown on the template and the remainder will be in the technical reports.

The primary metrics used for each infrastructure need can be found in the table below.

Table 4: Metrics used to assess contribution to meeting infrastructure needs (Stage 3 assessment report by AECOM/PwC)

Number	Need	Metric
1	Address infrastructure demands in areas with high population growth	<ul style="list-style-type: none"> Ability to improve access to services or increase service capacity for high growth areas
2	Address infrastructure challenges in areas with low or negative growth	<ul style="list-style-type: none"> Ability to optimise infrastructure delivery while maintaining or improving service delivery within low growth areas
3	Respond to increasing pressures on health infrastructure, particularly due to ageing	<ul style="list-style-type: none"> Improvements in access to health services Increase in efficiency of health services
4	Enable physical activity and participation	<ul style="list-style-type: none"> Increase in access to infrastructure to encourage physical activity Increase in physical activity rates
5	Provide spaces where communities can come together	<ul style="list-style-type: none"> Improvements in perceived access to and quality of open and community spaces Increase in arts participation and attendance
6	Improve accessibility for people with mobility challenges	<ul style="list-style-type: none"> Improvement in user experience of mobility challenged people accessing transport and social services infrastructure Proportion of infrastructure that is accessible for mobility challenged people

Number	Need	Metric
7	Provide better access to housing for the most vulnerable Victorians	<ul style="list-style-type: none"> • Reduction in housing stress for lower income households in the rental market • Reduction in average waiting time of people on the social housing register waitlist • Ability to provide homeless people a pathway into housing
8	Address increasing demand on the justice system	<ul style="list-style-type: none"> • Increase in efficiency of justice system • Reduction in demand for justice services
9	Provide access to high-quality education infrastructure to support lifelong learning	<ul style="list-style-type: none"> • Increase in overall education asset utilisation • Increase in education participation
10	Meet growing demand for access to economic activity in central Melbourne	<ul style="list-style-type: none"> • Increase in supply or management of demand for transport system capacity to accommodate journeys to and from the central city • Improvements in transport performance across the network to access central Melbourne
11	Improve access to middle and outer metropolitan major employment centres	<ul style="list-style-type: none"> • Increase in supply or management of demand for transport system capacity to accommodate journeys to and from middle and outer major employment centres • Improvements in transport performance across the network to access middle and outer major employment centres
12	Improve access to jobs and services for people in regional and rural areas	<ul style="list-style-type: none"> • Increase in supply or management of demand for transport system capacity to accommodate journeys to and from major employment centres and service centres in rural and regional areas • Improvements in transport performance across the network to access to jobs and services in rural and regional areas • Improvements in ICT connectivity in rural and regional areas
13	Improve the efficiency of freight supply chains	<ul style="list-style-type: none"> • Reduction in cost of the total freight task (origin to destination)

Number	Need	Metric
14	Manage threats to water security, particularly in regional and rural areas	<ul style="list-style-type: none"> Reduction in vulnerability of water supply systems to water shortages, that is, supply is sufficient to meet minimum levels of service agreed with water users Increase in the efficiency of irrigation delivery systems Increase in total water available for non-urban water users
15	Manage pressures on landfill and waste recovery facilities	<ul style="list-style-type: none"> Improvements in waste generation and/or re-use/recycling per capita Ability to address forecast future demand for waste infrastructure
16	Help preserve natural environments and minimise biodiversity loss	<ul style="list-style-type: none"> Increase in the volume and quality of Victoria’s preserved natural habitat Reduction in indigenous biodiversity losses
17	Improve the health of waterways and coastal areas	<ul style="list-style-type: none"> Increase of waterways in good or excellent condition Improvements in coastal water quality
18	Transition to low carbon energy supply and use	<ul style="list-style-type: none"> Reduction in Victoria’s greenhouse gas emissions
19	Improve the resilience of critical infrastructure	<ul style="list-style-type: none"> Increase in the resilience of critical infrastructure to disruptions Increase in the resilience of critical infrastructure to climate change

Further information on how these metrics were developed is contained in the *AECOM/PwC Assessment 3 technical report – supplement A*.

For some needs, there is more than one metric. We have applied metrics only where they are most relevant to the option. Therefore under Need 17 if an option only has an implication for waterways, but not coastal areas, we have only looked at its impact on the first metric about increasing the number of waterways considered to be in good or excellent condition. For a selection of large transport options, we have undertaken additional assessments using transport modelling, which has provided an alternative view on the contribution of options to the needs. This was prepared with a different method and scale to the contribution assessment described here, but provided useful further input. You can read more about this work in KPMG/Arup/Jacobs ‘*Economic appraisal and demand modelling*’ report 2016.

If you are interested in more detail about the needs and metrics, and how we arrived at these metrics, we encourage you to read the technical reports at infrastructurevictoria.com.au.

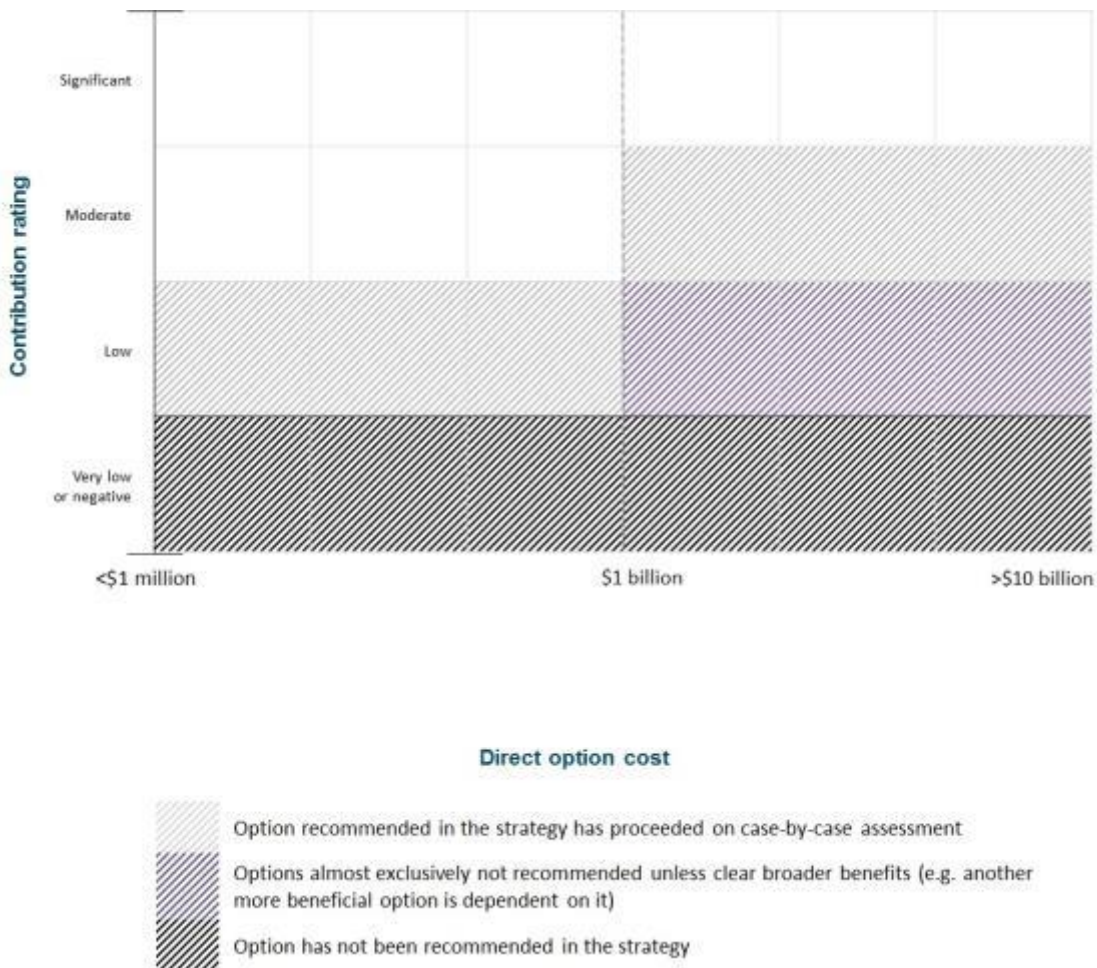
Our expectation is that options that cost more to deliver should make a greater contribution. On the basis of their contribution rating and direct option cost, options that make a very low or negative contribution to meeting the need across all time periods have not been recommended (unless they performed better against other needs).

Those options that make a low contribution and are of high cost have only been recommended in the strategy if there is evidence that the option will provide broader benefits to warrant that investment, for example, where the option’s complementary relationships with other options were strong.

In some cases, we have recommended options for future planning and investigations (e.g Driverless freight vehicles) because while the assessments were very low across all time periods, further work needs to be done.

Figure 4 provides a visual representation of how this has been applied.

Figure 4: Considering cost and contribution



It is important to note, however, that the contribution of an option to meeting the need may not directly align with the contribution of a related recommendation. Where options have been recommended in part or in a scaled-down form, we could expect the contribution to be lower, but so too would the cost.

What is the level of community support?

Assessment of community support has been drawn from feedback we have received through a range of consultation channels during the options and draft strategy consultation phases. This has included formal submissions, online responses, meetings and roundtables, as well as the recommendations made by the metropolitan and regional citizen juries. We also undertook community research on a select number of options. The findings from these surveys are included where relevant.

We have made a quantitative assessment of the level of discussion of the option as either 'high', 'moderate', or 'limited to no' discussion. For those with high or moderate, we have noted whether responses were generally positive or negative, or if there were polarised views. It didn't seem appropriate to attempt to make a call about whether an option was perceived positively or negatively when only a few submitters engaged with the options.

The image shows a survey form with the following fields and sections:

- Option REF
- Option type
- Location
- Sector
- Certainty of evidence
- Direct option cost
- Option lead time
- Contribution to meeting the need (assuming instantaneous implementation) - includes a blue bar chart with a scale from 0.0 to 15.00.
- What do we think of this option and why? - includes a yellow bar chart with a scale from 0.0 to 15.00.
- A red circle highlights the question: "What is the level of community support?"

It is important to note that our assessment of community support is based on what we've heard through our consultation channels. The level of community support is therefore only reflective of the views of those who participated in these channels, and the context in which the option was presented. For example, consultation on the draft strategy focused on the recommendations and related options. Therefore an option that was not recommended, such as the **Flemington racecourse rail line activation (FRA)**, received limited discussion. This is the assessment of community support in the context of the strategy, and should not be considered representative of broader community views.

Community and stakeholder feedback has been integral to the development of the 2016 strategy. It has not simply been about the level of support but also the additional information and evidence that have been provided to assist us to refine the recommendations and finalise the strategy.

What we think of this option and why

Each of these sections starts with a statement about how these options have been treated in the strategy: Whether an option has been recommended, recommended in part, or not recommended. This reflects how we thought about the option in developing the recommendations (see *Forming recommendations* on page 39). We then discuss our rationale for arriving at this position drawing on the different assessments detailed in the template.

When you look through what we think of an option and why, you will see some different responses, including:

- **This option was recommended in the strategy (ref. X.X.X).**

We've used this for options that we firmly believe are good ideas and should be pursued, and where our recommendation broadly matches the scope of the option as assessed.

- **This option was recommended in part in the strategy or This option was recommended in a scaled-down/scaled-up form in the strategy (ref. X.X.X).**

In some cases we have only recommended part of an option, or a scaled-down or scaled-up version of the option. This is where we have considered the recommendations in their totality in the strategy and considered how the recommendations should be balanced across different needs and sectors.

- **This option was recommended for further investigation in the strategy (ref. X.X.X).**

This indicates we believe there is merit in an option, but do not have sufficient evidence to recommend it be implemented, therefore we have recommended further work be undertaken.

- **This option was not recommended in the strategy.**

Where we believe an option is not viable we have been firm in stating this is not recommended. However, where we can see the merit in an option we do point this out, so it's clear that we are not saying it should never proceed – just that we haven't recommended it.

Where you see the 'ref.' followed by a number, this reference relates to the recommendation number (or numbers) in the strategy. This will help you to better cross-reference options to recommendations and vice versa.

The image shows a template for an options assessment. It includes the following fields and sections:

- Option REF**
- Option type** (with a question: "What is this option?")
- Location**
- Sector**
- Certainty of evidence**
- Direct option cost** (with a question: "What is the level of community support?")
- Option lead time**
- Contribution to meeting the need (assuming instantaneous implementation)**
 - Need 1: A blue progress bar with markers at 0.0, 5.0, 10.0, and 15.00.
 - Need 2: A yellow progress bar with markers at 0.0, 5.0, 10.0, and 15.00.
- What do we think of this option and why?** (This field is circled in red in the image.)

The Infrastructure Victoria logo is visible in the bottom right corner of the template.

What are the economic, social and environmental impacts of the option?

Each option has been evaluated on how it can influence a broad set of economic, social and environmental (ESE) indicators. This presents us with a preliminary understanding of the macro impacts of each option regardless of the need(s) it contributes to, which we can then compare against other options.

The ESE indicators we have used in our assessment are provided in the table below.

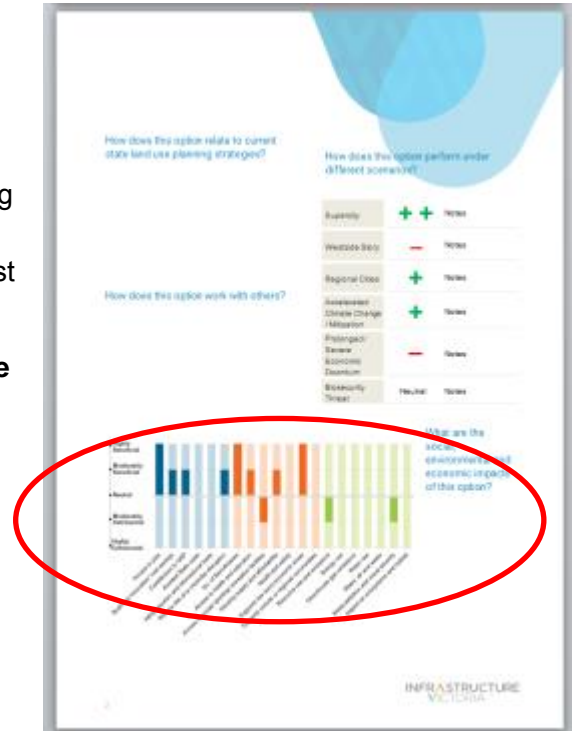


Table 5: ESE assessment criteria

Economic	Social	Environmental
<ul style="list-style-type: none"> • Access to jobs • Business cost savings • Contribution to gross state product • Avoided costs to the state • Degree to which an option is likely to attract additional tourists or generate additional international trade • Reduce risk of or minimise disruption 	<ul style="list-style-type: none"> • Number of beneficiaries • Access to education • Housing supply and affordability • Health and safety • Access to culture/sporting/recreation facilities • Supports low socio-economic areas • Supports remote or regional communities 	<ul style="list-style-type: none"> • Resource use • Energy use • Greenhouse gas emissions • Water use • Water, air and waste • Noise pollution and visual amenity • Impact on ecosystems and habitat

These indicators are of a different nature to the metrics discussed earlier, which focused purely on how well each option contributed to the relevant need(s).

The option is measured by its ability to influence these indicators and given one of the following scores against each economic, social or environmental indicator:

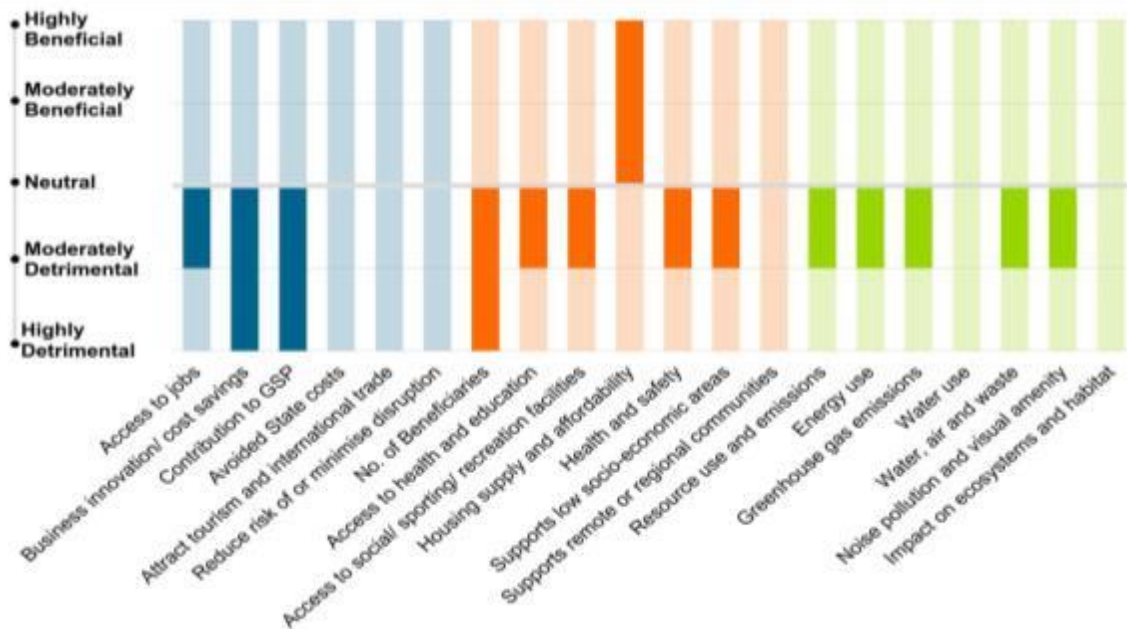
- Highly beneficial
- Moderately beneficial
- Neutral
- Moderately detrimental
- Highly detrimental.

An overview of the ESE impacts is included in the summary assessment for each option.¹ This has been informed by technical documents, which are available at infrastructurevictoria.com.au. The technical documents include each option’s assessment against the economic, social and environmental indicators, and the supporting methodology.

Each option has been assessed based on its direct outcomes – those things that it will have a direct impact on. Where an option enables other ‘secondary’ outcomes, these have been identified in as part of risks and opportunities (see the discussion later in this section on *Additional information*) but not assessed as part of the ESE analysis.

For example, **Central city job cap (CCJ)** has been assessed as improving housing supply and affordability as some people may choose to follow employers to new locations, thus potentially more evenly distributing demand for housing across the state. However it does have a number of highly detrimental impacts including constraining economic activity in the central city, which has been a key area for economic growth and development in Victoria over the past decade, and imposing additional costs on business for operating in their desired location.

Figure 5: CCJ – ESE assessment



Our expectation is that options should produce positive ESE impacts, and limited detrimental net impacts.

¹ There are a small number of options which have not had an ESE assessment.

How does this option relate to current state land use planning strategies?

Integration of land use and infrastructure planning is one of our guiding principles.

The key land use planning strategies for Victoria are *Plan Melbourne* and the eight *Regional Growth Plans*. Together these plans set the planning vision for Victoria. They bring together a range of land use policies, strategies and actions, which include the provision of infrastructure or influence infrastructure use and location. We have assessed how our options align with these planning strategies.

The strategy has been prepared prior to the release of the refreshed *Plan Melbourne*. We have assessed our options against *Plan Melbourne 2014* and where possible, the *Plan Melbourne refresh discussion paper* that was released in 2015. We anticipate there will be greater opportunities to align land use and infrastructure planning in future.



For each option, we have categorised options according to their alignment with *Plan Melbourne* and the *Regional Growth Plans*:

- **Consistent:** Consistent and aligns with overarching and detailed directions.
- **Contributes to implementing policy:** Contributes to achieving overarching policy objectives.
- **Not consistent:** Proposes an alternative outcome to the policies, objectives and actions in the land use plans.
- **Not applicable:** Does not relate to an objective or action in the land use plans. In many cases, this is because the plan is silent about this issue.

The *Plan Melbourne refresh discussion paper* has a number of options for discussion. These options intend to strengthen the focus of *Plan Melbourne* on housing affordability, climate change and energy efficiency and some options are different ways of achieving similar outcomes. A refreshed *Plan Melbourne* will be informed by community and stakeholder feedback on the discussion paper. We have made the distinction between the options under consideration in the discussion paper and adopted government policy in our assessment. In reflection of this assessment, options addressed in *Plan Melbourne refresh discussion paper* are categorised as:

- **Relates to key point/option for discussion:** Identified for discussion in the refresh document.

Understanding the relationship between our options and these state planning strategies, and whether the options are consistent or not, is an important consideration. If an option proposes a significant shift from an action or an overarching objective we have highlighted why and the rationale for diverging from the existing land use plans. For example, **Nuclear power plant construction (NPC)** is not consistent with state planning policies that favour renewable energy supply. However, it was assessed as an option because it is zero emissions and is relevant to meeting the need to transition to a low carbon energy supply (Need 18).

The classification of an option as 'contributes to implementing policy' highlights a positive contribution, whatever size that may be, to achieving policy objectives. This is a particularly low bar, and options which have been identified as contributing could make a very small but positive contribution.

In most cases we grouped our assessment of the *Regional Growth Plans*. This made sense as there was general consistency across the plans with a number of shared themes. For example, all plans addressed local and regional transport, the use of existing infrastructure, new housing and services and protecting and enhancing the environment. If a *Regional Growth Plan* objective or policy intent was inconsistent with our option, we have identified this and noted how it is different from our options.

How does this option work with others?

We looked at the relationship between options in terms of how they might enable, substitute, complement or inhibit one another in advancing one or more of the needs.

Options were treated as individual projects as per the description provided. Any complementary, enabling, dependent and either/or relationships between options were not considered in cost estimation, contribution assessments or ESE ratings.

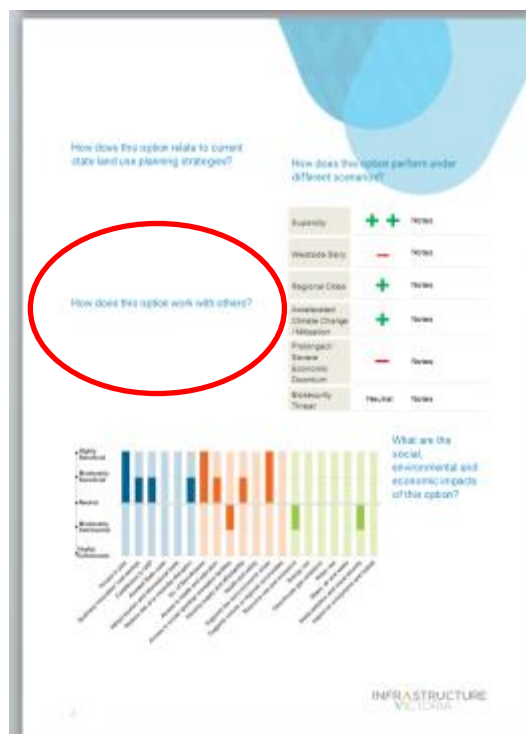
Without this assessment, there is a risk that options selected could work against or undermine one another, or even create further problems, rather than solving the intended problem in a coherent and an efficient way. The assessment indicates where options are:

- **Dependent:** Where an option might be dependent on another being in place before it can commence.
- **Complementary:** Where two or more options have greater benefits together as they might be mutually reinforced, produce a compound benefit, or mitigate a risk associated with one another.
- **An alternative:** Where one option can replace another in terms of addressing a need.
- **An enabler:** Where one option increases the viability of a second subsequent option, but they are not necessarily dependent upon one another.

For example, **National park asset management (NPP3)** and **Park pricing and expenditure regime (NPP1)** are complementary options as in combination they provide the foundation for a funding and accountability framework to enable better management of parks.

This work has informed the development of timeframes for and sequencing of our recommendations.

Where relevant, relationships between options may also be identified in the 'Risks and opportunities' section in *Additional information*.



How does the option perform under different scenarios?

The future is uncertain. For this reason we have identified a number of alternative future scenarios for the next 30 years to ‘stress test’ the options in terms of how they could strengthen Victoria’s resilience in the face of potential future challenges.

The alternative scenarios described below were selected because they represent a range of ways in which Victoria’s infrastructure could be plausibly tested in future decades. In this respect the list should not be seen as exhaustive. Nor do these scenarios represent our thinking on what is likely to happen in the future, or more likely to happen than other scenarios.

The scenarios have *Victoria in Future 2016* projections for 2046 as their base case in terms of the size and distribution of population and employment. All the scenarios share the same technological assumptions, e.g. availability of more advanced ICT, such as driverless vehicles.



Supercity

Due to continued very high migration and strong economic growth (driven particularly by a thriving central city), greater Melbourne’s population experiences higher than expected growth over the next few decades, but with similar development patterns as today – a mixture of consolidation at the centre, polycentric development and lower density sprawl at the periphery. The population of Melbourne in this scenario would be around 20 per cent higher than the base case.

Westside Story

Melbourne is rebalanced to the west and the north, with high population growth driven by high migration levels and strong economic growth. The west and north of Melbourne offer an affordable lifestyle, with more intensive housing growth out to the outer west but with strong growth in jobs also in employment clusters in Footscray, Sunshine and Werribee East. Nonetheless, a thriving central city remains a strong focus for employment for many in the west. The population of Melbourne in this scenario would be around 10 per cent higher than the base case.

Regional Cities

‘Sea/tree change’ shift to regional cities driven by high levels of congestion in Melbourne (driven by population growth 10 per cent above base case) and enabled by technological advances (such as ICT and driverless vehicles). This reduces the feeling of distance between regional cities and Melbourne, but also presents growth challenges for the regional centres.

- Accelerated Climate Change/Mitigation** Climate change is tracking higher than had been hoped for earlier in the century, resulting in increased weather volatility (floods, storms, and heatwaves) and increased migration to Victoria of climate refugees. In response, stronger efforts have been made to mitigate these impacts and de-carbonise the economy via a carbon price mechanism.
- Prolonged/Severe Economic Downturn** External events, possibly of a geopolitical nature, have either (1) constrained an otherwise expected Asian economic boom or (2) severely constrained Victoria’s ability to take advantage of this boom, with strong decline in demand for Victorian products and services within Asia. The population of Victoria under this scenario would be lower than the base case, mostly due to lower immigration levels.
- Biosecurity Threat** Whether by ill design or accident, a contagious disease outbreak has occurred in Victoria, seriously incapacitating a significant proportion of the population for an extensive period. While this would be a major disruption, it is assumed not to affect long-term population growth (i.e. population of Melbourne and Victoria is the same as the base case).

The options have been rated according to whether, compared to our assumptions for the 30 years to 2046, they become more or less important under each of the above scenarios, and where they might even be critical to avoid general system failure under that scenario. This is not an assessment of the general value of the option (which is captured in the economic, social and environmental assessment), only an assessment of whether its importance increases or decreases under any of the scenarios.

Options where a potential positive impact is contingent on the application of another key condition (including other options), or which could potentially be counter-productive, are also identified.

Table 6: Scenario analysis

Strong impact	++
More Important	+
No impact	Neutral
Less Important	-
Counter-productive	e.g. Negative impact unless demand is managed

Commentary on these ratings is provided alongside.

These ratings are qualitative, but provide us with a sense of how options may become more or less important in the future if things change. For example, we currently think **Recycled wastewater for drinking (RWW)** could reasonably be considered in the latter part of the 30 year period. However, under an accelerated climate change scenario this option will become more critical. It is important to be aware of this uncertainty as we will need to revisit the scenarios in future updates of the strategy to determine which options may need to be reconsidered and when.

Why are there port scenarios for some options?

At some point in the future, it is likely that Victoria will need a second container port. The decision about when and where to locate a new port will have a significant impact on land use, and how Victoria's freight and transport systems work. At this stage, we think a final decision about a second container port will need to be made in the second half of the 30 year strategy period. Infrastructure Victoria is preparing advice for the Special Minister of State about Victoria's future commercial ports capacity. This will be completed by May 2017. In the interim, we have tested a number of the options based on how they might interact with a government decision to locate a port at either Hastings, or 'Bay West' (a site along the north-western shore of Port Phillip Bay, somewhere between Point Lillias and Point Cook), recognising the important role of ports as gateways for national and international supply chains. The list of options we tested against these two scenarios is not exhaustive – we have selected the options mostly likely to interact with the site for a future port.

Port of Hastings

Under this scenario, the government has decided to build a second container port somewhere near the existing Port of Hastings. Locating a new container port in the south-east means there is a significant increase in truck movements along the Westernport Highway and Peninsula Link. The new port is also seeking rail access, which will require corridors that connect to the current freight network. To take advantage of the new port, there has been a significant increase in the volume of freight and logistics business looking to locate in south-east Melbourne.

Bay West

Under this scenario, the government has decided to build a second container port on the north-western shore of Port Phillip Bay, somewhere between Point Lillias and Point Cook (25–50 km south-west of Melbourne). Locating a new container port in the south-west means there is a significant increase in truck movements along the M1 freeway. The new port is also seeking rail access, which would connect to the Werribee/Geelong standard gauge freight line. To take advantage of the new port, there has been a significant increase in the number of freight and logistics businesses looking to locate in the west of Melbourne.

Additional information – the ‘Page 3’

The majority of options have a third page (and often more) that outline additional information that could not be included in the preceding pages of the template or that explains some of our broader thinking of the option.

This includes continuations of the ‘what is this option?’ and the ‘what do we think of this option and why?’ sections at the top of the page (if required).

It also includes one or more of the following:

Risks and opportunities: There are a number of implementation risks that we need to be aware of even as well as a number of opportunities that may go beyond the purpose for which the option is intended. We have sought to capture these for options that have undergone additional assessment.

This is not intended to be a holistic risk and opportunity assessment, but a high-level scan for the most material issues. We have captured risks and opportunities in the summary assessments and in the technical reports.

Funding: For major projects, policies and reforms with a significant cost to government that have been recommended in the strategy in some form or other, we have provided advice on a range of potential funding mechanisms for the option. **It is important to note that the funding advice in this book relates to the option as presented. Our funding recommendations can be found in the strategy and relate to recommendations.** Further detail on funding and financing is provided on page 44.

Additional notes: A section for any additional notes explaining, for example, changes from the draft to the final strategy or changes in the option’s scope resulting from consultation. In addition, we have provided details on the next steps and some important case studies for consideration. In some cases this section is extensive, and captures much of our thinking on an option or the evidence base, e.g. transport modelling.

Evidence base: Provides a summary of the evidence we have drawn upon in these assessments, in particular the technical reports by Aurecon/Deloitte and AECOM/PwC. The technical reports also detail additional evidence sources that underpinned the assessment work. In a few cases, business cases or feasibility studies might be referenced here. This is not intended to be an exhaustive list, as you’ll see further evidence cited in the technical reports and the strategy itself.



Forming recommendations

The detailed assessments of each option outlined above were the primary inputs for determining what was and wasn't recommended in the strategy. Forming strong performing options into recommendations to government also involved answering the following questions:

a) Given the role of state government, what advice could we reasonably give to Parliament?

In some cases, we looked at options and determined that there was only a limited role for state government. Recommendations were thus tailored to focus on what state government could reasonably be expected to do (noting, however, that working in partnership with other levels of government and private and community sector organisations would often be required to achieve the best outcomes).

b) What were we telling government to do differently? To change policy or regulatory settings, to introduce a systemic reform, to spend more on infrastructure, including specific major projects, or to spend more wisely on infrastructure?

There are a number of things we are assuming that state government will continue to do regardless of what is in the strategy, such as building new schools to meet demand. We have not made recommendations about what government should continue doing, but what it should do differently. In some cases, options (or components thereof) were deemed to be largely business as usual, so were not recommended.

c) What was the optimal timing and the logical next steps for implementing a recommendation (noting that all major projects should be subject to a business case)?

Providing clear and workable recommendations to government, particularly over a 30-year horizon, meant being specific about timing and next steps. Often, this meant elaborating on options to provide a pathway for implementation.

d) Had anything changed in the policy environment since an option was developed that would make it redundant?

During the strategy's development, government has made a number of announcements of projects or initiatives which has meant some options are no longer relevant. Where this occurred, options were deemed to be 'base case' and not recommended. This aligns with the point above that the strategy is aimed at telling government what to do differently.

e) Did any of the options seem too far out of scope for an infrastructure strategy?

We have been conscious not to recommend options where the link to infrastructure is unclear/remote or where the scale is too small/local. As discussed earlier, many of the options that fell into this category did not progress for further assessments following the release of version one of the *Draft options book* or were bundled in with other options.

f) How certain were we of the evidence and what could we say with confidence?

In some cases, the supporting evidence for an option was just not strong enough to make a recommendation. There were too many unanswered questions and potential for unintended consequences. In others, we were confident that action would be needed, but did not have enough certainty to make a firm recommendation. For this reason, the strategy includes a small number of recommendations for further investigation.

At times, in answering these questions, the recommendations shifted away from the underlying options that had been assessed. For example, the strategy includes a recommendation about developing a stronger evidence base and more transparent decision-making processes for investments in community sport and recreation facilities (refer to Recommendation 4.3.2). However, the underlying option for this recommendation, **Sport and recreational facility strategic investment (SRF)**, also included a costed program of upgrades and building, which was not recommended. This is not intended to imply government should stop supporting these facilities, but the recommendation focused on what government should do differently, in other words, not spending more money in this area, but allocating the money it does spend more wisely.

Balancing recommendations

Once the recommendations for each need had been formulated, we looked at how they could be balanced across the strategy. This involved analysing the breakdown of types, need/sectors and geographic areas, and considering broad cost implications.

For the most part, this analysis revealed that the recommendations were reasonably balanced, though some needs and their associated sectors were overrepresented. We considered whether this was an accurate reflection of the infrastructure need and scaled back or refocused some recommendations in response.

Type

In terms of type, around 45 per cent were behaviour change/better use solutions and around 35 per cent new/expanded asset solutions. The remainder were recommendations for better planning/prioritisation of capital works and further investigation of some reforms and projects.

Under each need, recommendations related to behaviour change/better use and new/expanded assets are presented together. This recognises that non-build and build solutions are both important in planning for Victoria's infrastructure future. It also recognises that they are deeply interrelated.

Needs and sectors

The balancing exercise also showed that some needs and their associated sectors, such as transport and health and human services (mainly housing), were overrepresented, particularly in terms of the potential capital cost of recommendations to government. On this basis, some recommended programs of work were scaled-down or refocused. This was not a process of sorting the 'bad' from the 'good'; it was a process of sorting the 'good' from the 'better'. In the end, transport and health and human services still feature strongly in the strategy, which is appropriate given the scale of the need and state government's strong role in these sectors.

Geographic spread

The vast majority of recommendations, around 70 per cent, had broad applicability across the state and were not specific to one area of region. Of the remainder, the split was around 20 per cent metropolitan and around 10 per cent regional and rural, which is appropriate, given the size and spread of population growth in Melbourne. Even then, there is significant cross-over in terms of the impacts of these recommendations.

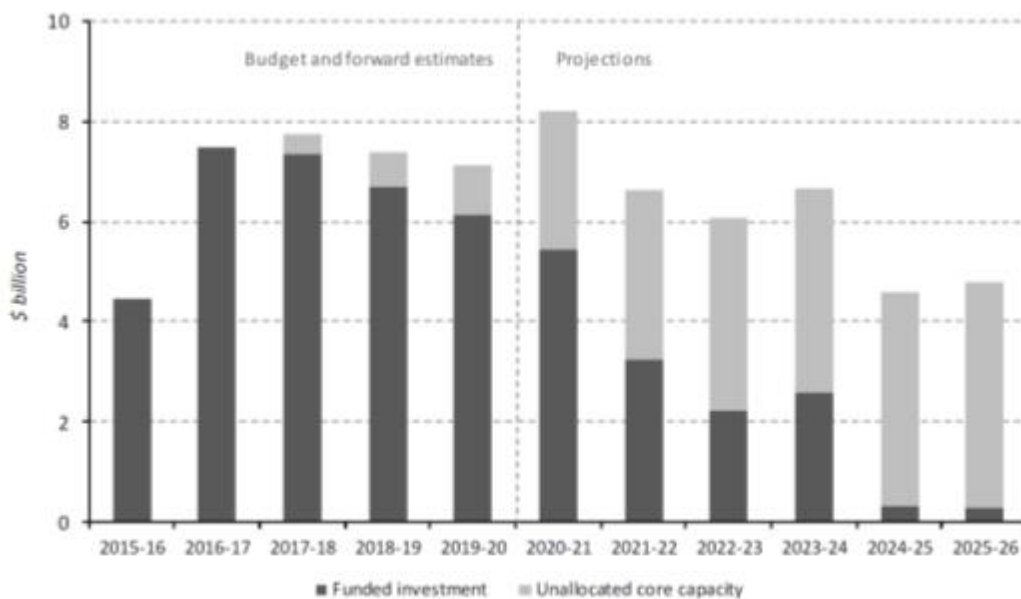
For example, the option for the **Wallan rail electrification (WRE1)** proposes to extend the electrified metropolitan rail network and will give greater access to the new growth areas in Melbourne’s north through additional services to Seymour, Wallan, Upfield and Craigieburn. As a result these growth areas will be taken off the regional services to Seymour, Shepparton and Albury-Wodonga. The scope also includes the reactivation of the Somerton link, which will enable regional services to run down the Upfield line, rather than the Craigieburn lines leading to better reliability on this more lightly used rail corridor. This may also allow for additional regional services as the Craigieburn line is reaching capacity.

Funding considerations

It is important to emphasise that when we considered the broad cost implications of recommendations, we did not attempt to fill a certain funding envelope. The strategy is not a budgeting exercise and, ultimately, government is responsible for prioritising spending on infrastructure.

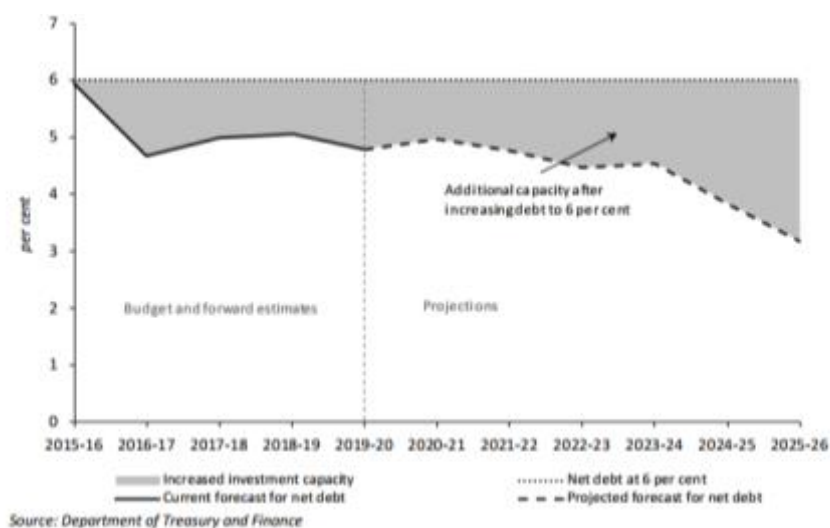
We did, however, do a sense check of our recommendations against the capacity for capital spending on infrastructure over the next ten years should net debt be maintained at around six per cent of gross state product (GSP), as outlined in the *2016-17 Victorian State Budget (Budget paper 2: Strategy and outlook)*. As you can see from Figure 6 and Figure 7, limited funding capacity is available over the next four years, but this is expected to increase over time.

Figure 6: Government infrastructure investment



Source: Department of Treasury and Finance

Figure 7: Investment capacity from increasing general government sector net debt to six per cent of GSP



This exercise resulted in the timings of some high cost recommendations being pushed back, particularly from the 0-5 year period covering the forward estimates when a large proportion of spending has already been committed.

We also looked at ways that government could source funding for major projects, policies and reforms, such as beneficiary and user charges.

Opportunities for accelerating recommendations

In developing the strategy, we were cautious not to set unrealistic expectations about what could be achieved and when. But we know circumstances can change and should there be capacity to bring forward delivery of any of our recommendations, there are many worthy candidates.

We undertook an assessment of all capital projects recommended for completion in the 5-15 year period to see if any could be brought forward to the 0-10 year period and all capital programs identified for delivery within 15 years to see if they could be rolled out faster or expanded. We also considered recommendations for further planning/prioritisation.

To pass the first hurdles, there had to be no major barriers to earlier delivery (such as long lead times or critical dependencies) and no opportunities to address the same problem by changing behaviour or better using existing assets. For example, many stakeholders called for **Melbourne Airport rail link (MAH)** to be brought forward, but our recommendations to improve the bus service (**Melbourne Airport bus dedicated road priority - MAB**), combined with advanced traffic management systems (**ATM**), the capacity provided to this corridor through the delivery of the Citylink Tulla Widening project, plus relief to this corridor from **North East Link (NEL)**, means that this high cost new asset is not required until the longer term.

We then posed a number of questions to determine how the recommendation might have fared had there been no constraints or had different aspects of our original assessment been emphasised over others:

- Does our evidence suggest this project/program will make a contribution to meeting the needs at an earlier time than our recommendation proposes?
- Could this project/program become more important under an alternative future scenario (e.g. different population distribution)?
- Could bringing forward this project/program assist in supporting improved land use development outcomes, such as more compact urban form?
- Does this project/program have dependent recommendations which could deliver a better outcome if this were accelerated?
- Does this project/program enjoy particular community support that would make earlier delivery more feasible?
- Is this a particularly low cost proposal (or for programs, comprises particularly low cost components), with a broad range of benefits?
- Could this project/program address an existing maintenance deficit?

Any recommendations with a positive response to the last two questions were prioritised for acceleration, as were those which met with positive responses across a majority of questions. We then grouped 'high performers' into themes, as set out in the strategy on page 217 (not in this book).

Funding and financing

We've looked at how major projects, policies and reforms could be funded. There is no silver bullet for raising all the revenue needed to fund all the infrastructure wanted by the community. General government revenue, which primarily comes from taxes, will continue to be a major source of funding for infrastructure. But continuing to increase general government revenue at all levels of government has consequences for Victoria's economy and community. Given the high cost of delivering infrastructure, the varying degrees to which different people benefit from the same piece of infrastructure and high public expectations of what will be delivered, government also needs to prioritise investment within available resources and consider alternative funding mechanisms.

Funding and financing are separate concepts that affect how Victorians use infrastructure:

- **Funding is all the revenue needed to pay for infrastructure.** It ultimately comes from the community through existing cash surpluses; increasing revenue (which means the community pays more via taxation), direct user charges or reducing government expenditure on services.
- **Financing affects when the government pays for infrastructure.** Government can finance using cash surpluses now, or by borrowing (which is needed to service and repay later). Debt is a financing tool, not a funding source.

It is important that government considers funding and financing for projects on a case-by-case basis to ensure value for money of the project and to balance the public policy objectives government wants to achieve, such as economic, social and environmental objectives.

In the strategy, our advice focuses on funding mechanisms only. This is because decisions on financing are typically determined when government procures infrastructure, which is after it has already decided to fund a project. Borrowing or raising debt is a financing instrument, not a funding source. Borrowing allows capital or 'debt' to be raised upfront to meet future costs at a point in time, helping to 'bring forward' investment in infrastructure. All borrowing comes at a cost and must be repaid by the community over time, with the cost of finance related to capital markets.

When looking to fund projects, government should consider a mix of funding mechanisms. With the exception of general government revenue, it is highly unlikely that a single mechanism will fully fund a project, particularly for large scale projects. For example, alternative mechanisms such as user charges and beneficiary charges are unlikely to ever be used to fully fund a major project. However, they can be part of the funding mix.

Funding principles

One of Infrastructure Victoria's guiding principles is to promote responsible funding and financing. Infrastructure Victoria's advice, if taken, could have major budgetary implications. Victoria's fiscal position is sound. However, ongoing sustainable fiscal management will remain important.

Funding infrastructure responsibly means making hard choices about what to fund and what not to fund. This includes looking at non-build solutions and taking into account lifecycle costs.

We have adopted funding principles to guide the use of mechanisms to help fund infrastructure and/or get the best use out of infrastructure. These principles are aligned with our guiding

principle to promote responsible funding and financing. Our funding principles recognise that equity, fairness, efficiency and effectiveness should play a role in applying funding mechanisms. We also have a principle capturing the balancing act between raising revenue and encouraging a productive economy.

Our principles are:

- Distribute the funding burden equitably and fairly
- Implement easy and cost effective funding mechanisms
- Ensure that the funding approach considers people's overall tax burden
- Promote the highest and best use of infrastructure
- Optimise the effectiveness and efficiency of infrastructure (including its maintenance) and services
- Change behaviour and manage demand
- Align the cost of infrastructure with users and those who privately benefit from it.

What we mean by each funding principle

Distribute the funding burden equitably and fairly

We consider whether it is reasonable to seek contributions to funding infrastructure from sections of the community and business, and in a way that does not significantly impact disadvantaged persons in the community or contribute to geographical inequality. This requires balancing efficiency with achieving social and environmental objectives.

Implement easy and cost effective funding mechanisms

We consider whether a funding mechanism can be implemented easily, including whether it:

- Is transparent
- Is easy to understand
- Is easy to comply with
- Minimises administrative and transaction costs.

It also includes whether the funding mechanism would raise significantly more revenue than the cost of its implementation.

Ensure that the funding approach considers people's overall tax burden

We need to be mindful of the overall funding burden that could result from using a range of funding mechanisms on a case-by-case basis, and how this is distributed across the community over time.

While each project requires a case-by-case examination of the potential funding mix, there is still a need to look across all levels of government and all calls on taxpayers to see whether the funding approach balances raising additional revenue against being too onerous on the community or constraining economic growth by distorting market activity. Government needs to consider how new funding mechanisms work with existing funding sources and charges to ensure the most appropriate long-term approach to funding infrastructure.

Promote the highest and best use of infrastructure

We consider funding mechanisms that encourage or incentivise infrastructure and land being used:

- Efficiently and effectively
- For the greatest return or for the most valuable purpose
- For the greatest value to the economy
- To achieve other economic, social or environmental objectives.

Optimise the effectiveness and efficiency of infrastructure (including its maintenance) and services

We look at funding mechanisms that help ensure the overall package delivered provides quality and value for money. This package includes value for money for asset build, delivery of government services, maintenance and cost of finance. We seek ways to encourage more efficient use of assets, delivering better services and infrastructure at the least cost. This principle ensures alignment with the strategy’s methodology of better use of existing assets.

Change behaviour and manage demand

In some instances, funding mechanisms should influence how infrastructure is used to get the most out of it. For instance, funding mechanisms can provide price signals to ‘sweat the asset’ or to spread the use of the asset, especially for peak loads. By providing signals we can help to change behaviour or better manage demand, thus reducing the amount of time that assets are underutilised and avoid potential over-investment to meet peak demand. This principle also aligns with the strategy’s framework to focus on changing behaviour and managing demand.

Align the cost of infrastructure with users and those who privately benefit from it

We apply a funding mechanism with consideration to the varying degrees to which different people benefit from the same piece of infrastructure. This recognises that different types of infrastructure provide different mixes of public and private benefit. Contributions should only be a portion of the level of benefit received from spending.

Our method for assessing the funding options

In our research document, *Funding and financing draft additional information*, we identified the following funding mechanisms (see Table 7) and highlighted the advantages, limitations and implementation considerations of the various funding mechanisms.

Table 7: Funding mechanisms

Funding mechanism	Description
User charges	User charges are fees or prices Victorians pay for using infrastructure. They can have two objectives: help recover the cost of infrastructure; or provide incentives for users to use infrastructure more efficiently by managing or shifting demand.
Beneficiary charges	Beneficiary charges seek contributions from individuals and businesses that indirectly and privately benefit from government investment in public infrastructure or planning decisions. Types of beneficiary charges include: developer contributions; betterment levies and major beneficiary contributions. Beneficiary charges are a type of ‘value capture’ funding mechanism.

Funding mechanism	Description
Property development	Property development includes selling development rights – both land rights and air rights (the right to the space above a property) – around or as part of public infrastructure when upgrading or building new infrastructure. It includes commercially leasing premises within publicly owned infrastructure. Property development can be a type of ‘value capture’ funding mechanism.
Asset sales and long-term leases	Asset sales and long-term leases sell, lease or privatise state assets including land and enterprises. This can involve selling or privatising individual assets or consolidating a number of small, underutilised or surplus assets for sale. In the strategy, we focus on asset sales where an asset is no longer fit-for-purpose and is surplus to government requirements. Asset sales and long-term leases can involve ‘value capture’ funding opportunities.
Donations and bequests	Donations and bequests is the receipt of funding or assets from individual or organisations, or by deceased estates.
General government revenue (incorporating federal, state and local revenue)	General government revenue is revenue collected by federal, state and local governments through general taxation or regulatory charges such as fees and fines.

In the same research document, you can also find information on financing mechanisms which include: state government issued bonds, social impact bonds, borrowing by private financiers, tax increment financing, local government borrowing and concessional loans from the federal government. As previously mentioned, we focus on funding mechanisms in the strategy.

Value capture is a form of infrastructure funding that helps align the cost of infrastructure more closely with those that benefit from government investment or planning decisions. Value capture mechanisms seek a funding contribution from individuals and/or businesses that directly or indirectly and privately benefit from government investment in public infrastructure or planning decisions. We identify beneficiary charges, property development and asset sales and long-term leases as value capture mechanisms. If you are interested in understanding more about using value capture to help fund infrastructure in Victoria, you can find further information in our policy paper *Value Capture – Options, Challenges and Opportunities for Victoria*, available on our website at infrastructurevictoria.com.au.

The *Infrastructure Victoria Act 2015* requires us to include recommendations in the 30-year infrastructure strategy regarding the funding options for specified major projects, policies or reforms. In discharging this function in the strategy, we provide funding advice on our:

- Recommended major projects with significant costs that commence in the short to medium term
- Recommended major policies and reforms with large implementation costs for government
- Recommendations which are, or incorporate, funding mechanisms.

We also provide funding recommendations in the strategy for some projects or policies where there is likely to be significant opportunity for government to leverage alternative funding mechanisms.

For major policy, projects and reforms with a significant cost to government recommended in the strategy in some form or other, we provide funding advice on a range of potential funding mechanisms as part of the summary assessments presented in this book. It is important to note that the funding advice in this book relates to the option as presented. Our funding recommendations can be found in the strategy and relate to the strategy recommendations.

Our funding advice and recommendations focus on where we see opportunities to consider alternative funding mechanisms that could contribute to the funding mix. However, the precise impact of funding mechanisms on the economy, society and environment depends on their design and specific application. The right mix and level of funding mechanisms for an infrastructure project still needs to be considered on a case-by-case basis, in particular to ensure that any new charges are levied in an efficient manner and do not duplicate existing charges.

We considered our principles in applying funding mechanisms for our recommended major projects, policies or reforms. For each major project, policy or reform, we looked at which funding mechanisms could be applied as well as some implementation considerations (see Table 8 for a general discussion).

As examples of our funding advice and recommendations, we considered the application of user charges for things like roads, public transport and water. We considered the application of beneficiary charges for major infrastructure such as when a new train station could be built or where significant planning changes could be implemented. Property development was considered for infrastructure upgrades or building new government facilities like courts, police stations, train stations, hospitals, community facilities and social housing. Asset sales were considered when part of a rationalisation incentive, or where consolidation of assets could occur which may involve sites being considered for alternative uses or for sale. Donations and bequests were considered where they currently make a contribution, such as at health or cultural facilities. In many cases, general government revenue will likely continue to be a funding source where there are broader public benefits.

You can find which options we provide funding advice for in our indexes, sorted by sector and by need. Options with funding advice are marked with an * (see pages 57 and 64).

Table 8: Funding mechanism considerations

Funding mechanism	When to apply?	Key implementation considerations
<p>User charges</p>	<p>Applicable when there are a large number of identifiable direct beneficiaries and the infrastructure or good is excludable (i.e. it is possible to prevent people who have not paid for access from using the asset).</p> <p>Can be used where there are benefits of sending a clear price signal (e.g. a price signal will incentivise users to use the infrastructure more efficiently by managing demand/changing behaviour).</p> <p>Can also be used to recover the cost, or a portion of the cost, of the infrastructure, maintenance or operations from users.</p>	<p>The nexus between the charge and use is clear.</p> <p>Determining whether the revenue generated is allocated to specific projects or returned to the consolidated fund for assessment and allocation against all priorities.</p> <p>The impact on sectors of the community who cannot afford to pay, which can be addressed through adjustments, if necessary.</p> <p>The impact on economic activity. The cost of implementation, including any regulation or oversight arrangements, is lower than the revenue that could be collected.</p> <p>The interaction between existing charges and new charges.</p>
<p>Beneficiary charges (such as developer contributions, betterment levies and major beneficiary contributions)</p>	<p>Applicable when there are a large number of identifiable indirect beneficiaries and there is uplift in land values, amenity or economic activity attributable to a government infrastructure investment or planning decision (e.g. increased business activity, improved access to jobs or a larger employee pool).</p>	<p>There are a number of design choices including:</p> <ul style="list-style-type: none"> • the value of the rate or charge, or amount of value to capture • the timing of collection of payments • who should pay (i.e. different land classes owned by developers, commercial landowners and/or residential landowners) • boundary selection <p>Determining whether the revenue generated is allocated to specific projects or returned to the consolidated fund for assessment and allocation against all priorities.</p> <p>The impact of implementing a charge to minimise any material or adverse unintended consequences for the economy, property prices or future development.</p> <p>The impact on sectors of the community who cannot afford to pay, which can be addressed through adjustments.</p> <p>Ensuring the cost of implementation, including any regulation or oversight</p>

Funding mechanism	When to apply?	Key implementation considerations
		<p>arrangements, is lower than the revenue that could be collected.</p> <p>The interaction between existing charges and new charges.</p>
<p>Property development</p>	<p>Applicable when the delivery of infrastructure creates opportunities to commercialise the use of government land and assets. For instance, opportunities for significant retail, residential or commercial development.</p> <p>Can also be used to improve amenity, access to services and offer more choice in services and land use in proximity to new and existing infrastructure.</p> <p>Applicable when underutilised government land and air space can be put to a higher and better use.</p> <p>Development would contribute to increased economic activity, property values and rents in surrounding areas.</p>	<p>Commercial skills will be required to effectively negotiate the lease or sale of development rights to maximise revenue and value for money.</p> <p>Consultation on the alignment of the type of new facility developed with business and community requirements will also be needed.</p>
<p>Asset sales and long-term leases</p>	<p>Applicable when an opportunity exists to: sell or privatise individual assets; or consolidate a number of small, underutilised, not fit-for-purpose or surplus assets for sale (including land). Our funding advice focuses on these sorts of asset sales.</p> <p>Can also be used where there is competition and contestability to improve performance or privatisation would yield better outcomes than government delivery.</p> <p>In some cases, it is preferable to sell the asset rather than keep the asset, thus avoiding future operating and maintenance costs and major asset upgrades.</p>	<p>Sufficient private sector interest in the asset would be required to create value for money through sale or lease of the asset.</p> <p>Commercial skills will be required to effectively negotiate the lease or sale of assets to maximise revenue and value for money.</p> <p>In some circumstances, regulation could be used if the sale or lease could have adverse impacts on particular parts of the community or sectors of the economy.</p> <p>Ensuring the cost of implementation, including any regulation or oversight arrangements, is lower than the revenue raised from the sale.</p>

Funding mechanism	When to apply?	Key implementation considerations
<p>Donations and bequests</p>	<p>Application is dependent on either:</p> <ul style="list-style-type: none"> • Government agencies investing resources to encourage more donations and bequests • Individuals/estates provide donations and bequests of their own volition. <p>Donations and bequests should be accepted, particularly when there is demonstrable community benefit from the donation or bequest, or the donation or bequest aligns with the objectives of the project.</p>	<p>Donor or bequest obligations or conditions should not unreasonably constrain the use of an asset.</p> <p>The resources required to operate and maintain infrastructure or equipment donated does not outweigh its value.</p>
<p>General government revenue</p>	<p>Applicable when the infrastructure has largely public good characteristics. (i.e. the infrastructure benefits the public at large and it is hard to identify individual beneficiaries). For example, delivering hospitals, schools and prisons.</p> <p>Can also be used to complement or supplement other funding sources, such as user charges, where these arrangements are being used to address equity issues through refunds or concessions.</p> <p>Where changing taxation settings will not have adverse impacts that cannot be managed through the transfer system.</p>	<p>Government should consider a range of potential funding mechanisms for infrastructure. General government revenue is likely to contribute when there are demonstrable public benefits.</p> <p>When it is impractical or not cost effective to use other types of funding mechanisms.</p>

Our assumptions

To develop the 30-year strategy, we have made some assumptions about the present and the future. This section outlines some of our assumptions of the future, the documents that have guided our analysis, policies and projects that have informed our base case, and expectations about government's business as usual spending. They have also underpinned our scenario assessments.

Assumptions about the future

In *Laying the foundations*, we discussed some of the global trends that were shaping how we were thinking about the future. This goes beyond the base case, which covers projects and policies related to Victoria's infrastructure, and appeals to reason about what is likely to occur over the 30-year horizon. Some of these assumptions include:

- **Overall population growth will continued at projected levels.** We have used the Victorian Government's official population projections, *Victoria in Future*, as one of the key inputs for determining demand for infrastructure over the 30-year period. We know that population projections are often revised, usually upwards, but they still provide a useful base to work from. As indicated in *Victoria in Future 2016* a significant proportion of state population growth comes from international migration. The policy levers that control these flows are held by the Commonwealth Government and they have not given a signal that this is likely to change in the near future.
- **Cities will continue to experience higher levels of population growth than other parts of the state.** The 21st century is increasingly viewed as the century of the city. Cities are important drivers of productivity because they concentrate economic activity and provide important links with rural areas, between cities and across international borders. As long as the benefits of urbanisation, such as agglomerations, continue to be seen to outweigh the disbenefits, such as congestion, we expect population growth will continue to concentrate in Victoria's cities.
- **Climate change will result in higher temperatures overall and more severe weather patterns.** Concentrations of greenhouse gases in the atmosphere are rising, which is projected to lead to changes in Victoria's climate systems. Over the long term, Victoria is projected to experience higher temperatures, more frequent droughts, higher bushfire risk, sea level rises and more intense storms. This has implications for all sectors and industries, from agriculture to health, and the infrastructure that supports them.
- **Advanced technologies, such as driverless vehicles, will deeply impact infrastructure use.** Throughout consultation we have continued to hear about the importance of being open to the potential disruptions of technology over the horizon. Driverless vehicles could deeply disrupt how we approach private vehicle usage. But other technologies, such as emerging renewable energies and 3D printing, could also have significant impacts on energy, transport, and water sectors. The one thing we know for certain is the way infrastructure is used today is not how it will be used in the future and there is a need to plan for infrastructure to be flexible and responsive to these potential changes.

To generate and assess options, we have made a set of assumptions about the infrastructure Victoria has now and what we expect Victoria will need in the future. These have been drawn from the best available information about the expected population and employment projections across the state (see Table 9).

Table 9: Strategic plans and reports that are included in our assumptions

Strategic document	Role in informing our assumptions
<p><i>The current and future state report: A spatial perspective 2016</i> – SGS Planning and Economics</p> <p>Available on our website infrastructurevictoria.com.au</p>	<p>These two reports outline possible variations between different futures, based upon how many people might live in Victoria, where they might live and work, and how global trends (including social, environmental and economic) might influence how we use infrastructure in the future.</p>
<p><i>The current and future state of Victoria: A macro perspective 2016</i> – Deloitte Access Economics</p> <p>Available on our website infrastructurevictoria.com.au</p>	
<p><i>Infrastructure capability assessment report 2016</i> – Deloitte Touche Tohmatsu and Aurecon</p> <p>Available on our website infrastructurevictoria.com.au</p>	<p>These assessments consider existing infrastructure across nine sectors: education and training; transport; energy; justice and emergency services; health and human services, including human services; water and waste; information and communication technology; environment, science and agriculture; and cultural, civic, sporting, recreation and tourism.</p> <p>The assessments examine what existing infrastructure Victoria has, who owns and operates the infrastructure, what the infrastructure is worth and announced investments in new infrastructure.</p> <p>The assessments also evaluate the condition and performance of existing infrastructure, how vulnerable existing infrastructure is and its capacity to meet current and future demand.</p>
<p><i>Victoria in Future 2016</i> and <i>Victoria in Future 2015</i>² – Department of Environment, Land, Water and Planning</p> <p>delwp.vic.gov.au/planning/forward-policy-and-research/victoria-in-future-population-and-household-projections</p>	<p>In conjunction with the two current and future state reports, Victoria in Future provides base case projections of Victorian population and households. This is a policy-neutral projection used by state government departments and agencies in their forward planning, so we've adopted this as our base case.</p>

² We have used VIF 2016 to inform elements of the strategy; however assessments undertaken by AECOM/PwC and Aurecon/Deloitte have used VIF 2015.

Strategic document	Role in informing our assumptions
<p><i>Plan Melbourne refresh discussion paper</i> – Department of Environment, Land, Water and Planning, 2015</p> <p>planmelbourne.vic.gov.au/plan-melbourne-refresh</p>	<p><i>Plan Melbourne</i> and the <i>Plan Melbourne refresh discussion paper</i> provide the policy direction for projected land use and development across metropolitan Melbourne. We’ve taken this as the central policy intent that Infrastructure Victoria’s strategy should support, but we also critically consider whether any changes in these directions could lead to a better overall outcome.</p>
<p><i>Regional Growth Plans</i></p> <p>dtpli.vic.gov.au/planning/plans-and-policies/rural-and-regional-planning/regional-growth-plans</p>	<p>The <i>Regional Growth Plans</i> provide policy direction for projected land use and development across Victoria’s regions (including regional centres). We’ve taken these as the central policy intent that Infrastructure Victoria’s strategy should support, but also critically consider whether any changes in these directions could lead to a better overall outcome.</p>

Developing a base case

There is a range of projects in different stages of implementation which we have not considered as options in this strategy. Our perspective is that where the government has committed funding to implement a policy, project or program within the forward estimates (four years out) that this will form part of the ‘base case’ for the strategy. This approach also applies for funding commitments made by local government or the private sector.

We have also made assumptions about what we think government will continue to invest in over the next 30 years. These are the business as usual activities, such as providing schools and community facilities. This has provided us with a baseline so we do not advise government to do things it is already doing. Instead we have focused on those things it should do more of, or should do differently.

An overview of the assumptions for each sector is outlined in Table 10. These should be considered indicative, rather than comprehensive.

Table 10: Assumptions by sector

Sectors	Assumed government investment
Cultural, civic, sporting, recreation and tourism	<p>Government will continue to invest in major and community arts and sports facilities across Victoria.</p> <p>Investment in community and regional sporting and recreation facilities will be in line with population growth.</p>

Sectors	Assumed government investment
Education and training	<p>Government will continue to build schools in line with population growth.</p> <p>University facilities will continue to be maintained and funded primarily by the federal government</p> <p>The private sector and local government will retain responsibility for early childhood centres and kindergartens.</p>
Energy	<p>An Australian emissions reductions target of 26 to 28 per cent on 2005 levels by 2030.</p> <p>A Victorian target of net zero emissions by 2050.</p> <p>Victorian renewable energy targets of 25 per cent by 2020 and 40 per cent by 2025.</p> <p>Implementation of competitive auction process for renewable energy projects with uptake of significant projects in the short-term.</p>
Health and human services	<p>Continued investment in core acute and sub-acute health services to meet demand.</p> <p>Release of the State-wide design, service and infrastructure plan for Victoria's health system in 2017 to identify regional-level priorities for health infrastructure investment.</p> <p>Implementation of housing initiatives recommended by the Royal Commission into Family Violence 2016 and initiatives announced up to November 2016 to address homelessness.</p>
ICT	<p>Full roll out of the National Broadband Network.</p> <p>Private sector to take the lead in the development and roll out of new and innovative technologies such as driverless cars and 3D printing.</p>
Justice and emergency services	<p>Government to invest in building new prison facilities in line with forecast prison population growth.</p> <p>BlueConnect program to strengthen Victoria Police intelligence and investigative response through the implementation of technology enabled service delivery transformation such as body worn cameras and mobile technology.</p> <p>Implementation of justice initiatives recommended by the Royal Commission into Family Violence 2016</p>
Science, agriculture and environment	<p>New technology will impact on agricultural practices, which will have flow-on effects for infrastructure demand.</p> <p>There will be increased demand for open, green spaces in urban areas as density increases.</p>

Sectors	Assumed government investment
Transport	<p>Automated vehicles will be on Victorian roads within the 30 year timeframe of the strategy.</p> <p>Demand for access to the central city and major employment centres will increase in line with population and employment growth.</p> <p>Some major projects include:</p> <ul style="list-style-type: none"> • Implementation of the Level Crossing Removals Program (as committed to in the forward estimates, including Dandenong to Caulfield) • Monash Freeway upgrade • Citylink Tulla widening • Murray Basin Rail project • Western Distributor • M80 ring road upgrade • Melbourne Metro • Mernda rail extension • Outer suburban arterial roads program • Transport Accident Commissions' (TAC) Safer Cyclists and Pedestrians Fund
Water and waste	<p>Climate change will threaten the security of rainfall dependent water sources.</p> <p>Initiatives to increase urban water use efficiency will be retained and continuously improved.</p>

OPTIONS ASSESSED BY INFRASTRUCTURE VICTORIA

There are 285 options that follow and they are sorted alphabetically. Each option has a unique three to four letter code. You will have seen this code in the strategy. This is one way to navigate this book, if you are searching electronically. Other ways to navigate this book include these two indexes, sorted by sector and by need.

Options where funding advice has been given are indicated in the tables below with an *.

Options by sector

Table 11: Options by sector

Sectors	Options	CODE
All	Critical asset centralised risk management	CAR
	Central city job cap	CCJ
	Centralised planning scheme	CPS1
	Greenfield development sequencing	GFS
	Infrastructure resilience assessment test	IRA
	Integrated government service and infrastructure planning	SIP
	Strategic transit-oriented centres and corridors*	STO
	Compact urban development*	UDC
Cultural, civic, sporting, recreational and tourism	Active established areas	AEA
	Active lifestyle infrastructure provision	ALP
	Bicycle and walking path data capture	BWP1
	Bicycle and walking path expansion and improvement*	BWP2
	Bicycle and walking path separation*	BWP3
	Community cultural facility investment framework	CCF
	Community infrastructure accessibility	CIM
	Melbourne arts and sports precinct connectivity	CPC
	Cultural and sport major infrastructure investment framework	CSM
	Community space refurbishment or rationalisation*	CSR
	Community space shared use agreements	CSS1
	Community space statewide event planning	CSS2
	Community and public space utilisation deregulation	CSU
	21st century libraries	LLH
	Park pricing and expenditure regime	NPP1
	National park private management	NPP2
	National park asset planning	NPP3
	Relocatable community infrastructure	RCI
	Integrated shared use community and recreation facilities	RFC
	Sport and recreational facility strategic investment	SRF
TAFE recapitalisation	TAF	
Education and training	Community infrastructure accessibility	CIM
	Community space refurbishment or rationalisation*	CSR
	Community space shared use agreements	CSS1
	Early childhood education availability	ECE1
	Early childhood education centralised planning model	ECE2
	Early childhood education corporate office facilities	ECE3
	21st century libraries	LLH
	Relocatable community infrastructure	RCI

Sectors	Options	CODE
	Schools as community facilities	SCF
	School campus utilisation	SCU1
	Education and medical research precincts linking with the private sector	SEP
	School facility use for out of school hours care	SFU
	School infrastructure funding certainty	SIF
	Schools with low performance	SLP
	Schools with low enrolments in rural areas	SLR
	School demand management	SOO
	School regional level maintenance contracts	SRM1
	Unlocking school resources with technology	SRS
	School shortages	SSS
	School sector-wide planning information	SSW
	School and tertiary education cooperation	STE
	TAFE recapitalisation	TAF
	Vocational education long-term funding certainty	VEL
Energy	Ageing coal generation asset transition	ACG
	Brown coal generator auction	BCA
	Brown coal licences	BCL
	Coal fired electricity plant conversion to gas fired plant	CFE
	Community wind farms	CWF
	Energy use efficiency	EDM1
	Energy demand management tariff reform	EDM2
	Energy efficient development	EED
	Energy generation from biomass	EGB
	Expansion of gas as an energy source	EGE
	Energy generation from waste	EGW
	Electricity network infrastructure capability	ENI
	Energy storage infrastructure	ESI
	Fuel reserve regulation	FRR
	Geothermal power supply	GPS
	Integrated power supply augmentation	IPS
	Local solar energy generation	LSE
	Nuclear plant construction	NPC
	Organic waste to energy	OWE
	Small scale solar energy regulation	SSE
Tidal and wave energy	TWE	
Wind and solar energy generation large scale investments	WSE	
Health and human services	Aged care facility expansion	ACF
	Aged care and mental health residential care investment	ACM
	Active established areas	AEA
	Affordable housing community land trusts	AHC
	Affordable housing inclusionary planning controls	AHR
	Affordable private rental stock provision	ARH
	Crisis housing provision expansion	CHP
	Community infrastructure accessibility	CIM
	Digital health embedded across the health system*	EEA
	Government owned and managed social housing provision to increase stock	GOM
	Health and aged care repurposing of facilities	HAC

Sectors	Options	CODE
	Health care not-for-profit and private sector involvement	HAP
	Health care alternative delivery options	HCA
	Health care delivery role change	HCD
	Health care decentralised delivery model	HCD2
	Health care patient subsidised travel program extension	HCP
	Health care smart facilities	HCS
	Health care big data leverage	HCT1
	Health education programs	HEP
	Health infrastructure coordinated planning	HIC
	Health service modernisation and expansion*	HIM
	Housing rental assistance and advocacy program extension	HRA
	Integrated community based health hubs*	ICP
	Justice and human services integrated planning and delivery	JCS
	Mental health & alcohol and other drug (AOD) acute and community facilities*	MHA
	New or expanded forensic health facility	NEF
	Northern metropolitan corridor health service expansion	NHE
	Preventative health care awareness	PHC
	Public high rise housing estate regeneration	PHG
	Public high rise housing estate renovation	PHR
	Residential facilities for people with disabilities	RFP
	Residential tenancies reform	RTR
	Affordable housing development incentives	SAH
	Community health facility access	SCC
	Affordable housing infrastructure plan	SCP
	Public housing asset management*	SHA
	Social housing utilising the Defence Housing Australia rental model	SHD1
	Social housing stock expansion*	SHE
	Social housing flexible use	SHF
	Social housing government role change	SHG
	Social housing private provision to increase stock	SHP1
	Social housing tenant transition to private stock	SHP2
	Affordable housing sector planning system amendment	SHS1
	Social housing "social rental" model	SHS2
Social housing stock transfer model	SHS3	
Social housing tenant transfer within a community	SHT	
Technology enabled health care	TEH	
Major hospital redevelopments*	THR	
Supportive housing responses	TSA	
Urban planning and approvals processes for health facilities.	UPA	
Information and communications technology (ICT)	Advanced driver assistance applications	ADA
	Access to services through technology and ICT	AST
	Big data leveraging	BDL
	Cyber security breach contingency planning	CSB
	Justice and human services case management system	CSC
	Data centre location planning	DCD
	Enhanced cyber security	ECS
	Digital health embedded across the health system*	EEA
Enhanced telecommunications performance	ETP	

Sectors	Options	CODE
	Government data sharing	GDS
	Increased telecommuting	ITT
	Justice service delivery through new technology	JSD
	Mobile police and justice workforce	MPW
	Unlocking school resources with technology	SRS
	Technology enabled health care	TEH
	Victorian data analytics centre	VDA
Justice and emergency services	Courts maintenance	CMD
	Justice and human services case management system	CSC
	Justice and human services integrated planning and delivery	JCS
	Justice delivery in areas of growth*	JDG
	Justice diversionary policy and programs	JDP
	Justice family violence response	JFV
	Justice and human services joint planning	JHS
	Justice CBD legal precinct	JLP
	Justice service delivery through new technology	JSD
	Justice delivery in regional areas	MJC
	Mobile police and justice workforce	MPW
	New or expanded men's prison	NMP
	New or expanded women's prison	NWP
	New or expanded forensic health facility	NEF
Police complexes*	PSS	
Science, agriculture and environment	Coastal protection infrastructure*	CPI
	Environmental water delivery infrastructure	EWD
	Habitat corridor link expansion and improvement	HCL
	National park access management	NPA
	Park pricing and expenditure regime	NPP1
	National park private management	NPP2
	National park asset planning	NPP3
	Riparian fence investment	RFI
	Stormwater harvesting and re-use	SRH
	Water delivery efficiency in irrigation	WDE
	Water infrastructure optimisation through increased network connectivity	WIO1
	Water infrastructure optimisation through governance arrangements	WIO2
	Water market development	WME
	Green infrastructure	UFF
Transport	Avalon Airport bus dedicated road priority	AAB
	Avalon airport high capacity transport shuttle	AAH
	Activity-based modelling	ABM
	Automated vehicle technology	ACT
	Advanced driver assistance applications	ADA
	Active established areas	AEA
	Alternative energy vehicles	AEV
	Altona Loop rail duplication	ALD
	Active lifestyle infrastructure provision	ALP
	Active lifestyle infrastructure regulation	ALR
	Arterial road network employment centre enhancements*	ARN
	Advanced traffic management	ATM

Sectors	Options	CODE
	Bendigo-Ballarat-Geelong rail revival	BBG
	Bicycle highways through the central city	BHT
	Beveridge intermodal freight terminal	BIF
	Bendigo rail full metropolitan separation	BRF
	Burnley rail group upgrades	BRG
	Bicycle and vehicle accident fault allocation	BVA
	Bicycle and walking path data capture	BWP1
	Bicycle and walking path expansion and improvement*	BWP2
	Bicycle and walking path separation*	BWP3
	Cross city road tunnel	CCR
	Central city tram network extension*	CCT
	City loop reconfiguration*	CLR
	Melbourne arts and sports precinct connectivity	CPC
	Car parking management	CPM
	Clyde rail extension*	CRE
	Key movement corridor incident management	CRR1
	Central regional rail control centre	CRR2
	Doncaster bus improvement	DBI
	Driverless car and ride sharing	DCR
	Driverless freight vehicles	DFV
	Doncaster heavy rail line	DHR
	Doncaster tram service	DTS
	Employment outside central city incentivisation	EOC
	Emergency traffic management	ETM
	Eastern freeway to CityLink connection*	EWE
	CityLink to Western Ring road connection*	EWV
	Freight consolidated centres	FCC
	Freight precinct land use planning	FPL
	Flemington Racecourse rail line activation	FRA
	Growth area train station upgrade and provision	GAT
	Geelong fast rail	GFR
	Gippsland-Pakenham rail shuttle	GPR
	Geelong rail electrification*	GRE
	Geelong and Werribee rail upgrade*	GWR
	High capacity trains - 10 car*	HCT2
	High capacity trains - 7 car*	HCT3
	High capacity trams*	HCT4
	High productivity freight vehicle network completion*	HPF
	Hoddle Street/Punt Road public transport prioritisation	HSP1
	Punt Road traffic management systems	HSP2
	High speed rail from Sydney to Melbourne	HSR
	International airport in the south-east of Melbourne	IAS
	Intermodal freight hubs for regional Victoria	IFH
	Integrated transport control centre	ITC
	Growth area bus service expansion	LBS
	Melbourne Airport bus dedicated road priority	MAB
	Melbourne Airport heavy rail line*	MAH
	Melbourne Airport metropolitan public transport connections	MAM
	Melbourne Airport new road link	MAN
	Mobility as a service	MAS

Sectors	Options	CODE
	Melbourne to Brisbane freight rail line	MBF
	Metropolitan bus network reform	MBN
	Multi-modal interchange improvements	MII
	Metropolitan level crossing removal completion*	MLC
	Melbourne Metro 2*	MMS
	Mildura passenger rail restoration	MPR
	Metropolitan rail capacity upgrades*	MRC
	Melton rail electrification	MRE1
	Metropolitan rail station interchange upgrades*	MRI
	Employment centre mass transit network*	MTN
	New port	NCP
	North East Link*	NEL
	New underground metro rail system	NUM
	Online liveability infrastructure platform	OLI
	Outer metro arterial roads*	OMA
	Outer metropolitan ring road*	OMR
	Port of Melbourne container terminal expansion	PMC
	Port of Melbourne rail shuttle	PMM
	Public transport alternative use of taxis or hire cars	PTA
	Public transport network resilience	PTN
	Public transport train timetabling	PTT
	Public transport accessibility	PTV
	Regional bus upgrades	RBU
	Residential and commercial property densification	RCP
	Regional coach upgrades	RCU
	Rowville heavy rail line	RHR
	Regional highway upgrades*	RHU
	Road asset management reform	RMF
	Regional metro rail service	RMR
	Regional rail capacity upgrades*	RRC
	Regional rail eastern corridor dedicated rail track*	RRE1
	Regional rail electrification	RRE2
	Regional rail gauge standardisation	RRG
	Regional rolling stock expansion*	RRS
	Regional road upgrades	RRU
	Road space allocation changes	RSA
	Rail signals and fleet upgrade*	RSF
	Regional train link upgrades	RTL
	SmartBus network extensions and service increases	SNE
	SmartBus service provision increase	SSP
	South Yarra Metro station	SYM
	Tram network extensions	TNE
	Real time public transport information	TNI
	Tram network link extensions	TNL
	Transport network price regime*	TNP
	Train platform utilisation	TPU
	Torquay rail extension	TRE
	Train station car parking improvement	TSC
	'Travelsmart' programs	TSP
	Tram and train fleet modifications	TTF

Sectors	Options	CODE
	Green infrastructure	UFF
	Webb Dock freight rail access	WDF
	Western interstate freight terminal*	WIF
	Wallan rail electrification*	WRE1
	Wollert rail extension	WRE2
	Water taxis/buses/ferries to the central city	WTB
	Wyndham Vale to Werribee rail extension*	WWV
Water and waste	Coastal protection infrastructure	CPI
	Domestic greywater recycling	DGR
	Environmental water delivery infrastructure	EWD
	E-waste services	EWS
	Waste landfill site land buffers	FLS
	Future waste management and landfill site locations	FWL
	Household waste disposal fees*	HWD
	Landfill waste levy increase	LLI
	Landfill site consolidation	LOC
	On-farm water efficiency	OFU
	Organic waste management	OWM
	Recycled material usage in building construction	RMU
	Recycled treated wastewater for non-potable agricultural use	RTA
	Recycled treated wastewater for non-potable use	RTH
	Riparian fence investment	RFI
	River and waterways natural flow regimes	RWN
	Recycled treated wastewater for drinking *	RWW
	Stormwater harvesting and re-use	SRH
	Stormwater quality management	SRQ
	Recycled treated wastewater for non-potable peri-urban agricultural use	TWR
	Green infrastructure	UFF
	Water delivery efficiency in irrigation	WDE
	Wonthaggi desalination plant expansion*	WDP
	Western and Eastern treatment plant resilience	WET
	Water infrastructure optimisation through increased network connectivity	WIO1
	Water infrastructure optimisation through governance arrangements	WIO2
	Waterway infrastructure to remove pollutants	WIR
	Water market development	WME
	Wastewater management in small towns	WMS
	Water pricing reform	WPR
	Water supply augmentation*	WSA1
	Water supply augmentation through building new dams	WSA2
	Waste water system augmentation in high growth areas	WWS

Options by need

Table 12: Options by need

Needs	Options	CODE
1. Address infrastructure demands in areas with high population growth	Active lifestyle infrastructure provision	ALP
	Affordable private rental stock provision	ARH
	Arterial road network employment centre enhancements*	ARN
	Bicycle and walking path data capture	BWP1
	Bicycle and walking path separation*	BWP3
	Community cultural facility investment framework	CCF
	Central city tram network extension*	CCT
	City loop reconfiguration*	CLR
	Melbourne arts and sports precinct connectivity	CPC
	Centralised planning scheme	CPS1
	Clyde rail extension*	CRE
	Central regional rail control centre	CRR2
	Cultural and sport major infrastructure investment framework	CSM
	Community space shared use agreements	CSS1
	Community and public space utilisation deregulation	CSU
	Growth area train station upgrade and provision	GAT
	Government data sharing	GDS
	Greenfield development sequencing	GFS
	International airport in the south-east of Melbourne	IAS
	Integrated community based health hubs*	ICP
	Justice delivery in areas of growth*	JDG
	Growth area bus service expansion	LBS
	21st century libraries	LLH
	Mobility as a service	MAS
	Metropolitan bus network reform	MBN
	Metropolitan rail capacity upgrades*	MRC
	Melton rail electrification	MRE1
	Northern metropolitan corridor health service expansion	NHE
	Online liveability infrastructure platform	OLI
	Organic waste management	OWM
	Police complexes*	PSS
	Relocatable community infrastructure	RCI
	Schools as community facilities	SCF
	Integrated government service and infrastructure planning	SIP
	Schools with low performance	SLP
	SmartBus network extensions and service increases	SNE
	School demand management	SOO
	Sport and recreational facility strategic investment	SRF
	Strategic transit-oriented centres and corridors *	STO
	South Yarra Metro station	SYM
	Tram network extensions	TNE
	Train station car parking improvement	TSC
	Compact urban development*	UDC
Green infrastructure	UFF	
Wallan rail electrification*	WRE1	

Needs	Options	CODE
	Wollert rail extension	WRE2
	Wyndham Vale to Werribee rail extension*	WVW
	Waste water system augmentation in high growth areas	WWS
2. Address infrastructure challenges in areas with low or negative growth	Access to services through technology and ICT	AST
	Community space refurbishment or rationalisation*	CSR
	Community space shared use agreements	CSS1
	Community space statewide event planning	CSS2
	Community and public space utilisation deregulation	CSU
	Government data sharing	GDS
	Health care alternative delivery options	HCA
	Justice and human services integrated planning and delivery	JCS
	Justice service delivery through new technology	JSD
	Mobility as a service	MAS
	Mobile police and justice workforce	MPW
	Police complexes*	PSS
	Public transport alternative use of taxis or hire cars	PTA
	Regional bus upgrades	RBU
	Regional highway upgrades*	RHU
	Regional road upgrades	RRU
	Schools as community facilities	SCF
	Integrated government service and infrastructure planning	SIP
	Schools with low enrolments in rural areas	SLR
	Unlocking school resources with technology	SRS
	Technology enabled health care	TEH
3. Respond to increasing pressures on health infrastructure, particularly due to ageing	Aged care facility expansion	ACF
	Aged care and mental health residential care investment	ACM
	Advanced driver assistance applications	ADA
	Active established areas	AEA
	Big data leveraging	BDL
	Digital health embedded across the health system*	EEA
	Emergency traffic management	ETM
	Government data sharing	GDS
	Health and aged care repurposing of facilities	HAC
	Health care not-for-profit and private sector involvement	HAP
	Health care alternative delivery options	HCA
	Health care delivery role change	HCD
	Health care decentralised delivery model	HCD2
	Health care patient subsidised travel program extension	HCP
	Health care smart facilities	HCS
	Health care big data leverage	HCT1
	Health education programs	HEP
	Health infrastructure coordinated planning	HIC
	Health service modernisation and expansion*	HIM
	Integrated community based health hubs*	ICP
	Mental health & alcohol and other drug (AOD) acute and community facilities*	MHA
	New or expanded forensic health facility	NEF
	Preventative health care awareness	PHC
	Regional road upgrades	RRU
	Technology enabled health care	TEH

Needs	Options	CODE
	Major hospital redevelopments *	THR
	Urban planning and approvals processes for health facilities.	UPA
4. Enable physical activity and participation	Active established areas	AEA
	Active lifestyle infrastructure provision	ALP
	Active lifestyle infrastructure regulation	ALR
	Bicycle and vehicle accident fault allocation	BVA
	Bicycle and walking path data capture	BWP1
	Bicycle and walking path expansion and improvement*	BWP2
	Bicycle and walking path separation*	BWP3
	Cultural and sport major infrastructure investment framework	CSM
	Habitat corridor link expansion and improvement	HCL
	Online liveability infrastructure platform	OLI
	Integrated shared use community and recreation facilities	RFC
	Schools as community facilities	SCF
	Integrated government service and infrastructure planning	SIP
	Sport and recreational facility strategic investment	SRF
	Green infrastructure	UFF
5. Provide public spaces where communities can come together	Active lifestyle infrastructure provision	ALP
	Community cultural facility investment framework	CCF
	Community infrastructure accessibility	CIM
	Melbourne arts and sports precinct connectivity	CPC
	Cultural and sport major infrastructure investment framework	CSM
	Community space refurbishment or rationalisation*	CSR
	Community space shared use agreements	CSS1
	Community space statewide event planning	CSS2
	Community and public space utilisation deregulation	CSU
	Greenfield development sequencing	GFS
	21st century libraries	LLH
	Online liveability infrastructure platform	OLI
	Relocatable community infrastructure	RCI
	Schools as community facilities	SCF
6. Improve accessibility for people with mobility challenges	Automated vehicle technology	ACT
	Access to services through technology and ICT	AST
	Community infrastructure accessibility	CIM
	Mobility as a service	MAS
	Multi-modal interchange improvements	MII
	Public transport alternative use of taxis or hire cars	PTA
	Public transport accessibility	PTV
	Residential facilities for people with disabilities	RFP
Community health facility access	SCC	
7. Provide better access to housing for the most vulnerable Victorians	Affordable housing community land trusts	AHC
	Affordable housing inclusionary planning controls	AHR
	Affordable private rental stock provision	ARH
	Crisis housing provision expansion	CHP
	Government owned and managed social housing provision to increase stock	GOM
	Housing rental assistance and advocacy program extension	HRA
	Public high rise housing estate regeneration	PHG
	Public high rise housing estate renovation	PHR
	Residential tenancies reform	RTR

Needs	Options	CODE
	Affordable housing development incentives	SAH
	Affordable housing infrastructure plan	SCP
	Public housing asset management *	SHA
	Social housing utilising the Defence Housing Australia rental model	SHD1
	Social housing stock expansion*	SHE
	Social housing flexible use	SHF
	Social housing government role change	SHG
	Social housing private provision to increase stock	SHP1
	Social housing tenant transition to private stock	SHP2
	Affordable housing sector planning system amendment	SHS1
	Social housing "social rental" model	SHS2
	Social housing stock transfer model	SHS3
	Social housing tenant transfer within a community	SHT
	Supportive housing responses	TSA
8. Address increasing demand on the justice system	Courts maintenance	CMD
	Justice and human services case management system	CSC
	Justice and human services integrated planning and delivery	JCS
	Justice delivery in areas of growth*	JDG
	Justice diversionary policy and programs	JDP
	Justice family violence response	JFV
	Justice and human services joint planning	JHS
	Justice CBD legal precinct	JLP
	Justice service delivery through new technology	JSD
	Mental health & alcohol and other drug (AOD) acute and community facilities*	MHA
	Justice delivery in regional areas	MJC
	Mobile police and justice workforce	MPW
	New or expanded forensic health facility	NEF
	New or expanded men's prison	NMP
	New or expanded women's prison	NWP
Police complexes*	PSS	
9. Provide access to high-quality education infrastructure to support lifelong learning	Early childhood education availability	ECE1
	Early childhood education centralised planning model	ECE2
	Early childhood education corporate office facilities	ECE3
	Enhanced telecommunications performance	ETP
	Greenfield development sequencing	GFS
	21st century libraries	LLH
	Schools as community facilities	SCF
	School campus utilisation	SCU1
	Education and medical research precincts linking with the private sector	SEP
	School facility use for out of school hours care	SFU
	School infrastructure funding certainty	SIF
	Schools with low performance	SLP
	Schools with low enrolments in rural areas	SLR
	School demand management	SOO
	School regional level maintenance contracts	SRM1
	Unlocking school resources with technology	SRS
School shortages	SSS	

Needs	Options	CODE
	School sector-wide planning information	SSW
	School and tertiary education cooperation	STE
	TAFE recapitalisation	TAF
	Vocational education long-term funding certainty	VEL
10. Meet growing demand for access to economic activity in central Melbourne	Avalon Airport bus dedicated road priority	AAB
	Avalon airport high capacity transport shuttle	AAH
	Activity-based modelling	ABM
	Automated vehicle technology	ACT
	Advanced driver assistance applications	ADA
	Altona Loop rail duplication	ALD
	Advanced traffic management	ATM
	Big data leveraging	BDL
	Bicycle highways through the central city	BHT
	Bendigo rail full metropolitan separation	BRF
	Burnley rail group upgrades	BRG
	Bicycle and walking path data capture	BWP1
	Bicycle and walking path expansion and improvement*	BWP2
	Bicycle and walking path separation*	BWP3
	Central city job cap	CCJ
	Cross city road tunnel	CCR
	Central city tram network extension*	CCT
	City loop reconfiguration*	CLR
	Car parking management	CPM
	Clyde rail extension*	CRE
	Key movement corridor incident management	CRR1
	Central regional rail control centre	CRR2
	Doncaster bus improvement	DBI
	Driverless car and ride sharing	DCR
	Doncaster heavy rail line	DHR
	Doncaster tram service	DTS
	Employment outside central city incentivisation	EOC
	Eastern freeway to CityLink connection*	EWE
	CityLink to Western Ring road connection*	EWW
	Flemington Racecourse rail line activation	FRA
	Growth area train station upgrade and provision	GAT
	Government data sharing	GDS
	Geelong fast rail	GFR
	Gippsland-Pakenham rail shuttle	GPR
	Geelong rail electrification*	GRE
	Geelong and Werribee rail upgrade*	GWR
	High capacity trains - 10 car*	HCT2
	High capacity trains - 7 car*	HCT3
	High capacity trams*	HCT4
	Hoddle Street/Punt Road public transport prioritisation	HSP1
	Punt Road traffic management systems	HSP2
	High speed rail from Sydney to Melbourne	HSR
	Increased telecommuting	ITT
Melbourne Airport bus dedicated road priority	MAB	
Melbourne Airport heavy rail line*	MAH	
Mobility as a service	MAS	

Needs	Options	CODE
	Metropolitan bus network reform	MBN
	Multi-modal interchange improvements	MII
	Metropolitan level crossing removal completion*	MLC
	Melbourne Metro 2*	MMS
	Mildura passenger rail restoration	MPR
	Metropolitan rail capacity upgrades*	MRC
	Melton rail electrification	MRE1
	Metropolitan rail station interchange upgrades*	MRI
	New underground metro rail system	NUM
	Public transport train timetabling	PTT
	Rowville heavy rail line	RHR
	Road asset management reform	RMF
	Regional rail capacity upgrades*	RRC
	Regional rail eastern corridor dedicated rail track*	RRE1
	Regional rail electrification	RRE2
	Regional rolling stock expansion*	RRS
	Road space allocation changes	RSA
	Rail signals and fleet upgrade*	RSF
	Strategic transit-oriented centres and corridors *	STO
	South Yarra Metro station	SYM
	Tram network extensions	TNE
	Real time public transport information	TNI
	Transport network price regime*	TNP
	Train platform utilisation	TPU
	Torquay rail extension	TRE
	Train station car parking improvement	TSC
	'Travelsmart' programs	TSP
	Tram and train fleet modifications	TTF
	Compact urban development*	UDC
	Victorian data analytics centre	VDA
	Wallan rail electrification*	WRE1
	Wollert rail extension	WRE2
	Water taxis/buses/ferries to the central city	WTB
Wyndham Vale to Werribee rail extension*	WVW	
11. Improve access to middle and outer metropolitan major employment centres	Activity-based modelling	ABM
	Advanced driver assistance applications	ADA
	Active established areas	AEA
	Arterial road network employment centre enhancements*	ARN
	Big data leveraging	BDL
	Bendigo rail full metropolitan separation	BRF
	Bicycle and walking path data capture	BWP1
	Bicycle and walking path expansion and improvement*	BWP2
	Bicycle and walking path separation*	BWP3
	Clyde rail extension*	CRE
	Key movement corridor incident management	CRR1
	Driverless car and ride sharing	DCR
	Employment outside central city incentivisation	EOC
	Eastern freeway to CityLink connection*	EWE
	CityLink to Western Ring road connection*	EWV
	Growth area train station upgrade and provision	GAT

Needs	Options	CODE
	Government data sharing	GDS
	Growth area bus service expansion	LBS
	Melbourne Airport bus dedicated road priority	MAB
	Melbourne Airport heavy rail line*	MAH
	Melbourne Airport metropolitan public transport connections	MAM
	Mobility as a service	MAS
	Metropolitan bus network reform	MBN
	Multi-modal interchange improvements	MII
	Metropolitan level crossing removal completion*	MLC
	Metropolitan rail capacity upgrades*	MRC
	Melton rail electrification	MRE1
	Metropolitan rail station interchange upgrades*	MRI
	Employment centre mass transit network *	MTN
	North East Link*	NEL
	Outer metro arterial roads*	OMA
	Outer metropolitan ring road*	OMR
	Public transport train timetabling	PTT
	Residential and commercial property densification	RCP
	Rowville heavy rail line	RHR
	Road asset management reform	RMF
	Road space allocation changes	RSA
	Integrated government service and infrastructure planning	SIP
	SmartBus network extensions and service increases	SNE
	SmartBus service provision increase	SSP
	Strategic transit-oriented centres and corridors*	STO
	Tram network extensions	TNE
	Tram network link extensions	TNL
	Transport network price regime*	TNP
	Train station car parking improvement	TSC
	'Travelsmart' programs	TSP
	Compact urban development*	UDC
Victorian data analytics centre	VDA	
12. Improve access to jobs and services for people in regional and rural areas	Avalon Airport bus dedicated road priority	AAB
	Avalon airport high capacity transport shuttle	AAH
	Access to services through technology and ICT	AST
	Bendigo-Ballarat-Geelong rail revival	BBG
	Bendigo rail full metropolitan separation	BRF
	Bicycle and walking path data capture	BWP1
	Central regional rail control centre	CRR2
	Community space statewide event planning	CSS2
	Digital health embedded across the health system*	EEA
	Enhanced telecommunications performance	ETP
	Government data sharing	GDS
	Geelong fast rail	GFR
	Gippsland-Pakenham rail shuttle	GPR
	Geelong rail electrification*	GRE
	Geelong and Werribee rail upgrade*	GWR
	Health care alternative delivery options	HCA
	Health care patient subsidised travel program extension	HCP
	High speed rail from Sydney to Melbourne	HSR

Needs	Options	CODE	
	Justice and human services integrated planning and delivery	JCS	
	Justice service delivery through new technology	JSD	
	21st century libraries	LLH	
	Mobility as a service	MAS	
	Justice delivery in regional areas	MJC	
	Mildura passenger rail restoration	MPR	
	Mobile police and justice workforce	MPW	
	Public transport alternative use of taxis or hire cars	PTA	
	Regional bus upgrades	RBU	
	Regional coach upgrades	RCU	
	Regional highway upgrades*	RHU	
	Road asset management reform	RMF	
	Regional metro rail service	RMR	
	Regional rail capacity upgrades*	RRC	
	Regional rail eastern corridor dedicated rail track*	RRE1	
	Regional rail electrification	RRE2	
	Regional rail gauge standardisation	RRG	
	Regional rolling stock expansion*	RRS	
	Regional road upgrades	RRU	
	Regional train link upgrades	RTL	
	Schools as community facilities	SCF	
	Integrated government service and infrastructure planning	SIP	
	Unlocking school resources with technology	SRS	
	Technology enabled health care	TEH	
	Torquay rail extension	TRE	
	'Travelsmart' programs	TSP	
	13. Improve the efficiency of freight supply chains	Activity-based modelling	ABM
		Advanced traffic management	ATM
Bendigo-Ballarat-Geelong rail revival		BBG	
Beveridge intermodal freight terminal		BIF	
Central regional rail control centre		CRR2	
Driverless freight vehicles		DFV	
Employment outside central city incentivisation		EOC	
Eastern freeway to CityLink connection*		EWE	
CityLink to Western Ring road connection*		EWW	
Freight consolidated centres		FCC	
Freight precinct land use planning		FPL	
High productivity freight vehicle network completion*		HPF	
Intermodal freight hubs for regional Victoria		IFH	
Melbourne Airport new road link		MAN	
Melbourne to Brisbane freight rail line		MBF	
New port		NCP	
North East Link*		NEL	
Outer metro arterial roads*		OMA	
Outer metropolitan ring road*		OMR	
Port of Melbourne container terminal expansion		PMC	
Port of Melbourne rail shuttle		PMM	
Regional highway upgrades*		RHU	
Regional rail eastern corridor dedicated rail track*		RRE1	
Regional rail gauge standardisation		RRG	

Needs	Options	CODE
	Transport network price regime*	TNP
	Victorian data analytics centre	VDA
	Webb Dock freight rail access	WDF
	Western Interstatefreight Terminal*	WIF
14. Manage threats to water security, particularly in regional and rural areas	Domestic greywater recycling	DGR
	On-farm water efficiency	OFU
	Recycled treated wastewater for non-potable agricultural use	RTA
	Recycled treated wastewater for non-potable use	RTH
	Recycled treated wastewater for drinking *	RWW
	Stormwater harvesting and re-use	SRH
	Recycled treated wastewater for non-potable peri-urban agricultural use	TWR
	Water delivery efficiency in irrigation	WDE
	Wonthaggi desalination plant expansion*	WDP
	Water infrastructure optimisation through increased network connectivity	WIO1
	Water infrastructure optimisation through governance arrangements	WIO2
	Water market development	WME
	Water pricing reform	WPR
	Water supply augmentation*	WSA1
Water supply augmentation through building new dams	WSA2	
Waste water system augmentation in high growth areas	WWS	
15. Manage pressures on landfill and waste recovery facilities	E-waste services	EWS
	Energy generation from waste	EGW
	Waste landfill site land buffers	FLS
	Future waste management and landfill site locations	FWL
	Household waste disposal fees*	HWD
	Landfill waste levy increase	LLI
	Landfill site consolidation	LOC
	Organic waste management	OWM
16. Help preserve natural environments and minimise biodiversity loss	Recycled material usage in building construction	RMU
	Environmental water delivery infrastructure	EWD
	Habitat corridor link expansion and improvement	HCL
	National park access management	NPA
	Park pricing and expenditure regime	NPP1
	National park private management	NPP2
	National park asset planning	NPP3
	Riparian fence investment	RFI
17. Improve the health of waterways and coastal areas	Stormwater quality management	SRQ
	Green infrastructure	UFF
	Environmental water delivery infrastructure	EWD
	Park pricing and expenditure regime	NPP1
	On-farm water efficiency	OFU
	Riparian fence investment	RFI
	Recycled treated wastewater for non-potable agricultural use	RTA
	River and waterways natural flow regimes	RWN
Stormwater harvesting and re-use	SRH	
Stormwater quality management	SRQ	
Green infrastructure	UFF	

Needs	Options	CODE
	Waterway infrastructure to remove pollutants	WIR
	Wastewater management in small towns	WMS
18. Transition to low carbon energy supply and use	Ageing coal generation asset transition	ACG
	Active established areas	AEA
	Alternative energy vehicles	AEV
	Brown coal generator auction	BCA
	Brown coal licences	BCL
	Coal fired electricity plant conversion to gas fired plant	CFE
	Community wind farms	CWF
	Energy use efficiency	EDM1
	Energy demand management tariff reform	EDM2
	Energy efficient development	EED
	Energy generation from biomass	EGB
	Expansion of gas as an energy source	EGE
	Energy generation from waste	EGW
	Electricity network infrastructure capability	ENI
	Energy storage infrastructure	ESI
	Geothermal power supply	GPS
	Integrated power supply augmentation	IPS
	Local solar energy generation	LSE
	Nuclear plant construction	NPC
	Organic waste to energy	OWE
	Organic waste management	OWM
	Small scale solar energy regulation	SSE
	Tidal and wave energy	TWE
	Wind and solar energy generation large scale investments	WSE
19. Improve the resilience of critical infrastructure	Activity-based modelling	ABM
	Big data leveraging	BDL
	Critical asset centralised risk management	CAR
	Courts maintenance	CMD
	Coastal protection infrastructure*	CPI
	Key movement corridor incident management	CRR1
	Central regional rail control centre	CRR2
	Cyber security breach contingency planning	CSB
	Data centre location planning	DCD
	Enhanced cyber security	ECS
	Emergency traffic management	ETM
	Enhanced telecommunications performance	ETP
	Fuel reserve regulation	FRR
	Government data sharing	GDS
	Infrastructure resilience assessment test	IRA
	Integrated transport control centre	ITC
	Metropolitan level crossing removal completion*	MLC
	New port	NCP
	Public transport network resilience	PTN
	Relocatable community infrastructure	RCI
	Victorian data analytics centre	VDA
	Western and Eastern treatment plant resilience	WET

The options – summary assessments



Avalon Airport bus dedicated road priority

AAB

Option type

Incremental expansion of existing assets

Location

Geelong regional city, Barwon region

Melbourne central subregion and Melbourne western subregion

Melbourne – Geelong state-significant transport corridor

Sector

Transport

Certainty of evidence

Low

Direct option cost

\$100 million–\$250 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 10: Meet growing demand for access to economic activity in central Melbourne; and

Need 12: Improve access to jobs and services for people in regional and rural areas

Very Low	Very Low	Very Low	Very Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Implement on-road priority bus services for the entire journey connecting Southern Cross Station and Geelong Station with Avalon Airport. Interventions could include dedicated bus lanes on arterial roads and freeway access ramps, managed motorway lane priority or dedicated lanes, and bus traffic light priority. Currently a limited number of private bus services link the airport with Geelong and the Surf Coast and central Melbourne.

This option would enable the bus service to bypass road congestion and run efficient connection services. Improved priority would enable bus services to maintain optimal performance and increase mode share, providing enhanced access for people to connect with flights at Avalon Airport.

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option was not recommended in the strategy because our assessment is that current and forecast demand will be too low to support the reallocation of road space from general road users to exclusive use for bus services between central Melbourne and Avalon Airport.

Overall this option was found to provide a very low contribution to meeting needs 10 and 12 and had negative economic and social impacts. In the longer term, future developments in automated vehicles may eliminate the need for dedicated lanes on the Princes Freeway for high capacity vehicles such as buses. Alternative proposals for improving public transport access to Avalon, for example, a bus link from Lara Station, may warrant further investigation in future Infrastructure Victoria strategy updates if patronage growth increases above forecasts.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

A rail connection to Avalon Airport is identified in the G21 Plan. This option contributes to policy directions to improve transport links.

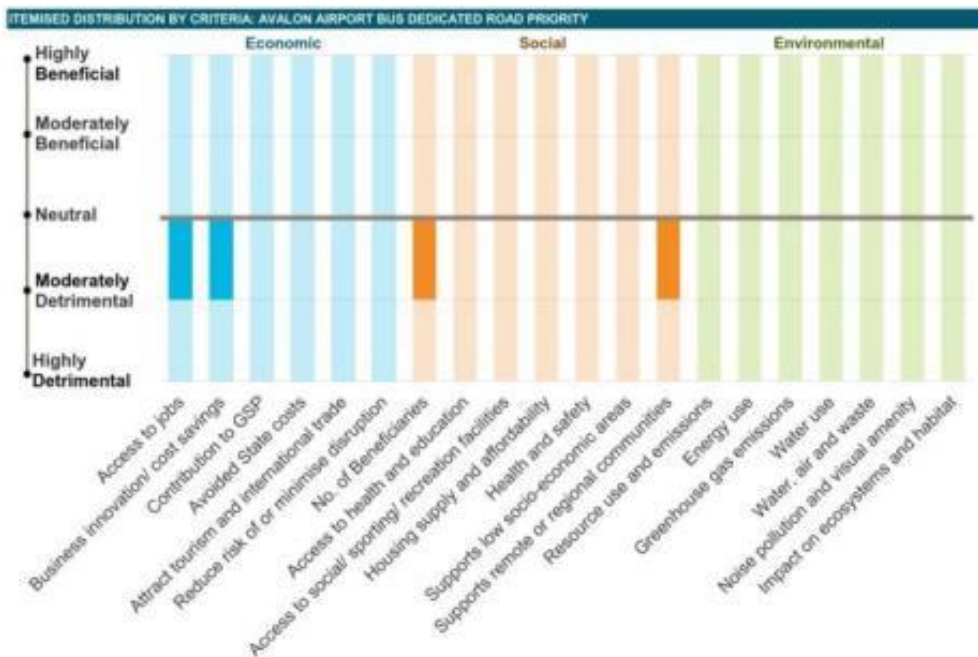
How does this option perform under different scenarios?

Supercity	+	Supports mode shift to address congestion
Westside Story	+	Supports mode shift to address congestion
Regional Cities	+	Supports mode shift to address congestion
Accelerated Climate Change /Mitigation	Neutral	
Prolonged/ Severe Economic Downturn	-	Less demand for mass transit and air travel
Biosecurity Threat	Neutral	

How does this option work with others?

This option is an alternative to the Avalon Airport high capacity transport shuttle (AAH). It should not proceed together with AAH.

What are the economic, social and environmental impacts of this option?



Commentary:

On-road priority bus services will benefit those who travel to Avalon Airport. However, these services will displace other road users by occupying a highway lane. As the relative demand for trips between Geelong and Melbourne is much higher than the demand for services to Avalon Airport, this option is expected to reduce access to jobs and social infrastructure.

Risks and opportunities

On-road priority including dedicated bus lanes could have negative impacts on road travel for other users. Future patronage levels may be too low to support a prioritised service.

Improved accessibility and decreased travel time to and from central Melbourne for Avalon Airport customers could result in a potential increase in patronage for Avalon Airport.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Avalon Airport, *Avalon Airport master plan*, 2015

Avalon airport high capacity transport shuttle

AAH

Option type

New assets

Location

Geelong regional city, Barwon region

Melbourne – Geelong state-significant transport corridor

Sector

Transport

Certainty of evidence

Medium

Direct option cost

\$100 million–\$250 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 10: Meet growing demand for access to economic activity in central Melbourne

Very Low	Very Low	Very Low	Very Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

Need 12: Improve access to jobs and services for people in regional and rural areas

Low	Low	Low	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Construct a high capacity transport shuttle between a new station on the existing Melbourne – Geelong rail line and Avalon Airport. This will enable passengers on existing V/Line services from Southern Cross Station and Geelong to connect with the airport.

Initially a timetabled bus service will run on the new link to match the train schedule. As demand increases this service would be upgraded to a bus rapid transit frequency service. Should the demand exceed the capacity of this rapid transit service, a shuttle connection would then replace the road connection. Construction of the high capacity transport shuttle will provide fast and efficient public transport access to Avalon Airport and support future expansion of the terminal.

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option was not recommended in the strategy because our assessment is that current and forecast demand projections will be too low to warrant the cost of the construction of a dedicated high capacity public transport service between Avalon Airport and a new station on the Geelong rail line. This option has the potential to be required in the longer term. Changes in demand projections and the role that the private operator may play in delivering high capacity public transport links to Avalon Airport should be monitored. A land reservation for a new transport corridor is in place, which appropriately keeps this option open for the longer term. Alternative proposals for improving public transport access to Avalon, for example, a bus link from Lara Station, may warrant further investigation in future Infrastructure Victoria strategy updates if patronage growth increases above forecasts.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Consistent

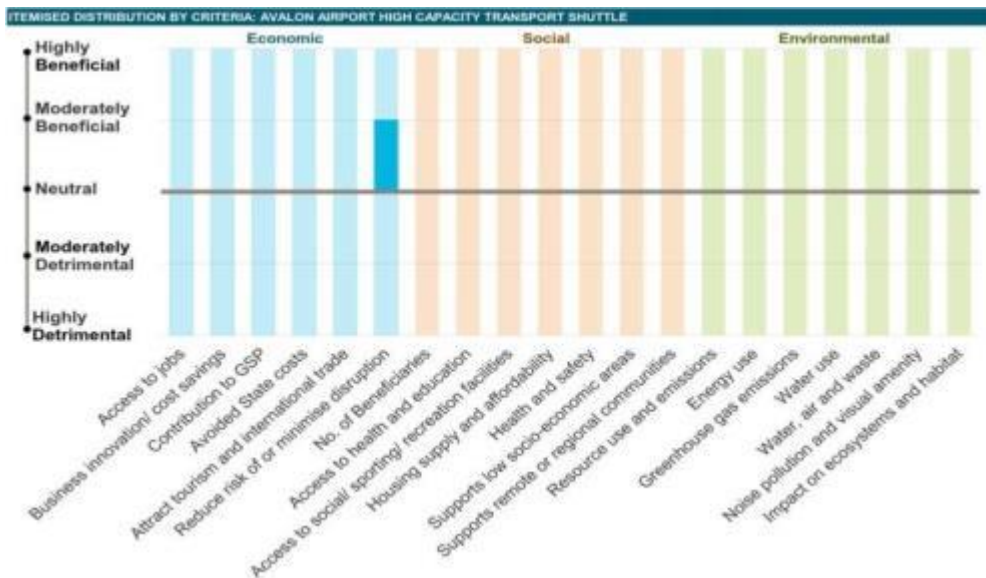
How does this option perform under different scenarios?

Supercity	+	Supports mode shift to address congestion
Westside Story	+	Supports mode shift to address congestion
Regional Cities	+	Supports mode shift to address congestion
Accelerated Climate Change /Mitigation	Neutral	
Prolonged/ Severe Economic Downturn	-	Less demand for mass transit and air travel
Biosecurity Threat	Neutral	

How does this option work with others?

This option is an alternative to Avalon Airport bus dedicated road priority (AAB). It should not proceed together with AAB.

What are the economic, social and environmental impacts of this option?



Risks and opportunities

There are risks from undertaking construction in an existing operational rail corridor that would need to be managed during the option delivery phase.

The scope of the option allows for expansion of the service to respond to demand as it happens.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Victorian Government, *Avalon Airport Rail Link planning study*, 2014

Avalon Airport, *Avalon Airport master plan*, 2015

Activity-based modelling ABM

Option type

Better use through information

Location

Statewide

Sector

Transport

Certainty of evidence

Low

Direct option cost

\$1 million–\$10 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 10: Meet growing demand for access to economic activity in central Melbourne; and

Need 11: Improve access to middle and outer metropolitan major employment centres; and

Need 13: Improve the efficiency of freight supply chains

Low	Low	Low	Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

To support long-term transport planning, the government needs to develop and maintain enhanced modelling capability for Victoria. This will enable improved strategic modelling of future transport system functioning, including the operation of driverless vehicles and the impact of pricing policies that vary by time of day. This could involve tour-based modelling, potentially as a first step, or activity-based modelling. Further assessment is required to identify the requirements and the best tools. The models are assumed to be available for use by the private sector under a similar arrangement to the Victorian integrated transport model (VITM). Tour-based modelling explores the movement of people between activities as groups of common activities (by travel zones). These models provide less focus on the individual activities and more on ‘trip chains’ where people may travel to multiple places in sequence for different purposes (e.g. travel to the shops on the way home from work). Activity-based modelling would go to a greater level of detail, where instead of allowing broad movements of people between different activities, individuals are modelled more closely.

What is the level of community support?

There was limited discussion of this option during public consultation.

What do we think of this option and why?

This option was recommended in the strategy (ref. 10.2.1, 11.2.1 and 13.1.1) because it has the potential to strengthen the evidence base for future development of transport and land use policies. In addition, it can improve the effectiveness of government investment and provide better value to taxpayers. Although its direct impact against the needs was deemed to be low, this relatively low cost option nonetheless would improve the capability of the state to plan effectively for the future. Activity-based modelling technologies can better simulate, and thus better support, the development of a more integrated and automated transport system than existing ‘four-step’ transport models currently used by government.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

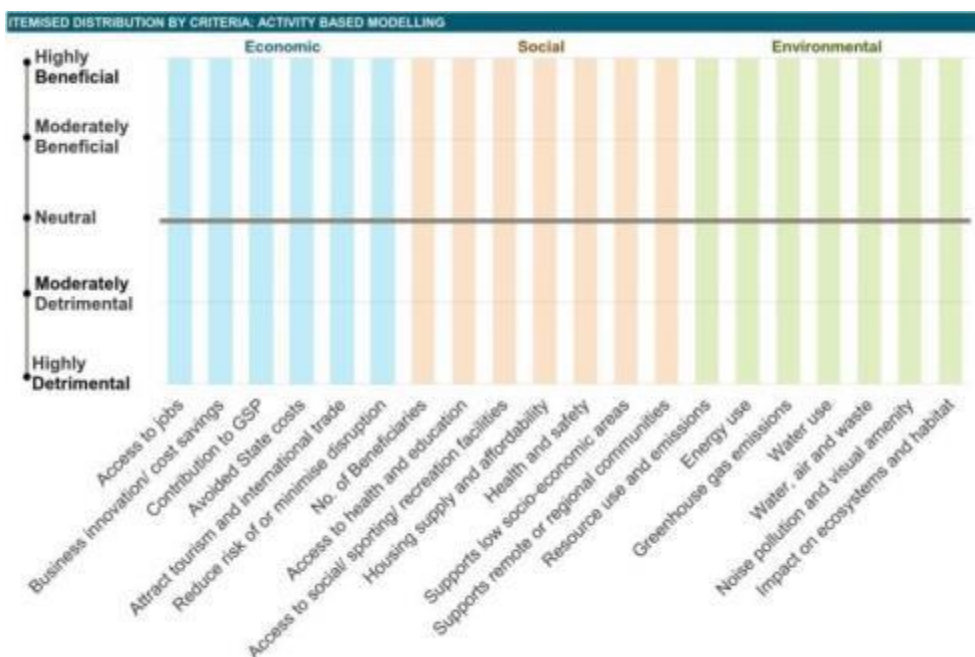
How does this option perform under different scenarios?

Supercity	+	Improved planning capability
Westside Story	+	Improved planning capability
Regional Cities	+	Improved planning capability
Accelerated Climate Change /Mitigation	+	Improved planning capability
Prolonged/ Severe Economic Downturn	+	Improved planning capability
Biosecurity Threat	+	Improved planning capability

How does this option work with others?

This option complements those options involving transport planning and integrated land use and transport, in that it can better simulate travel behaviour at a household level, and across an average day.

What are the economic, social and environmental impacts of this option?



Commentary:

No net impacts identified.

Risks and opportunities

There is a risk this model may not be widely accepted as a tool to be used in business cases.

An opportunity from this option would be the interaction between models in the future, increasing its potential benefits.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Aged care facility expansion ACF

Option type

Incremental expansion of existing assets

New assets

Location

Statewide

Sector

Health and human services

Certainty of evidence

Medium

Direct option cost

>\$10 billion

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 3: Respond to increasing pressures on health infrastructure, particularly due to ageing

Significant	Significant	Significant	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option seeks to respond to the growing need for aged care residential support by providing new purpose-built residential care facilities and facilities to support people staying in their homes, such as day activity centres and short stay (respite) facilities. The current demand for residential aged care is largely met by the non-government sector (divided evenly between not-for-profit and for-profit providers) and this is expected to continue. The main capital expenditure for government will therefore be replacement of existing public facilities as they become obsolete.

The demand for residential aged care facilities will significantly increase to support the care needs of the ageing population throughout Victoria. Using population forecasts and current aged care bed ratios, it is anticipated that the equivalent of at least 2,300 additional beds will be required per year over the next 30 years.

What is the level of community support?

There was limited discussion of this option during public consultation. This may be as it was not recommended in the draft strategy. An earlier version of this option Aged care and mental health residential care investment (ACM) generated a moderate level of discussion of this option, and responses were generally positive. Both citizen juries made recommendations in support of ACM.

What do we think of this option and why?

This option was not recommended in the strategy because the action required by government was considered to be business as usual. There will continue to be a need for state government to provide aged care beds in limited circumstances. This is particularly where there are few alternatives and to support people with complex physical/mental health needs that the non-government aged care sector cannot meet under existing arrangements. Government and the private sector are currently meeting the overall requirement for aged care facilities and there is no evidence that supports the need for an altered approach. We will monitor this in the development of future Infrastructure Victoria strategy updates.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

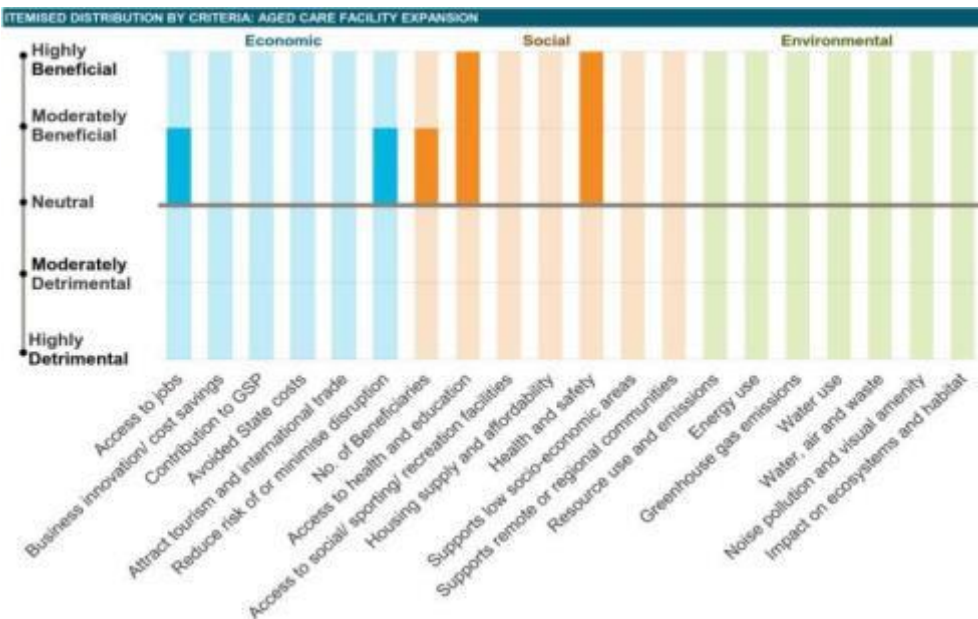
How does this option perform under different scenarios?

Supercity	+	Increased demand
Westside Story	+	Increased demand
Regional Cities	+	Increased demand
Accelerated Climate Change /Mitigation	Neutral	
Prolonged/ Severe Economic Downturn	Neutral	
Biosecurity Threat	+	As involves health facilities that will be affected

How does this option work with others?

The option urban planning and approvals processes for health facilities (UPA) is a significant enabler for this option, as is health care not-for-profit and private sector involvement (HAP).

What are the economic, social and environmental impacts of this option?



Commentary:

A large capacity expansion in aged care services is expected to improve access to jobs with high labour demands. This option may also reduce demands on resources in other areas of the health system, such as hospitals.

Risks and opportunities

The primary risk associated with this option is that land cannot be secured for the development of residential facilities that enable people to remain in their communities and have the necessary access to services. In developing new facilities in established areas, aged care providers will be competing with residential developers for the same sites.

Another risk for this option is that a potential mismatch arises between the type of facilities available and the community's needs. With developments in technology, medical research and health service delivery, more people may be able to stay in their homes and residential facilities will be predominantly for people with more complex physical or mental health needs. In geographical locations that are not attractive to the private sector to provide services, government may have to continue to fund the capital development of a percentage of facilities.

Additional notes

Demand forecast

Using population forecasts and aged care bed ratios, it is forecast that the equivalent of at least 2300 additional beds will be required per year over the next 30 years. The figure has been developed by applying population growth forecasts to the commonwealth aged care provision ratio in a residential setting, which nominates a ratio of 80 beds per 1,000 persons aged 70 years or older. In support of the increasing focus on providing appropriate infrastructure to age in the home, an increased number of facilities to cater for day activities and short stay (respite) will also be required.

There is a high level of uncertainty in projecting aged care bed numbers over a 30-year period. Depending on assumptions adopted the number could significantly alter. For example, if it is assumed that people live in their homes to an older age in the future, the need for additional beds per year reduces. Alternatively if people start to live longer once they enter residential aged care facilities, or the forecasting is based on the 85 years and older cohort (who make up the majority in aged care residential facilities) the figures would increase. We have adopted the 2,300 figure as reflective of what will be required in the shorter term and a likely scenario for the longer term.

While the current demand is largely met, it is anticipated that in the 0-10 year period, there will be a need for investment in inner and northern metropolitan Melbourne, western metropolitan Melbourne, the Hume region and the Grampians region. Facilities would be initially targeted at the 'demand gap' areas noted above and then provided in future areas of demand, provided at a rate to match aged population growth.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Victorian Department of Health and Human Services, *Statewide system design, service and infrastructure plan for Victoria's health system, Stakeholder discussion paper*, 2016

Ageing coal generation asset transition ACG

*Option ACG is addressed in BCL – Brown coal
licences*



Aged care and mental health residential care investment ACM

Option ACM is addressed in MHA – Mental health and alcohol and other drugs (AOD) acute and community facilities and ACF – Aged care facility expansion

Automated vehicle technology ACT

Option type

Better use through technological innovations
Better use through regulation

Location

Statewide

Sector

Transport

Certainty of evidence

Low

Direct option cost

\$10 million–\$25 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 6: Improve accessibility for people with mobility challenges; and

Need 10: Meet growing demand for access to economic activity in central Melbourne

Very Low	Very Low	Low	Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option considers both regulation change to permit the use of automated and driverless vehicle technology on Victorian roads and trials of automated vehicle technology to test how they might operate most effectively in local conditions. This would aim to support the establishment of an effectively regulated market for the roll-out of automated vehicle technologies.

The subsequent uptake of these technologies is expected to improve the performance and efficiency of the road network by improving traffic flow (including minimising disruptive traffic accidents and reducing the need for parking), as well as potentially increasing the carrying capacity of existing road space through shorter following distances and narrower lanes. This will have a range of benefits, including improving the range of mobility options for many people, and enabling more efficient last-mile connections to higher capacity public transport (to better support multi-modal travel).

What is the level of community support?

There was a moderate level of discussion of the recommendation Driverless vehicles, which includes this option. Responses were generally positive.

What do we think of this option and why?

This option was recommended in part in the strategy (ref. 6.2.2 and 10.7.3). Specifically, it is recommended that there be regulatory changes where needed to enable the testing and deployment of driverless vehicles over 0-30 years and support further research and consultation. This would support the development of a national approach to maximising the benefits of this technology for public transport and road users. As industry trials are critical to understanding how these technologies perform in local conditions (particularly in terms of safety), consideration could also be given to what government's role should be in regard to aspects of the transport system over which it has direct oversight.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

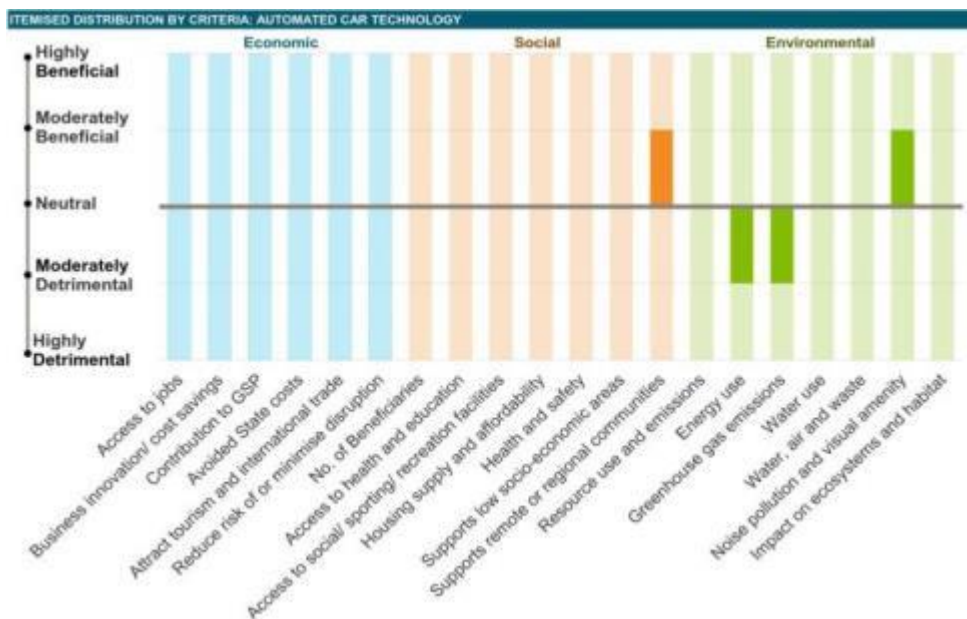
How does this option work with others?

Automated car technology is complementary to those options proposing to build new road links (particularly motorways) or upgrade existing ones. It has the potential to increase road capacity beyond its current limits by enabling shorter following distances, faster motorway speeds and even narrower lanes. However, it should be complemented with transport network pricing (TNP), which can work to contain potential rebound effects in terms of travel demand.

How does this option perform under different scenarios?

Supercity	++	Improves access, transport options
Westside Story	++	Improves access, transport options
Regional Cities	++	Improves access, transport options
Accelerated Climate Change /Mitigation	+	Smoother traffic flows (depends on containing induced demand)
Prolonged/ Severe Economic Downturn	+	Reduced reliance on vehicle ownership
Biosecurity Threat	+	More capacity for road vehicles

What are the economic, social and environmental impacts of this option?



Risks and opportunities

This technology may require infrastructure across the whole network to be effective. It will require a new regulatory framework to encompass safety, liability, and other factors, which may not foresee all potential legal issues. A final risk is the possibility that there will be a shift from active transit modes (walking and bicycle) to road transit, which may have human health and climate implications.

There is an opportunity to connect services of large driverless buses to mass public transit and active transport hubs, as well as run large driverless buses along high demand roads, including freeways.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then the timing of this recommendation has been changed from 0-15 years to 0-30 years, based on new evidence that the shift to a fully driverless fleet on all roads will be more gradual, with limited deployment to parts of the network beginning around 2030. We have also changed the scope to include public transport in response to feedback that these vehicles could be available to the market at the same time or even earlier than cars.

Discussion on future application of this technology

At lower uptake levels driverless vehicles can play a role in supporting multi-modal travel and shared mobility (increased vehicle occupancy), while reducing traffic disruptions and improving traffic flow on motorways. At higher levels of uptake driverless vehicles have the potential to significantly increase road network capacity (through narrower lanes, faster speeds on motorways but with shorter following distances, etc.).

Fully driverless vehicles also have the potential to offer greatly improved mobility to those who would otherwise be unable or unwilling to operate a motor vehicle themselves – this includes children, the elderly, the disabled, and other vulnerable transport users. The downside, however, of this increased potential for mobility is the impact it might have on road network capacity, i.e. it could increase the overall amount of travel being taken using motor vehicles. Similarly, the fact that the users of driverless vehicles would no longer be required to drive, but could undertake other activities while on the road, could encourage people to take longer or more trips, since time in the car is no longer ‘lost’ time for users. People could even use vehicles to undertake non-passenger errands (i.e. empty running), which could also contribute to a significant expansion in car travel and possibly worsen road congestion. This could happen regardless of how large or small the vehicle fleet is, i.e. reducing the number of cars people actually own (as they could instead pay per-use) will not necessarily result in less congestion. The fleet could radically shrink but the actual number of cars on the road at any one time, and the amount of overall car travel per day, could nonetheless increase, undercutting the mobility benefits of driverless technology.

Transport Modelling

Infrastructure Victoria commissioned KPMG, Jacobs and Arup to undertake transport modelling for a number of options being considered for the strategy, including a variety of ‘build’ and ‘non-build’ transport options. This allowed major transport projects to be quantitatively assessed alongside several technology, policy and reform options. In addition, economic analysis was undertaken for the ‘build’ options to estimate a cost benefit ratio. The options were modelled individually, mostly on a standalone basis, with a number of options then also tested in various combinations.

This analysis was undertaken on a different basis and produced different results to what is presented throughout the options book, which was prepared by AECOM/PWC with the intention of allowing a mixture of qualitative and quantitative assessment across the full range of options, across all sectors and needs. While on the face of it these two analyses reference similar metrics, different assumptions and methodologies have been applied. In particular, the KPMG/Jacobs/Arup assessment provided purely relative ratings of each option's contribution to the needs, with the

ratings scale set by the performance of only the select range of options modelled. This had the result of showing some transport options as making a “high” contribution to Need 18 (transition to lower carbon energy supply and use) simply because they were the highest of the options modelled; however, in Infrastructure Victoria’s judgement most transport sector options will make a much lower contribution than energy sector options, as transport comprises a much smaller proportion of total carbon emissions. It provides a useful assessment for sorting the relative contribution of the options modelled, but should not be taken as an absolute assessment. In contrast, the assessments developed in the AECOM/PwC assessment considered the full range of options identified for each need and provided more of an ‘absolute’ assessment.

With these caveats in mind, however, the results of this alternative analysis are helpful inputs into Infrastructure Victoria’s ‘global’ assessment, and in preparing the strategy we have come to a considered view based on the totality of evidence available to us.

In terms of the KPMG/Jacobs/Arup analysis of this option, a number of different scenarios were run to test the impact of autonomous vehicles in 2046, including if the automated vehicles were electric and if they were operated as ‘robo-taxis’. One noteworthy result for automated vehicles not running as robo-taxis was the significant increase in vehicle kilometres travelled and even mode shift away from public transport, whereas robo-taxis tended to see a reduction in vehicle kilometres travelled and mode shift towards public transport. The increase in capacity of motorways assumed in the modelling resulted in significant improvements in travel times and travel time reliability, even with higher vehicle kilometres travelled. The most positive impact was achieved when automated vehicles were modelled as robo-taxis and subject to road network pricing. The scale and geographic extent of these positive impacts were significantly greater than any of the build scenarios modelled.

For more detail, consult the ‘Economic appraisal and demand modelling’ report to Infrastructure Victoria.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria’s draft 30-year infrastructure strategy*, 2016

KPMG/Arup/Jacobs, *Economic appraisal and demand modelling*, 2016

Advanced driver assistance applications ADA

Option type

Better use through regulation

New assets

Location

Statewide

Sector

Transport

ICT

Certainty of evidence

Medium

Direct option cost

\$100 million–\$250 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 10: Meet growing demand for access to economic activity in central Melbourne; and

Need 11: Improve access to middle and outer metropolitan major employment centres

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option would seek to amend regulation to enable both investment in connected vehicle technology and conduct of trials to support advanced driver assistance systems (ADAS) applications such as driver safety warnings and real-time information about traffic conditions.

Connected vehicle technology involves the use of ICT to enable road vehicles to receive and send real-time information automatically (e.g. from roadside transmitting units). Drivers can receive advice about optimal route options, speed, and road hazards, but also information to avoid the immediate risk of collision with other vehicles (e.g. to supported automated braking systems). This latter functionality requires the availability of ICT technology with minimal latency (i.e. near instantaneous data communication). In the shorter term this could be provided by Wi-Fi based digital short range communication from the roadside and between vehicles, or, in the medium term, by improved cellular technology.

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option was recommended in part in the strategy (ref. 10.7.2 and 13.2.3). Specifically, we recommended that regulatory changes be made where they are needed to support the testing and rollout of ADAS, but with trialling to be led and funded by the private sector (as it is not clear what government's role should be in this regard). As vehicle connectivity is a key element of these systems, and will also support the operation of driverless vehicles, the government should consider supporting the establishment of a national certification authority to administer national standards and to provide guidance in regard to the deployment of best-practice technologies supporting vehicle connectivity. The new era of connected and more automated transport will not only save lives but also enable us to make better use of the existing road network.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Consistent

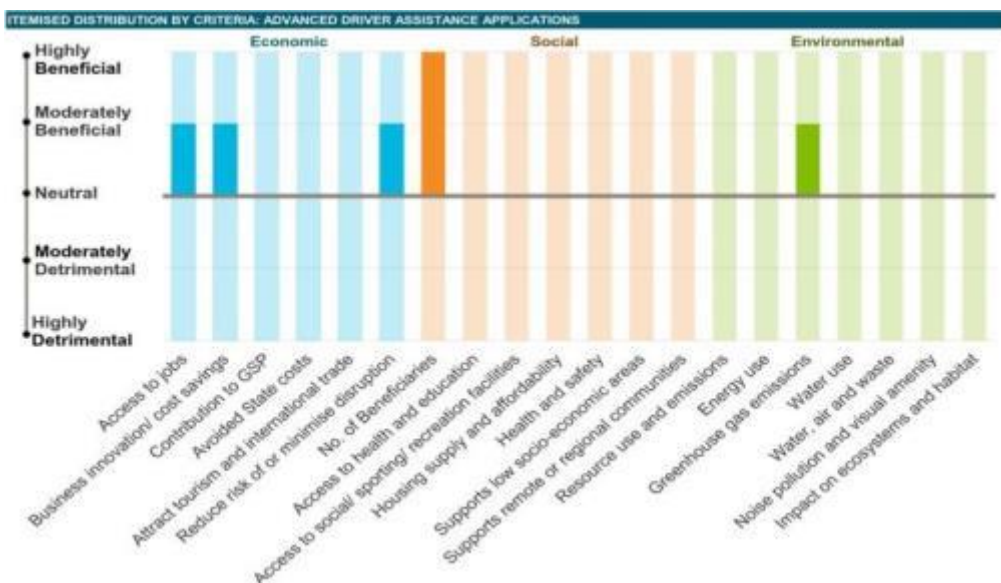
How does this option perform under different scenarios?

Supercity	++	Addresses heightened risk of congestion
Westside Story	++	Addresses heightened risk of congestion
Regional Cities	++	Addresses heightened risk of congestion
Accelerated Climate Change /Mitigation	+	Smoother traffic flows reduces rate of carbon emissions
Prolonged/ Severe Economic Downturn	Neutral	
Biosecurity Threat	+	Improves individual, low risk mobility

How does this option work with others?

This option is complementary to automated vehicle technology (ACT) in that advanced driver assistance technologies will over time converge with automated vehicle technology to support driverless functionality. ADAS will also, as the vehicle fleet becomes more connected, largely take over the role currently performed by advanced traffic systems (ATM).

What are the economic, social and environmental impacts of this option?



Risks and opportunities

There is a risk that driver skill and awareness will decline as a result of implementing this technology. There is also a risk that technology may fail and cause an accident.

ADAS systems can lead to reduced congestion and reduced accidents leading to less pressure on the health system, and could contribute to the Transport Accident Commission's Towards Zero objectives. Taranto, Young and Logan find the full uptake of such technologies (anti-lock braking systems, electronic stability control and GPS based cooperative crash avoidance technologies) could reduce serious injuries by 25-35 per cent.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then the scope of this recommendation has changed to remove reference to roadside units, and focus on the removal of regulatory barriers. This is in response to new evidence about the uncertainty regarding which mix of technologies will play a key role. We, therefore, do not wish to be prescriptive about the potential scope of works.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Taranto, D., Young, K., and Logan, D, *Evaluation of the potential safety benefits of collision avoidance technologies through vehicle to vehicle dedicated short range communications (DSRC) in Australia*, 2011

Active established areas AEA

Option type

Incremental expansion of existing assets

New assets

Location

Statewide

Sector

Transport

Cultural, civic, sporting, recreation and tourism

Certainty of evidence

Medium

Direct option cost

\$50 million–\$100 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 3: Respond to increasing pressures on health infrastructure, particularly due to ageing; and

Need 4: Enable physical activity and participation; and

Need 6: Improve accessibility for people with mobility challenges

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

Need 11: Improve access to middle and outer metropolitan major employment centres; and

Need 18: Transition to low carbon energy supply and use

Low	Low	Low	Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option aims to implement a program of design measures and supporting infrastructure that promote walking and cycling in established neighbourhoods across Victoria which may have not benefited from such planning (such as precinct structure plans) or missed out on infrastructure for active transport during development. This includes the retrofitting of ten conventional car-oriented suburbs with well-connected pedestrian and bicycle infrastructure to offer an alternative to car travel for short and medium distance trips. Priority areas for these types of improvements include suburbs with major yet relatively disconnected (by foot and bicycle) activity generators such as train stations or shopping centres, and with poor health or social indicators. An established suburb with opportunities for better connections is Sunbury, which was used as the basis for costing.

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive. This option was recommended by the metropolitan citizen jury.

What do we think of this option and why?

This option was recommended in part in the strategy (ref. 4.2.1) because our assessment is that it can address physical inactivity and its associated health problems. In addition, retrofitting established suburbs will be necessary to achieve the state's policy of 20-minute neighbourhoods. At this stage, we believe that the cost of implementation in all established areas across the state would be prohibitive. The option costs the retrofitting of ten suburbs, but our recommendation is scaled down to five pilots, three in metropolitan Melbourne and two in regional areas with an estimated total capital cost of around \$30 million, based on the costs of retrofitting central Sunbury. We think that five pilots will provide a strong basis for the evaluation of outcomes, including the types of suburbs best suited for the roll-out and the most effective infrastructure changes. A full program is likely to be more than ten suburbs. The costing for this option may underestimate delivering a program across larger suburbs where land acquisition or bridges could be required.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

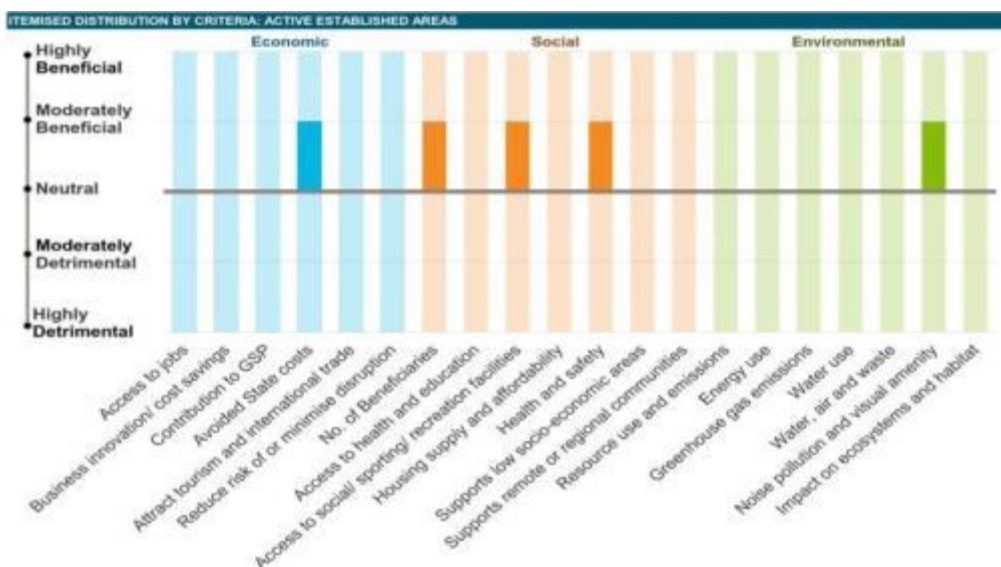
How does this option work with others?

The delivery of expanded and improved bicycle and walking infrastructure (BWP2) or path separation (BWP3) in established areas could substitute the need for this option, or otherwise limit the scope of the works required.

How does this option perform under different scenarios?

Supercity	+	Supports mode shift to address congestion
Westside Story	Neutral	Supports mode shift to address congestion
Regional Cities	+	Supports mode shift to address congestion
Accelerated Climate Change /Mitigation	+	Supports more carbon efficient travel
Prolonged/ Severe Economic Downturn	Neutral	More affordable transport options
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



Risks and opportunities

Areas without existing active infrastructure are likely to be car dependent. This may reduce the mode shift to active and public transport options.

Increased participation through walking may reduce risk of social isolation.

Additional notes

Program design

A key focus of the program would be creating active transport connections between residential areas and commercial and transport hubs. Priority actions for the retrofitting program include:

- Clear designation of cycle lanes within the framework of an interconnected overall bike network.
- Completion of footpaths in residential areas.
- Improvement of footpaths on commercial streets, with attention to width, shade and buffers from traffic.
- Restriping or redesign of intersections to increase the safety of pedestrian and cycle movements.
- Implementation of traffic calming to manage the speed of cars particularly in areas with potential for growth in foot and cycle traffic.
- Road space allocation changes where viable.

The overall costing was developed from retrofitting ten suburban town-centres, based on the assumed costs to implement this option in Sunbury. Sunbury was chosen because:

- It's roughly the same size as a large metropolitan suburb (~6 kilometres across which is comparable to Glen Waverley).
- We have more certainty on where people will walk to (since it is more isolated than regular metropolitan suburbs) and therefore can have more focus on these routes.
- It has clear infrastructure deficits – e.g. missing footpaths.
- It is a lower-SEIFA area and therefore more likely to be prioritised.
- It has a train station and shopping precinct with inconsistent active transport connections to and from the larger surrounding community.

Health criteria for identifying sites for the five pilots

Recent research suggests that neighbourhoods with destinations within walking distance facilitate higher rates of walking. In addition, those living in areas with strong neighbourhood connectivity have higher rates of physical activity than those living in neighbourhoods that do not. As an important focus of this option is the health outcomes, Heart Foundation data and related Victorian Heart Maps could be used to consider pilot sites by the risk factor of 'insufficient exercise'.

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then the scope of this recommendation has been expanded from three to five pilots – three in metropolitan Melbourne and two in regional areas. This responds to feedback from regional stakeholders that a pilot program should include their communities. We have also refined the wording to remove reference to the Commonwealth Smart Cities' Plan, as it did not align to neighbourhood level access but rather access to jobs.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Heart Foundation, Action area 4: Active Transport in *Blueprint for an active Australia*, 2nd edition, 2014.

Giles-Corti, Foster, Koohsari, Francis, and Hooper, The influence of urban design and planning on physical activity in H. Barton, S. Thompson, S. Burgess, & M. Grant (Eds.), *The Routledge handbook of planning for health and well-being: shaping a sustainable and healthy future*, 2015

Heart Foundation, *Does density matter?*, 2014

Alternative energy vehicles

AEV

Option type

Changing behaviour through subsidies

Location

Statewide

Sector

Transport

Certainty of evidence

Medium

Direct option cost

\$3 billion–\$5 billion

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 18: Transition to low carbon energy supply and use

Low	Low	Low	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option considers reductions in the carbon intensity of vehicle travel by encouraging the uptake of alternative energy vehicles (including electric, hydrogen fuel cell and biodiesel) through the provision of incentives, including lower registration fees, stamp duty rebates, subsidising workplace charging infrastructure, and working to bring alternative energy vehicles into the current government vehicle fleet. It is noted that whilst Victoria’s energy generation is fuelled by brown coal under current technology, use of electric vehicles will not reduce the carbon footprint. However, when lower carbon producing forms of electricity generation are achieved, this option will be effective. Vehicle emissions in high density areas in the short-term will be improved under this model.

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option was not recommended in the strategy. The Victorian Government has already taken the key steps in facilitating the uptake of this technology through its Electric Vehicle Trial, and now it is up to the private sector to drive further uptake of electric vehicles, particularly as the price of battery storage comes down over time.

There is also the risk that until a greater proportion of our electricity is generated from renewable sources, the environmental benefits of ‘greening’ our car fleet may be limited. However, once the reliance on non-renewal energy sources (particularly brown coal) decreases, there is potential for the uptake of electric vehicles to contribute significantly to ‘de-carbonising’ the transport sector.

Nonetheless, there is merit in government taking steps now to electrify more of its own fleet where it makes financial and environmental sense to do so, such as the adoption of electric buses and fleet vehicles.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

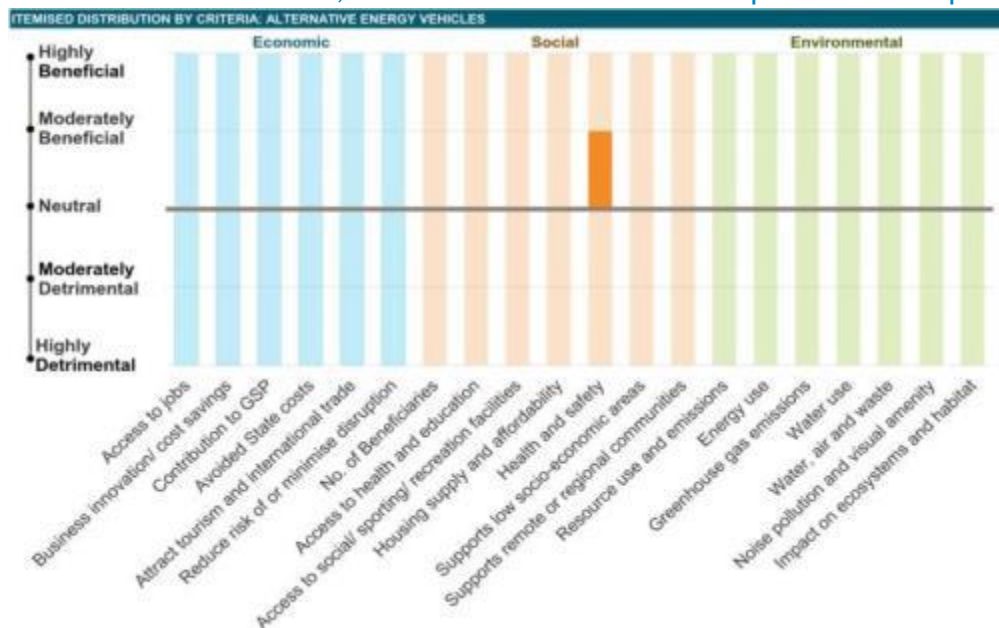
How does this option perform under different scenarios?

Supercity	Counter-productive unless demand is managed	
Westside Story	Counter-productive unless demand is managed	
Regional Cities	Counter-productive unless demand is managed	
Accelerated Climate Change /Mitigation	++	Supports more carbon efficient travel
Prolonged/ Severe Economic Downturn	Neutral	
Biosecurity Threat	Neutral	

How does this option work with others?

This option is complementary to a range of options which result in the reduction in the state's reliance on electricity generated from non-renewable sources, such as charges around auctions and licences for brown coal (BCA, BDL), and the increased availability of renewal energy, such as solar PV on buildings (SSE), in that these options could optimise the environmental value of alternative energy vehicles. A transport pricing regime (TNP) could also play a role in curbing any rebound effect in terms of induced demand for vehicle travel.

What are the economic, social and environmental impacts of this option?



Risks and opportunities

There is a risk that significant costs could be incurred in lowering vehicle registration fees or subsidising investments, for little environmental benefit, if there is not a significant shift towards the renewable generation of electricity. Should electrification reduce the per kilometre cost of travel, this option could also result in more vehicle travel, adding to congestion.

This option may reduce the need to import fuel from overseas, and could encourage investment in alternative forms of electricity generation. It may also create a more diversified economy with manufacturing and service jobs in the alternative energy vehicle sector.

Additional notes

International research shows mixed results in evaluating the benefits of subsidies and other incentives for uptake of these vehicles. National carbon standards (through federal changes to the *Motor Vehicle Standards Act 1989*) may have greater impact, based on overseas experience.

The statement that "*in the short-term vehicle emissions in high density areas will be improved with this model*" is doubtful, as without significant uptake of these technologies and taking into consideration the growth in vehicle kilometres travelled it is unlikely to have a benefit in the short-term although there could be some improvements to local air quality. Otherwise, as the option states, further work needs to be undertaken to understand the benefits and likely penetration of the technology. All upstream emissions are associated with the fuel generated by brown coal. Production of aluminium, etc. is also energy intensive and a full 'well to wheels' analysis should be undertaken to ensure that perverse outcomes do not occur.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Affordable housing community land trusts

AHC

Option type

Changing behaviour through regulation

Location

Statewide

Sector

Health and human services

Certainty of evidence

Medium

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Direct option cost

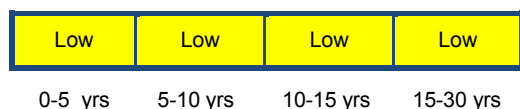
\$1 million–\$10 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 7: Provide better access to housing for the most vulnerable Victorians



What is this option?

This option proposes that government supports the implementation of community land trusts (CLTs) to provide a new lower cost and long-term rental and home ownership option for low to moderate income households. Support would be provided by government developing regulatory and legal frameworks to enable the model to operate in Victoria. CLTs are a type of land-rent model where the CLT controls the underlying land and sells the building-only component to home purchasers via ground leases, which remove the land value from the cost of home purchase. A trust may also own and manage some of the dwellings as affordable rental housing. When purchasers wish to sell their house there are restrictions on sale price and who can purchase the property, ensuring that the dwellings remain affordable to all successive purchasers.

What is the level of community support?

There was limited to no discussion specifically on this option during public consultation. The metropolitan citizen jury did, however, recommend the inclusion of a new option to support a rent to buy model of co-contribution home ownership which targets a similar household type and has matched objectives with the community land trust model.

What do we think of this option and why?

This option was not recommended in the strategy because it does not target the most vulnerable Victorians, but applies to less vulnerable and more moderate income households. We only undertook limited assessment of the option but believe the option has merit as it could provide a small scale but innovative response to address housing need by providing a pathway between rental and home ownership, as well as other beneficial social outcomes. By supporting people to move out of the rental market the model could also help free up affordable and social rental housing opportunities for others. We believe shared equity models and the 'rent to buy' option proposed by the citizen jury also have merit, however we did not progress these models for similar reasons.

Affordable housing inclusionary planning controls

AHR

Option type

Better use through land use and planning controls

Location

Statewide

Sector

Health and human services

Certainty of evidence

Medium

Direct option cost

\$1 million–\$10 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 7: Provide better access to housing for the most vulnerable Victorians

Significant	Significant	Significant	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option proposes the introduction of mandatory (or inclusionary) planning provisions to increase the supply of affordable private rental dwellings. Inclusionary planning controls would require developments to incorporate affordable housing dwellings on their site. The opportunity presented by this option is for government to more effectively utilise the Victorian planning system to support the delivery of affordable housing. Further work is required to determine the detail of the approach and the affordable housing requirement that could be reasonably applied and not have the perverse effect of limiting development. The structure for how these will be implemented also requires further development (further detail in *What is this option? cont'd*).

What is the level of community support?

There was a high level of discussion of the recommendation Affordable housing planning mechanisms, which includes this option. Responses were mixed, however some stakeholders were not supportive due to concerns about the impact on development costs. This option was recommended by the metropolitan citizen jury.

50 per cent of people surveyed as part of community research supported private developers being required to allocate social housing in new developments.

What do we think of this option and why?

This option was recommended in the strategy (ref. 7.3.2) because it will increase the supply of affordable housing in areas with access to jobs and services, where there is an undersupply of affordable housing in Victoria. The SGS *Rental Affordability Index* (November 2015) provides evidence that affordable rental properties for low income households are only accessible on the outer fringes of urban areas. The option also enables affordable housing to be integrated amongst other housing providing additional social benefit, rather than creating local concentrations of disadvantage (further detail in *What do we think of this option and why? cont'd*).

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy	
Plan Melbourne refresh 2015	Relates to key point/option for discussion	Refer additional notes
Regional Growth Plans	Contributes to implementing policy	

How does this option work with others?

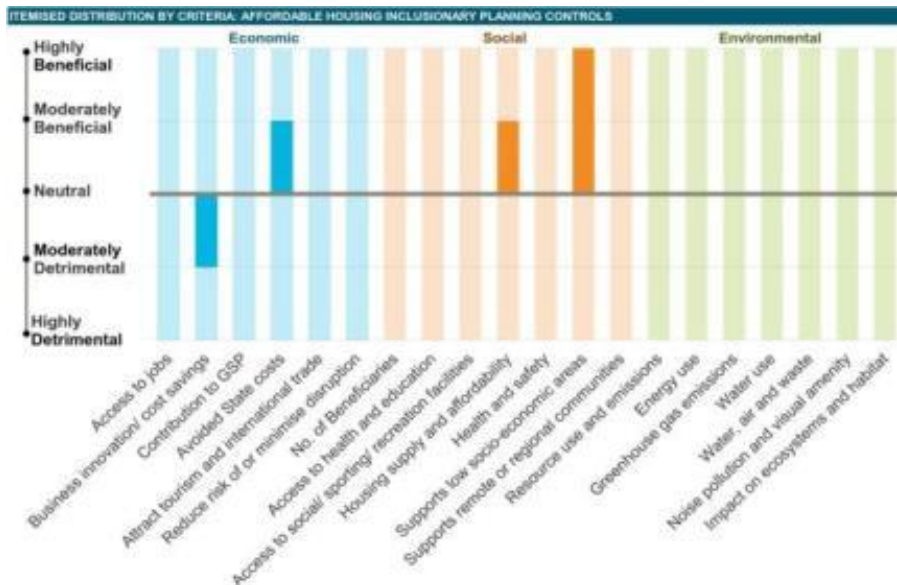
In order to be effective this option needs to be supported by an overarching affordable housing infrastructure plan (SCP). Integrated government service and infrastructure planning (SIP) could assist with identifying areas that should be prioritised for additional affordable housing. Areas identified for housing intensification that are located close to public transport and services would be preferred areas for inclusionary zoning. These will be identified through compact urban development (UDC) and strategic transit-oriented centres and corridors (STO). The option

bears some similarity to the affordable housing development incentives option (SAH), which aims to achieve the same outcome through voluntary means and is effective in different situations

How does this option perform under different scenarios?

Supercity	+	Reflecting population growth
Westside Story	+	Reflecting population growth
Regional Cities	+	Reflecting population growth
Accelerated Climate Change /Mitigation	++	Increased migration of climate refugees requiring housing
Prolonged/ Severe Economic Downturn	++	Increased number of households suffering housing stress
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



Commentary:

This option is anticipated to be moderately detrimental to business cost saving as developers may forgo some profit depending on the detail of the model developed. Economic returns generated by improved access to jobs and services are reflected in avoided state costs.

What is this option? (cont'd)

Victoria has a shortage of housing available for rent by low income households. In Melbourne there is a particular shortage of rental properties available for low income households in areas with access to transport, jobs and services. Further information providing details of this is provided within the background information on option SCP.

Prior to the 2014 election the existing government proposed to introduce a trial of inclusionary zoning, in which land sold by the government for development, would be required to include a share of new construction to be affordable to first home-owners and low income families. This trial is yet to be implemented.

The cost to implement this option considers only the cost to implement the regulatory change and excludes any financial cost to developers or property owners. The impact of introducing inclusionary zoning should be addressed when establishing the system, adjusting existing development levies and taxes to ensure that it does not limit developments proceeding or significantly affect project viability. It is noted that this option is not just imposing a tax; it is providing a mechanism to place affordable housing where it can offer the most community benefit.

What do we think of this option and why? (cont'd)

The implementation of this option will require the strong collaboration of state and local government. The system will require a supporting planning framework to be developed, defining the level and extent of inclusionary zoning to be applied at a state, subregional and local basis. Amendment to the state legislation will also be required in order to effectively enable the application of inclusionary zoning, including providing a definition of affordable housing in the Victoria planning provisions. It is recommended that inclusionary zoning is considered in suitable development areas to projects undertaken on government land, in areas where government is undertaking actions that will provide uplift to private land values (such as improved public transport access or land rezoning) and on large developments. We are not recommending against the broader application of inclusionary zoning, we just don't have the evidence to support going beyond these three applications.

The state government has recently released a draft vision and framework for the Arden precinct, a new commercial and residential precinct across 56 hectares in North Melbourne to be developed on government land around the proposed new Arden train station. This location would be well suited to the application of inclusionary zoning due to its access to transport and availability of government land. Local governments should also be encouraged to consider suitable development opportunities on council owned land such as redeveloping council carparks.

Risks and opportunities

Some developments may suffer a perceived stigma in relation to the social and affordable component, which may in turn result in the private component being less marketable.

The opportunity presented by this option is for government to more effectively utilise the planning system to support the delivery of affordable housing. As housing development is tied to planning approval there is a strong basis and opportunity to use this process to support desired social outcomes. This option provides the significant opportunity to maintain social mix in redevelopments of valuable land.

Additional notes

Justification for major departures from land use plans

Currently the planning system does not incorporate inclusionary zoning and *Plan Melbourne 2014* does not propose to apply inclusionary zoning. However, *Plan Melbourne refresh 2014 discussion paper's* option for discussion (45A) is to 'consider introducing planning tools that mandate or facilitate or provide incentives to increase social and affordable housing supply'.

Next steps

The next steps to implement this option are:

- Develop a strategy for affordable housing that nominates a broad response including dwelling targets (in type, number and location) and an approach to funding. Refer to the options for an affordable housing infrastructure plan (SCP).
- Confirm the mechanisms in the Victorian Planning system that are required to implement inclusionary zoning and identify target locations across the state for the application of inclusionary zoning. Refer to the options addressing subregional infrastructure planning (SIP), and strategic transit-oriented centres and corridors (STO).
- Support the ongoing development of the community housing sector and develop guidelines and governance frameworks to support the interaction of the private and community housing sectors.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Hulse, K, et al, *Changes in the supply of affordable housing in the private rental sector for lower income households, 2006–11*, 2014

Hulse, K, et al, *Supply shortages and affordability outcomes in the private rental sector: Short and longer term trends*, 2015

SGS Economics and Planning, *Revisiting the economics of inclusionary zoning*, 2015

SGS Economics and Planning, *Rental Affordability Index – Release Report* November 2015, 2015

Altona Loop rail duplication ALD

Option type

Incremental expansion of existing assets

Location

Melbourne western subregion

Sector

Transport

Certainty of evidence

Medium

Direct option cost

\$100 million–\$250 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 10: Meet growing demand for access to economic activity in central Melbourne

Low	Low	Low	Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option would deliver the duplication of the Altona Loop connection between Altona Junction and Laverton Station. Building upon the work to be completed with the Kororoit Creek level crossing removal, this option would include:

- Duplicated track from the level crossing removal to Seaholme
- Duplicated track between Laverton and Westona Stations
- New rail flyovers at Altona and Laverton junctions.

This option will provide increased capacity, reliability and more frequent services on the Altona Loop and reduce conflicts between city-bound Altona trains and outbound Werribee (main line) trains. This will allow more people from the Altona area to access jobs and services in the central city.

What is the level of community support?

There was limited discussion of this option during public consultation. This may be as it was not recommended in the draft strategy.

What do we think of this option and why?

This option was not recommended in the strategy because we assessed that it provides a low contribution to meeting need 10, supporting a relatively small and slower growing catchment area. While we have not recommended this option, it would be prudent to leave open the potential delivery of this option and continue to test its viability through updates to detailed rail plans, such as the *Network Development Plan – Metropolitan Rail*. In 2012, that plan identified this option for delivery in Stage 4 within 20 years and future assessments should consider any changes to land use or rail network operations, including whether this improvement is needed to support service reliability on the Werribee corridor.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

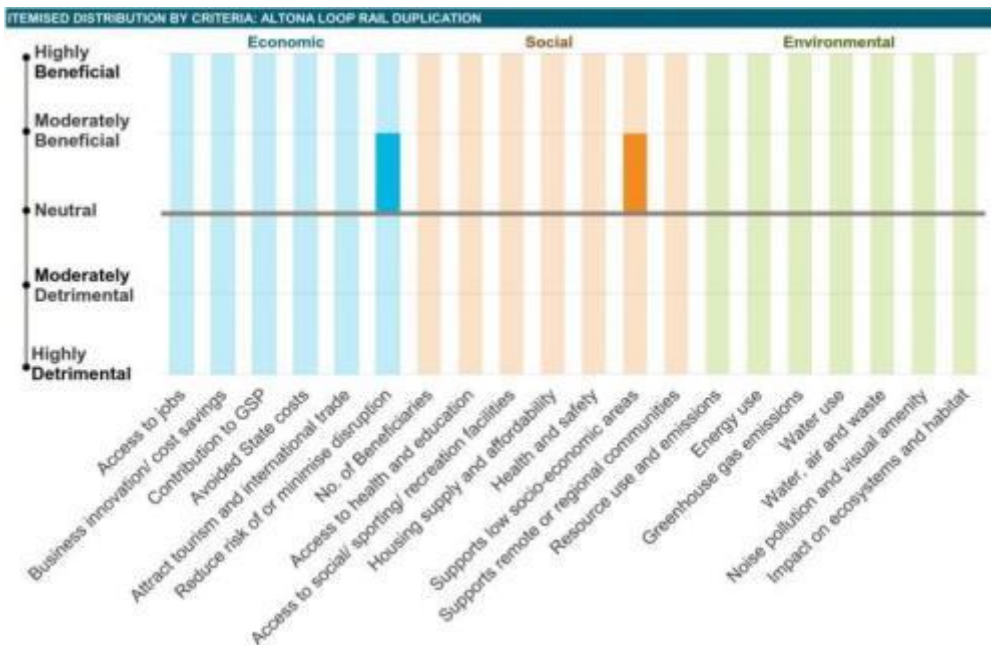
How does this option perform under different scenarios?

Supercity	+	Addresses heightened risk of congestion
Westside Story	+	Addresses heightened risk of congestion
Regional Cities	+	Addresses heightened risk of congestion
Accelerated Climate Change /Mitigation	+	Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	-	Less demand for mass transit
Biosecurity Threat	Neutral	

How does this option work with others?

No significant relationships for this option have been identified.

What are the economic, social and environmental impacts of this option?



Commentary:

This option would provide extra redundancy in the Werribee line and allow for more frequent and reliable services on the Altona Loop.

Risks and opportunities

There are risks from undertaking construction in an existing operational rail corridor that would need to be managed during the option delivery phase.

Duplicating the Altona Loop may give greater flexibility in how services are run to the Williams Landing/Werribee growth area. This could also enable a potential future extension of the Altona Loop line to Point Cook.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Public Transport Victoria, *Network development plan: Metropolitan rail*, 2012

Active lifestyle infrastructure provision

ALP

Option type

Better use through refurbishment of existing assets
Incremental expansion of existing assets

Location

Statewide

Sector

Transport
Cultural, civic, sporting, recreation and tourism

Certainty of evidence

Medium

Direct option cost

\$100 million–\$250 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 1: Address infrastructure demands in areas with high population growth; and

Need 5: Provide public spaces where communities can come together

Low	Low	Low	Low
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0-5 yrs 5-10 yrs 10-15 yrs 15-30 yrs

Need 4: Enable physical activity and participation

Moderate	Moderate	Moderate	Moderate
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0-5 yrs 5-10 yrs 10-15 yrs 15-30 yrs

What is this option?

This option makes improvements to the amenity/attractiveness and activation of public spaces to improve opportunities for exercise, walking and cycling. This would include installation of:

- Bicycle and equipment lockers at all metro and major regional train stations.
- Bicycle racks on trams and buses.
- Locker rooms and shower facilities at convenient locations throughout the city and suburbs to encourage cycling and walking.
- Infrastructure that supports exercising, including public toilets, weather protection and water bubblers.

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive. Both citizen juries made recommendations in support of this option.

What do we think of this option and why?

This option was recommended in part in the strategy (ref. 4.2.2) because we think this option represents a key step in normalising walking and cycling for transport. Fully rolling out locker facilities across all metro and major regional rail stations over 0-10 years is estimated to have a capital cost of around \$50 million. Bicycle racks on buses could also be considered, drawing from the findings of the current trial, but we have not recommended this. Bicycle racks on trams may also be warranted for longer routes with larger catchments (e.g. route 75) but would need further investigation. Other aspects of the option (locker rooms and shower facilities, public toilets, weather protection, water bubblers) are considered more appropriately delivered at a local level. This is a relatively low cost option with a moderate contribution to enabling physical activity and participation (need 4) and has beneficial social and environmental impacts.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

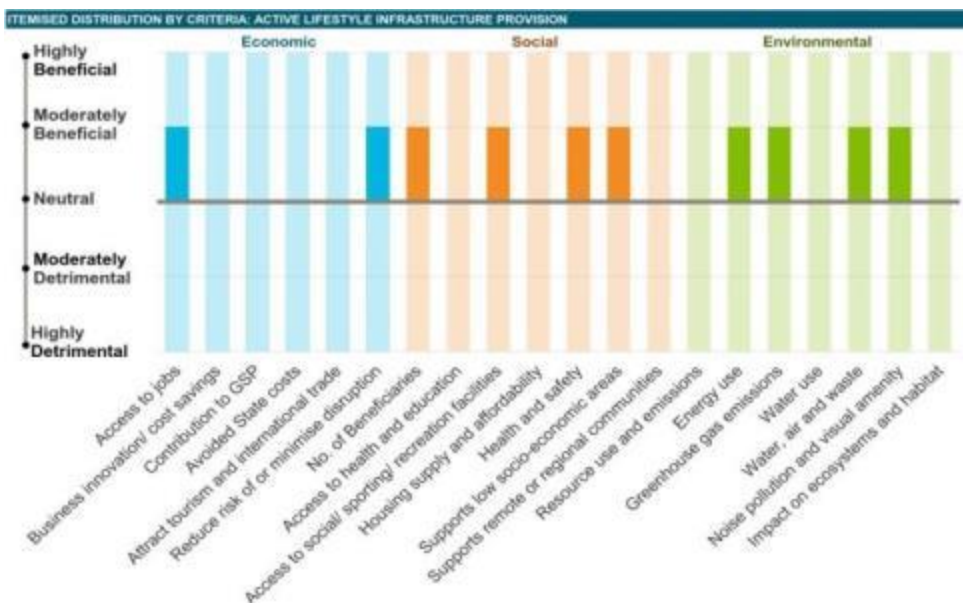
How does this option work with others?

This option is mutually reinforcing with options that support walking and cycling, e.g. expanding and improving walking and cycling paths (BWP2), particularly where new networks support access to train stations or bus stops (the 'last mile'). Together these options would create whole-of-journey provision and increase the catchment area of public transport and enable longer trips by public transport and cycling, which otherwise would be made by private vehicle.

How does this option perform under different scenarios?

Supercity	++	More efficient use of transport capacity
Westside Story	+	More efficient use of transport capacity
Regional Cities	+	More efficient use of transport capacity
Accelerated Climate Change /Mitigation	+	Supports more carbon efficient travel
Prolonged/ Severe Economic Downturn	+	More affordable transport options
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



Commentary:

Mode shift from other modes of transport (passenger vehicles and public transport) may have benefits for greenhouse gas emissions, air quality and amenity through reduced noise. Energy use is also expected to be improved.

Risks and opportunities

With the construction of new infrastructure there is a risk that the ongoing maintenance could become a burden for state and local governments. This could reduce the ability of governments to fund other productive assets and services for the community.

There may be an opportunity for private sector involvement in the provision of infrastructure that supports active transport through commercial facilities or advertising areas. This could reduce the construction costs to state and local governments.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Active lifestyle infrastructure regulation ALR

Option type

Changing behaviour through land use and planning controls

Location

Statewide

Sector

Transport

Certainty of evidence

Medium

Direct option cost

<\$100 million

Contribution to meeting the need

Need 4. Enable physical activity and participation –
Moderate

What is this option?

Planning regulation sets out principles of 'active design' incorporated through the stipulation of minimum requirements (and existing community retrofit where possible). This option considers where changes to planning regulation would result in the delivery of infrastructure that would be particularly beneficial for walking and cycling, in particular planning provisions for end-of-trip facilities.

What is the level of community support?

There was a high level of discussion of this option during consultation. Responses were generally positive. This option was recommended by the metropolitan citizen jury.

What do we think of this option and why?

This option was recommended in part in the strategy (ref. 4.1.1) because we think that the current approach in planning regulation for end-of-trip facilities does not reflect demand for cycling and discourages people from cycling. The current rates under the state's planning provisions (clause 52.34) were set more than 10 years ago. We believe a review should assess the feasibility of increasing rates (particularly for the central city) and improving the related design requirements for the provision of these facilities across Victoria. The City of Melbourne recently reviewed the rates and subsequently recommended substantial increases to the Minister for Planning - this work should be considered as an important input. A review would need to consider the costs of higher standards (e.g. to developers, which would be passed on to consumers through higher housing costs) as well as the benefits. This is a relatively low cost option which offers a moderate contribution to enabling physical activity and participation.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

How does this option perform under different scenarios?

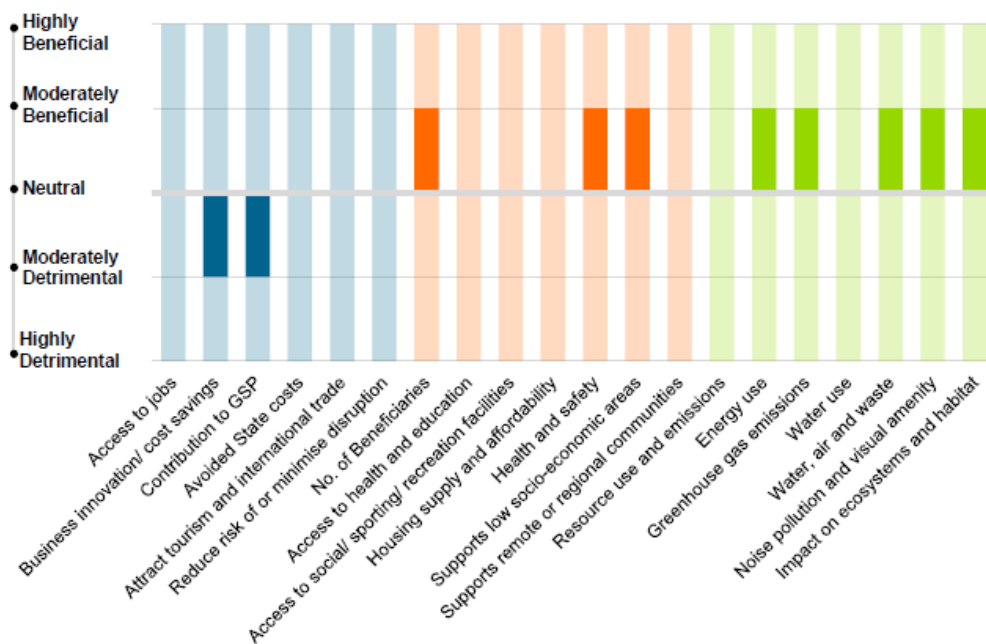
Supercity	++	More efficient use of transport capacity
Westside Story	+	More efficient use of transport capacity
Regional Cities	+	More efficient use of transport capacity
Accelerated Climate Change /Mitigation	+	Supports more carbon efficient travel
Prolonged/ Severe Economic Downturn	+	More affordable transport options
Biosecurity Threat	Neutral	

How does this option work with others?

To realise the intentions of this option, it is best accompanied with other active transport options such as expanding and improving walking and cycling networks (BWP2).

What are the economic, social and environmental impacts of this option?

ITEMISED DISTRIBUTION BY CRITERIA



Commentary:

There is potential for impacts on business if regulatory changes result in costs borne by industry.

Risks and opportunities

There is a risk that the additional requirements on developers will increase costs for new home owners. This could require people to borrow more or reduce the size of their proposed new homes. With greater requirements on the private sector to provide 'active design' in new developments there is an opportunity for local councils to invest funds in other projects and activities. This could benefit the community more broadly through better service provision and taking pressure off high rate increases for infrastructure.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then we have clarified that the recommendation should also look at improving facility standards for end of trip facilities as well as rates, in response to stakeholder feedback. These standards are a key part of planning provision clause 52.34 and therefore it makes sense to include them in the review scope.

Evidence base

AECOM/PwC, *Assessment 2: Economic, social and environmental assessments and option relationship mapping*, 2016

City of Melbourne, *Off-street bicycle and motorcycle parking review: Final report*, 2016

Deloitte/Aurecon, *Assessment 1: Options analysis report*, 2016

Affordable private rental stock provision

ARH

Option type

New assets

Location

Statewide

Sector

Health and human services

Certainty of evidence

Medium

Direct option cost

\$5 billion–\$10 billion

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 7: Provide better access to housing for the most vulnerable Victorians

Significant	Significant	Significant	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option proposes the provision of 20,000 new affordable private rental dwellings specifically targeted to low-income households. These dwellings would be funded by the private sector, with the community housing sector or a leasing agent acting as an operator/manager. Affordable private rental dwellings are defined as housing permanently available at a reduced rent to households through access and affordability requirements set by government and subsidised by government. The provision of affordable private rental dwellings can be activated and incentivised by several mechanisms. The state government can provide subsidies or utilise the planning system through creating incentives (SAH) and adopting inclusionary zoning (AHR), and the commonwealth government can also provide subsidies or utilise investment and taxation mechanisms (further detail in *What is this option? cont'd*).

What is the level of community support?

There was a moderate level of discussion of the recommendation for affordable rental housing provision, which includes this option. Responses were generally positive.

What do we think of this option and why?

This option was recommended in part in the strategy (ref. 7.4.3) because it could make a substantial contribution towards meeting the unmet need for access to housing for vulnerable Victorians. While the option we consulted on proposes provision of 20,000 new dwellings, a specific quantum of housing was not recommended in the strategy, as further analysis is required. Determining the quantum requires detailed investigation and planning, as would be provided in the recommendation for an affordable housing infrastructure plan (SCP). Depending on the mechanism adopted the cost to government will vary (further detail in *What do we think of this option and why? cont'd*).

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	Relates to key point/option for discussion
Regional Growth Plans	Contributes to implementing policy

How does this option work with others?

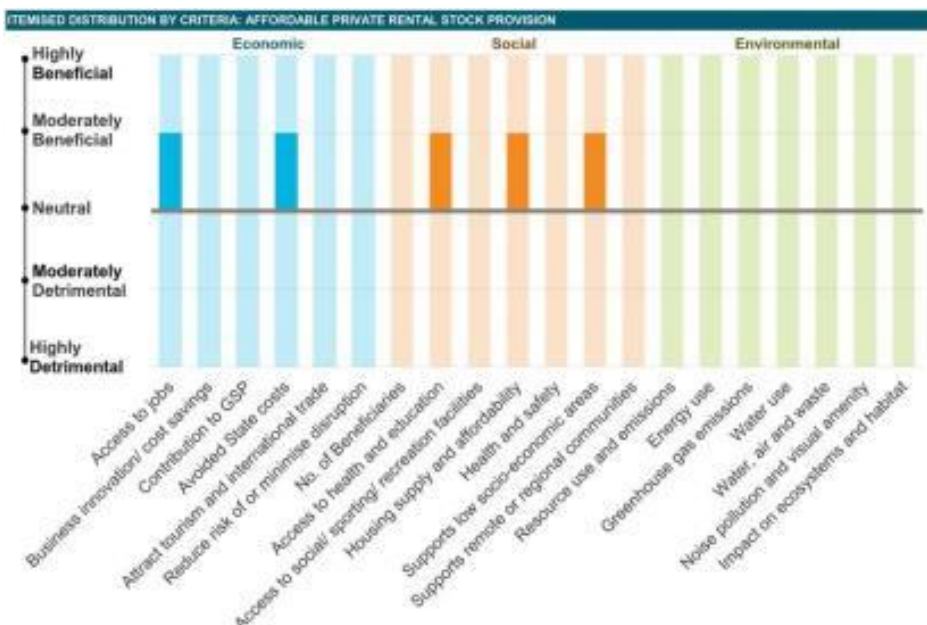
The benefit of this option will only be fully realised if it is provided as part of a pathway of complementary housing solutions, rather than in isolation. Developing an affordable housing infrastructure plan (SCP) will be critical to determine the quantum, type and location of housing solutions required. The housing solution options that are complementary include CHP, HRA, RTR and SHE. Options that involve statutory planning measures that facilitate provision of affordable housing would benefit this option. This includes options such as affordable housing sector planning system amendment

(SHS1), affordable housing development incentives option (SAH) and affordable housing inclusionary planning controls option (AHR).

How does this option perform under different scenarios?

Supercity	+	Reflecting population growth
Westside Story	+	Reflecting population growth
Regional Cities	+	Reflecting population growth
Accelerated Climate Change /Mitigation	++	Addresses increased migration of climate refugees requiring housing
Prolonged/ Severe Economic Downturn	++	Addresses increased number of households suffering housing stress
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



Commentary:

Due to the small scale of the intervention across the full population, the full social benefits are not reflected on the chart. Further the assessment does not consider the flow on health and wellbeing benefits provided by the provision of secure housing.

What is this option? (cont'd)

We estimate that there is currently an unmet requirement for access to affordable housing for approximately 75,000 to 100,000 vulnerable low income households in Victoria.

This unmet requirement could be addressed through the provision of new affordable private rental dwellings (as proposed in this option) and social housing, increased financial support packages or a combination of all of the above.

Affordable private rental accommodation that is appropriately incentivised is likely to respond to low income household need (as compared to very low income households and households with complex needs), taking some pressure off social housing sector.

Affordable private rental housing models exist in many different forms around the world, however, Australia has not extensively developed this model. Victoria currently has approximately 5,500 dedicated affordable rental properties which were delivered under the National Rental Affordability Scheme (NRAS) from 2009 to 2014. The NRAS was a commonwealth initiative to stimulate the supply of new affordable rental dwellings. The scheme offered annual incentives for ten years provided on the condition that throughout the ten-year period the dwelling is rented at 20 per cent below the market rate to eligible low and moderate income households. The commonwealth government determined not to proceed with any additional allocations under this scheme in May 2014. The commonwealth government has subsequently established a working group focused primarily on investigating ways to boost the supply of affordable rental housing through innovative financing models. Consultation on potential models closed in March 2016 and the results of the working group are unknown.

Victoria has not historically introduced any significant mechanisms to activate the supply of private affordable rental housing. However, other states in Australia have utilised planning mechanisms, with the longest running scheme initiated in inner Sydney in the early 1990s. Recently the Victorian government has utilised the private sector on a small scale to provide affordable housing, by taking out head leases with landlords to provide housing as part of the family violence housing assistance package.

Developing the affordable housing infrastructure plan option (SCP) will be critical to determine the quantum, type and location of affordable private rental housing required. Further information providing context on this option is provided within the background information included within the option SCP.

What do we think of this option and why? (cont'd)

With the best information that we are able to obtain, we believe that the provision of approximately 30,000 new dedicated affordable dwellings in the next ten years could be an appropriate infrastructure response to address the current unmet demand for housing, delivered under this option as affordable private rental housing or as social housing option (SHE).

We tested this option against need 1, as inner metropolitan growth areas would be a suitable location for an affordable housing, however, as the metric is assessing the impact of infrastructure investment to improve access to services in growth areas, it did not perform well.

Risks and opportunities

Subject to the structure of the model adopted, this option could attract significant new capital into affordable housing provision. Knowledge can be drawn to develop a suitable model in the Australian context, drawing from the NRAS that was in place from 2009 to 2014 as well as experience with utilising planning system mechanisms from other jurisdictions. Investor confidence in the longevity of any scheme proposed will need to be established to facilitate investment at an institutional level.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then we have highlighted that while the recommendation timeline is 0-30 years a concerted effort will be required in the early part of this period.

We have also refined the discussion of the Commonwealth Government models.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Affordable development outcomes, *Improving Access to Affordable Housing*, 2016

Commonwealth of Australia, *The road home: A national approach to reducing homelessness*, 2008

Hulse, K, et al, *Changes in the supply of affordable housing in the private rental sector for lower income households, 2006–11*, 2014

Hulse, K, et al, *Supply shortages and affordability outcomes in the private rental sector: Short and longer term trends*, 2015

Productivity Commission, *Report on government services volume G, Housing and homelessness*, 2016

SGS Economics and Planning, *Rental Affordability Index: Quarter 2 – 2015*, 2015

Arterial road network employment centre enhancements

ARN

Option type

Incremental expansion of existing assets
New assets

Location

Melbourne wide

Sector

Transport

Certainty of evidence

Low

Direct option cost

\$3 billion–\$5 billion

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 1: Address infrastructure demands in areas with high population growth; and

Need 11: Improve access to middle and outer metropolitan major employment centres

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option considers targeted upgrades to the road network surrounding major employment centres to support their development by improving access and avoiding bottlenecks, with design prioritisation given to public transport. The centres concerned include the designated National Employment Clusters (NECs) at Sunshine, East Werribee, Latrobe, Parkville, Monash and Dandenong, as well as Metropolitan Activity Centres (MACs) such as at Box Hill, Broadmeadows and Footscray. An example of such an upgrade is the proposed Westall Road extension from Princes Highway to Monash Freeway (for which VicRoads is preparing a business case), to improve connectivity and support the Monash NEC.

What is the level of community support?

There was a high level of discussion of this option during consultation. Responses were generally positive. This option was recommended, with qualifications, by the metropolitan citizen jury.

What do we think of this option and why?

This option was recommended in part in the strategy (ref. 11.5.1) because it is a key enabler of the development of major employment centres. Specifically, we recommended the development of a transparent prioritisation framework for the delivery of upgrades to arterial roads servicing major employment centres.

The purpose of these enhancements is to improve access to employment, but to do this (and to be attractive business destinations) there is a need for high quality transport networks. It should be noted that arterial roads will often carry multiple modes, particularly where focused on these centres, and as such may be complementary to a number of other options focused on improving on-road public transport to the centres (further detail in *What do we think of this option and why? cont'd*).

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

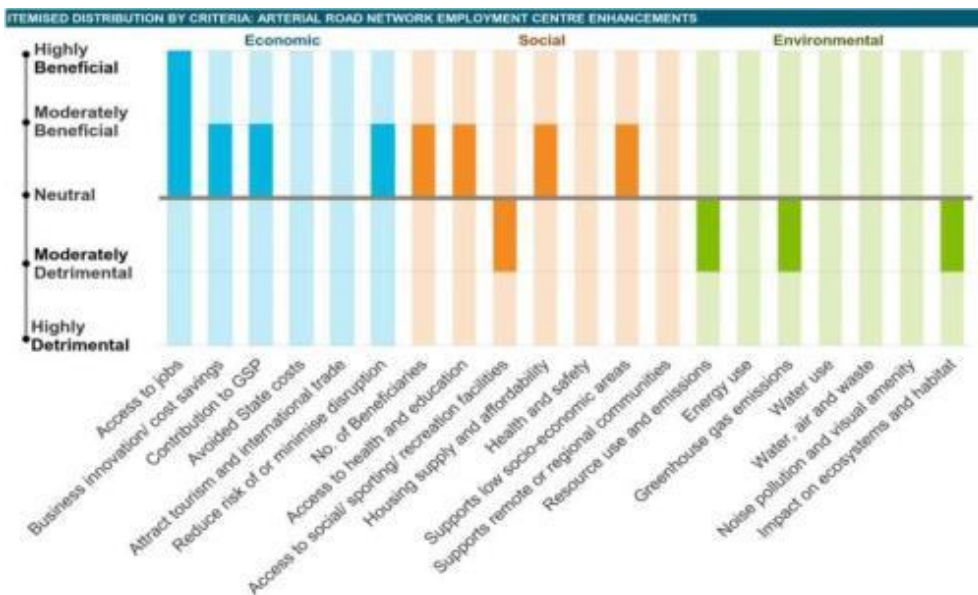
How does this option perform under different scenarios?

Supercity	++	Addresses heightened risk of congestion
Westside Story	+	Addresses heightened risk of congestion
Regional Cities	+	Addresses heightened risk of congestion
Accelerated Climate Change /Mitigation	Potentially counter-productive unless demand managed or vehicles powered renewably	
Prolonged/ Severe Economic Downturn	-	Less demand for travel
Biosecurity Threat	Neutral	

How does this option work with others?

It is essential that these road network upgrades be complemented by other options that will help to maximise sustainable access to these growing centres for commuters and to enable most efficient access to goods and services (and to therefore minimise the impact of congestion) – e.g. employment centre mass transit network (MTN), SmartBus network extensions (SNE) and growth areas bus service expansion (LBS). Advanced traffic management technologies (ATM) and transport network pricing (TNP) could also have a role to play in ensuring optimal use of these arterial links and avoiding induced demand.

What are the economic, social and environmental impacts of this option?



What do we think of this option and why? (cont'd)

It is expected that there will be a likely focus in the framework on the north of Melbourne where there are particularly acute congestion issues such as improving access to the Latrobe National Employment Cluster and Broadmeadows MAC. To the west, there is a need to ensure that a base network is in place to underpin growing services and knowledge sector employment at Sunshine and East Werribee NECs and Footscray MAC, while protecting important freight and logistics industries.

Risks and opportunities

There is a risk that the development of the new arterial network may impact local amenity and induce more car travel if the use of this road space was not priced. The road construction could reduce open space and introduce additional noise and emissions in residential areas.

With the development of a greater arterial network around employment centres, there is an opportunity to support the movement of people with high-quality SmartBus routes and dedicated bus lanes. This would maximise the movement of people in allowing more people to access employment centres without depending on private car transport.

Funding

Should government choose to pursue this program, it will then need to consider funding options. Below is a range of potential funding mechanisms which could be examined to help fund the program.

Potential funding mechanisms

General government revenue	User charges	Beneficiary charges	Property development	Asset sales
✓	✓	✓		

General government revenue is likely to be a major source of funding for arterial road network employment centre enhancements. This program could provide a public and economic benefit by increasing access to employment across Melbourne.

Beneficiary charges could also be considered if there is a substantial uplift in land values and business activity near new projects. These include developer contributions, which could be levied on new developments occurring in the vicinity of new infrastructure. This already occurs for arterial roads serving employment centres in greenfield areas, where developer contributions provide financial contributions or works/land-in-kind, and should continue to do so.

User charges applied as part of a transport network pricing regime to manage demand could also be a potential source of funds for enhanced employment centre arterial roads.

Infrastructure Victoria is examining transport network pricing as part of our research program. We think that the primary objective of a transport network pricing regime – where users pay to access and use the transport network – should be to manage demand, rather than to recover costs for infrastructure. We are focusing on examining road pricing regimes in metropolitan Melbourne as a first step towards a comprehensive transport network pricing regime that includes roads and public transport. Careful consideration must be given to the design of the regime to ensure it is efficient, fair and sustainable. If developer contributions and user charges are both considered by government, it should ensure that new charges do not unfairly duplicate each other or any existing charges.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Access to services through technology and ICT

AST

Option type

Incremental expansion of existing assets

Location

Statewide

Sector

ICT

Certainty of evidence

Low

Direct option cost

\$50 million–\$100 million

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 2: Address infrastructure challenges in areas with low or negative growth; and

Need 6: Improve accessibility for people with mobility challenges; and

Need 12: Improve access to jobs and services for people in regional and rural areas

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option seeks to identify different approaches to improve service delivery by utilising ICT and technology, including by providing centralised online information hubs and/or potential new service delivery models.

Improving access to services through ICT will particularly benefit those in regional and rural areas or with mobility difficulties. It can also have secondary benefits in the form of reducing the need for some people to travel in order to access services, relieving pressure on the transport network and reducing car-based pollution.

Overall, providing alternative service delivery methods can help build resilience, particularly in the event of transport disruptions.

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive. Both citizen juries made recommendations in support of this option.

What do we think of this option and why?

This option was not recommended in the strategy, as government is already doing work in this area. As part of a recent announcement of the Victorian Government's Information Technology Strategy, Service Victoria has been charged with modernising the delivery of high volume government transactions with the aim of setting a new standard for customer service in Victoria.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

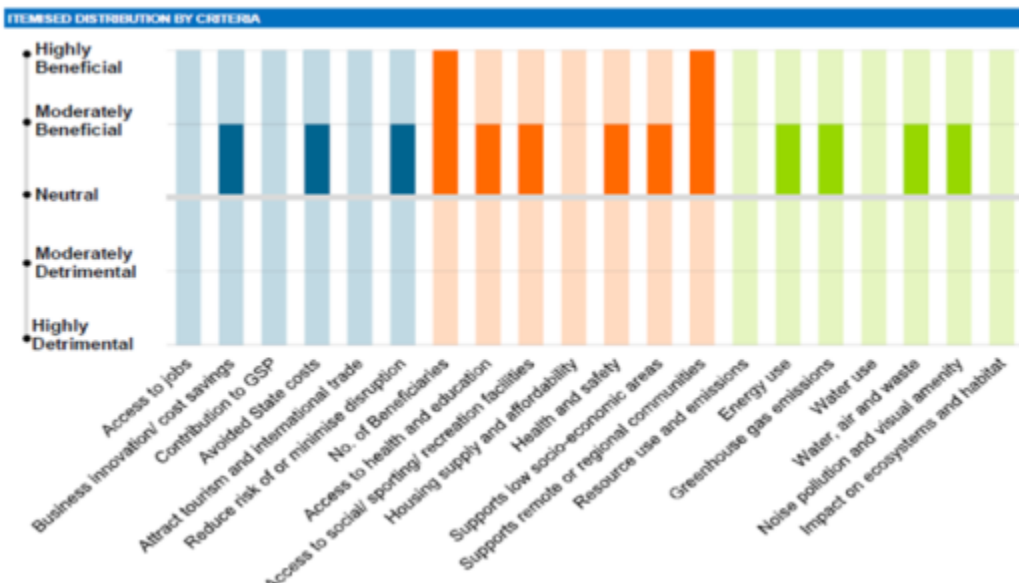
How does this option work with others?

In being non-specific with regard to the services targeted, this option is assumed to be holistic in approach. It could, therefore, be complemented with the technology enabled health care (THE) that has a much more focused purpose. It also is an enabler for mobile police and justice workforce (MPW), public transport alternative use of taxi or hire car (PTA) and could enable people to inquire online about the timing of bus and coach services (RBU).

How does this option perform under different scenarios?

Supercity	+	Reduces need for travel
Westside Story	+	Reduces need for travel
Regional Cities	+	Reduces need for travel
Accelerated Climate Change /Mitigation	+	Reduces need for travel
Prolonged/ Severe Economic Downturn	+	Reduces need for travel
Biosecurity Threat	+++	Reduces need for travel

What are the economic, social and environmental impacts of this option?



Risks and opportunities

There may be regulatory hurdles and also issues with equitable access. In addition, the widespread use and reliance on technology and ICT for infrastructure is vulnerable to a number of acute shocks such as extreme weather events causing outages, terrorism and cyber-crime.

There is an opportunity to reduce transport demand at peak times and improve transport system performance.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Advanced traffic management ATM

Option type

Incremental expansion of existing assets
Better use through technological innovations

Location

Melbourne

Sector

Transport

Certainty of evidence

Medium

Direct option cost

\$3 billion–\$5 billion -

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 10: Meet growing demand for access to economic activity in central Melbourne; and

Need 13: Improve the efficiency of freight supply chains

Moderate	Moderate	Moderate	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Expand the use of traffic management tools (such as lane use management, access ramp signalling, CCTV and variable message signs) to manage freeway flows to achieve high levels of efficiency and reliability. The initiative would be applied progressively to the entire urban motorway network, with application triggered by congestion levels. Some measures might also be applied on key arterials.

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive. This option was recommended by the regional citizen jury.

What do we think of this option and why?

This option was recommended in the strategy (ref. 10.6.2 and 13.2.1) because evidence indicates that it could over time make a significant contribution to improving access to the central city and improving freight supply chain efficiency. While this assessment could be overly optimistic considering the throughput of motorways compared to rail and the constraints of arterial roads in central Melbourne, it is clear that this option will strengthen the resilience of Victoria's road network into the future.

'Managed motorways' and other traffic management technologies included in this option are already a feature of some roadways in Melbourne, and have wide public acceptance. They have been successful in improving traffic flows on key links into and across the central city, optimising the performance and maximising the value of these key transport assets to the community. These technologies are an important stepping stone ahead of connected and driverless vehicle technologies, which could further increase the utilisation of scarce road space on motorways.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

How does this option work with others?

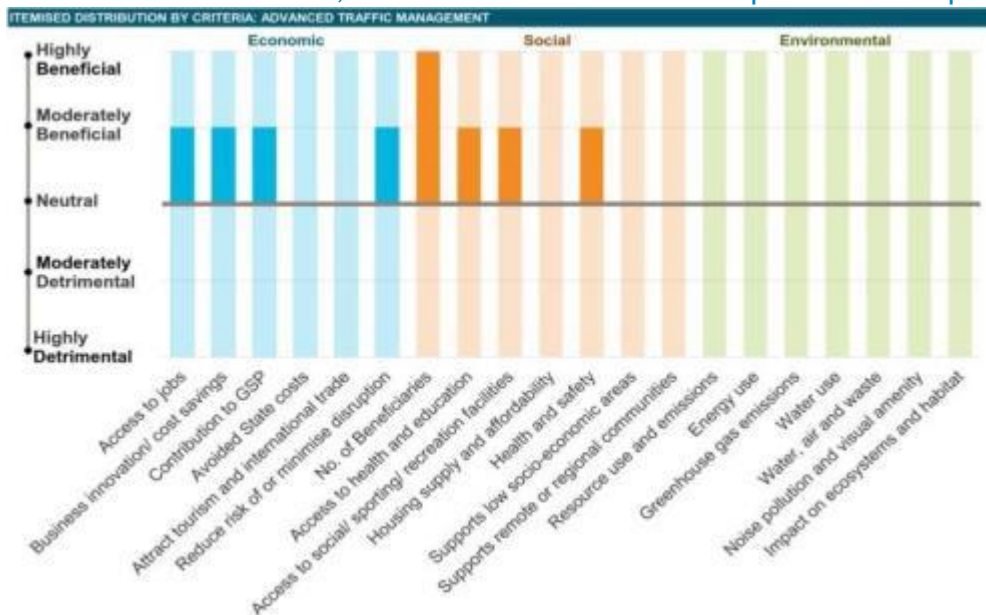
As this option includes design prioritisation for public transport, it would work well with SmartBus service provision increase (SNE), buses to Tullamarine (MAB) and growth areas (LBS) where these options are applicable to Sunshine and Werribee locales.

Expanding upon those options, partnering this option with mass transit employment centre networks (MTN) and encouraging employment outside of Melbourne CBD (EOC), such as Werribee and Sunshine, would strengthen access to employment in these centres.

How does this option perform under different scenarios?

Supercity	++	Addresses heightened risk of congestion
Westside Story	++	Addresses heightened risk of congestion
Regional Cities	++	Addresses heightened risk of congestion
Accelerated Climate Change /Mitigation	+	Smoother traffic flows reduces rate of carbon emissions
Prolonged/ Severe Economic Downturn	-	Less demand for travel
Biosecurity Threat	+	Minimises impact of shift to driving from public transport

What are the economic, social and environmental impacts of this option?



Risks and opportunities

With the rapid pace of change in technology there is a risk that the new management systems could become redundant soon after implementation. This could result in wasted investment that could have been provided to other productive projects. This option provides the opportunity to use traffic management systems to improve freight productivity through the use of traffic light sequencing for heavy vehicle priority on entering the freeway. This increase in productivity has the ability to reduce transport costs and prices for consumers. There is an opportunity for congestion reduction, enabling better access across Melbourne.

Additional notes

Transport Modelling

Infrastructure Victoria commissioned KPMG, Jacobs and Arup to undertake transport modelling for a number of options being considered for the strategy, including a variety of 'build' and 'non-build' transport options. This allowed major transport projects to be quantitatively assessed alongside several technology, policy and reform options. The options were modelled individually, mostly on a standalone basis, with a number of options then also tested in various combinations.

This analysis was undertaken on a different basis and produced different results to what is presented in the options book, which was prepared by AECOM/PWC with the intention of allowing a mixture of qualitative and quantitative assessment across the full range of options, across all sectors and needs. While on the face of it these two analyses reference similar metrics, different assumptions and methodologies have been applied. In particular, the KPMG/Jacobs/Arup assessment provided purely relative ratings of each option's contribution to the needs, with the ratings scale set by the performance of only the select range of options modelled. This had the result of showing some transport options as making a "high" contribution to Need 18 (transition to lower carbon energy supply and use) simply because they were the highest of the options modelled; however, in Infrastructure Victoria's judgement most transport sector options will make a much lower contribution than energy sector options, as transport comprises a much smaller proportion of total carbon emissions. It provides a useful assessment for sorting the relative contribution of the options modelled, but should not be taken as an absolute assessment. In contrast, the assessments developed in the AECOM/PwC assessment considered the full range of options identified for each need and provided more of an 'absolute' assessment.

With these caveats in mind, however, the results of this alternative analysis are helpful inputs into Infrastructure Victoria's 'global' assessment, and in preparing the strategy we have come to a considered view based on the totality of evidence available to us.

In terms of the KPMG/Jacobs/Arup analysis of this option, transport modelling showed that an implementation of advanced traffic management on all Melbourne motorways could, by improving traffic flow, result in small improvements in accessibility to inner, middle and outer economic centres. The employment centre with the largest expected improvement in accessibility was Melbourne Airport. This may be due to its proximity to the M80, Calder and Tullamarine Freeways, which all increase in capacity. It could also reduce total vehicle hours travelled and relieve congestion across the network, most notably the inner and eastern regions, despite the fact that traffic volumes actually increased compared to the 2046 Base, and there was mode shift towards private vehicles. Congestion relief, and thus smoother flowing traffic, across the network was found to also cause a reduction in daily carbon dioxide emissions, notwithstanding the increase in car use, as well as improved freight efficiency.

For more detail, consult the 'Economic appraisal and demand modelling' report to Infrastructure Victoria.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

KPMG/Arup/Jacobs, *Economic appraisal and demand modelling*, 2016

Bendigo-Ballarat-Geelong rail revival

BBG

Option type

Better use through refurbishment of existing assets

Incremental expansion of existing assets

Location

Loddon Campaspe, Central Highlands and Barwon regions

Bendigo, Ballarat and Geelong regional cities

Sector

Transport

Certainty of evidence

Medium

Evidence base

AECOM/PwC, *Assessment 2: Economic, social and environmental assessments and option relationship mapping*, 2016

Public Transport Victoria, *Rail Revival Study: Geelong-Ballarat-Bendigo Project Feasibility Summary Report*, 2013

Direct option cost

\$1 billion–\$5 billion

Contribution to meeting the need

Need 12. Improve access to jobs and services for people in regional and rural areas – **Low**

Need 13. Improve the efficiency of freight supply chains – **Low**

What is this option?

This option considers reopening the rail corridor between Bendigo and Geelong via Ballarat for passenger rail services to enhance access between Victoria's three largest regional centres. This option includes the reopening of rail corridors closed to services, the reactivation of a number of closed stations and upgrading sections of track. The returned rail service would replace the existing limited weekday bus services between the three regional centres. Reopening the rail line would support access to jobs and services in regional and rural areas.

What is the level of community support?

There was limited to no discussion of this option during public consultation. The regional jury had mixed views of this option.

What do we think of this option and why?

This option was not recommended in the strategy because based on our assessment and the results of the PTV feasibility study it provides a low contribution to meeting the need with a high cost. Even under our regional cities scenario, and despite submissions supporting this option, we believe that alternative solutions will better support the transport need along this corridor. This might include more frequent and direct coach services between the three cities that could be considered under regional coach upgrades (RCU). In the strategy we have prioritised upgrading and improving the existing passenger rail network, given the sizeable task in doing this and demonstrable catchment, rather than reopening old lines which generally would serve a limited range of trips and have relatively high threshold costs to bring up to passenger operation standards. Were a fundamentally different population distribution to occur in Victoria, with vastly more growth in these regional cities, this option could become more viable. As a result, Infrastructure Victoria would caution against the sale of any land or approval of new developments that would encroach on this rail corridor. However, even with the growth projected for these cities, our initial findings are that more cost effective options should be considered in the short to medium term.

Brown coal generator auction BCA

Option type

Changing behaviour through regulation

Location

This option would significantly impact the Latrobe Valley region where Victoria's four coal power stations are located. The initiative could result in cleaner energy for use across the state.

Sector

Energy

Certainty of evidence

Medium

Direct option cost

\$10 million–\$25 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 18: Transition to low carbon energy supply and use

Significant	Significant	Significant	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option considers the use of regulatory mechanisms to facilitate an orderly transition away from brown coal or innovation to reduce emissions. One mechanism proposed in literature involves applying a reverse auction. This would involve industry compensating existing generators in exchange for shutting down coal production without government subsidies. For example, plants could bid competitively over the payment they require for closure, the regulator chooses the most cost effective bid, and payment is made by the remaining power stations in proportion to their carbon dioxide emissions. A variation of this plan is being implemented in Germany, resulting in the planned closure of some coal power plants. In Germany's case the government compensates closing generators for forgone profits while industry pays the cost of closing the plants (further detail in *What is this option? cont'd*).

What is the level of community support?

There was a moderate level of discussion of the recommendation Brown coal transition, which includes this option. Responses to the recommendation were generally positive.

What do we think of this option and why?

This option was recommended for further investigation in the strategy, as one possible mechanism to enable an orderly transition away from brown coal energy supply to lower emission energy sources (ref. 18.2.1). This is because this option can bring forward the closure of high emission ageing coal generators in a more transparent manner. These generators may otherwise have little financial incentive to rehabilitate or close. While the mechanism proposed is based on research in an Australian context, it is yet to be tested. For example, there are divergent views on the extent of electricity price rises that would result. Policy design will require consideration of social and economic impacts. Because the mechanism proposed requires a multi-jurisdictional approach, the role for state government would be to investigate it further and propose its implementation to the national energy regulator and to other jurisdictions, for example through the Council of Australian Governments (further detail in *What do we think of this option and why? cont'd*).

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy	
Plan Melbourne refresh 2015	N/A	
Regional Growth Plans	Contributes to implementing policy	Refer to 'additional notes' for discussion

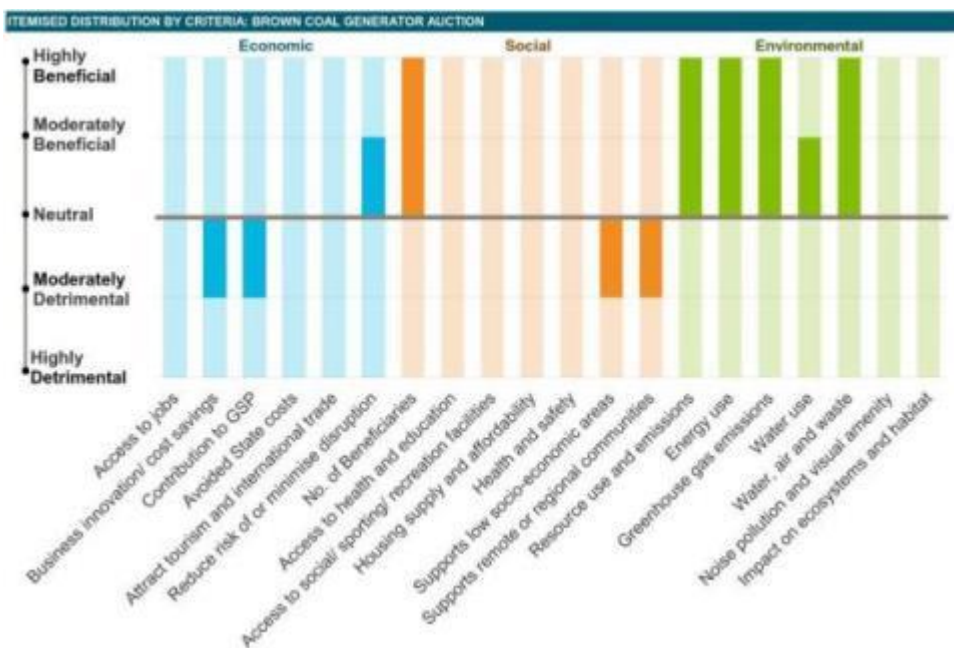
How does this option perform under different scenarios?

Supercity	++	Heightened need to address supply security in transition to low carbon future
Westside Story	++	Heightened need to address supply security in transition to low carbon future
Regional Cities	++	Heightened need to address supply security in transition to low carbon future
Accelerated Climate Change /Mitigation	++	Acute need to reduce carbon emissions
Prolonged/ Severe Economic Downturn	+	
Biosecurity Threat	Neutral	

How does this option work with others?

This option can be viewed as an alternative to stringent environmental standards on brown coal generation plants (BCL).

What are the economic, social and environmental impacts of this option?



Commentary:

In the short-term this option would impact communities in the Latrobe Valley. Longer-term impacts are contingent on legacy planning and new economic opportunities from alternative energy generation technologies. There are also likely to be broader economic impacts through higher electricity prices.

What is this option? (cont'd)

Close to 90 per cent of Victoria's power supply is sourced from brown coal power stations. Brown coal is a cheap and abundant energy resource in Victoria. However, the four remaining brown coal power stations in the Latrobe Valley are the most emissions intensive generators in Australia and these plants are ageing and approaching their renewal or retirement age. This option proposes to develop and implement a reverse auction process to enable an accelerated shutdown of existing coal production with a focus on high emitting, ageing generators.

What do we think of this option and why? (cont'd)

Assessment of this option does not estimate, nor do we propose, the extent of innovation, the number of brown coal generators that may close, or the time period over which this may occur. However, any material change to emissions from brown coal generation could make a significant contribution to reducing emissions in Victoria. The mechanism proposed complements international, federal and state government commitments to mitigate the impacts of climate change. Subject to scheme design, this option could assist in providing greater certainty to both the market and the community. Consideration of impacts on energy prices, security of supply and transition assistance for affected communities in policy design would be essential, particularly for the community in the Latrobe Valley who would be impacted by this option. Learnings from countries such as Germany who have adopted versions of the mechanism proposed will also be important.

Risks and opportunities

This option may be less efficient if a national carbon price policy is implemented. There is a risk of unforeseen consequences of this mechanism given that it is yet to be trialled. There is a likelihood of generator closures in the absence of this option, and scheme design would need to address risks of perverse market outcomes in this environment. Potential impacts on energy prices and security and reliability of supply as a result of this option would need to be considered.

There is an opportunity for significant investment in lower emissions technology with a clear signal to the brown coal market.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended for further investigation in the draft strategy. Since then we have clarified the role for government in considering a reverse auction process to highlight that implementation would require participation of other jurisdictions.

Carbon price

The best approach to mitigating the market failure in recognising environmental impacts in sourcing and using energy is a singular mechanism to internalise the environmental cost of climate change. A carbon price would achieve this. National climate change policies have changed over time and for a short period (2012 to 2014) Australia did have this mechanism in operation. The design of this option (option BCA) would need to complement and be adaptable to national policies as far as possible. For example policy design should consider carbon price scenarios and committed state and national timelines to achieve greenhouse gas reduction targets.

How does this option relate to current state planning strategies?

The Gippsland regional growth plan (RGP) aims to protect valued earth resources, such as brown coal. This option accelerates the closure of coal fired power stations which is not consistent with this direction of the growth plan. However, the Gippsland RGP also has a direction to prepare a strategic energy plan that identifies and protects the region's established and emerging energy resources to maintain Gippsland as Victoria's energy hub. This supports

initiatives that involve renewable energy or reduce or mitigate carbon emissions. Adoption of this option will be an important input into a strategic energy plan for Gippsland.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Australian Government Department of the Environment and Energy, *Repealing the Carbon Tax*

Frontier Economics, *Sudden impact – revised version: Scrutinising the wholesale price impact of assisted closure of brown coal power stations*, 2016

Jotzo, F and Mazouz, S, *Brown coal exit: a market mechanism for regulated closure of highly emissions intensive power stations*, 2015

Reputex, *Powering down? Electricity price impacts of coal generation exit from the NEM*

Brown coal licences

BCL

Option type

Changing behaviour through safety and environmental standards

Location

Statewide

Sector

Energy

Certainty of evidence

Medium

Direct option cost

\$10 million–\$25 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 18: Transition to low carbon energy supply and use

Significant	Significant	Significant	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option considers the use of regulatory mechanisms to facilitate either an orderly transition away from brown coal generation or innovation to reduce emissions. This would involve applying environmental standards to coal generation licences. To provide a clear market signal for the development of lower emission energy sources, this option proposes to facilitate transition or innovation through enhancements to brown coal generation licences. For example, each power station could be required to operate under an annual emissions intensity threshold to retain a generation license. These thresholds could be staged over time, triggering withdrawals or continued innovation to reduce emissions (further detail in *What is this option? cont'd*).

What is the level of community support?

There was a moderate level of discussion of the recommendation Brown coal transition, which includes this option. Responses to the recommendation were generally positive. This option was recommended by the metropolitan citizen jury.

What do we think of this option and why?

This option was recommended for further investigation in the strategy (ref. 18.2.1) as one possible mechanism to enable an orderly transition away from brown coal energy supply to lower emission energy sources. This is because this option can accelerate innovation or bring forward the closure of the high emission ageing coal generators that may otherwise have little financial incentive to rehabilitate or close. The benefits of this would be providing clearer signals to the market, and complementing international, federal and state government commitments to mitigate the impacts of climate change. This option can be directly applied at a state level. Learnings can also be gained from other countries who have adopted versions of this option, for example the United States (further detail in *What do we think of this option and why? cont'd*).

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy	
Plan Melbourne refresh 2015	N/A	
Regional Growth Plans	Contributes to implementing policy	Refer to 'additional notes' for discussion

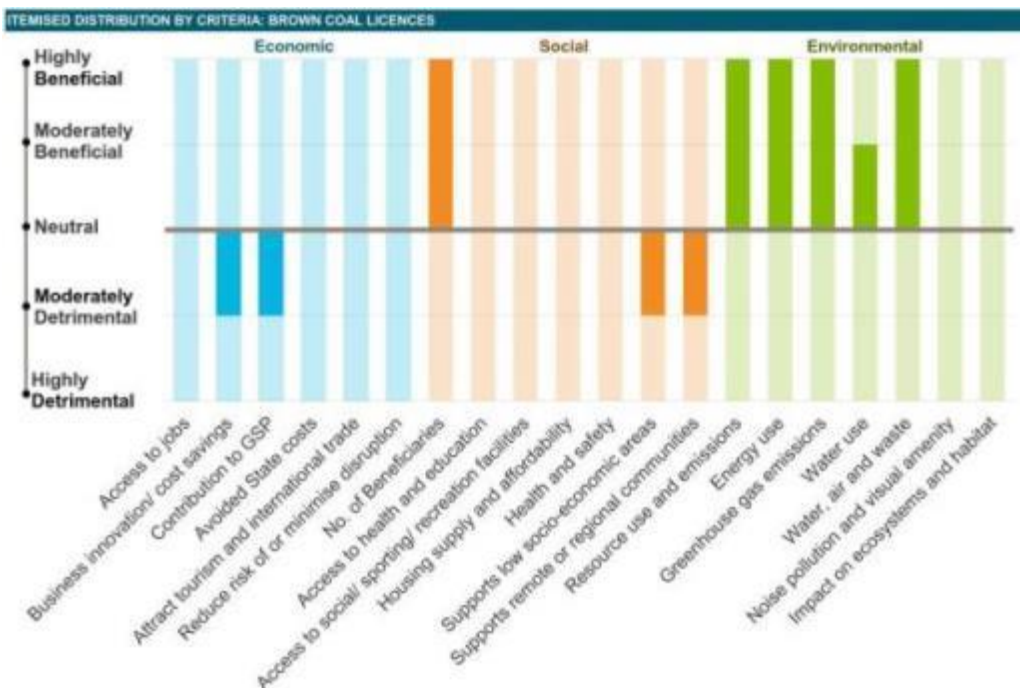
How does this option perform under different scenarios?

Supercity	++	Heightened need to address supply security in transition to low carbon future
Westside Story	++	Heightened need to address supply security in transition to low carbon future
Regional Cities	++	Heightened need to address supply security in transition to low carbon future
Accelerated Climate Change /Mitigation	++	Acute need to reduce carbon emissions
Prolonged/ Severe Economic Downturn	Neutral	
Biosecurity Threat	Neutral	

How does this option work with others?

This option can be viewed as an alternative to a reverse auction process to bring forward closure of brown coal generation plants (BCA).

What are the economic, social and environmental impacts of this option?



Commentary:

In the short-term this option would impact communities in the Latrobe Valley. Longer-term impacts are contingent on legacy planning and new economic opportunities from alternative energy generation technologies. There are also likely to be economic impacts through higher electricity prices.

What is this option? (cont'd)

Close to 90 per cent of Victoria's power supply is sourced from brown coal power stations. Brown coal is a cheap and abundant energy resource in Victoria, however, the four remaining brown coal power stations in the Latrobe Valley are the most emissions intensive generators in Australia, and these plants are ageing and approaching their renewal or retirement age. Policy initiatives in most countries focus on plant emissions rather than restricting fuel sources. Amendments to generation licences (rather than extraction licences) have been used in Europe to increase the environmental requirements for coal generators such that ageing coal plants require either significant capital upgrade or closure. This has been mandated under the European Union's *Large Combustion Plant Directive*.

Currently, viable and scalable technologies to achieve adequate greenhouse gas (GHG) emission reductions for coal generation are limited. International research is however ongoing and this option preserves the possibility of the coal generation sector innovating in order to meet more stringent emissions standards, for example, through carbon capture and storage, or greenhouse gas (GHG) emission scrubbing. In the event that there is innovation in managing coal sourced generation GHG emissions, Victoria may benefit and preserve its existing infrastructure capabilities and natural resource values. These technologies could also have a broader application in addressing industrial emissions, beyond energy production.

What do we think of this option and why? (cont'd)

Assessment of this option does not estimate, nor do we propose, the extent of innovation, the number of brown coal generators that may close, or the time period over which this may occur. However, any material change to emissions from brown coal generation would make a significant contribution to reducing emissions in Victoria. Consideration of impacts on energy prices, security of supply and transition assistance for affected communities in policy design would be essential, particularly for the community in Latrobe Valley who would be impacted by this option. Subject to scheme design, this option could assist in providing greater certainty to both the market and the community.

Risks and opportunities

This option may be less efficient if a national carbon price policy is implemented. There is a likelihood of eventual generator closures in the absence of this option, and scheme design would need to address risks of perverse market outcomes in this environment. Potential impacts on energy prices and security and reliability of supply as a result of this option would need to be considered. There is an opportunity for significant investment in lower emissions technology with a clear signal to the market.

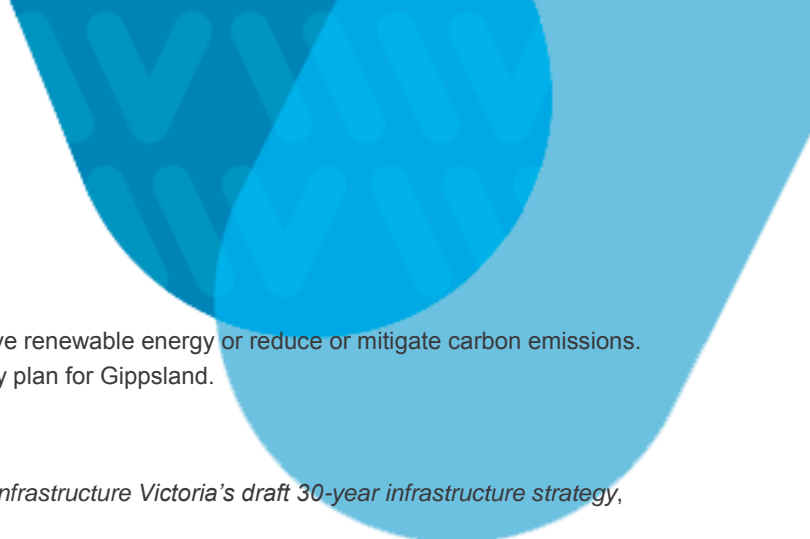
Additional notes

Carbon price

The best approach to mitigating the market failure in recognising environmental impacts in sourcing and using energy is a singular mechanism to internalise the environmental cost of climate change. A carbon price would achieve this. National climate change policies have changed over time and for a short period (2012 to 2014) Australia did have this mechanism in operation. The design of this option (BCL) would need to complement and be adaptable to national policies as far as possible. For example policy design should consider carbon price scenarios and committed state and national timelines to achieve greenhouse gas reduction targets.

How does this option relate to current state planning strategies?

The Gippsland regional growth plan (RGP) aims to protect valued earth resources, such as brown coal. This option accelerates innovation or closure of coal fired power stations. If the option leads to closure, it is not consistent with this direction of the growth plan. However, the Gippsland RGP also has a direction to prepare a strategic energy plan that identifies and protects the region's established and emerging energy resources in order to maintain Gippsland as



Victoria's energy hub. This will support initiatives that involve renewable energy or reduce or mitigate carbon emissions. This option will be an important input into a strategic energy plan for Gippsland.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Australian Government Department of the Environment and Energy, *Repealing the Carbon Tax*

Canadian Department of Environment and Department of Health, *Regulatory impact statement: Reduction of carbon dioxide emissions from coal-fired generation of electricity regulations*, 2011

United States Environmental Protection Agency, *Clean power plan for existing power plants*, 2015

United Kingdom Government, *Environmental permitting guidance: The large combustion plants directive (guidelines to understand the European Community (EC) Directive 2001/80/EC)*, 2010

Big data leveraging BDL

Option BDL is addressed in GDS – Government data sharing and VDA – Victorian data analytics centre

Bicycle highways through the central city

BHT

Option type

New assets

Location

Melbourne central subregion

Sector

Transport

Cultural, civic, sporting, recreation and tourism

Certainty of evidence

Low

Direct option cost

<\$100 million

Contribution to meeting the need

10. Meet growing demand for access to economic activity in central Melbourne – **Low**

What is this option?

This option would deliver dedicated bike lanes to facilitate better travel immediately into and across the CBD. Grade-separation from other road users would be relevant for routes that are high demand, limited by space or impacted by a river or other obstacle.

What is the level of community support?

There was a high level of discussion of the recommendation Cycling corridors-walking improvements, which includes this option. This option was recommended by metropolitan citizen jury.

57 per cent of people surveyed as part of community research supported building dedicated bicycle highways into the CBD.

What do we think of this option and why?

This option was recommended in part in the strategy (ref. 4.1.3 and 10.3.2) because, despite a low contribution to meeting the overall transport task, we think there is an opportunity for greater cycling to and through the central city. This option could potentially reduce traffic congestion and public transport demand particularly during peak hours. This low contribution would be greater if coupled with improved end-of-trip facilities (ALR), improved linkages to public transport (ALP) and broader network improvements (BWP2 and BWP3). Although cycling infrastructure is usually less expensive on average than motorised modes, the construction of, for example, an elevated veloway could be costly. As recommended in the strategy, locations where grade-separated bicycle highways in the central city could facilitate safer and more direct access should be identified and prioritised. The Strategic Cycling Corridors, once finalised should provide the framework for this.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

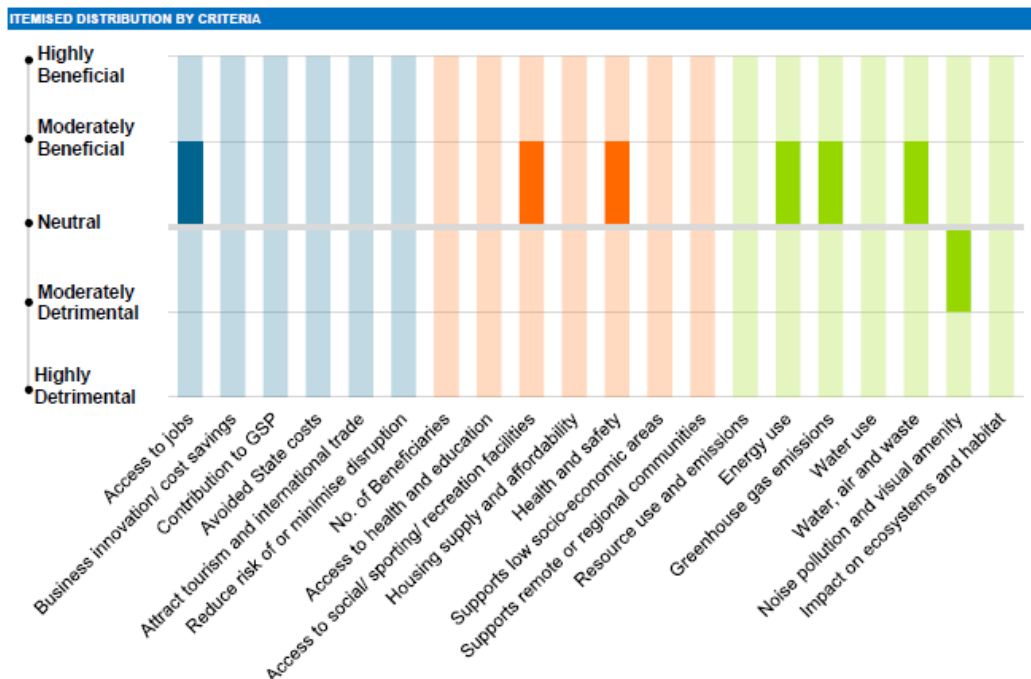
How does this option work with others?

A program of separating or segregating cycling and walking paths (BWP3) across Victoria should provide the framework to prioritise areas in the central city for new bicycle highways. These two options would need to be considered together. This option would in part be dependent on improved end-of-trip facilities (ALR) to accommodate growth in trips.

How does this option perform under different scenarios?

Supercity	++	Supports mode shift to address congestion
Westside Story	+	Supports mode shift to address congestion
Regional Cities	+	Supports mode shift to address congestion
Accelerated Climate Change /Mitigation	+	Supports more carbon efficient travel
Prolonged/ Severe Economic Downturn	+	More affordable transport options
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?





Risks and opportunities

There is a risk that despite increased bicycle infrastructure there may still be a rise in conflict between cyclists and other road users. There may be more crashes involving cyclists with the growth of commuter cycling, particularly in the areas beyond the upgraded infrastructure. There may also be risks associated with pedestrians who need to cross these bicycle highways.

Construction of bicycle infrastructure provides the potential opportunity to defer the need for additional public transport services or car parking in central Melbourne. With more people riding, the growth in the demand for public transport and private car use could be reduced.

Evidence base

AECOM/PwC, *Assessment 2: Economic, social and environmental assessments and option relationship mapping*, 2016

Deloitte/Aurecon, *Assessment 1: Options analysis report*, 2016

Beveridge intermodal freight terminal BIF

Option type

New assets

Location

Melbourne northern region

Sector

Transport

Certainty of evidence

Medium

Direct option cost

\$500 million–\$750 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 13: Improve the efficiency of freight supply chains



What is this option?

Development of an interstate, intermodal (rail and road) freight terminal at Beveridge, north of Melbourne.

What is the level of community support?

There was limited discussion of this option during public consultation. This may be as it was not recommended in the draft strategy.

What do we think of this option and why?

This option was not recommended in the strategy, because the level of certainty for its need is not as great as the Western Interstate Freight Terminal (WIF), which would absorb much of the demand that might be placed on Beveridge.

This option is instead best considered as part of our recommendation on freight precinct land use planning (ref. 13.3.1), which would confirm key existing and future freight assets requiring planning protection and the most appropriate interventions to do this.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

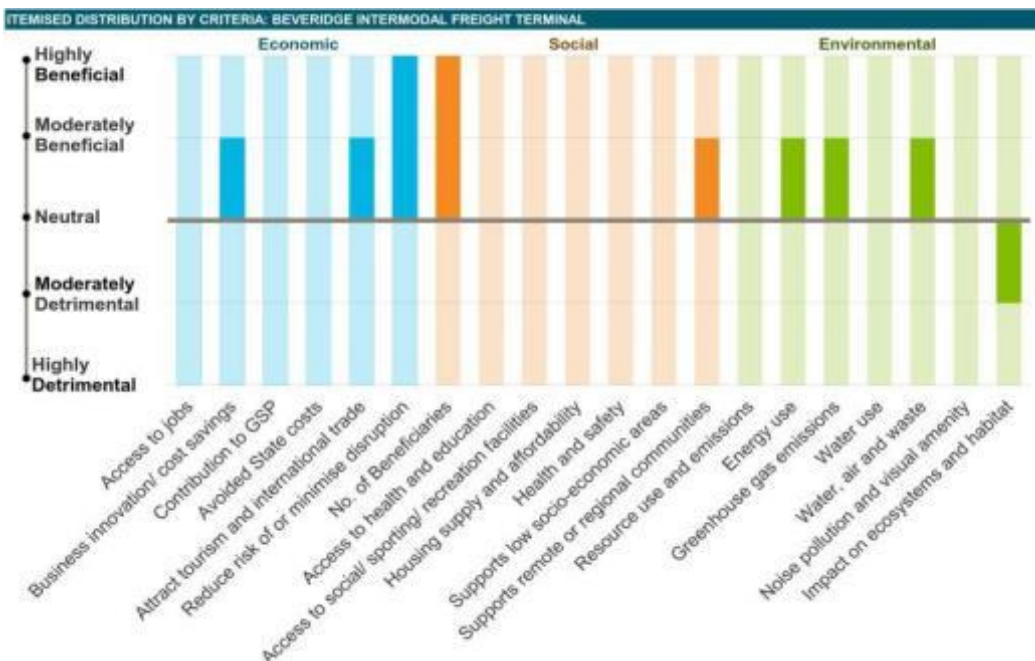
How does this option perform under different scenarios?

Supercity	+	Reduces conflicts between freight and road traffic
Westside Story	+	Reduces conflicts between freight and road traffic
Regional Cities	+	Reduces conflicts between freight and road traffic
Accelerated Climate Change /Mitigation	+	Facilitates more carbon efficient rail freight
Prolonged/ Severe Economic Downturn	-	Less demand for freight transport
Biosecurity Threat	Neutral	Notes
Bay West	+	
Hastings	+	

How does this option work with others?

This option would be complementary to intermodal freight hubs for regional Victoria (IFH) and freight precinct land use planning (FPL).

What are the economic, social and environmental impacts of this option?



Risks and opportunities

This is a high cost asset which is dependent on long-term economic growth to become viable.

This option has the potential to significantly increase the capacity and reduce the cost of interstate freight transport in the north-south and east-west national corridors.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Bendigo rail full metropolitan separation

BRF

Option type

Incremental expansion of existing assets

Location

Melbourne northern subregion and Melbourne western subregion

Melbourne – Bendigo state-significant transport corridor

Sector

Transport

Certainty of evidence

Low

Direct option cost

\$1 billion–\$3 billion

Option lead time

5–10 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 10: Meet growing demand for access to economic activity in central Melbourne; and

Need 11: Improve access to middle and outer metropolitan major employment centres

Very Low	Very Low	Low	Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

Need 12: Improve access to jobs and services for people in regional and rural areas

Very Low	Very Low	Very Low	Very Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option would deliver full separation of Bendigo regional services from Melbourne metropolitan services between Sunbury and Sunshine by quadrupling the tracks to release more capacity along the corridor. This separation would improve reliability and reduce travel times. The scope would include widening of rail bridges, station reconstructions and likely land acquisition adjacent to the rail corridor for the construction of the new track pair. When completed, all regional passenger services entering the city from the west would be directly connected to the central city without sharing tracks with metropolitan services. The Ballarat and Geelong lines were fully separated from metropolitan services with the completion of Regional Rail Link. This option provides greater accessibility to central city employment opportunities, including the Sunshine National Employment Cluster, and services for people living in northern Victoria.

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option was not recommended in the strategy because our assessment is that this section of the Bendigo/Sunbury corridor will not be the primary bottleneck restricting additional services to access the central city. Although the additional tracks may provide operational benefits between Sunbury and Sunshine, the major bottleneck of services will occur between Sunshine and the city. As a result, this option has been assessed as providing only a very low to low contribution to meeting the need with a high cost to construct. We note that existing transport plans do not identify a need for these tracks in order to deliver planned service uplifts over the longer term. This option may be warranted over the much longer term, however, and Infrastructure Victoria would caution against allowing development that would encroach on this rail corridor making it more difficult and costly to deliver future track amplifications (further detail in *What do we think of this option and why? cont'd*).

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

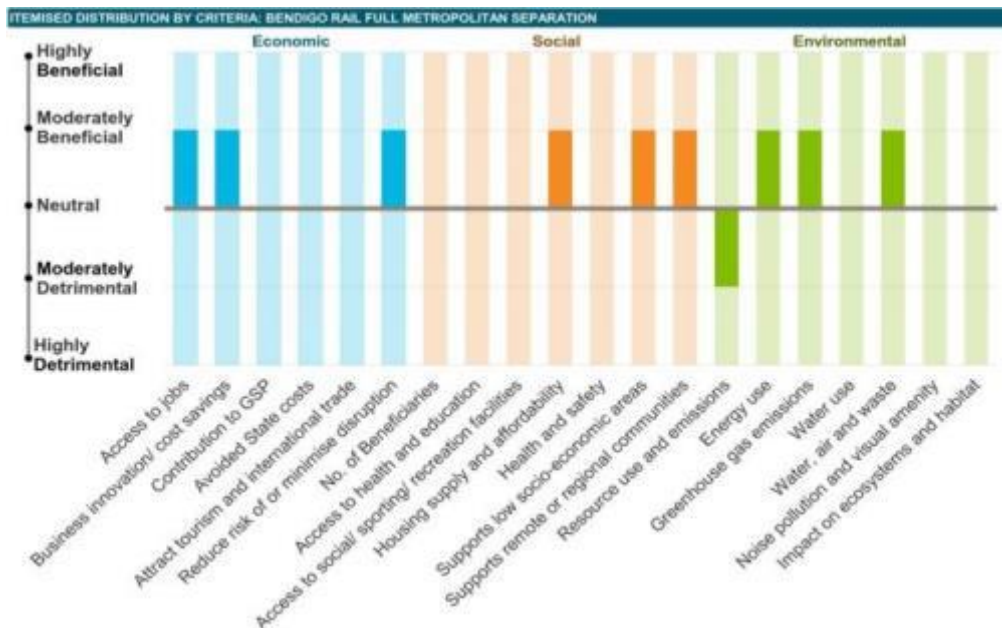
How does this option perform under different scenarios?

Supercity	+	Improving access
Westside Story	+	Improving access
Regional Cities	++	Improving access
Accelerated Climate Change /Mitigation	+	Supports more carbon efficient travel
Prolonged/ Severe Economic Downturn	-	Less demand for higher capacity transport
Biosecurity Threat	Neutral	

How does this option work with others?

No key relations with other options have been identified.

What are the economic, social and environmental impacts of this option?



Risks and opportunities

There is the potential for significant disruption to existing regional and metropolitan services during construction.

This option may provide an opportunity to undertake signalling or track upgrades on the metropolitan lines simultaneously.

What do we think of this option and why? (cont'd)

An alternative way of providing these additional tracks would be to deviate the Bendigo Line to operate via Melbourne Airport as part of a new Melbourne Airport Rail Link. This is likely to be a substantially higher cost way of delivering these additional tracks, particularly if it results in a need for tunnelling the approaches to a Melbourne Airport station. While it warrants consideration if a comprehensive options assessment is undertaken for the Melbourne Airport Rail Link, it would be prudent to continue to protect the existing rail corridor for potential track amplifications over the very long-term.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Burnley rail group BRG

Option BRG is addressed in MRC – Metropolitan rail capacity upgrades

Bicycle and vehicle accident fault allocation BVA

Option type

Changing behaviour through regulation

Location

Statewide

Sector

Transport

Certainty of evidence

Medium

Direct option cost

<\$100 million

Contribution to meeting the need

Need 4. Enable physical activity and participation – **Low**

What is this option?

This option would change current regulations and legislation to be similar to a number of European countries where drivers/vehicles (including cyclists in the case of pedestrians) are assumed to be at fault in all accidents unless fault can be proved otherwise. The changes would put the emphasis on the drivers of vehicles (or cyclists in the case of pedestrians) to be clearer on their responsibilities.

What is the level of community support?

There was a high level of discussion of this option during consultation. Responses were generally negative. This option was opposed by the regional jury, and in the metropolitan jury views were mixed.

What do we think of this option and why?

This option was not recommended in the strategy because there is no clear evidence that the state's no fault liability insurance scheme (TAC) and the ability of cyclists to purchase insurance for personal property damage, is a major barrier to the take up of cycling. There is also limited evidence that any change in these arrangements will change perceptions of cycling by other road users. The Victorian insurance arrangements compare well to many European nations with a much higher mode share of cycling. In any event, the option has tenuous links to infrastructure. This does not preclude the government continually reviewing the regulatory settings to ensure that cycling is encouraged

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

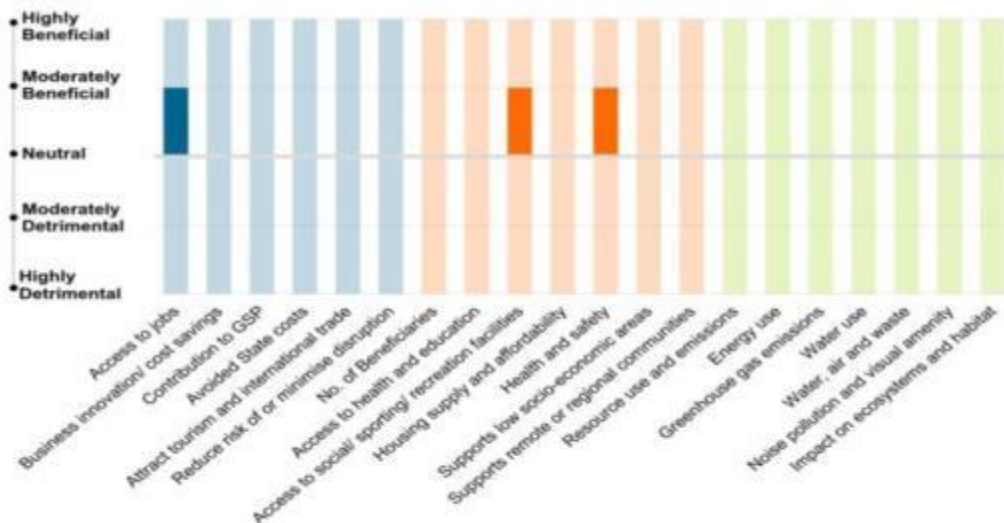
How does this option perform under different scenarios?

Supercity	+	Supports mode shift to address congestion
Westside Story	+	Supports mode shift to address congestion
Regional Cities	+	Supports mode shift to address congestion
Accelerated Climate Change /Mitigation	+	Supports more carbon efficient travel
Prolonged/ Severe Economic Downturn	+	More affordable transport options
Biosecurity Threat	Neutral	

How does this option work with others?

Strong investment in expanding the network of off-road paths for cycling (BWP3) could reduce the need for this option by reducing the potential risk of collision with motor vehicles. Also, advanced driver assistance systems (ADA) and automated car technology (ACT) will enable drivers to better avoid collisions with cyclists and pedestrians.

What are the economic, social and environmental impacts of this option?



Risks and opportunities

There is a risk that changes to the regulations and legislation could be perceived as being 'anti-car' and create further tension between cyclists and cars.

The opportunity is that the barriers to cycling, particularly perceived safety risk, would be mitigated and this would in turn drive a change in the cultural norms for cycling across Victoria.

Additional notes

European context

In many European countries, larger vehicles are held liable if the vehicle is involved in an accident or injury with a cyclist. (see European Transport Safety Council 2005, *The Safety of Vulnerable Road Users in the Southern, Eastern and Central European Countries*, Brussels, p. 10.). This approach is intended to help make motorists pay more attention to vulnerable road users such as cyclists and pedestrians, leading to a better safety outcome. In the Netherlands, vulnerable road users are recognised by relevant laws (Article 185 WVV). This is a key area of interest for cycling advocates who argue that such laws are fundamental to transforming a city like Melbourne into a major cycling city like Amsterdam or Copenhagen. However, the Dutch law simply focuses on ensuring that a cyclist (or pedestrian) is adequately compensated in the case of an accident.

The law requires drivers to pay (usually through their insurer) for both personal injury and property damage sustained by the cyclist. While the Dutch law is essentially 'strict liability' in approach, the degree of liability depends on the circumstances of the case. For instance, a cyclist under the age of 14 years cannot be held responsible for personal injury or property damage. However, a cyclist older than 14 may be held at least partly responsible in the event of a crash.

While the Dutch law is intended to encourage safer driving around vulnerable road users, it also provides a secondary benefit by making compensation for personal injury and property damage to cyclists more obtainable.

Evidence base

AECOM/PwC, *Assessment 2: Economic, social and environmental assessments and option relationship mapping*, 2016

Deloitte/Aurecon, *Assessment 1: Options analysis report*, 2016

Dutch law reference, *Article 185 WVV*, 1994

European Transport Safety Council, *The safety of vulnerable road users in the southern, eastern and central European countries*, 2005

Hembrow, D. and Wagenbuur, M, *Campaign for sustainable safety, not strict liability, A view from the cycle path*, 2012

Bicycle and walking path data capture

BWP1

Option type

Better use through technological innovations

Better use through information

Location

Statewide

Sector

Transport

Cultural, civic, sporting, recreation and tourism

Certainty of evidence

High

Direct option cost

<\$100 million

Contribution to meeting the need

Need 4. Enable physical activity and participation – **Low**

What is this option?

This option is using improved data capture and usage information to make better asset investment and maintenance decisions for walking and cycling. There are currently a number of means in which data for cyclists and pedestrians is captured through fixed loops, censuses and surveys and physical road side counts. This option would expand the state's 32 fixed bicycle loop counters enabling monitoring of various cycling routes in Melbourne and surrounds, as well as developing supportive open data visual and analytical tools to support new and existing sources of data.

What is the level of community support?

There was a high level of discussion of this option during consultation. Responses were generally positive.

What do we think of this option and why?

This option was recommended in the strategy (ref. 4.1.2 and 10.3.1) because although it is assessed as only making a low contribution to need 4, it is low cost and the resulting data is necessary to prioritise the delivery of walking and cycling projects (BWP2 and BWP3). The costs could be higher if a larger roll out of counters is implemented, but other low-cost measures to gain this data should be considered provided the quality and consistency of the data is not compromised. This includes an opportunity to explore new technological innovations to derive high-quality data, such as GPS and Bluetooth. The other benefit of this data is enabling the creation of information to support wayfinding or route choice to attract new demand, potentially integrating with other transport information.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

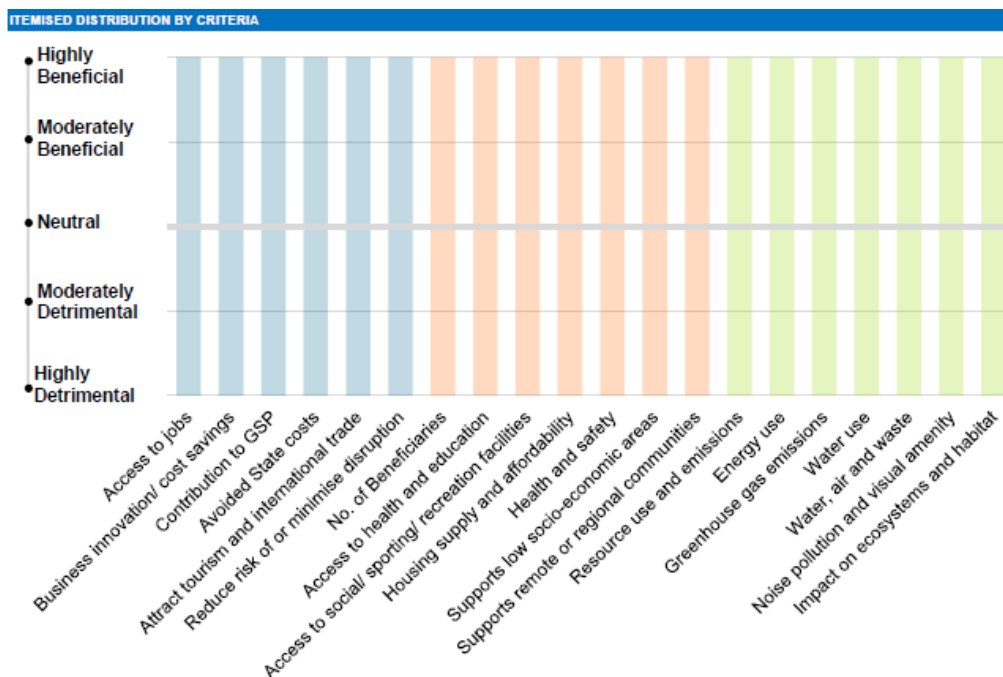
How does this option perform under different scenarios?

Supercity	++	Supports mode shift to address congestion
Westside Story	+	Supports mode shift to address congestion
Regional Cities	+	Supports mode shift to address congestion
Accelerated Climate Change /Mitigation	+	Supports more carbon efficient travel
Prolonged/ Severe Economic Downturn	+	More affordable transport options
Biosecurity Threat	Neutral	

How does this option work with others?

The walking and cycling options (BHT, BWP2 and BWP3) are complementary to this option as they would be aided by data collection to support investment decisions and evaluations. This option would also support road space allocation decisions (RSA).

What are the economic, social and environmental impacts of this option?



Commentary:

No net impacts identified.

Risks and opportunities

There is a risk that in order to obtain a comprehensive picture of the use of the network, the data capture costs could be substantial. This level of investment in some areas may not be justified to record data on a small number of users.

In addition to using the data sets for investment decisions, there is the opportunity to use the data for tourism and other promotional activities. Data could be used to help inform the promotion of under-utilised or 'top rides' that would encourage further active transport.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then we have clarified that a key outcome of this data capture and analysis should be a common state-wide approach. We have also highlighted the opportunity to look at future data sources and how this data could be used (e.g. development of new wayfinding apps), in response to stakeholder feedback.

Bicycle counters and other data sources

Aside from counters numbers of users, bicycle counter sites are also used by VicRoads to examine the road safety impact of the paths, e.g. the increase in speed which may relate to electric bicycles or cyclists in "race mode". There is also a case for multiple sites on the same path to help validate existing counts and provide some data redundancy.

Crowd sourced data needs to be investigated to complement the existing sites. This low cost data set allows VicRoads to examine travel patterns and changes in behaviour. Parkiteer (bike storage numbers at train stations) is another alternative form of available data.

There is an opportunity to extend partnerships with local government to share the collection costs and leverage existing storage and reporting platforms. This would be particularly useful in rural and regional settings as there are limited sites outside the metropolitan Melbourne area.

New technologies

Beyond counters and visual counts, intelligent transport systems and smart phone technologies that are being developed to understand walking and cycling preferences and aid route choices, way finding and bicycle sharing services. These should be supported both to collect data and to distribute it to current and future pedestrians and cyclists.

Evidence base

AECOM/PwC, *Assessment 2: Economic, social and environmental assessments and option relationship mapping*, 2016

Deloitte/Aurecon, *Assessment 1: Options analysis report*, 2016

Bicycle and walking path expansion and improvement BWP2

Option type

Incremental expansion of existing assets

New assets

Location

Statewide

Sector

Transport

Cultural, civic, sporting, recreation and tourism

Certainty of evidence

High

Direct option cost

\$250 million–\$500 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 1: Address infrastructure demands in areas with high population growth; and

Need 4: Enable physical activity and participation

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

Need 10: Meet growing demand for access to economic activity in central Melbourne; and

Need 11: Improve access to middle and outer metropolitan major employment centres

Low	Low	Low	Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option considers expansion of the bicycle and walking paths network (including the Principal Bicycle Network), particularly where there are missing links, to increase opportunities for active transport. For example, there are many areas in Melbourne which do not have footpaths. Similarly, the Principal Bicycle Network has many incomplete areas (which are being prioritised as ‘Strategic Cycling Corridors’). Possible creation of new bike and pedestrian paths, including fixed bike lanes, could expand bike ways through dedicated on-road bicycle priority lanes, although separated bike paths are preferable for many routes (see option BWP3).

What is the level of community support?

There was a high level of discussion of this option during consultation. Responses were generally positive. This option was recommended by the metropolitan citizen jury.

What do we think of this option and why?

This option was recommended in the strategy (ref. 4.1.3 and 10.3.2) because we think there is under-investment in walking and cycling infrastructure. Together walking and cycling have a greater mode share than public transport and there is evidence of strong benefits with strong cost benefit ratios for these types of projects across the world. The delivery of this program within 0-15 years is focused on network plans that the government is in the process of completing: Strategic Cycling Corridors and pedestrian network improvements. We recommend that the government commit to funding beyond the \$100 million allocated to the Safer Cyclists and Pedestrians Fund with an immediate focus on expanding and improving network coverage on state government roads and land or other significant locations, such as the CBD. The assessment of moderate contribution to needs 1 and 4 against all time periods indicates that immediate benefits will be realised with this investment.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	Relates to key point/option for discussion
Regional Growth Plans	N/A

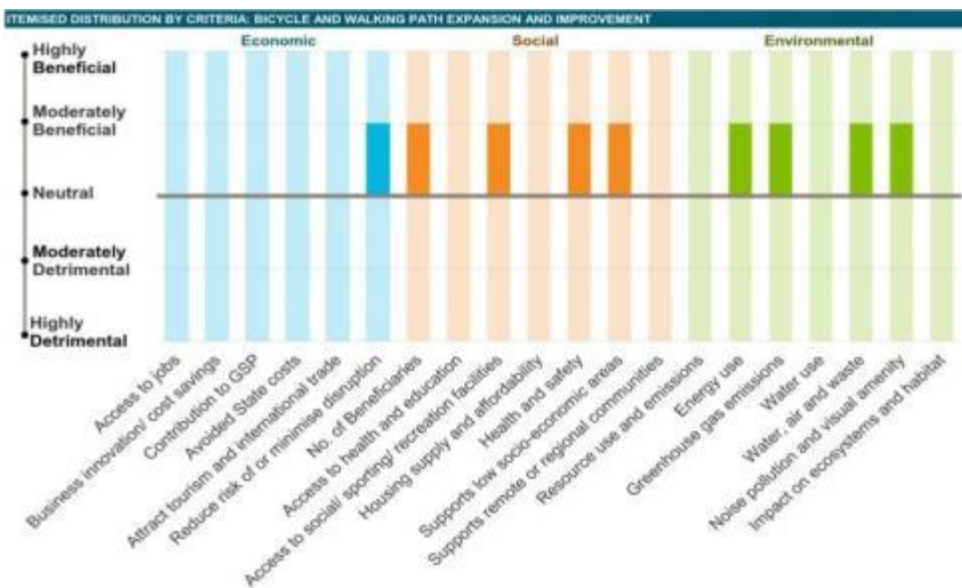
How does this option work with others?

If combined with a program of separating or segregating cycling and walking paths (BWP3), including from other road users, larger benefits may be achieved. There is potential for some overlap with developing active established areas (AEA), although the latter is focused on the established areas only, and for shorter trips.

How does this option perform under different scenarios?

Supercity	++	Supports mode shift to address congestion
Westside Story	+	Supports mode shift to address congestion
Regional Cities	+	Supports mode shift to address congestion
Accelerated Climate Change /Mitigation	+	Supports more carbon efficient travel
Prolonged/ Severe Economic Downturn	+	More affordable transport options
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



Commentary:

Reductions in motorised vehicle travel would contribute to a reduction in air pollution, water pollution, land consumption and energy use. Active transport could also contribute to a quieter environment and positively influence visual amenity in most instances.

Risks and opportunities

There are delivery risks for the construction of cycling and footpath extensions with challenges of access to land where the paths are off-road. This can lead to project delays and cost overruns. Use of new walking and bicycle paths may be limited in some areas which have traditionally been car dependent.

By developing a comprehensive bicycle network there is the opportunity to elevate cycling as a fundamental mode of transport. This can help attract new riders and generate greater appreciation for cycling.

Funding

Should government choose to pursue this program, it will then need to consider funding options. Below is a range of potential funding mechanisms which could be examined to help fund the program.

Potential funding mechanisms

General government revenue	User charges	Beneficiary charges	Property development	Asset sales
✓		✓		

General government revenue is likely to be a major source of funding for bicycle and walking path expansion and improvement (BWP2). Victoria could also explore opportunities to seek federal government contributions for programs such as BWP2. Currently a major program for active transport (walking and cycling) access to Sydney CBD is on Infrastructure Australia's priority initiatives list.

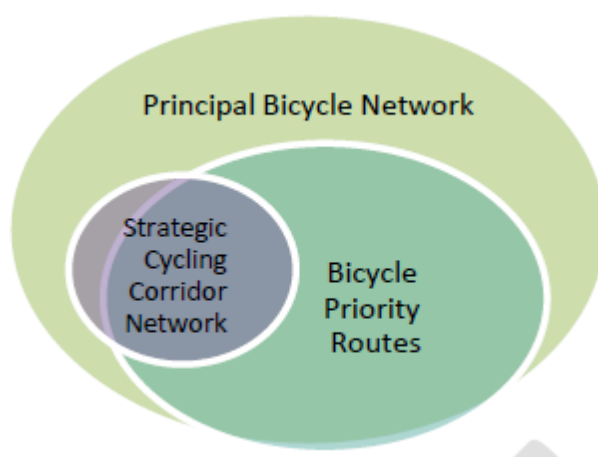
Beneficiary charges such as developer contributions could be considered to help fund projects like BWP2. This could be sourced from existing developer contributions such as the Growth Areas Infrastructure Contribution, developer contribution plans, and open space contributions. Reforms to infrastructure contributions are currently underway in Victoria, which aim to simplify the developer contribution process. State and local governments could deliver additional bicycle and walking path expansions and improvements by nominating projects as part of existing and future developer contribution schemes.


Additional notes

Strategic Cycling Corridors

The proposed Strategic Cycling Corridors (SCCs) are intended to be a subset of the state's overarching (but largely incomplete) Principal Bicycle Network (PBN) and overlap strongly with Bicycle Priority Routes (BPRs). These BPRs were identified in network plans agreed by VicRoads and local government— a process better known as SmartRoads – but in many cases have not been implemented.

The relationship between the PBN, BPR and Strategic Cycling Corridors is represented by the diagram below, produced by VicRoads.





SCCs are intended to deliver a network of safe, direct and high quality cycling corridors connecting activity centres, public transport hubs and other key locations. In this way they would be a stepping stone toward the delivery of the overarching PBN. Importantly, the corridors would be one, or a combination of, the following three standards only;

- a) off-road paths
- b) on-road separated bike lanes
- c) traffic calmed local streets .

In particular, end to end delivery of the entire corridor is proposed, such that the current problems with fragmented and incomplete paths would be avoided.

Next steps for Strategic Cycling Corridors

The delivery of the SCCs in 15 years should first focus on areas where government has control of the relevant road or land. In other cases, government should immediately initiate discussions for the delivery of SCCs on other roads or land as these can often be lengthy. Government will often need to gain agreement to resolve ongoing maintenance and replacement issues, including through licence agreements or other processes. Consideration could be given for more efficient ways to speed up this process.

This initial focus should also turn to areas where there is strong agreement with councils on the need and where there is high demand. This is largely the central city councils and projects could include St Kilda Road, Sydney Road and addressing the missing link in the Main Yarra Trail between CBD and Port Melbourne.

Our funding advice indicates that there are opportunities for SCCs to be delivered through the planning system, including through developer contributions. As the intended status of the routes (once finalised) is not likely to be clear, a next step could be to have SCCs reflected in planning schemes across the state.

International review of walking and cycling projects

A UK Department for Transport review in 2014 reviewed a number of walking and cycling projects across the world, including Sydney, and found that these projects typically provide excellent cost benefit ratios. An average ratio was 5.95, with 4:1 provided for the Sydney example (noting it found a mean ratio of 18:1 from the top 10 sections of the broader program).

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

AECOM for City of Sydney, *Inner Sydney regional bicycle network demand assessment and economic appraisal*, 2010

Commonwealth of Australia, *Walking, riding and access to public transport; Supporting active travel in Australian communities*, 2013

Davis, A, *Claiming the health dividend: A summary and discussion of value for money estimates from studies of investment in walking and cycling*, 2014

Bicycle and walking path separation

BWP3

Option type

Better use through refurbishment of existing assets
 Incremental expansion of existing assets
 New assets

Location

Statewide

Sector

Transport

Certainty of evidence

High

Direct option cost

\$500 million–\$750 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 1: Address infrastructure demands in areas with high population growth; and

Need 10: Meet growing demand for access to economic activity in central Melbourne; and

Need 11: Improve access to middle and outer metropolitan major employment centres

Low	Low	Low	Low
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0-5 yrs 5-10 yrs 10-15 yrs 15-30 yrs

Need 4: Enable physical activity and participation

Moderate	Moderate	Moderate	Moderate
----------	----------	----------	----------

0-5 yrs 5-10 yrs 10-15 yrs 15-30 yrs

What is this option?

This option focuses on altering existing road, bike and walkway infrastructure to separate bicycle and pedestrian usage, including from other road users. In some places this may require widening of paths or provision of additional footpath or cycling infrastructure. Research suggests that infrastructure that provides some level of separation or segregation from other users (such as motorised vehicles) would make cycling safer and attract additional users to regular cycling. This option would, in the first instance, aim to facilitate improved access to employment centres.

What is the level of community support?

There was a high level of discussion of this option during consultation. Responses were generally positive. Both citizen juries made recommendations in support of this option. 64 per cent of people surveyed as part of community research supported expanding footpaths to include bike lanes.

What do we think of this option and why?

This option was recommended in the strategy (ref. 4.1.3 and 10.3.2) because we think there is under-investment in walking and cycling infrastructure. Walking and cycling together have greater mode share than public transport across Victoria and the City of Melbourne has a target of 10 per cent mode share in its municipality by 2030. The delivery of this program within 0-15 years is focused on the network plans that the government is in the process of completing: Strategic Cycling Corridors and pedestrian network improvements. We recommend that the government commit to funding beyond the \$100 million allocated to the Safer Cyclists and Pedestrians Fund with a focus on progressively separating walking and cycling and from other road users. This program is distinct to BWP2, because there is a need to continually drive improvements to the standards of the existing network to support improved safety and meet increasing demand.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	Relates to key point/option for discussion
Regional Growth Plans	Contributes to implementing policy

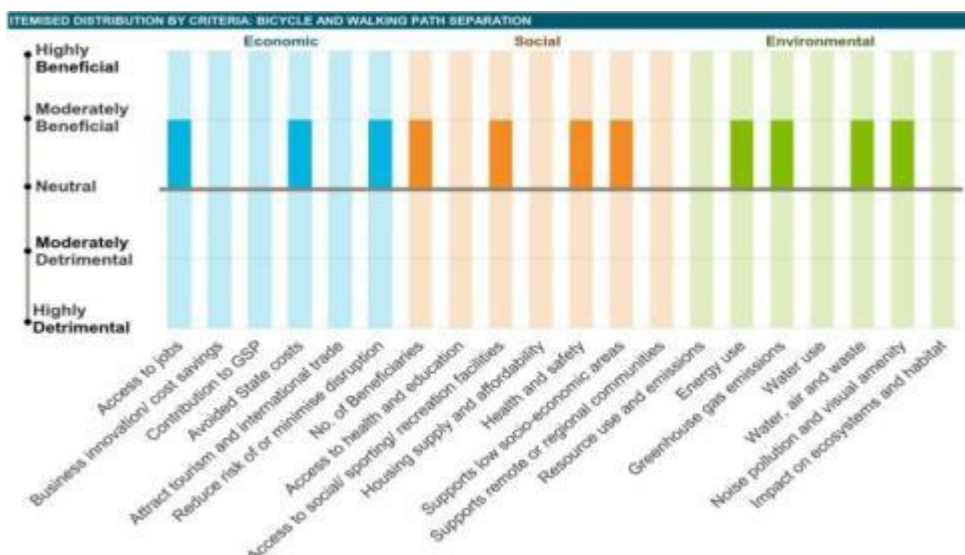
How does this option work with others?

The completion of road space allocation work (RSA) may enable a clearer sense of where this option can be completed. For example, the ease with which the option could be implemented may increase, since the space available for the paths will be known. This option would provide the greatest benefit if undertaken in conjunction with, or following, broader network expansion and improvement (BWP2) ensuring not just separation of modes but more comprehensive bicycle and walking path networks. There is potential for some overlap with developing active established areas (AEA), although the latter is focused on the established areas only, and for shorter trips.

How does this option perform under different scenarios?

Supercity	++	Supports mode shift to address congestion
Westside Story	+	Supports mode shift to address congestion
Regional Cities	+	Supports mode shift to address congestion
Accelerated Climate Change /Mitigation	+	Supports more carbon efficient travel
Prolonged/ Severe Economic Downturn	+	More affordable transport options
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



Commentary:

Physically separating active transport infrastructure can attract a greater number of new cycling trips by people who are less confident in riding in traffic. This option improves mode choice for travellers, benefiting access to employment and improving the resilience of transport connections.

Risks and opportunities

There is a risk in the development of separated bicycle and walking paths that some current shared user paths may become walking-only, forcing bikes onto on-road bike lanes. This could lead to less safe and less attractive cycle options.

With the separation of cycle and walking paths, there may be an opportunity for emerging forms of electric bicycles or mobility devices with low speeds to safely use bicycle paths. This will eliminate the conflict with pedestrians and allow better access for faster moving bicycles and scooters. There may also be an opportunity to develop additional bicycle paths to fill in 'gaps' between established cycling corridors.

Funding

Should government choose to pursue this program, it will then need to consider funding options. Below is a range of potential funding mechanisms which could be examined to help fund the program.

Potential funding mechanisms

General government revenue	User charges	Beneficiary charges	Property development	Asset sales
✓		✓		

General government revenue is likely to be a major source of funding for bicycle and walking path separation (BWP3). Victoria could also explore opportunities to seek federal government contributions for programs such as BWP3. Currently a major program for active transport (walking and cycling) access to Sydney CBD is on Infrastructure Australia's priority initiatives list.

Beneficiary charges such as developer contributions could be considered to help fund projects like BWP3. Developer contribution plans and open space contributions could help fund separate paths for bicycles and pedestrians where there is increasing population and demand for cycling and walking arising from new development. Reforms to infrastructure contributions are currently underway in Victoria, which aim to simplify the developer contribution process. State and local governments could deliver additional bicycle and walking path expansions and improvements by nominating projects as part of existing and future developer contribution schemes.

Additional notes

Victorian Integrated Survey of Travel and Activity (VISTA) figures for cycling

VISTA indicates that cycling accounts for 2.0 per cent of weekday trips for all purposes – close to the 2011 Census result (1.6 per cent for journey to work). In addition, on a weekday in metropolitan Melbourne more trips are made by bicycle than by either tram (1.5 per cent) or bus (1.8 per cent). This goes up in the inner ring of suburbs (5 per cent) though it is lower in the middle and outer. But even in the inner ring, cycling is still used for more trips than tram (4.3 per cent) or bus (1.4 per cent).

Sharing shared paths

Almost three-quarters of recreational paths on the Metropolitan Trail Network, now largely subsumed by the Principal Bicycle Network, were originally intended for recreation and low levels of transport use. However, many of these routes now have high levels of transport use, and this can lead to challenges with safely sharing the space.

One example is that in a survey of 1,128 Victorians aged 60 or over, 39 per cent identified bicycle riders on shared paths as a moderate or major constraint to their walking. This is significant when considering for people aged 75 years and over, walking comprises 77 per cent of the total time spent on physical activity.

While cyclists generally prefer shared paths to riding on the road, in a survey of over 600 Victorian cyclists, 66 per cent said they 'really like' riding on a segregated path, compared to 7 per cent for a shared path.

In a survey of 607 Victorians with vision impairment, 8 per cent had been involved in a collision and 20 per cent were in a near collision as a pedestrian over the previous five years and 24 per cent of these incidents were with bicycle riders.

International review of walking and cycling projects

A UK Department for Transport review in 2014 reviewed a number of walking and cycling projects across the world, including Sydney, and found that these projects typically provide excellent cost benefit ratios. An average ratio was 5.95, with 4:1 provided for the Sydney example (noting it found a mean ratio of 18:1 from the top 10 sections of the broader program).

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

CDM Research, *Cyclist Route Choice Survey*, unpublished report to VicRoads, 2012

Garrard, J, *Senior Victorians and Walking: obstacles and opportunities*, Victoria Walks, 2013

Oxley, J; Liu, S; Langford, J; Bleechmore, M; and Guaglio, A *Road Safety for Pedestrians' Who Are Blind or Have Low Vision* Monash University Accident Research Centre and Vision Australia, 2012

State of Victoria, *Cycling into the Future 2013-23, Victoria's Cycling Strategy*, 2013

Victorian Department of Economic Development, Jobs, Transport and Resources, *Victorian integrated survey of travel and activity (VISTA)*, 2013

Critical asset centralised risk management CAR

Option type

Better use through public service delivery and approval processes

Better use through coordination processes

Location

Statewide

Sector

All

Certainty of evidence

Medium

Direct option cost

\$10 million–\$25 million

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 19: Improve the resilience of critical infrastructure

Low	Low	Low	Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

There is currently a statewide plan to manage critical infrastructure and associated risks. The legislation requires that a Critical Infrastructure Register contain all infrastructure designated to be vital critical infrastructure or assessed to be major or significant critical infrastructure. This register details the responsible party for the asset and is maintained by Emergency Management Victoria (EMV). This option considers the development of a centralised approach to risk management for critical government-owned assets, including the delivery and implementation of a statewide critical infrastructure plan and asset management plan.

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive.

What do we think of this option and why?

This option was not recommended in the strategy because there is no evidence that the current approach to managing critical infrastructure risk is a problem. While the option principally focuses on government assets, this is complicated whereby private operators manage public assets. It is possible that in the medium term a review of the critical infrastructure arrangements and the role of EMV could be undertaken. At this point the issue of greater centralisation may arise, however, care is needed to ensure accountability and management of risks rests with those best placed to do so. A centralised model is bound to create confusion with regard to governance, risk ownership and accountabilities.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

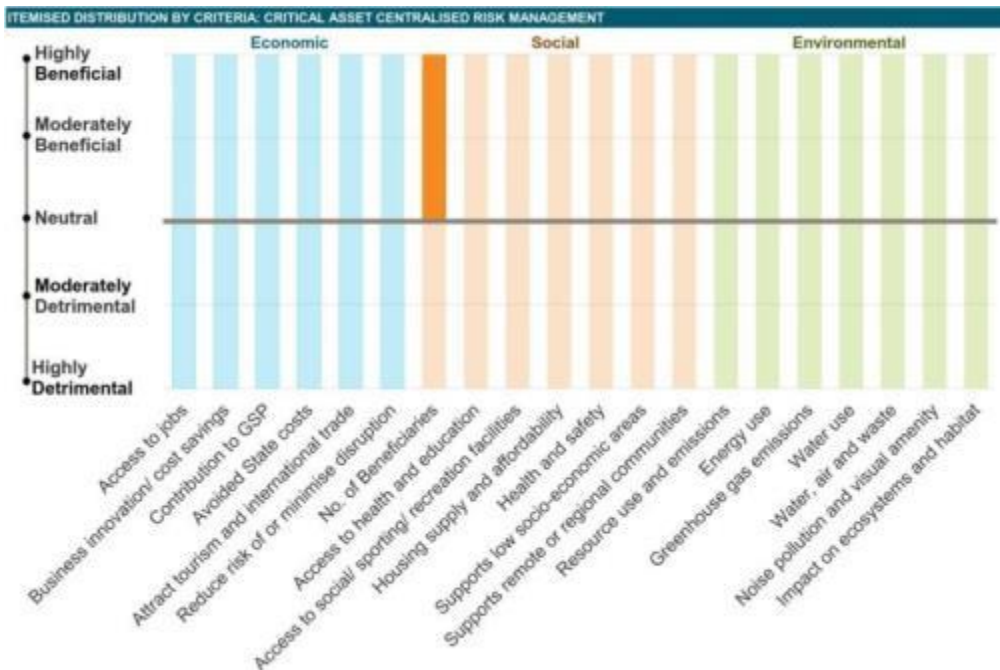
How does this option perform under different scenarios?

Supercity	+	Improved operational reliability
Westside Story	+	Improved operational reliability
Regional Cities	+	Improved operational reliability
Accelerated Climate Change /Mitigation	+	Improved operational reliability
Prolonged/ Severe Economic Downturn	+	Improved operational reliability
Biosecurity Threat	++	Improved operational reliability

How does this option work with others?

Pairing this option with a centralised planning scheme (CPS1) may enhance coordination between planning and risk mitigation in specific areas in the state. This partnering could be particularly strong in taking into account the effects of shifting demographics and implications for critical infrastructure in both high growth (need 1) and low growth (need 2) areas across the state.

What are the economic, social and environmental impacts of this option?



Risks and opportunities

Most of the state's critical infrastructure is managed by the private sector. Shifting arrangements for more centralised control of government assets could compromise the consistency of approach. Centralising risk could also result in a disconnection from service delivery and the other non-critical asset risks that remain with the relevant owner. Agreeing terms of implementation of the risk management strategy may become difficult.

The opportunity is to ensure that a consistent approach is applied to risk management across government, building on the strong role of Emergency Management Victoria. Co-location of services and consistent risk management approaches may improve the interoperability and resilience of sectors.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Emergency Management Victoria, *Critical infrastructure resilience strategy*, 2015

Victorian Parliament, *Critical Infrastructure - Part 7A of the Emergency Management Act*, 2013

Community cultural facility investment framework

CCF

Option type

Better use through public service delivery and approval processes

Better use through coordination processes

Location

Statewide

Sector

Cultural, civic, sporting, recreation and tourism

Certainty of evidence

Medium

Direct option cost

\$1 million–\$10 million

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 1: Address infrastructure demands in areas with high population growth; and

Need 5: Provide public spaces where communities can come together

Low	Low	Low	Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Some community cultural facilities are in need of upgrading or are coming to the end of their useful life. This relates to population growth and changing trends in the way communities participate in activities such as music, performance, arts and crafts. New and upgraded facilities require significant investment. Currently there is limited evidence for where community cultural facilities are required or a funding strategy to support their development. The aim of this option is to develop a framework that can plan for a network of cultural facilities across the state. This option proposes the provision of a strategic planning and investment framework to ensure investment will be targeted based on need and delivering maximum outcomes.

What is the level of community support?

There was limited discussion of this option during public consultation.

What do we think of this option and why?

This option was recommended in the strategy (ref. 5.1.2) because improved planning frameworks will enable the delivery of facilities to support wider community participation in cultural activities with associated social inclusion benefits. At this stage, we have not recommended a funding strategy. We think it is more important to get the decision-making framework right in the first instance to ensure that future state government investment decisions are strategic and will help to deliver agreed outcomes through a stronger evidence base and a more transparent decision-making processes. Local government is a key provider of community cultural activities they will therefore need to be a partner in the development of the framework.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

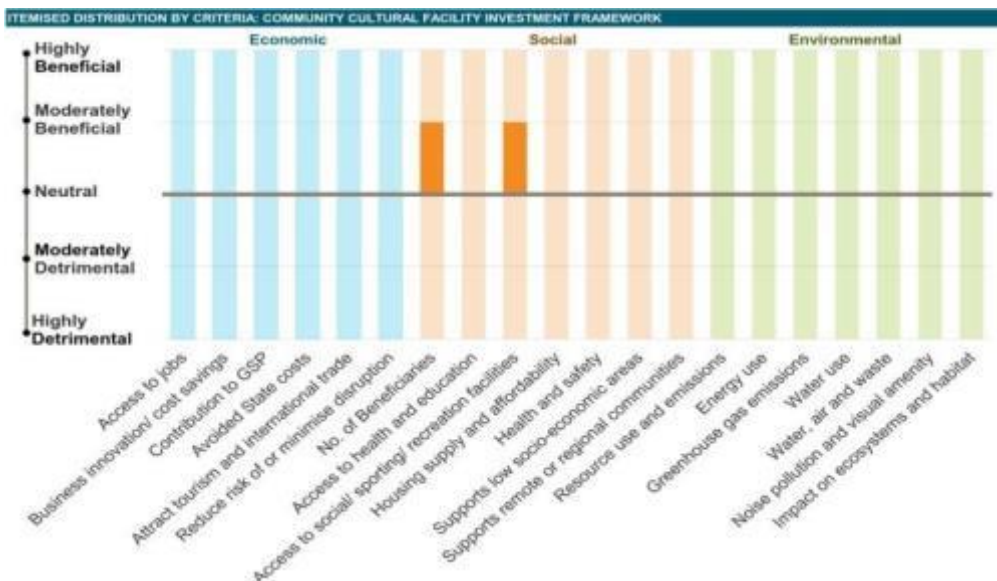
How does this option perform under different scenarios?

Supercity	+	Increased demand
Westside Story	+	Increased demand
Regional Cities	+	Increased demand
Accelerated Climate Change /Mitigation	Neutral	
Prolonged/ Severe Economic Downturn	Neutral	
Biosecurity Threat	Neutral	

How does this option work with others?

When the needs for community cultural facilities are better understood this would inform opportunities for integration of community arts facilities, such as shared performance spaces or schools as community facilities (SCF). It could also inform where community infrastructure requires upgrading and renewal (CSR).

What are the economic, social and environmental impacts of this option?



Commentary:

There are many social inclusion benefits, particularly for diverse and disadvantaged groups, to be gained through arts participation.

Risks and opportunities

The strategy would need to achieve consensus, support and governance from a diverse group of cultural facilities owners, operators and users (e.g. local government, not-for-profits, arts companies) to be successful.

Appropriate consideration needs to be given to funding (where necessary) for community activities and the arts to ensure that these facilities are invested in. Integrated community facilities can strengthen the viability and sustainability of creative community organisations that make use of the infrastructure. This will help to ensure that the facilities experience ongoing utilisation.

Additional notes

Next steps

In determining need and outcomes the community cultural investment framework will need to consider:

- If existing facilities are no longer fit for purpose and whether they can be maintained and upgraded.
- Adequate demand to ensure viability of operations.
- Changing trends in participation in cultural activities.
- Changing trends towards delivering community cultural programs in integrated facilities and hubs.
- Opportunities to integrate community cultural facilities on school sites.
- Understanding the needs of Aboriginal and multicultural communities and the role that community cultural facilities play to support cultural expression and social cohesion.
- How to foster the development of creative practice in a long-term self-sustaining way.
- Gaps in provision.
- Provision of adequate and appropriate community cultural facilities that can support a pathway to elite participation.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Central city job cap CCJ

Option type

Better use through land use and planning controls

Location

Melbourne central subregion

Sector

All

Certainty of evidence

Low

Direct option cost

<\$100 million

Contribution to meeting the need

Need 10. Meet growing demand for access to economic activity in central Melbourne – **Moderate**

What is this option?

This option would 'cap' the number of jobs available in the central city and re-focus this growth within National Employment Centres as well as Geelong (as Victoria's second city) and other regional centres. The cap could be set as a target for the central city area. This option could be achieved through the following examples:

- Requiring new government offices to locate outside the central city
- Land use planning controls that restrict development of new commercial developments in the central city.
- Transport pricing to disincentivise access to the central city.

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option was not recommended in the strategy because it is likely to constrain investment generally in Victoria, with jobs locating in other major cities rather than suburban and regional Victoria. Its moderate contribution to meeting growing demand for access to central Melbourne would be by reducing demand on transport networks to travel to the central city. However, the likely impact is to reduce overall employment in Victoria.

This option would have multiple detrimental impacts including reducing Victoria's gross state product and exacerbating social inequality by restricting people's access to high value jobs in the central city. The relatively small whole-of-life cost for this option is only related to regulatory changes and not the broader economic costs.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy	Could support regional cities and NECs
Plan Melbourne refresh 2015	N/A	
Regional Growth Plans	N/A	

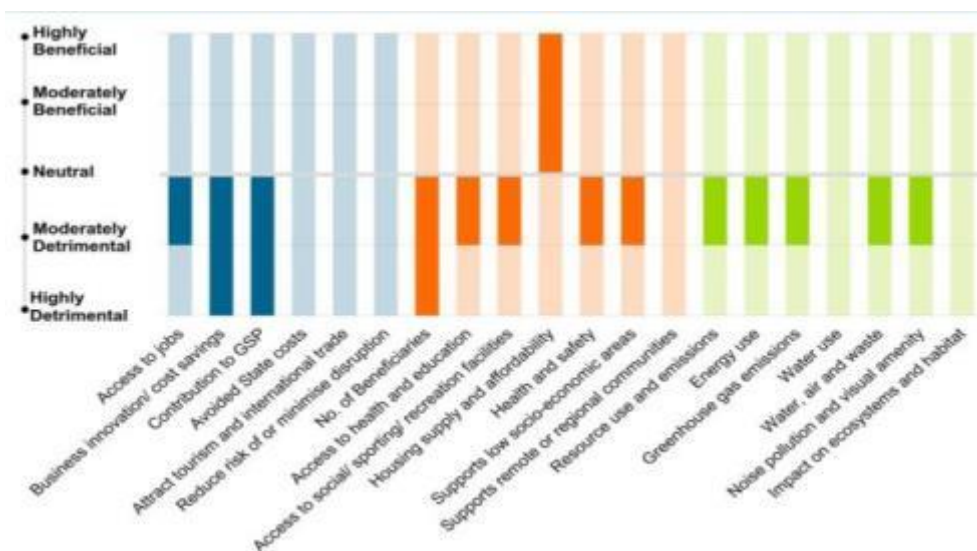
How does this option work with others?

This option could complement the option employment outside central city incentivisation (EOC).

How does this option perform under different scenarios?

Supercity	++	Supports more efficient use of transport capacity
Westside Story	+	Supports more efficient use of transport capacity
Regional Cities	+	Supports more efficient use of transport capacity
Accelerated Climate Change /Mitigation	+	Assuming public transport accessibility
Prolonged/ Severe Economic Downturn	+	More affordable transport options
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



Commentary:

This option would reduce the economic growth of central Melbourne and likely result in multiple negative social, environmental and economic impacts for Melbourne, Victoria and potentially Australia.

Risks and opportunities

A significant risk with this option is that the restrictions that would be required to be imposed would result in private sector business locating in other capital cities within Australia or overseas, rather than remaining in Victoria outside of the central city. This could have a significant impact on the economic performance of Victoria.

To date, developments in communications and technology have not been able to reduce the need for many high value jobs being located in the central city. As technology continues to develop over the next 30-years, the need to be located in the central city may reduce.

Evidence base

AECOM/PwC, *Assessment 2: Economic, social and environmental assessments and option relationship mapping*, 2016

Deloitte/Aurecon, *Assessment 1: Options analysis report*, 2016

Cross city road tunnel

CCR

Option type

New assets

Location

Melbourne central subregion

Sector

Transport

Certainty of evidence

Low

Evidence base

Deloitte/Aurecon, *Assessment 1: Options analysis report*, 2016

Direct option cost

>\$10 billion

Contribution to meeting the need

Need 10. Meet growing demand for access to economic activity in central Melbourne – **Low**

What is this option?

Construct a cross city tunnel from the west of the city to the east of the city with tunnel entrances either side of the CBD to reduce inner city congestion and enable motorists to avoid driving through the city centre or through already congested routes around the city. It would provide a similar function to the Cross City Tunnel in Sydney, which links Darling Harbour on the western fringe of the CBD with the inner east.

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option was not recommended in the strategy because no further evidence has been found that might alter Infrastructure Victoria's earlier assessment that this option performed poorly in terms of contribution with a high cost.

Given that the existing east to west freeway options are south of the CBD (the M1 including the Burnley and Domain tunnels) and north-east of the city (the M3), and proposals for linking Eastern Freeway to CityLink (EWE), there is a clear question of the potentially duplicative nature of a CBD road tunnel.

The question is then whether this is a potentially better option than EWE for connecting the city's north-east and north-west. Given that the existing alignment for that tunnel exists, and would not require a large volume of traffic to be re-routed into a tunnel under the CBD, this option is considered to be of low contribution to transport capacity. Also, given that such an option may require the re-routing of traffic from the southern and northern cross city routes into a tunnel entrance closer to the CBD, this option may even have a negative impact by creating greater road congestion.

Central city tram network extension CCT

Option type

Incremental expansion of existing assets

Location

Melbourne central subregion

Sector

Transport

Certainty of evidence

Medium

Direct option cost

\$1 billion–\$3 billion

Option lead time

5-10 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 1: Address infrastructure demands in areas with high population growth; and

Need 10: Meet growing demand for access to economic activity in central Melbourne



0-5 yrs 5-10 yrs 10-15 yrs 15-30 yrs

What is this option?

Extend tram lines within the central city area including to the new urban renewal areas of E-Gate and Fishermans Bend and the missing tram link between Dynon and Footscray. The extension to Fishermans Bend involves an extension along Collins St to go over the Yarra River and into the Fishermans Bend precinct along Plummer St. The E-Gate extension will provide a direct link with the city and the missing tram link between Dynon and Footscray will connect Footscray, Docklands and the city.

Extending the tram network contributes to amenity and the attractiveness for businesses and people to relocate to the redevelopment areas. These extensions will provide city access to new residents and visitors from the urban redevelopment areas and a new cross-city tram link.

What is the level of community support?

There was limited to no discussion of this option during public consultation. This option was recommended by the metropolitan citizen jury.

What do we think of this option and why?

This option was recommended in part in the strategy (ref. 1.2.1 and 10.8.1) because the tram extension from the central city to Fishermans Bend will have a city shaping and catalytic impact on opening up Australia's largest urban renewal precinct which could enable housing for 80,000 people and 60,000 jobs to be located adjacent to central Melbourne.

The Fishermans Bend tram section was recommended for delivery within 5–10 years. We acknowledge that in the short-term the tram may be underutilised, but without it there is a substantial risk that development of Fishermans Bend may not reach desired high densities. Future Infrastructure Victoria strategy updates will assess the provision of other new tram links to support central city expansion including to E-Gate and Footscray.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

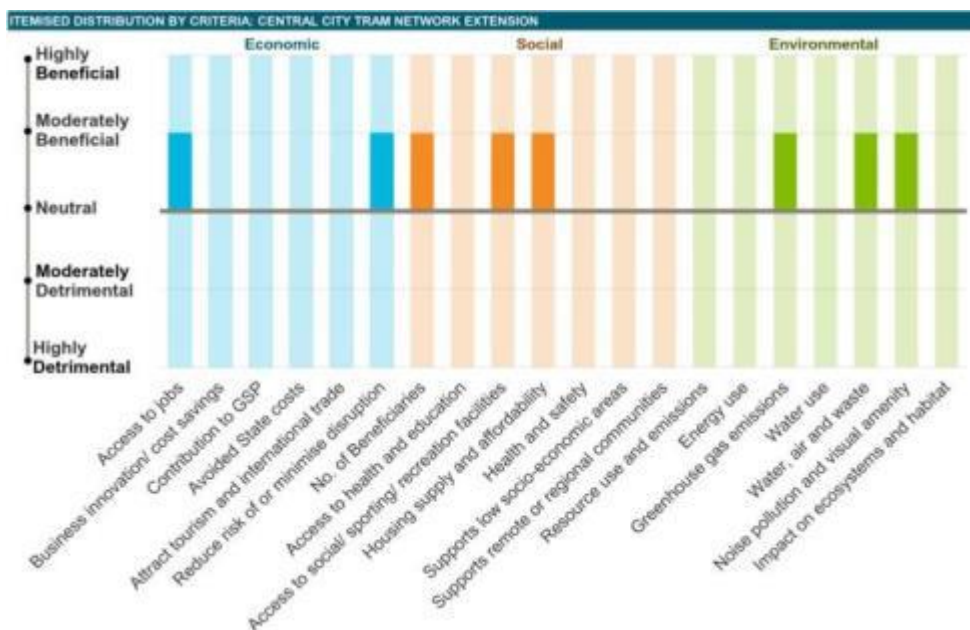
How does this option perform under different scenarios?

Supercity	++	Supports mode shift to address congestion
Westside Story	+	Supports mode shift to address congestion
Regional Cities	+	Supports mode shift to address congestion
Accelerated Climate Change /Mitigation	+	Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	-	Less demand for mass transit
Biosecurity Threat	Neutral	

How does this option work with others?

The new tram line into the Fishermans Bend Urban Renewal Area enables strategic transit-oriented development corridors (STO) and urban development in established areas (UDC) to occur in the this region. This option would complement Melbourne Metro 2 (MMS).

What are the economic, social and environmental impacts of this option?



Risks and opportunities

There are risks with establishing a new tram connection through built up areas that may require land acquisition and negotiating a new waterway obstruction over the Yarra River. This could lead to project delays and cost overruns.

There is an opportunity to match the housing in the new developments with tram services that will help ensure that people are not dependent on car-based transport and that new precincts are designed as active walking and cycling suburbs.

Funding

Should government choose to pursue the program, it will then need to consider funding options. Below is a range of potential funding mechanisms which could be examined to help fund the full program of works. In contrast to our strategy recommendation related to this option, we have also included property development as a potential funding mechanism, as the full option, as described above, includes a tram extension to E-Gate.

Potential funding mechanisms

General government revenue	User charges	Beneficiary charges	Property development	Asset sales
✓	✓	✓	✓	

General government revenue will likely be a major source of funding for central city tram network extension (CCT). Victoria could explore opportunities to seek federal government contributions for programs such as CCT. The federal government has previously provided funding for similar programs, such as stage one of the Gold Coast light rail tram project.

Beneficiary charges could also be considered if there is a substantial uplift in land values and business activity in the vicinity of the new projects. These include developer contributions, which could be levied on new developments near new infrastructure. This will be particularly relevant for privately owned land in Fishermans Bend and Footscray. For E-Gate, government could consider selling land with a development plan in place that requires financial contributions and/or works-in-kind from developers that help to deliver the tram network extension.

Some funding could also be raised from betterment levies applied to commercial and/or residential properties in a defined catchment in the vicinity of new infrastructure if there is a substantial uplift in land values and business activity. A betterment levy could capture a portion of the additional land and business value created by the tram extensions, particularly surrounding Fishermans Bend and Footscray. If betterment levies and user charges are both considered by government, it should ensure that new charges do not unfairly duplicate each other or any existing charges.

Additionally, land and air rights surplus to government requirements at E-Gate could be sold for property development. This could help to fund some of the cost of a tram extension. Property development can assist in putting underutilised government land and space to higher and better uses, creating added value through improved amenity and access to services. Government should identify and preserve the tram corridor before the sale of land occurs to minimise the cost of the project.

Existing user charges (i.e. public transport fares) should continue to be charged but are only expected to cover a portion of ongoing operating costs.

Infrastructure Victoria is examining transport network pricing as part of our research program. We think that the primary objective of a transport network pricing regime – where users pay to access and use the transport network – should be to manage demand, rather than to recover costs for infrastructure. We are focusing on examining road pricing regimes in metropolitan Melbourne as a first step towards a comprehensive transport network pricing regime that includes roads and public transport. Careful consideration must be given to the design of the regime to ensure it is efficient, fair and sustainable.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Victorian Department of Environment, Land, Water and Planning, *Fisherman's Bend Recast Vision*, 2016

Coal-fired electricity plant conversion to gas-fired plant CFE

Option type

Better use through refurbishment of existing assets

Location

Statewide

Sector

Energy

Certainty of evidence

Medium

Direct option cost

\$3 billion–\$5 billion

Option lead time

5–10 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 18: Transition to low carbon energy supply and use

Low	Low	Low	Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option considers the conversion of coal-fired electricity plants to gas-fired plants. This technology is typically considered for older coal generation plants such as those in Victoria. The technology for this appears to be available however similar international projects are struggling for large-scale commercial viability.

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option was not recommended in the strategy because conversion of coal fired plants to gas fired plants is yet to be commercially viable. However, this option is a form of innovation for brown coal generators, and where viable it could be one of a suite of possible responses by the private sector to support a brown coal transition (recommendation 18.2.1). If found to be economically feasible this option would be of particular benefit to the community in the Latrobe Valley who may be otherwise impacted by reduced coal generation capacity. Technological advances in the short to medium term may influence the viability of this option. The market rather than government is best placed to respond to cost effective opportunities for further uptake.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

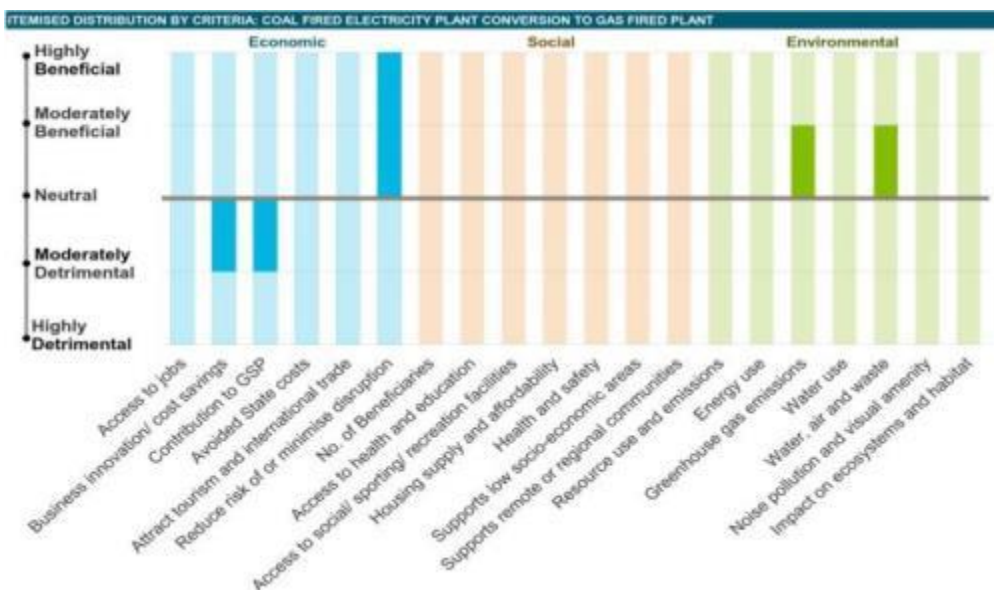
How does this option perform under different scenarios?

Supercity	+	Addresses heightened risk of increased emissions
Westside Story	+	Addresses heightened risk of increased emissions
Regional Cities	+	Addresses heightened risk of increased emissions
Accelerated Climate Change /Mitigation	++	Acute need to reduce carbon emissions
Prolonged/ Severe Economic Downturn	Neutral	
Biosecurity Threat	Neutral	

How does this option work with others?

This option complements initiatives incentivising innovation to reduce greenhouse gas emissions from brown coal generators (BCL).

What are the economic, social and environmental impacts of this option?



Commentary:

This option is anticipated to have strong benefits for the resilience of the electricity supply network, as gas is a more flexible form of generation than brown coal. Gas can be used to meet both baseload power needs and to respond rapidly to changes in demand.

Risks and opportunities

Current technology does not make this option economically viable.

This option provides an opportunity to continue to use well developed electricity transport networks that connect the Latrobe Valley to end users across Victoria and to interstate markets. However, similar benefits could be obtained through the construction of new gas-fired generation in the Latrobe Valley

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Reinhart, B. et. al., *A case study on coal to natural gas fuel switch*, 2012

Victorian Department of Economic Development, Jobs, Transport and Resources, *The CarbonNet project*, 2016

Crisis housing provision expansion CHP

Option type

Incremental expansion of existing assets

New assets

Location

Statewide

Sector

Health and human services

Certainty of evidence

Medium

Direct option cost

\$100 million–\$250 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 7: Provide better access to housing for the most vulnerable Victorians

Significant	Significant	Significant	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option proposed the provision of additional crisis accommodation facilities to accommodate 400 people needing an immediate housing solution. These beds could be supplied through a combination of purpose-built facilities or funding for motel or other accommodation, however, for the purpose of costing, they have been assumed to be provided as purpose-built facilities. This option would result in an increase in the supply of very short-term crisis housing responses required for highly vulnerable households to access at the point of crisis.

What is the level of community support?

There was a moderate level of discussion of the recommendation Crisis and transitional accommodation, which included this option. Responses were mixed with concern raised that provision of longer-term housing solutions were a higher priority.

What do we think of this option and why?

This option was recommended in part in the strategy (ref. 7.4.2) because an increase in the supply of short-term housing responses is required for highly vulnerable Victorians, particularly households escaping family violence, people exiting prison and young people. This option proposes the provision of facilities to accommodate 400 people, however, a specific quantum was not recommended in the strategy, as further analysis is required. Determining the quantum requires detailed investigation and planning, as outlined as outlined in Affordable Housing Infrastructure Plan (SCP). Based on the best information we are able to obtain, we believe the provision of short term accommodation to support approximately 350 to 750 people, provided as crisis accommodation or supportive housing responses (TSA), could be an appropriate infrastructure response. Crisis accommodation is not an appropriate medium or long-term housing response and the quantum of new supply required will be dependent on the availability of longer-term affordable housing supply for people to move to following the initial crisis.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

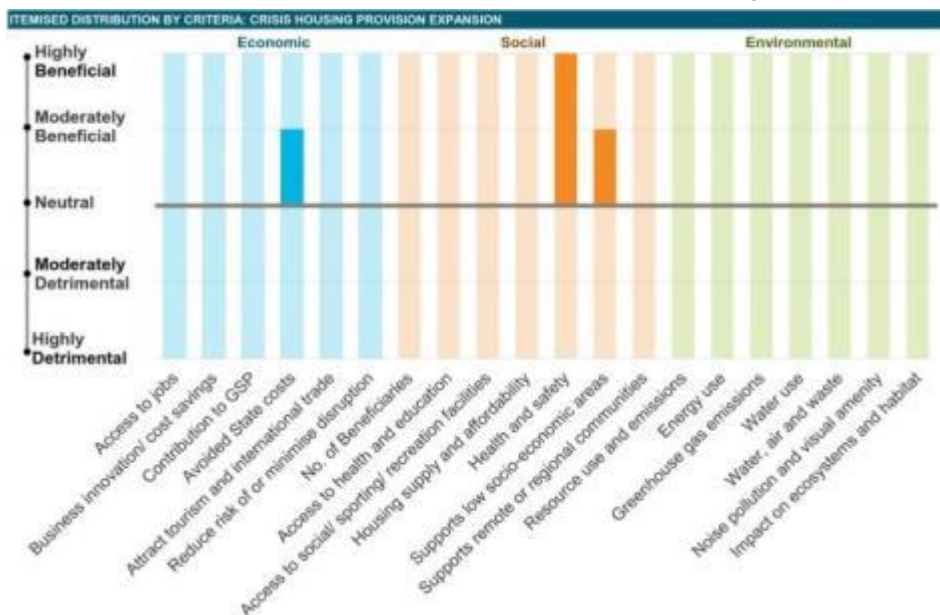
How does this option work with others?

The benefit of this option will only be fully realised if it is provided as part of a pathway of complementary housing solutions as outlined in affordable housing infrastructure plan (SCP), rather than an isolated solution. The housing solution options that are complementary include ARH, HRA, RTR, SHE and TSA.

How does this option perform under different scenarios?

Supercity	+	Reflecting population growth
Westside Story	+	Reflecting population growth
Regional Cities	+	Reflecting population growth
Accelerated Climate Change /Mitigation	++	Increased migration of climate refugees requiring housing
Prolonged/ Severe Economic Downturn	++	Increased number of households suffering housing stress
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



Commentary:

By improving community safety, and avoiding incidences of homelessness, this option could have benefits for avoided state costs, for example, reducing hospitalisation.

Risks and opportunities

Without the development of appropriate 'exit points' from crisis accommodation to longer-term affordable housing, this option could be ineffective at contributing to the overall need of providing better access to housing for the most vulnerable Victorians.

Additional notes

The need for both crisis and transitional housing

The need for both crisis and supportive housing is difficult to quantify as the actual demand is not fully known, with data sources that overlap and are incomplete. The provision of housing is also just one of many interventions that can be offered to people seeking to access crisis housing. A challenge with this option is providing a portfolio of crisis housing with the ability to adjust where it is provided to meet fluctuating demand across the community.

In 2014-15 the total number of clients presenting to specialised homelessness agencies was 102,793 clients; 38,000 of whom were homeless at the point of contact and 48,456 who had experienced homelessness at some time in 2014-15. Six per cent of all clients had repeat periods of homelessness and nearly one third did not have their accommodation need met. The Victorian daily average unmet need was estimated at 115 persons. In addition to this, 247 people were counted as sleeping on the street in Melbourne CBD during June 2016. It is estimated that 22,773 persons were homeless in Victoria in 2011, of whom 1,091 were 'living rough' (living in improvised dwellings, sleeping out or in tents).

On 26 July 2016, the state government announced the establishment of a task force to address this issue and provision of an additional 38 crisis beds for 3 months. The task force is due to report back by December 2017.

Changes to recommendations and option name from the draft strategy

This option was recommended in the draft strategy. Since then the scale of this recommendation has been reduced in response to the government's recently announced investment in crisis accommodation (commitments made up until the end of November 2016). The title of the recommendation has also been changed in response to feedback from the housing sector about the appropriate terminology.

Community research

Ninety three per cent of people surveyed as part of community research supported the provision of more crisis and transition housing

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Affordable development outcomes, *Improving access to affordable housing*, 2016

Community infrastructure accessibility CIM

Option type

Better use through refurbishment of existing assets

Incremental expansion of existing assets

Better use through coordination

Location

Statewide

Sector

Cultural, civic, sporting, recreation and tourism

Education and training

Health and human services

Certainty of evidence

Medium

Direct option cost

<\$1 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 4: Enable physical activity and participation; and

Need 5: Provide public spaces where communities can come together; and

Need 6: Improve accessibility for people with mobility challenges

Moderate	Moderate	Moderate	Moderate
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0-5 yrs

5-10 yrs

10-15 yrs

15-30 yrs

What is this option?

This option is for government to adopt Universal Design principles and for each department to develop Universal Design guidelines appropriate to their function. Universal Design principles ensure that new and upgraded community infrastructure achieves higher levels of accessibility to support Victoria's ageing and diverse population. Government and local government can lead the implementation of best-practice Universal Design.

The aim of Universal Design is to provide one design solution that can accommodate and include all people irrespective of mobility, gender or age.

Following its application across state government, Universal Design guidelines for Victoria should be developed and considered for use by planning and responsible authorities similar to the *Safer Design Guidelines for Victoria*.

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive. Community health facility access (SCC) was proposed in the first *Draft options book* and is now included in this option. There was a moderate level of discussion on SCC and responses were polarised. Both CIM and SCC were recommended by the metropolitan citizen jury.

What do we think of this option and why?

This option was recommended in the strategy (ref. 6.1.1) because Universal Design can avoid the need for expensive retrofit of poorly designed assets and it makes a moderate contribution to a number of needs at a low cost. The government should build on the existing application of Universal Design principles by Sport and Recreation Victoria and the Department of Education. The application of this knowledge, across state government, will improve the design and accessibility of government facilities and infrastructure. We think this option will provide the foundation for broader industry application of Universal Design in the future.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	Relates to key point/option for discussion
Regional Growth Plans	N/A

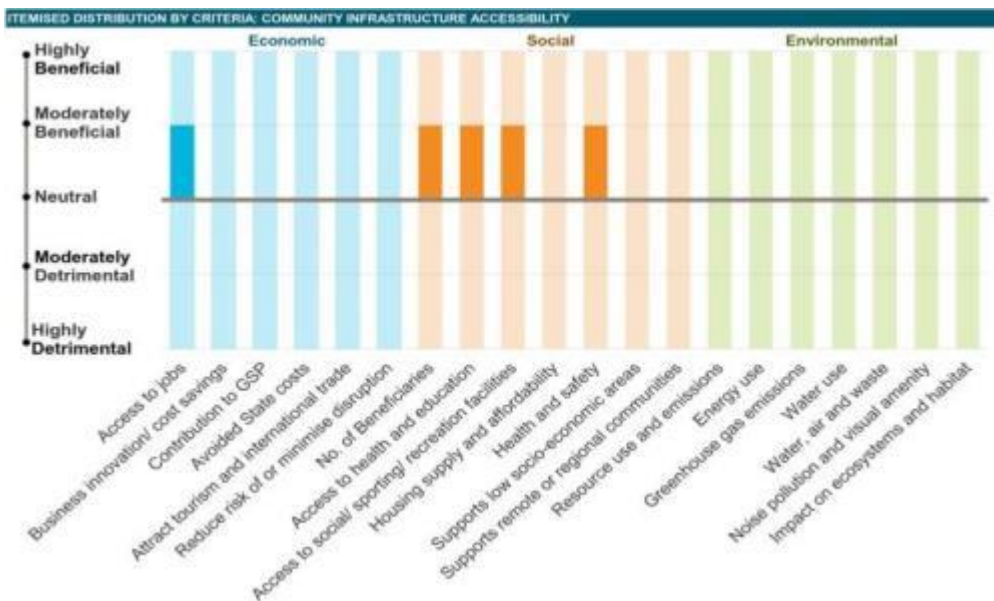
How does this option perform under different scenarios?

Supercity	+	Increases access and transport choice
Westside Story	+	Increases access and transport choice
Regional Cities	+	Increases access and transport choice
Accelerated Climate Change /Mitigation	+	More efficient use of public transport
Prolonged/ Severe Economic Downturn	+	Provides a lower cost transport option
Biosecurity Threat	Neutral	

How does this option work with others?

This option complements public transport accessibility (PTV) which proposes to accelerate the program of upgrading assets to Disability Discrimination Act (DDA) compliance.

What are the economic, social and environmental impacts of this option?



Risks and opportunities

The incorporation of Universal Design principles may increase the complexity of infrastructure delivery.

Incorporating the principles of Universal Design when providing community infrastructure may reduce the cost of retrofitting facilities at a later date.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then we have clarified the link between the recommendation and the adoption of guidelines. This responds to stakeholder misinterpretation that design/delivery would occur in 0-5 years.

Building Quality Standards Handbook

The Department of Education and Training (DET) have updated their *Building Quality Standards Handbook* to incorporate the principles of Universal Design. These standards now apply to all new builds and upgrades. Consultants employed by DET must take these principles into consideration.

Next steps

- Review the current application of Universal Design principles by Sport and Recreation Victoria and the Department of Education and Training. This should include the identification of barriers to the implementation of the guidelines and key factors that lead to successful implementation.
- All state government departments should prepare their own set of guidelines appropriate to their functions, that can be applied to all new and refurbished infrastructure within 0-5 years.

Scope change

In the first *Draft options book*, this option was released as a concept requiring further development and proposed a mandated approach to the application of Universal Design principles across all sectors. Preliminary investigation highlighted the challenge of introducing minimum standards versus facilitating best practice outcomes.

The option was subsequently reframed to focus on the best way to integrate Universal Design into government practice. It recognised that the state government is the developer and manager of many community assets where accessibility is important. We recognised that Universal Design is relatively new and, as it is designed to deliver a variety of outcomes, is challenging to mandate as a minimum standard. This highlighted government's role to lead by example, build capacity and demonstrate the benefits of good design.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

City Loop reconfiguration CLR

Option type

Incremental expansion of existing assets

Location

Melbourne central subregion

Sector

Transport

Certainty of evidence

Medium

Direct option cost

\$1 billion–\$3 billion

Option lead time

5–10 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 1: Address infrastructure demands in areas with high population growth; and

Need 10: Meet growing demand for access to economic activity in central Melbourne



0-5 yrs 5-10 yrs 10-15 yrs 15-30 yrs

What is this option?

This option would reconfigure the Melbourne Underground Rail Loop (MURL) Northern and Caulfield Loop Lines to increase capacity particularly on the Upfield, Craigieburn and south-east rail lines and to enable Wallan electrification. The works will include new tunnelling links, signalling upgrades, a new rail flyover and rolling stock. This upgrade and reconfiguration will enable additional services to be run through the core of the rail network, support extensions to the network and allow for the creation of standalone end-to-end rail lines. Further operational details are outlined in the *PTV Network Development Plan – Metropolitan Rail*, December 2012. This option will increase access to the city centre and the overall resilience of the network.

What is the level of community support?

There was limited to no discussion of this option during public consultation. This option was recommended by the metropolitan citizen jury.

What do we think of this option and why?

This option was recommended in the strategy (ref. 10.10.1) because it will increase capacity on the lines that serve the northern growth corridor and enable the Wallan Electrification (WRE1). Although the Melbourne Metro project will boost capacity of the Craigieburn and Upfield lines, these lines will again come under pressure in the 15–30-year period. This option was recommended despite its modest preliminary cost benefit ratio as no other option was identified to provide the scale of capacity uplift needed by this corridor beyond Melbourne Metro, and the Wallan Rail Electrification depends on it. Reconfiguring City Loop tunnels will result in more people needing to change trains, a key trade-off to the capacity boost the option provides. With further planning, the effects of this could be reduced and the net benefit may rise. Construction should commence shortly after completion of Melbourne Metro, as the additional capacity from Melbourne Metro could offer flexibility in managing the disruption associated with reconfiguring City Loop tunnels.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

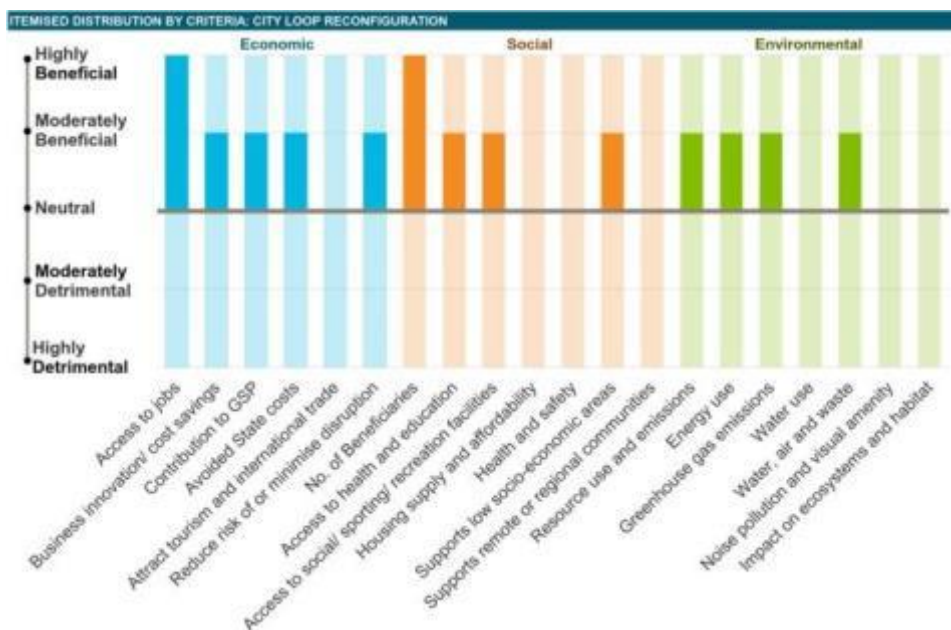
How does this option work with others?

This option enables Wallan rail electrification (WRE1) through additional capacity for rail services on the northern group of lines. This option would be complementary to (and potentially dependent on) metropolitan rail interchange upgrades (MRI) as it will drive significantly greater passenger interchange, particularly at North Melbourne.

How does this option perform under different scenarios?

Supercity	++	Supports mode shift to address congestion
Westside Story	++	Supports mode shift to address congestion
Regional Cities	++	Supports mode shift to address congestion
Accelerated Climate Change /Mitigation	+	Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	-	Less demand for mass transit
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



Risks and opportunities

There are risks to be managed during delivery of the project, including unknown ground conditions during tunnelling and impacts to rail and utility services during construction.

The project would also require many passengers to change their travel patterns, including interchanging more, which needs careful management to not overly impact on passengers and to not erode the overall benefit.

There may be opportunities during the construction phase to upgrade utilities, stations and access in the existing City Loop, thus providing a basis for the expansion of future service needs.

Funding

Should government choose to pursue this project, it will then need to consider funding options. Below is a range of potential funding mechanisms which could be examined to help fund the project.

Potential funding mechanisms

General government revenue	User charges	Beneficiary charges	Property development	Asset sales
✓	✓	✓		

General government revenue will likely contribute funding for the City Loop reconfiguration as the benefits of the project are shared by multiple rail lines across metropolitan Melbourne and will provide some relief to related road networks, which are congested.

Beneficiary charges could also be considered to help fund the project if there is a substantial uplift in land values and business activity. Given the large number and wide range of beneficiaries, a broad based city-wide or subregional betterment levy could be examined. The original Melbourne City Rail Loop was partly funded by two betterment levies (one applied across the City of Melbourne, the other across metropolitan Melbourne), which collected funding between 1963 and 1995.

Existing user charges (public transport fares) should continue to be charged but are only expected to cover a portion of ongoing operating costs.

Infrastructure Victoria is examining transport network pricing as part of our research program. We think that the primary objective of a transport network pricing regime – where users pay to access and use the transport network – should be to manage demand, rather than to recover costs for infrastructure. We are focusing on examining road pricing regimes in metropolitan Melbourne as a first step towards a comprehensive transport network pricing regime that includes roads and public transport. Careful consideration must be given to the design of the regime to ensure it is efficient, fair and sustainable.

Additional Notes

Transport modelling and economic analysis

Infrastructure Victoria commissioned KPMG, Jacobs and Arup to undertake transport modelling for a number of options being considered for the strategy, including a variety of 'build' and 'non-build' transport options. This allowed major transport projects to be quantitatively assessed alongside several technology, policy and reform options. In addition, economic analysis was undertaken for the 'build' options to estimate a cost benefit ratio, including for this option. The options were modelled individually, mostly on a standalone basis, with a number of options then also tested in various combinations.

This analysis was undertaken on a different basis and produced different results to what is presented throughout the options book, which was prepared by AECOM/PWC with the intention of allowing a mixture of qualitative and quantitative

assessment across the full range of options, across all sectors and needs. While on the face of it these two analyses reference similar metrics, different assumptions and methodologies have been applied. In particular, the KPMG/Jacobs/Arup assessment provided purely relative ratings of each option's contribution to the needs, with the ratings scale set by the performance of only the select range of options modelled. This had the result of showing some transport options as making a "high" contribution to Need 18 (transition to lower carbon energy supply and use) simply because they were the highest of the options modelled; however, in Infrastructure Victoria's judgement most transport sector options will make a much lower contribution than energy sector options, as transport comprises a much smaller proportion of total carbon emissions. It provides a useful assessment for sorting the relative contribution of the options modelled, but should not be taken as an absolute assessment. In contrast, the assessments developed in the AECOM/PwC assessment considered the full range of options identified for each need and provided more of an 'absolute' assessment.

With these caveats in mind, however, the results of this alternative analysis are helpful inputs into Infrastructure Victoria's 'global' assessment, and in preparing the strategy we have come to a considered view based on the totality of evidence available to us.

In terms of the KPMG/Jacobs/Arup transport modelling of this option, it was found that the City Loop Reconfiguration is expected to marginally improve accessibility to employment, health, education and Inner City jobs, due to the trade-off between improving capacity while requiring additional passenger interchange. It would expand rail capacity to central Melbourne by 10% and relieve congestion on parts of the rail network, particularly the Craigieburn and Upfield rail lines. Modelling indicates that job accessibility is most improved to East Werribee NEC as a result of the project. This improvement is the result of improved access from the Craigieburn, Upfield and Glen Waverley groups.

Modelling of the project also predicts significant benefits to road users resulting from a shift from private car to public transport

In terms of the economic analysis, the preliminary Cost benefit ratio range of the City Loop Reconfiguration is 0.6 to 0.8 with or without wider economic benefits (WEBs) (noting that WEBs are likely understated for rail projects in this analysis due to its preliminary nature). When combined with Wallan rail electrification (WRE1) the preliminary ratio range rises to 0.8 - 1.1 without WEBs or 0.9 - 1.2 with WEBs, demonstrating the importance of the additional capacity to the northern growth corridor. However, the modelling of CLR and WRE1 together showed overcrowding to the north of Craigieburn, indicating the service plan did not match demand (it had not been optimised, due to the preliminary nature of the modelling) and suggesting that benefits had likely been underestimated. While this is a modest economic result, it suggests the City Loop Reconfiguration in combination with WRE1 is worthy of detailed economic assessment, including to resolve the identified modelling issue.

For more detail, consult the 'Economic appraisal and demand modelling' report to Infrastructure Victoria.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

KPMG/Arup/Jacobs, *Economic appraisal and demand modelling*, 2016

Public Transport Victoria, *Network development plan: Metropolitan rail*, 2012

Victorian Department of Economic Development, Jobs, Transport and Resources, *Melbourne metro business case*, 2016

Courts maintenance and optimised use CMD

Option type

Better use through refurbishment of existing assets

Location

Statewide

Sector

Justice and emergency services

Certainty of evidence

Medium

Direct option cost

\$250 million–\$500 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 8: Address increasing demand on the justice system

Moderate	Significant	Significant	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

Need 19: Improve the resilience of critical infrastructure

Low	Low	Low	Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Courts in Victoria vary in age (the oldest is 160 years old), condition, functionality and compliance with requirements such as accessibility and security. This option concerns the ongoing maintenance requirements for these important justice assets, noting that a recent assessment found only 16 per cent of the assets meet identified assessment benchmarks. The key aspects of this option will be how to use maintenance to:

- Optimise the capacity of the existing asset base
- Improve functionality, compliance and condition (including accessible and safe environments for family violence victims)
- Increase the flexible, integrated and multijurisdictional use of the infrastructure for the criminal and civil jurisdictions.

What is the level of community support?

There was limited to no discussion of this option during public consultation. This option was recommended by the metropolitan citizen jury.

What do we think of this option and why?

This option was recommended in the strategy (ref. 8.3.2) because it will enable safer, more efficient and more accessible court and tribunal environments. This includes contributing to the goals of the Family Violence Royal Commission that as far as possible (family violence) victims should have all their legal issues determined in the same court. By upgrading physical infrastructure through planned maintenance, and potentially repurposing space, this option is expected to have a moderate contribution to need 8 in years 0-5 but increasing to significant in the years 5-30. This includes the benefits which result from demand being accommodated by maximising the capacity of existing courts and tribunals, to improve functionality and drive efficiencies. The immediate priority is to bring those court facilities that are not recommended to be refurbished or replaced (under recommendation 8.1.2) up to an acceptable standard of safety, condition and functionality.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

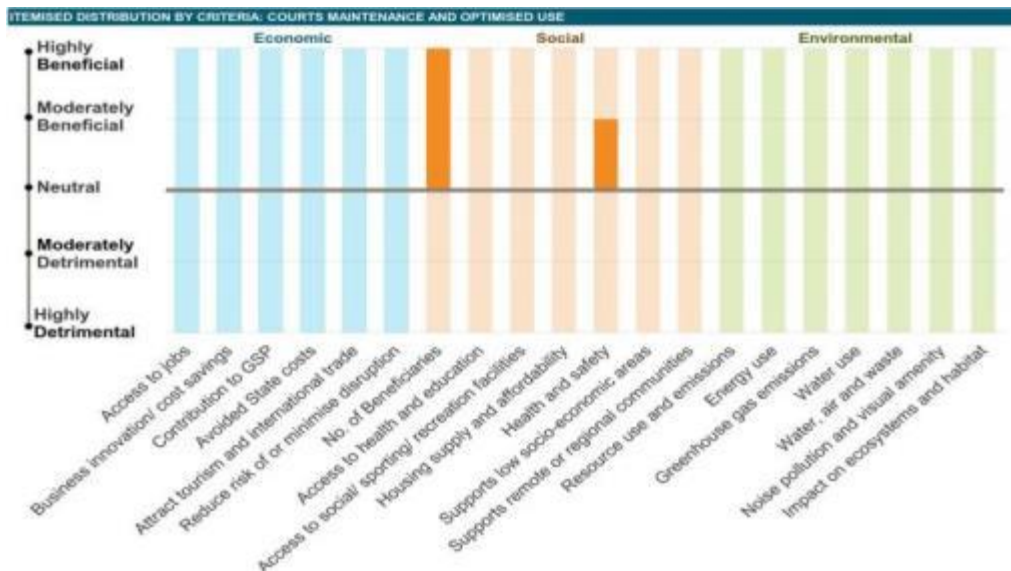
How does this option perform under different scenarios?

Supercity	Neutral
Westside Story	Neutral
Regional Cities	Neutral
Accelerated Climate Change /Mitigation	Neutral
Prolonged/ Severe Economic Downturn	Neutral
Biosecurity Threat	Neutral

How does this option work with others?

This option is complementary with the justice delivery in areas of growth (JDG) and the justice CBD legal precinct (JLP) which both seek to deliver new or refurbished court assets across Victoria.

What are the economic, social and environmental impacts of this option?



Risks and opportunities

There may be some risks which may arise from working in older buildings such as exposure to asbestos, however it is assumed these will be managed during the planning phase. There may be opportunities to upgrade the energy efficiency of buildings.

Additional notes

Court maintenance issues

In 2014, Court Services Victoria (CSV) updated a 2011 Building Condition Assessment (BCA) undertaken the Department of Justice.

It rates each owned building (leased properties are not included in the assessment) against condition, function and compliance to give a total rating out of 5. CSV set the benchmark for assets at 3.5 out of 5 and only 16 per cent of CSV owned courts were assessed as meeting or exceeding the overall rating of 3.5 out of 5. Specifically;

- Only 18 per cent meet or exceed the compliance rating of 3.5 out of 5
- Only 18 per cent meet or exceed the functionality rating of 3.5 out of 5
- Only 57 per cent meet or exceed the condition rating of 3.5 out of 5

The BCA indicated that it would cost approximately \$104 million to address these issues. There is evidence of consistent under-investment in court assets which has meant that facilities have been operating until they fail, which has significant repercussions by reducing public access to justice services, e.g. the recent Heidelberg Court closure.

The poor overall asset condition results from low spending on maintenance compared to the value of the asset base. CSV reported that in the past six years, investment has been approximately 0.22 per cent of the total asset replacement value, against an industry standard of 1-2 per cent.

These results have informed CSV's work on service planning priorities identified in their Strategic asset plan.

Justice delivery in areas of growth (JDG)

We have recommended the delivery of eight new or refurbished courts across Victoria in the strategy (recommendation 8.1.2). In some cases we have identified new areas where a court is needed to meet demand, and in other cases where existing facilities are experiencing demand pressures. For the existing facilities, part of the problem was their poor condition, safety compliance and functionality as identified in the BCA discussed above. Werribee and Bendigo are two important examples here.

Where we have recommended new or refurbished facilities to address demand currently met by courts with maintenance challenges, these issues will be addressed. A new facility in Wyndham, for example, will render the current Werribee Court surplus to needs, obviating the need for maintenance. This highlights the interdependence of the two options and recommendations.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Court Services Victoria, *Building condition assessment*, 2014

Court Services Victoria, *Annual report 2014-15*, 2015

Court Services Victoria, *Strategic asset plan*, 2016

Deloitte/Aurecon, *Infrastructure capability assessment: Justice and emergency services*, 2016

Melbourne arts and sports precinct connectivity CPC

Option type

New assets

Location

Melbourne central subregion

Sector

Cultural, civic, sporting, recreation and tourism

Transport

Certainty of evidence

Low

Direct option cost

\$100 million—\$500 million

Contribution to meeting the need

Need 5. Provide spaces where communities can come together – **Moderate**

What is this option?

This option proposes to build a pedestrian and cycling walkway to integrate Melbourne's sporting and cultural precincts between Domain Gardens, South Melbourne, the Yarra River, Federation Square and Birrarung Marr.

This option would increase access between the two key precincts and would also maximise opportunities to activate the public spaces throughout the entire precinct during events and between event peak periods when the precincts may otherwise be dormant.

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option was not recommended in the strategy because options that improve pedestrian connections at a specific precinct level are not of sufficient scale for this strategy. Better linking the Melbourne arts and sports precinct may well have merit, but further work is required to determine the outcomes that would be achieved through improving the link as well as the cost and contribution of the investment. When future upgrades are proposed for the existing arts and sports facilities in these precincts, the improved connection could also be considered at that time. A recommended option for developing a cultural and sport major infrastructure investment framework (CSM) could assist with decision-making about the connection.

We understand that this route forms part of a proposed Strategic Cycling Corridor but there may be merit in expanding the option to consider the wider pedestrian links across the arts and major sporting precinct including the MCG to Melbourne Park links and Richmond Station.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

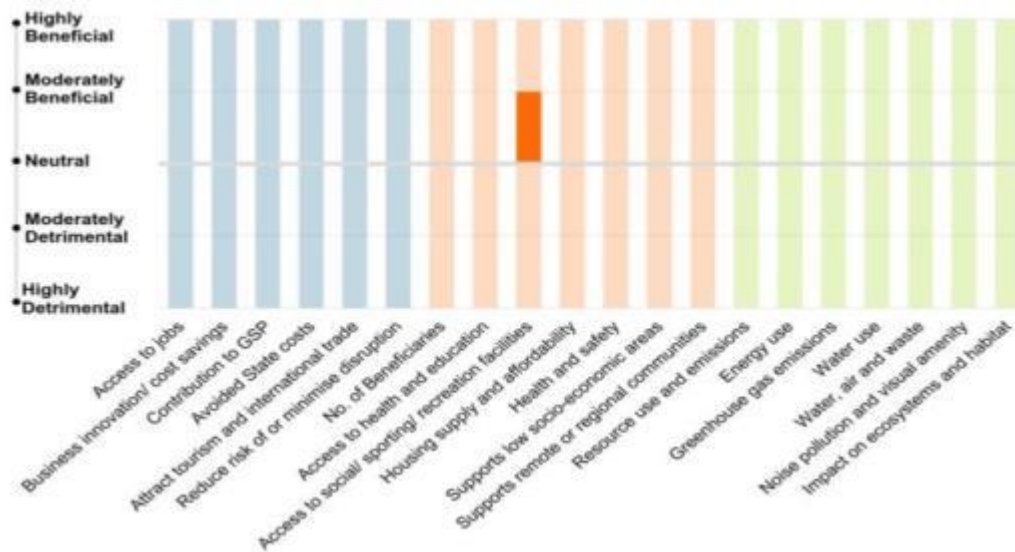
How does this option perform under different scenarios?

Supercity	Neutral
Westside Story	Neutral
Regional Cities	Neutral
Accelerated Climate Change /Mitigation	Neutral
Prolonged/ Severe Economic Downturn	Neutral
Biosecurity Threat	Neutral

How does this option work with others?

Developing a major sports and cultural investment decision-making framework (CSM) could support the delivery of this option by considering when ancillary and community level infrastructure could be delivered as part of major upgrades, for example, to the MCG or NGV.

What are the economic, social, and environmental impacts of this option?



Risks and opportunities

An implementation risk is that there is insufficient evidence to demonstrate what the main outcome of this option would be trying to achieve.

Better activation of underutilised public spaces can help to reduce antisocial behaviour. Improved walking and cycling connections between the key destinations should help to reduce the risk of road accidents between pedestrians, cyclists and cars.

Evidence base

AECOM/PwC, *Assessment 2: Economic, social and environmental assessments and option relationship mapping*, 2016

Deloitte/Aurecon, *Assessment 1: Options analysis report*, 2016

Coastal protection infrastructure CPI

Option type

Better use through refurbishment of existing assets

Incremental expansion of existing assets

New assets

Location

Statewide

Sector

Science, agriculture and environment

Water and waste

Certainty of evidence

Low

Direct option cost

\$1 billion–\$3 billion

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 19: Improve the resilience of critical infrastructure

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option proposes a program of works to maintain and provide new coastal protection infrastructure. This investment would prevent beach erosion and asset damage in critical locations at risk due to rising sea levels and extreme weather and tidal events. Studies indicate that the medium and longer-term impacts of climate change will see increasing need to protect infrastructure in coastal areas, in particular transport infrastructure and residential buildings. There is currently not a consistent funding model to achieve this. Coastal protection infrastructure ranges from natural and man-made structures to limit tidal overtopping, to measures to reduce sediment transport and reduce wave heights. Some defences are in place but may not be sufficient for future rises in sea levels and extreme climatic events.

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive.

What do we think of this option and why?

This option was recommended in part in the strategy (ref. 19.1.4) because there is evidence of infrastructure in coastal areas being at risk and this is expected to increase into the future. Government should work with local government to identify key locations where assets of state importance like roads are at risk from rising sea levels, extreme weather and tidal events before a program of work is commenced. An assessment of actions includes planned retreat, accommodation and hard or soft protections. The effects of storm events could cause significant disruption, so by protecting business from infrastructure failure, and by supporting existing land use, this option is anticipated to have a positive impact on business costs (further detail in *What do we think of this option and why? cont'd*).

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	Relates to key point/option for discussion
Regional Growth Plans	Consistent

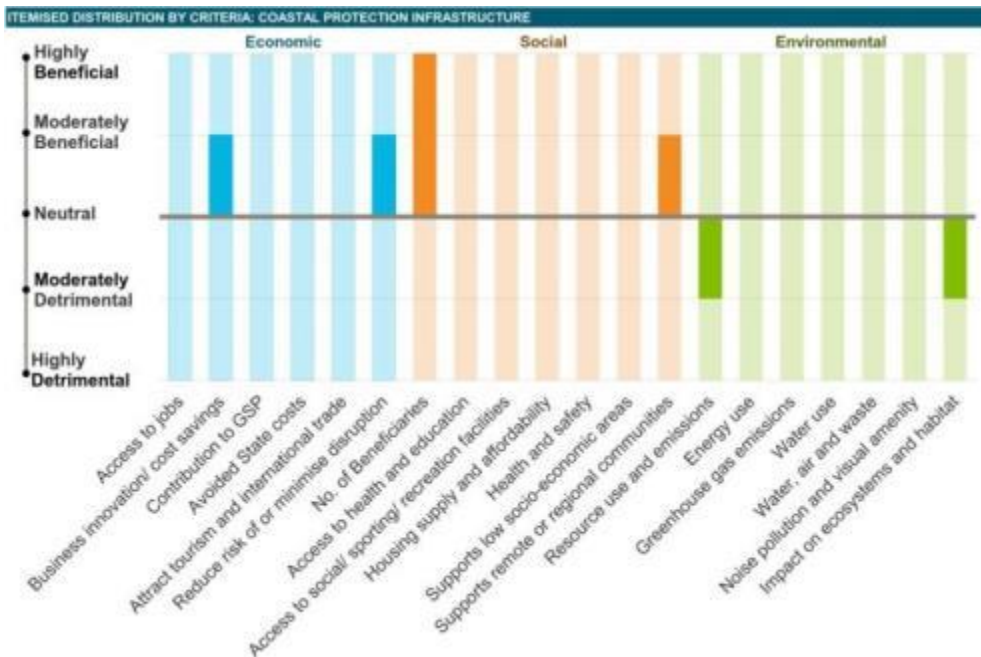
How does this option perform under different scenarios?

Supercity	Neutral	
Westside Story	Neutral	
Regional Cities	+	Addresses heightened risk to infrastructure
Accelerated Climate Change /Mitigation	+	Addresses heightened risk to infrastructure
Prolonged/ Severe Economic Downturn	Neutral	
Biosecurity Threat	Neutral	

How does this option work with others?

This option would work well with an infrastructure resilience assessment test (IRA).

What are the economic, social and environmental impacts of this option?



Commentary:

The installation of coastal protection infrastructure is anticipated to have negative impacts on coastal ecosystems and habitat. By necessity, much of the construction will take place in greenfield areas including on the coastline itself.

What do we think of this option and why? (cont'd)

The first step is for government to develop the ongoing technical capacity and expertise to:

- monitor and collect data on the impacts of coastal hazards
- provide advice on physical coastal processes
- develop a systematic approach to identifying priorities
- provide advice to relevant infrastructure managers
- explore cost sharing arrangements.

Risks and opportunities

The risk for this option is that the infrastructure will not be in place to offset major impacts due to the high cost preventing it being installed at all locations.

This option presents an opportunity to integrate infrastructure considerations with land use planning, including where current uses may not be compatible with climate trends.

Funding

Should government choose to pursue this program, it will need to consider funding options. Below is a range of potential funding mechanisms which could be examined to help fund the program.

Potential funding mechanisms

General government revenue	User charges	Beneficiary charges	Property development	Asset sales
✓		✓		

General government revenue, through a mix of state and local government revenue, is likely to continue to be a major source of funding for programs like coastal protection infrastructure where the asset protection is for public infrastructure and general community safety.

Although the focus of the option is protecting public assets, there will in some cases be spin-off benefits generated for private or commercial asset holders, including reduced business costs. In these instances, beneficiary charges could be sought, such as co-contribution from private beneficiaries.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then we have added material to outline next steps. In particular, the need for an accountable party with clear tasks to focus on the short term.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

City of Port Phillip, *Planning for climate change – A case study of Victoria*, 2007

Victorian Department of Environment, Land, Water and Planning, *Beach renourishment program: Protection of Port Phillip beaches and foreshores*, 2016

Victorian Department of Environment, Land, Water and Planning, *Coasts*, 2016

Victorian Department of Environment, Land, Water and Planning, *Coastcare Victoria Community Grants Program*, 2016

Car parking management

CPM

Option type

Changing behaviour through economic charging

Location

Melbourne central subregion

Sector

Transport

Certainty of evidence

Low

Direct option cost

<\$100 million

Contribution to meeting the need

Need 10. Meet growing demand for access to economic activity in central Melbourne – **Low**

What is this option?

Reduce the attractiveness of commuting by car to the CBD by using the existing government congestion levy more effectively to increase parking prices. Changes to pricing could be done in conjunction with regulations to limit the physical availability of car parking in future developments.

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were polarised. This option was opposed by the regional citizen jury.

What do we think of this option and why?

This option was not recommended in the strategy because it is unlikely to be nearly as effective in managing travel demand as transport pricing (TNP). This is a low cost option which has been assessed as having a low impact as a standalone option. It could be regarded as a proxy for cordon pricing (like that which has been implemented in central London), but not a very effective one, as it is levied on car parking owners rather than transport users (who can cross-subsidise the cost of the parking). It also does not affect those transiting the CBD by car. While restricting the number of car parking spaces in the CBD would not conflict with the adoption of broader transport network pricing (TNP), it is arguable that the latter would render the parking levy redundant as an instrument for demand management.

How does this option relate to current state land use planning strategies??

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

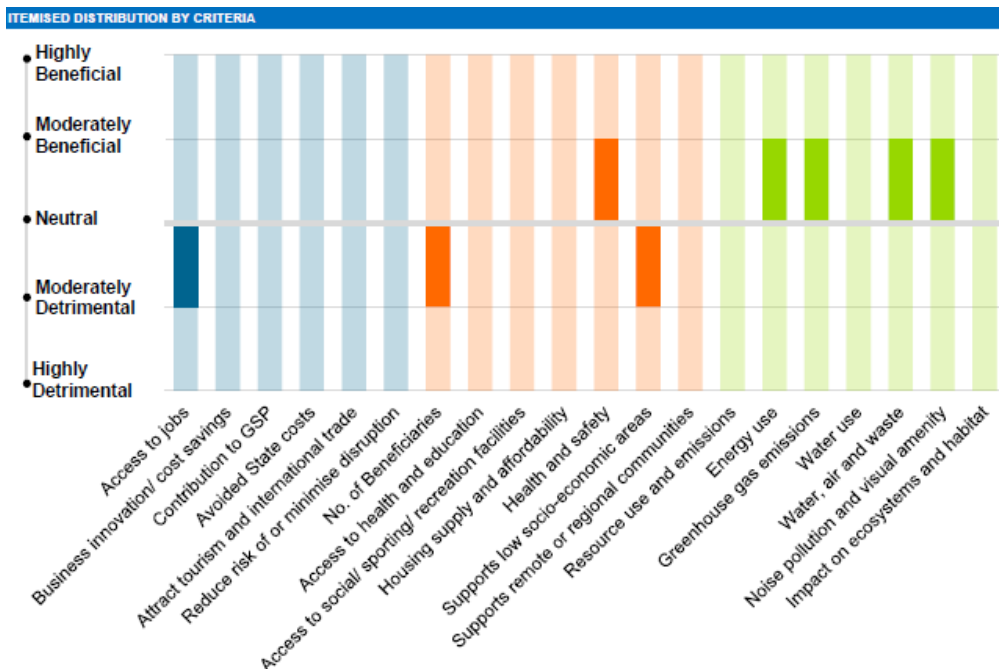
How does this option work with others?

The effectiveness of this option could be enhanced by being implemented in conjunction with the central city job cap, and employment outside central city incentivisation options (CCJ and EOC). While restricting the number of car parking spaces in the CBD would not conflict with broader transport network pricing (TNP), it is arguable that the latter would render the parking levy redundant as an instrument for demand management.

How does this option perform under different scenarios?

Supercity	++	Supports mode shift to address congestion
Westside Story	+	Supports mode shift to address congestion
Regional Cities	+	Supports mode shift to address congestion
Accelerated Climate Change /Mitigation	+	Reduces motor vehicle travel
Prolonged/ Severe Economic Downturn	-	Less demand for travel
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



Risks and opportunities

There is a risk that the implementations of interventions such as increased parking levies do not achieve the policy goals. For example, past increases to parking levies in central Melbourne have been passed on to short stay as well as long stay users despite the goal of making commuter parking less attractive.

With the revenue from increased parking prices there is an opportunity to better support public transport services. This has the potential to make public transport a more attractive transport alternative while reducing car dependency and vehicle emissions.

Evidence base

AECOM/PwC, *Assessment 2: Economic, social and environmental assessments and option relationship mapping*, 2016

Deloitte/Aurecon, *Assessment 1: Options analysis report*, 2016

Centralised planning scheme CPS1

Option type

Better use through land use and planning controls

Better use through coordination processes

Location

Statewide

Sector

All

Certainty of evidence

Medium

Direct option cost

<\$100 million

Option lead time

1–5 years

Contribution to meeting the need

Need 1. Address infrastructure demands in areas with high population growth areas – **Moderate**

What is this option?

Transfer planning decision-making and infrastructure coordination from relevant Local Government Authorities (LGA) to a central authority, such as the Victorian Planning Authority. This could facilitate a greater level of certainty and coordinated decision-making for high change areas, particularly across the metropolitan areas and in regional areas experiencing change. This would assist with better sequencing and delivery of infrastructure.

What is the level of community support?

There was a high-level of discussion of this option during consultation. Responses were polarised. Almost all local government authorities, who made submissions, did not support this option. However, sectors of the property development industry recognised some merit in the state having a stronger role to provide more planning certainty and better coordinate state infrastructure planning in areas experiencing growth.

What do we think of this option and why?

This option was not recommended in the strategy because the key beneficial elements of this option can be addressed through compact urban development (UDC) and strategic transit-oriented centres and corridors (STO). Those options provide direction for where state and local governments should plan for additional intensification of housing and commercial activity, based on the need to better leverage growth around existing infrastructure and jobs. We have also recommended an improved process for integrated government service and infrastructure planning (SIP) which should improve infrastructure coordination and integration with land use planning. Finally, given the highly contested status of the option, we felt that the evidence to support it needed to be stronger.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	Not consistent
Regional Growth Plans	N/A

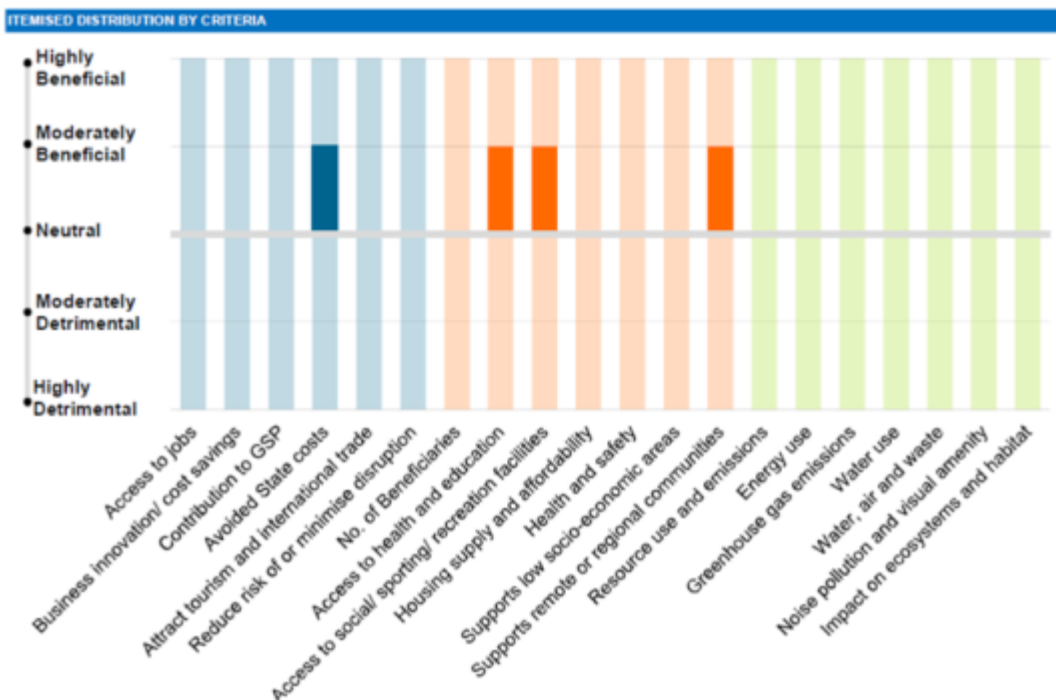
How does this option perform under different scenarios?

Supercity	+	Supports delivery of housing and infrastructure for high-growth areas
Westside Story	+	Supports delivery of housing and infrastructure for high-growth areas
Regional Cities	+	Supports delivery of housing and infrastructure for high-growth areas
Accelerated Climate Change /Mitigation	Neutral	
Prolonged/ Severe Economic Downturn	Neutral	
Biosecurity Threat	Neutral	

How does this option work with others?

Integrated government service and infrastructure planning (SIP) combined with stronger direction for where additional housing growth (UDC) and employment activity (STO) should occur could be a substitute for this option when considered in combination.

What are the economic, social and environmental impacts of this option?



Commentary:

If this option led to faster approvals for required medium density housing this could have positive economic and social benefits.

Risks and opportunities

Local councils and their constituents usually resist centralised control of planning decisions. There would also be a high level of resistance from the community if they perceived that the centralised control would remove third party participation in planning permit process. Developers, on the other hand, would likely favour a more centralised planning system as it could provide more planning certainty and improved infrastructure co-ordination.

Evidence base

AECOM/PwC, *Assessment 2: Economic, social and environmental assessments and option relationship mapping*, 2016

Deloitte/Aurecon, *Assessment 1: Options analysis report*, 2016

Ministerial Advisory Council for the Metropolitan Planning Strategy for Melbourne, *Melbourne, let's talk about the future*, 2013

Clyde rail extension CRE

Option type

Incremental expansion of existing assets

Location

Melbourne southern subregion

Sector

Transport

Certainty of evidence

Medium

Direct option cost

\$1 billion–\$3 billion

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 1: Address infrastructure demands in areas with high population growth;

Moderate	Moderate	Significant	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

Need 10: Meet growing demand for access to economic activity in central Melbourne; and

Need 11: Improve access to middle and outer metropolitan major employment centres

Moderate	Moderate	Moderate	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Extend the metropolitan rail network to Clyde from the current terminus at Cranbourne in Melbourne’s south-east potentially utilising the existing decommissioned rail corridor. The works will include grade separations with existing roads, new stabling and maintenance facilities, new stations and Cranbourne East and Clyde, duplication of the existing track between Dandenong and Cranbourne and modifications to Dandenong Station. This extension to the network will give better access to the new growth areas in the City of Casey. It will enable more efficient access to central Melbourne and support potential future extensions of the rail network in the south-east.

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive.

What do we think of this option and why?

This option was recommended in the strategy (ref. 1.3.7 and 10.8.4) because of the significant future demand for high capacity transport links in the outer south east of Melbourne, including from Cranbourne East, Clyde and surrounds. The delivery of a high capacity transport link to Clyde makes a moderate to significant contribution to meeting needs 1, 10 and 11 over time (sooner for need 1) by providing access to the central city and to Dandenong which is an important employment and service destination for this growing south eastern growth corridor. This option should be delivered within the 10-15-year timeframe. Providing early train station certainty enables a desirable integrated land use and infrastructure outcome with higher density housing and commercial activity in close proximity to the new stations and along the rail corridor. Prior to the delivery of a rail service, alternative modes such as an improved bus service should be considered with the recommendation for growth area local buses (ref. 1.3.2 and 11.4.2) (further detail in *What do we think of this option and why? cont'd*).

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

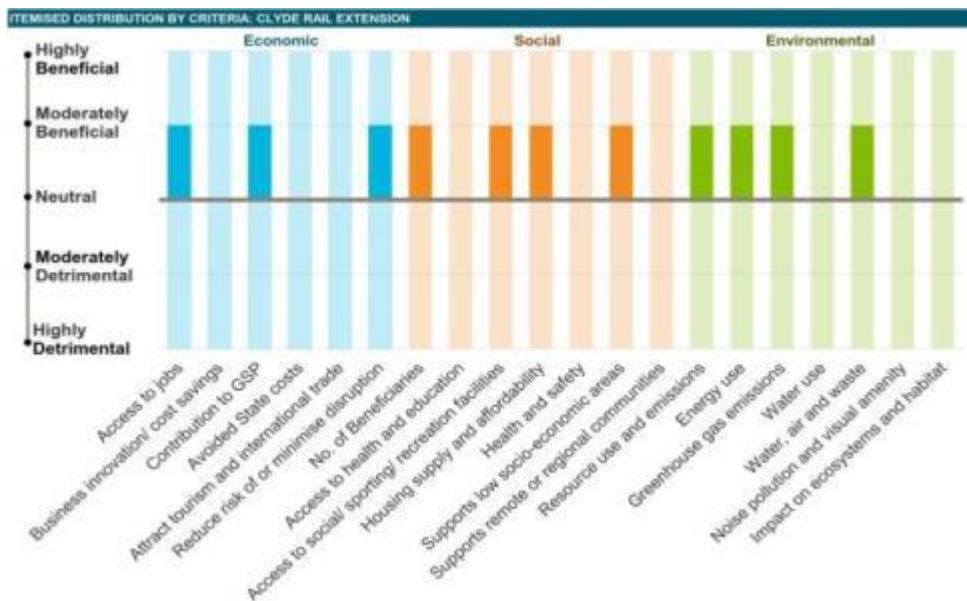
How does this option work with others?

No key relationships with other options have been identified.

How does this option perform under different scenarios?

Supercity	++	Supports mode shift to address congestion
Westside Story	-	Less demand for mass transit
Regional Cities	+	Supports mode shift to address congestion
Accelerated Climate Change /Mitigation	+	Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	-	Less demand for mass transit
Biosecurity Threat	Neutral	
Bay West	-	
Hastings	Neutral	

What are the economic, social and environmental impacts of this option?



What do we think of this option and why? (cont'd)

Providing quality public transport services to newly developing suburbs should assist in reducing the potential for entrenched car-based behaviours and support the development of healthier and more sustainable neighbourhoods and communities. The sale of any land or approval of new developments that would encroach on this currently reserved rail corridor should be avoided.

Risks and opportunities

There may be risks with contaminated soil from working in an old rail corridor that would need to be managed during the construction phase.

The extension of the Cranbourne Line has the opportunity to re-use the existing rail easement and some track formation to Clyde. This could reduce the overall project cost of the new rail infrastructure.

Funding

Should government choose to pursue this project, it will then need to consider funding options. Below is a range of potential funding mechanisms which could be examined to help fund the project.

Potential funding mechanisms

General government revenue	User charges	Beneficiary charges	Property development	Asset sales
✓	✓	✓	✓	

General government revenue is likely to be a major source of funding for projects like Clyde rail extension as the benefits of the project are shared by transport users in a broad area between Clyde and Melbourne's CBD.

Should this project include new train stations, beneficiary charges could be considered if there is a substantial uplift in land values and business activity in the vicinity of the new train stations. These include developer contributions, which could be levied on new developments occurring in the vicinity of new train stations. Parts of this project could be eligible for funding from existing developer contributions such as the Growth Areas Infrastructure Contribution. Some funding could also be raised from betterment levies applied to commercial and/or residential properties in a defined catchment around new train stations to capture a portion of the additional land and business value created by the project.

Property development could also be considered, for example, selling or leasing land and air rights surplus to government requirements at new train station sites for commercial, residential or retail development. Property development can assist in putting underutilised government land and space to higher and better uses, creating added value through improved amenity and access to services.

Existing user charges (public transport fares) should continue to be charged but are only expected to cover a portion of ongoing operating costs.

Infrastructure Victoria is examining transport network pricing as part of our research program. We think that the primary objective of a transport network pricing regime – where users pay to access and use the transport network – should be to manage demand, rather than to recover costs for infrastructure. We are focusing on examining road pricing regimes in metropolitan Melbourne as a first step towards a comprehensive transport network pricing regime that includes roads and public transport. Careful consideration must be given to the design of the regime to ensure it is efficient, fair and sustainable.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then the timing of this recommendation has been changed from 15-30 years to 10-15 years. This responds to stakeholder feedback and additional evidence, which highlighted that earlier delivery of this extension will support the land use outcomes and development of the town centre at Clyde. As a result of the timing change funding advice has also been provided for this recommendation.

Interface issues

A number of interface issues will need to be resolved in the development of the project and construction for the rail extension to Clyde. These include the integration with Pakenham services, signalling systems, traction power supply and track layout among others taking into account the proposed service frequency and design requirements.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Public Transport Victoria, *Network development plan: Metropolitan rail*, 2012

Key movement corridor incident management CRR1

Option type

Changing behaviour through information

Location

Statewide

Sector

Transport

Certainty of evidence

Low

Direct option cost

\$100 million–\$250 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 10: Meet growing demand for access to economic activity in central Melbourne; and

Need 11: Improve access to middle and outer metropolitan major employment centres; and

Need 19: Improve the resilience of critical infrastructure

Low	Low	Low	Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Develop a contingency plan to maintain transport access on key transport corridors, in the event of road or rail assets being temporarily out of service. This option would seek to improve cross-modal coordination by better leverage of ICT and traffic management technologies. Included in this would be the provision of real-time information to transport users regarding alternative transport and route options.

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option was recommended in the strategy (ref. 19.2.2) because this is a low cost option which offers the ability to minimise the impact of transport disruptions. It does this by bringing all parts of the transport network to bear in response to getting people where they need to go. This option has been rated low for all periods as it is an enabler only, however the need for option may become more important as the network comes under increased demand pressure in future years. The value of this option is also likely to increase when taking into consideration other options we are recommending such as the establishment of an integrated transport control centre (ITC) and the better provision of real-time transport information (TNI).

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

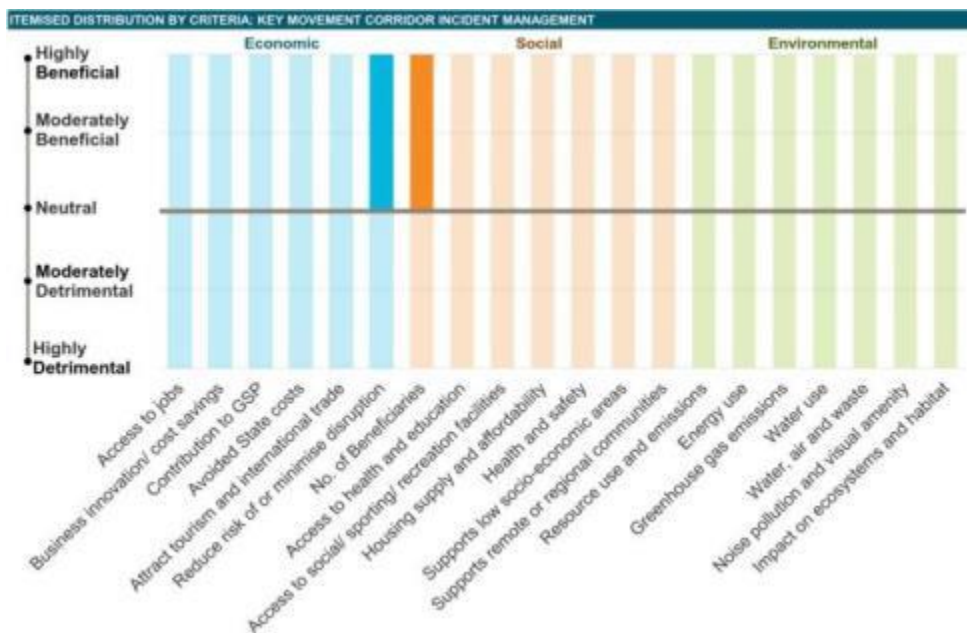
How does this option perform under different scenarios?

Supercity	++	Heightened congestion worsens impact of disruptions
Westside Story	+	More critical to minimise disruptions Notes
Regional Cities	+	More critical to minimise disruptions Notes
Accelerated Climate Change /Mitigation	+	Improves traffic flow, reducing rate of carbon emissions
Prolonged/ Severe Economic Downturn	-	
Biosecurity Threat	Neutral	

How does this option work with others?

This option is complementary to integrated transport control centre (ITC), real time transport information (TNI) and advanced driver assistance applications (ADA) – the latter may provide real-time data for use by transport system operators and managers.

What are the economic, social and environmental impacts of this option?



Risks and opportunities

A risk of this is that there may be limited impact without additional investment in central infrastructure control.

Provision of real-time information to users has the potential to reduce the impact of transport disruptions, particularly where there is network redundancy or alternative available modes exist.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Central regional rail control centre CRR2

Option type

New asset

Location

Statewide

Sector

Transport

Certainty of evidence

Low

Direct option cost

\$100 million – \$250 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 1: Address infrastructure demands in areas with high population growth; and

Need 19: Improve the resilience of critical infrastructure

Low	Low	Low	Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

Need 10: Meet growing demand for access to economic activity in central Melbourne; and

Need 12: Improve access to jobs and services for people in regional and rural areas; and

Need 13: Improve the efficiency of freight supply chains

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Establish an integrated regional rail control centre to manage movements of both passenger and freight trains. The project will have the ability to reduce disruptions and support the faster resolution of issues across the regional rail network. It will also support rail operations on the metropolitan network where tracks are shared with the regional lines. The integration of passenger and freight rail control will create efficiencies in communications and systems. This option has the ability to increase the reliability of regional commuter services and the overall supply of transport to the central city.

What is the level of community support?

There was limited to no discussion of this option during public consultation. This option was recommended by the regional citizen jury.

What do we think of this option and why?

This option was recommended in the strategy (ref. 19.2.4) because of the role it could play in reducing disruptions and delays on the regional network and supporting more efficient rail operations.

This option was assessed as making a low to moderate contribution to meeting a number of needs across all time periods, for a relatively low upfront cost. It was recommended for delivery in the 15-30-year period as this timing is consistent with the likely need for major renewal of existing control facilities. The opportunity to integrate the regional rail control centre with other transport control centres (ITC) should also be considered.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

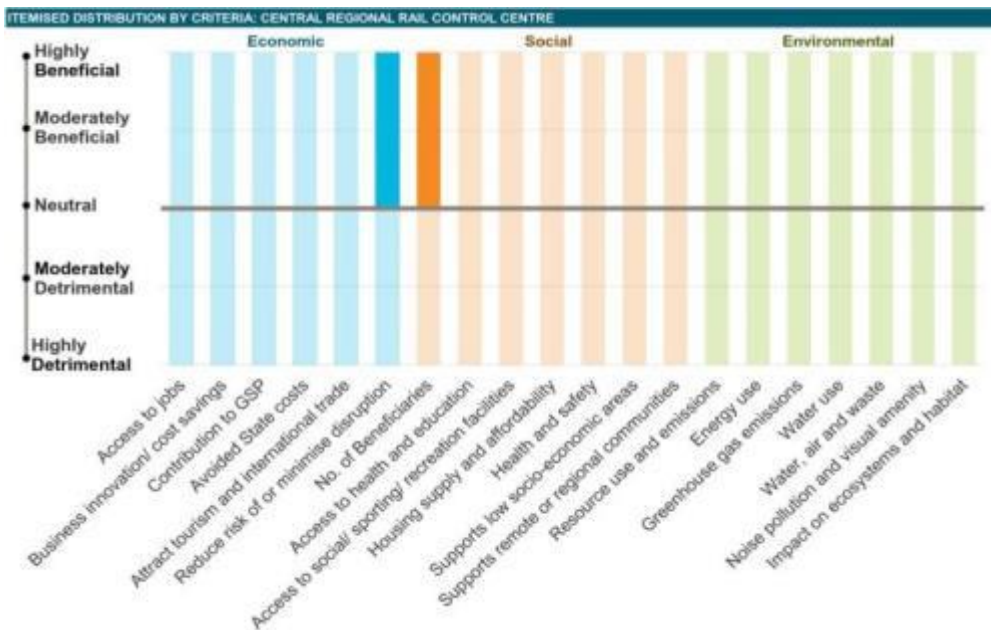
How does this option work with others?

This option complements key movement corridor incident management (CRR1) and integrated transport control centre (ITC). Working together these options can increase the efficiency, safety and reliability of the transport network.

How does this option perform under different scenarios?

Supercity	+	Need for improved reliability & efficiency
Westside Story	+	Need for improved reliability & efficiency
Regional Cities	+	Need for improved reliability & efficiency
Accelerated Climate Change /Mitigation	+	Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	-	Less demand for travel
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



Commentary:

The option has been assessed on the basis of normal transport conditions, and so the high rating assigned to resilience incorporates these benefits, which are not otherwise captured.

Risks and opportunities

There is a potential risk in that the individual requirements of V/Line, ARTC and the various freight operators could be difficult to incorporate in to a shared control centre. This may result in delays and additional costs to the government to resolve these differences.

There is an opportunity to further integrate the proposed regional system with the existing metropolitan rail control system. This could further enhance the efficiency of the entire rail network.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then we have made a change to acknowledge that a greater degree of functional integration across sectors (i.e. beyond transport) could strengthen system resilience in terms of the availability of levers to respond to system challenges and disruptions.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Critical infrastructure contingency planning CSB

Option type

Better use through technological innovations

Location

Statewide

Sector

ICT

Certainty of evidence

Low

Direct option cost

\$10 million–\$25 million

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 19: Improve the resilience of critical infrastructure

Low	Low	Low	Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Introduce requirements for public and private operators of critical infrastructure to develop and maintain adequate contingency plans for the delivery of essential services in the event of major disruptions, particularly ICT failures.

What is the level of community support?

There was limited discussion of this option during public consultation.

What do we think of this option and why?

This option was recommended in the strategy (ref. 19.2.1), as it is important there be continuity in the operation of critical infrastructure and the essential services they provide to the community. While our recommendation referred to ICT generally, we think that the development of contingency planning will increasingly focus on cyber security issues. While ensuring that cyber space is secure and reliable is an important national goal, some of the most critical approaches to managing it will be clear governance and clarity of responsibilities between government and other players, and a clear set of 'rules' to ensure that cyber security can be policed and managed. To ensure this continuity in cases where cyber breaches have occurred, particularly for infrastructure that may be owned and operated by the private sector, there is a role for state regulation to require operators to have adequate contingency plans in place, and thereby minimise the impact of malicious cyber-attacks.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

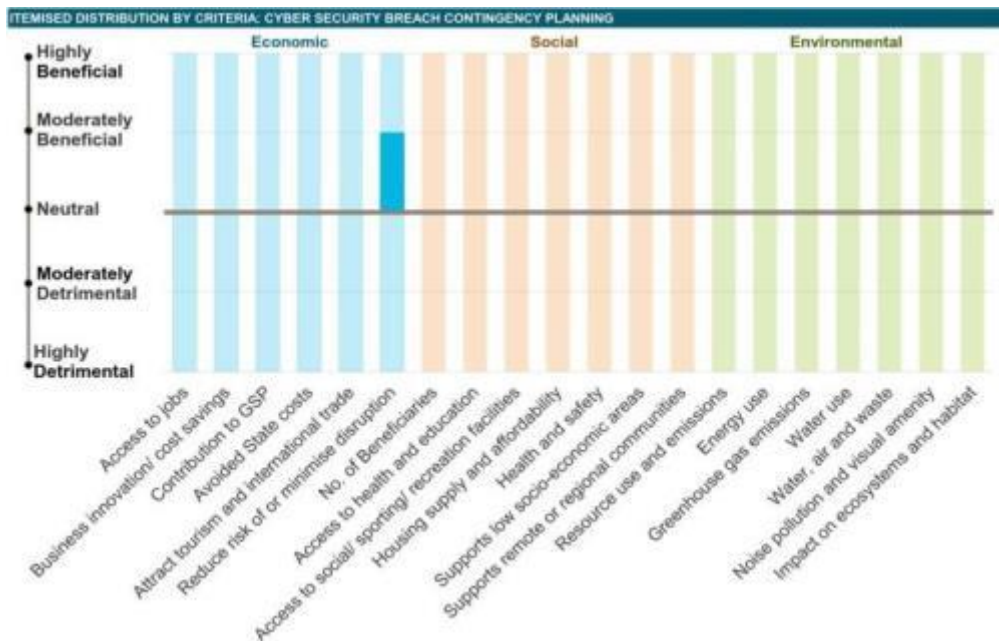
How does this option work with others?

As this option supports the resilient operation (and continued delivery of services) across a range of sectors, it indirectly supports those options reliant on effective management of control systems and integrity in the use of data. This includes options such as Advanced Traffic Management (ATM) and Automated Vehicle Technology (ACT).

How does this option perform under different scenarios?

Supercity	Neutral
Westside Story	Neutral
Regional Cities	Neutral
Accelerated Climate Change /Mitigation	Neutral
Prolonged/ Severe Economic Downturn	Neutral
Biosecurity Threat	<div style="text-align: center;">+</div> Improves resilience of critical infrastructure

What are the economic, social and environmental impacts of this option?



Risks and opportunities

There is a risk for this option that cyber security contingency plans will not be developed in a coordinated fashion between private and public sectors, and between different organisations with responsibility for essential services. Additionally, contingency plans with regulatory minimum requirements nominated creates the risk those organisations will only prepare plans to the minimum level required, regardless of whether this level is appropriate for their sector or circumstances. Plans and coordination of plans may also struggle to keep pace with technological change and new and evolving cyber security threats.

There is an opportunity to link cyber security contingency planning, in particular, to improved coordination of essential and emergency services, to enable more effective responses to emergencies as well as cyber security breaches. There may also be an opportunity for economies of scale as organisations put new processes and technologies in place to address cyber threats.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Justice case management system CSC

Option type

Better use through technological innovations

Location

Statewide

Sector

Justice and emergency services

ICT

Certainty of evidence

Low

Direct option cost

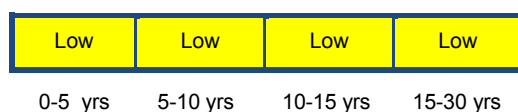
\$100 million–\$250 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 8: Address increasing demand on the justice system



What is this option?

This option would roll out a case management system across all Victorian court jurisdictions to integrate and standardise document management, and to create one view of the client. This would be the first stage in a broader case management system across the criminal justice system (there is an existing case management system for civil matters, particularly in the higher courts).

The new ICT system would be accessed through a secure gateway, to support improved client services and target justice service initiatives. This new infrastructure would enable the demand on the justice system to be more efficiently met by improved access to justice including through reduced waiting times.

What is the level of community support?

There was limited to no discussion of this option during consultation. Both citizen juries made recommendations in support of this option.

What do we think of this option and why?

This option was recommended in the strategy (ref. 8.2.3) because although only making a low contribution to need 8 in isolation, it makes a more material contribution jointly with justice and human services integrated planning and delivery (JCS). Currently the courts have fragmented, and in some cases not fit-for-purpose court management systems, which undermine efficient justice delivery particularly when responding to increased demand. Western Australia and New South Wales already have statewide case management systems in place, whilst Queensland is developing one. This system should be developed over 0-10 years as the first stage of a broader criminal justice case management. In particular, linking to systems being developed by Victoria Police in response to the Royal Commission into Family Violence to provide one view of the client across the criminal justice system, followed by better integration with civil case management and linking with human services and health systems.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

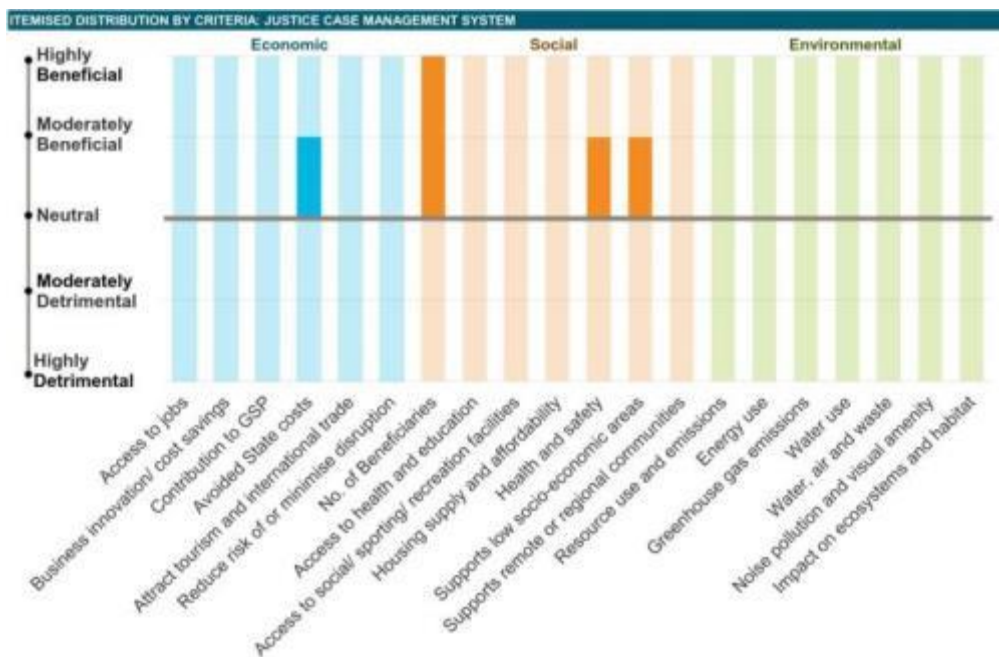
How does this option work with others?

The quality of this system may be best maximised if supported by integrated justice and human services delivery (JCS). There is also potential that this option could complement efforts to implement digital health records (EEA). This is particularly important given the role of drugs and alcohol in the commission of crimes.

How does this option perform under different scenarios?

Supercity	+	More efficient operation of courts
Westside Story	Neutral	
Regional Cities	Neutral	
Accelerated Climate Change /Mitigation	Neutral	
Prolonged/ Severe Economic Downturn	+	More efficient operation of courts
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



Risks and opportunities

Major ICT projects can have high risk of contract overruns or delivering platforms that are not fit for purpose or in extreme cases failures to deliver services. There could also be risks with information security.

Those interacting with justice services may have complex needs or may be vulnerable, so the benefits of the system could be expanded by designing supporting non-ICT services.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then we have refined the scope of the recommendation to reflect the need for the system to link to civil justice systems.

Next steps

The findings of an Ombudsman report into such IT projects recommended roll out in appropriate stages. Given the progressive scope proposed for this option, appropriate staging will be a key consideration.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Victorian Ombudsman, *Own Motion Investigation into ICT-enabled Projects*, 2011

Cultural and sport major infrastructure investment framework

CSM

Option type

Better use through coordination processes
 Better use through public service delivery and approval process

Location

Statewide

Sector

Cultural, civic, sporting, recreation and tourism

Certainty of evidence

Low

Direct option cost

\$10 million–\$25 million

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 1: Address infrastructure demands in areas with high population growth; and

Need 4: Enable physical activity and participation; and

Need 5: Provide public spaces where communities can come together

Low	Low	Low	Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

There is a history of investment in high profile and high cost major cultural and sport infrastructure at a state and regional level in Victoria. This includes Melbourne Museum, Kardinia Park Geelong and Melbourne Park. In a number of areas, new investments are being planned and proposed and are seen as drivers of economic development and tourism. In an environment of scarce resources, a decision-making framework is needed to maximise benefits of major sporting and cultural investments. The role of the state in planning investments for these facilities is critical due to the investment size (sometimes billions of dollars), the land holdings required, as well as the need to manage impacts and leverage benefits for surrounding precincts and transport infrastructure. A more transparent investment framework is required to avoid politicisation of these investment decisions, to ensure that they are not made on an ad hoc basis or in response to high profile advocacy without a clear rationale (further detail in *What is this option? cont'd*).

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive.

What do we think of this option and why?

This option was recommended in the strategy (ref. 4.3.1, 5.1.1) because it will avoid decisions about future government investment in major cultural and sporting infrastructure being made on an ad hoc basis or excessively influenced by high profile advocacy. This framework will also ensure widespread community benefit rather than just benefit to one or two groups. At this stage, we have not included a funding strategy as we think it is more important to get the decision-making framework right first. The framework should be developed within 0-5 years and include requirements that any investment has a wider community benefit through the provision of new spaces for wider community sport and recreation, or community arts and cultural use. There is also the potential to consider how these investments could support pathways from amateur to elite sports or arts participation.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

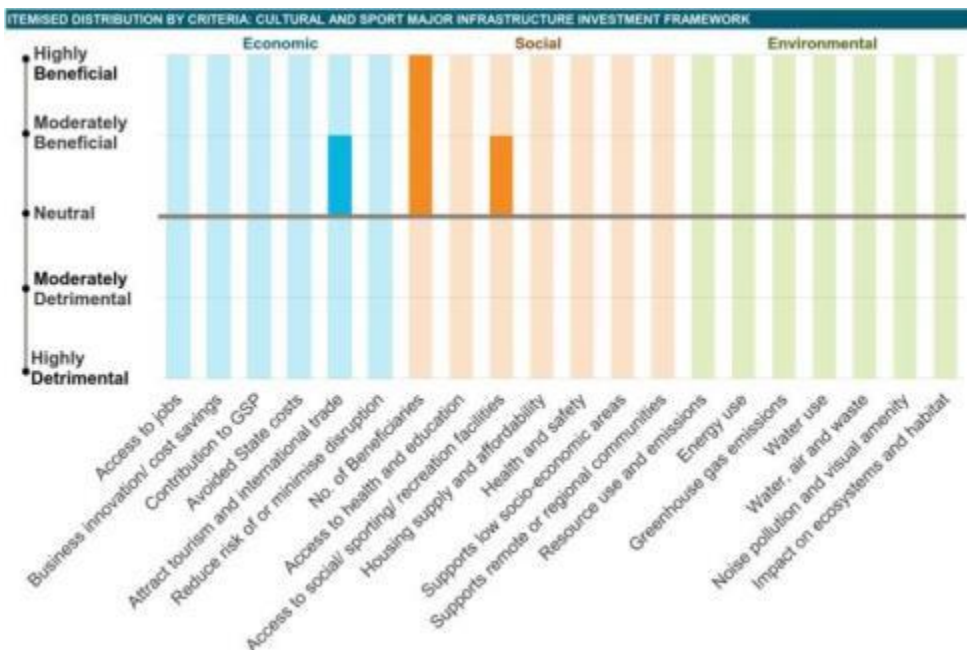
How does this option work with others?

This option is complementary to both a community cultural facility investment framework (CCF) and a sport and recreation strategic investment framework (SRF) which seek to drive better decision-making for local infrastructure based on clear evidence. Similarly, this option could act as an alternative to programs for sport and recreation and cultural facilities in particular areas by enabling better leveraging of investment in this major infrastructure by community groups.

How does this option perform under different scenarios?

Supercity	+	Heightened need for high-performing spaces
Westside Story	Neutral	
Regional Cities	Neutral	
Accelerated Climate Change /Mitigation	Neutral	
Prolonged/ Severe Economic Downturn	Neutral	
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



Commentary:

Assuming a decision and investment framework results in facilities that are needs-based and well located, this has the potential to attract further sports and event tourism, particularly from interstate.

What is this option? (cont'd)

This option would require the state government to adopt an investment framework for major cultural and sports infrastructure to ensure that these investment decisions meet clear outcomes which may include:

- Maintaining and strengthening the state's competitive position and capability as a major events destination
- Ensuring adequate demand to drive viability of operations
- Designing in the needs of broader users from the beginning
- Facilitating and encouraging grass roots and community activities and participation
- Providing elite pathways for participation
- Improving resident access, including proximity to public transport
- Building or catering to underserved audiences
- Providing capacity for regional touring or outreach
- Building new audiences and markets
- Fostering skills development and job creation in a creative and innovative economy
- Delivering open space for community use
- Reflecting the needs of cultural diversity
- Reflecting trends of sports participation and cultural interests rather than established preferences
- Leveraging funding from the private sector
- Ensuring that facilities can meet the needs of both elite sport and arts (for high-performance or competition level participation)
- Enabling and funding a range of services to be programmed by enabling multipurpose use and flexibility
- Requiring the development of a community and civic charter outlining the community engagement approach.

Risks and opportunities

There is a risk that engagement with proponents of projects could confuse accountability for decision-making against this framework.

This option presents an opportunity to further leverage major investments in sport and cultural facilities to benefit local and regional communities and economies. This could be achieved through enabling better coordination and assessment of broader infrastructure provisions and social and economic impacts to maximise investment benefit.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

New South Wales Government, *Stadia strategy*, 2012

Queensland Department of Premier and Cabinet, *Arts and cultural investment framework*, 2015

SGS Economics and Planning, *Creative infrastructure investment framework*, 2016

Community space refurbishment or rationalisation CSR

Option type

Better use of through refurbishment of existing assets
 Better use through subsidies
 Better use through funding agreements

Location

Statewide

Sector

Cultural, civic, sporting, recreation and tourism
 Education and training

Certainty of evidence

Medium

Direct option cost

\$3 billion–\$5 billion

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 1: Address infrastructure demands in areas with high population growth; and

Need 2: Address infrastructure challenges in areas with low or negative growth; and

Need 5: Provide public spaces where communities can come together

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option proposes that state government provides a targeted incentive fund to support local government and community organisations to refurbish or rationalise existing community infrastructure. This could include public community facilities such as halls, single room kindergartens, standalone maternal and child health services and poor quality open spaces across Victoria that are no longer fit for purpose or meeting community needs. Provision of funds would be based on service planning and a detailed assessment of existing spaces, comparing utilisation levels with the standard of the facilities to best meet current and future community needs including the needs of ageing and culturally diverse communities. Funds from any asset sales raised would be directed towards consolidation of facilities, upgrades and new infrastructure.

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive. Both citizen juries made recommendations in support of this option.

What do we think of this option and why?

This option was recommended in part in the strategy (ref. 1.4.4, 2.3.2 and 5.4.2) because it will help local governments address community infrastructure (e.g. kindergartens, maternal and child health, neighbourhood houses, and sports fields) which are no longer fit for purpose or in need of upgrade. The recommended fund of \$50 million per year over 5-30 years should be established over the next 0-5 years and be linked to criteria that would require ineffective assets to be divested or refurbished. The cost for this option was scaled-down in the recommendation. We think that grants should be capped at about \$2 million per project and this would fund at least 25 projects or about 30 per cent of council areas per year. While councils and a range of community organisations should be eligible, priority should be given to areas experiencing high levels of growth or in regional areas with resource constraints.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

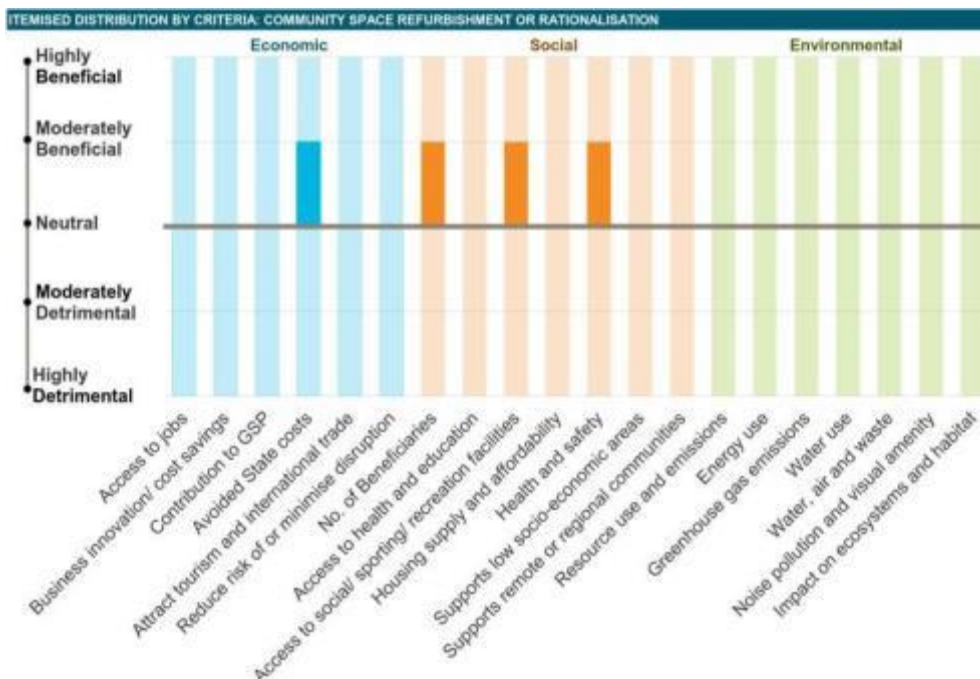
How does this option work with others?

This option would support compact urban development (UDC) and strategic transit-oriented centres and corridors (STO) as existing community facilities will need to be upgraded to respond to population growth in established areas. This option will also assist to identify where existing sport facilities (SRF) and community cultural facilities (CCF) are not meeting changing community needs.

How does this option perform under different scenarios?

Supercity	+	Addresses increased need for fit-for-purpose facilities
Westside Story	+	Addresses increased need for fit-for-purpose facilities
Regional Cities	+	Addresses increased need for fit-for-purpose facilities
Accelerated Climate Change /Mitigation	Neutral	
Prolonged/ Severe Economic Downturn	+	Need to make better use of existing facilities
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



Commentary:

There are a number of social benefits when older community infrastructure can be upgraded or disposed of to help meet changing community needs, particularly universal services such as early years' facilities.

Risks and opportunities

This option risks community opposition where changes may be proposed to existing community spaces (such as to existing kindergartens, parks etc.) even where they are underused or in a poor condition. The proposed incentive fund would assist to manage this opposition as communities would be able to see the benefit of enabling upgrades and renewal to infrastructure to better meet community need.

This option has the potential to support the maintenance of ageing infrastructure and support urban renewal, through consolidation of, and investment in, existing and upgraded community spaces.

Funding

Should government choose to pursue this program, it will then need to consider funding options. Below is a range of potential funding mechanisms which could be examined to help fund the program.

Potential funding mechanisms

General government revenue	User charges	Beneficiary charges	Property development	Asset sales
✓	✓		✓	✓

General government revenue is likely to continue to be a major source of funding for programs like community space refurbishment or rationalisation as it could improve community spaces across Victoria.

For this program, funds from any asset sales raised would be directed towards consolidation of facilities, upgrades and new infrastructure. Selling low performing, costly, or not fit-for-purpose community infrastructure would also encourage a higher and better use of surplus assets (including land) and provides an opportunity to avoid future operating and/or maintenance costs. There might be opportunities to look at underutilised assets and whether efficiencies could be gained through co-location to ensure best use of infrastructure and to share some ongoing recurrent and maintenance costs from the different uses.

Property development could also be considered. For example, refurbishing community facilities could be partly funded by partnering with the private sector through property development by selling or leasing facilities or floor space for commercial retail development (such as cafés and shops). This could also enhance the amenity surrounding community facilities and offer more choice in retail, employment and social interaction, particularly for regional areas.

User charges are appropriate where there are identifiable direct beneficiaries and where it is possible to control access to the community facility (i.e. the infrastructure is excludable, such as a public swimming pool). User charges could be used to recover from users some of the cost of the infrastructure, maintenance or operations for these facilities. User charges for using refurbished community facilities could be considered to help fund future development. Equity objectives can be met, if necessary, through designing a pricing scheme that provides concessions for those who cannot afford to pay.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then the recommendation has been refined to highlight that service planning should always precede infrastructure decisions, and decisions to rationalise or refurbish assets should be in response to service planning. This responds to feedback from the local government sector.

Next steps

Local government and community organisations would need to lead the process of identifying assets that require refurbishment or rationalisation through service planning and asset management planning. Ideally, for local government, this process would be linked to strategic resource planning. Council strategic resource plans:

- Take into account services and initiatives contained in any plan adopted by council.
- Include financial statements describing the required financial resources for the next four financial years.
- Include statements describing the required non-financial resources, including human resources for at least the next four financial years.
- Include any other information prescribed by the regulations.

This option could include assets located on Crown Land that are managed by local government/community as committees of management established under the *Crown Land (Reserves) Act 1978*.

Community research

Ninety two per cent of people surveyed as part of community research supported incentive funding be provided to encourage councils to either update their facilities to make them flexible and multiple purpose, or close down and sell outdated facilities to assist with the building of new ones.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

VPA, *Melbourne's open space land data*, 2016

Community space shared use agreements

CSS1

Option type

- Better use through coordination processes
- Better use through public service delivery and approval processes
- Better use through contractual processes

Location

Statewide

Sector

- Cultural, civic, sporting, recreation and tourism
- Education and training

Certainty of evidence

Low

Direct option cost

\$1 million–\$10 million

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 1: Address infrastructure demands in areas with high population growth

Low	Low	Low	Low
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0-5 yrs 5-10 yrs 10-15 yrs 15-30 yrs

Need 2: Address infrastructure challenges in areas with low or negative growth; and

Need 5: Provide public spaces where communities can come together

Moderate	Moderate	Moderate	Moderate
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0-5 yrs 5-10 yrs 10-15 yrs 15-30 yrs

What is this option?

This option is about improving the tools and guidelines to support governance processes that will enable the establishment of standardised shared use agreements between different agencies and associations across Victoria. This would lead to the sharing of community spaces and facilities such as school facilities, recreation, sporting, cultural and other community infrastructure. While these agreements have previously been prepared predominantly for shared use of school facilities, it is envisaged that their use could be extended to different councils, service providers, not-for-profits and associations. Shared use agreements are most successful when the governance for new or refurbished facilities is established early to jointly plan and design for integrated shared use. The establishment of governance to develop the shared use agreements can be supported by experienced infrastructure brokers who can facilitate these agreements.

What is the level of community support?

There was a high level of discussion of this option during consultation. Responses were generally positive. Both citizen juries made recommendations in support of this option.

What do we think of this option and why?

This option was recommended in strategy (ref. 1.4.2, 2.3.1 and 5.2.2) because it will enable better sharing of facilities. This is a low cost option that makes a moderate contribution to needs 2 and 5. Shared facilities will enable maximum community access to state owned facilities such as schools. In low growth areas this should lead to reduced costs and the potential rationalising of single use older assets or assets that are costly to maintain. There is a role for the state to lead the development of tools, guidelines and requirements to formalise and simplify the preparation of the agreements, with local government as a key partner. Other partners would be not-for-profit organisations, non-government schools and potentially the private sector.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	Relates to key point/option for discussion
Regional Growth Plans	Contributes to implementing policy

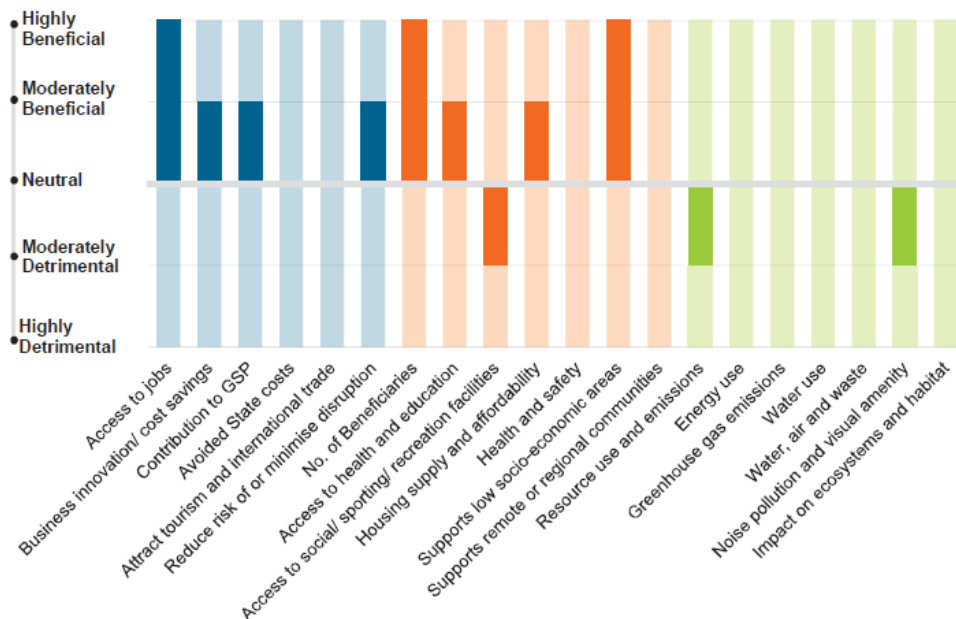
How does this option perform under different scenarios?

Supercity	+	Maximises access to community space
Westside Story	+	Maximises access to community space
Regional Cities	+	Maximises access to community space
Accelerated Climate Change /Mitigation	Neutral	
Prolonged/ Severe Economic Downturn	+	Maximises access to community space
Biosecurity Threat	Neutral	

How does this option work with others?

This option is an important enabler for other options that require sharing of facilities such as schools as community facilities (SCF).

What are the economic, social and environmental impacts of this option?



Commentary:

There are significant social and economic benefits for communities when facilities can be shared for wider use.

Risks and opportunities

Without a skilled broker it can be difficult to bring together a partnership. An enduring partnership that can ensure the infrastructure is shared over the longer term is challenging without formal shared use agreements between parties.

Formal shared use agreements also provide for opportunities for different interest groups and stakeholders to build integrated facilities and should reduce the need to build multiple single purpose facilities. The Department of Education and Training has already developed shared use agreements. These agreements can be further developed and formalised to support a range of stakeholder needs.

Additional notes

Next steps

- Establish appropriate governance to review the effectiveness of existing agreements such as those used by the Department of Education and Training would be an important first step (0-5 years).
- Shared use agreements should address the following:
 - Expectations of the landlord and the parties using the facilities
 - Division of expenses
 - Insurance and liability provisions
 - Dispute resolution clauses.
- While this option focuses primarily on developing shared use agreements to enable sharing of state facilities, these tools and guidelines should also support local government, non-government schools and community organisations to also share their facilities.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

AECOM/PwC, *Assessment 2: Economic, social and environmental assessments and option relationship mapping*, 2016

Community space statewide event planning CSS2

Option type

Changing behaviour through information
Better use through coordination processes

Location

Statewide

Sector

Cultural, civic, sporting, recreation and tourism

Certainty of evidence

Low

Direct option cost

<\$100 million

Contribution to meeting the need

Need 2. Address infrastructure challenges in areas with low or negative growth – **Low**

Need 5. Provide spaces where communities can come together – **Moderate**

Need 12. Improve access to jobs and services for people in regional and rural areas – **Low**

What is this option?

There are many community and public spaces across Victoria which could be better utilised. This option proposes the development of a local annual community activities calendar for public spaces. While it is acknowledged that many local councils do this already as part of their ongoing operations, this option is about making this approach systematic across all Victorian councils. This option would not mandate coordination but would seek to promote the benefits of such. Existing online events platforms could be expanded, for example, to all councils and event organisers.

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally negative. The regional citizen jury recommended this option.

What do we think of this option and why?

This option was not recommended in the strategy because there is no clear role or need for the state. Councils and other organisations already program events for public spaces. If councils choose to better coordinate their events there are no barriers preventing this coordination. The state can have a supporting role through deregulating access to public spaces and this has been addressed through community and public space utilisation and deregulation (CSU).

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

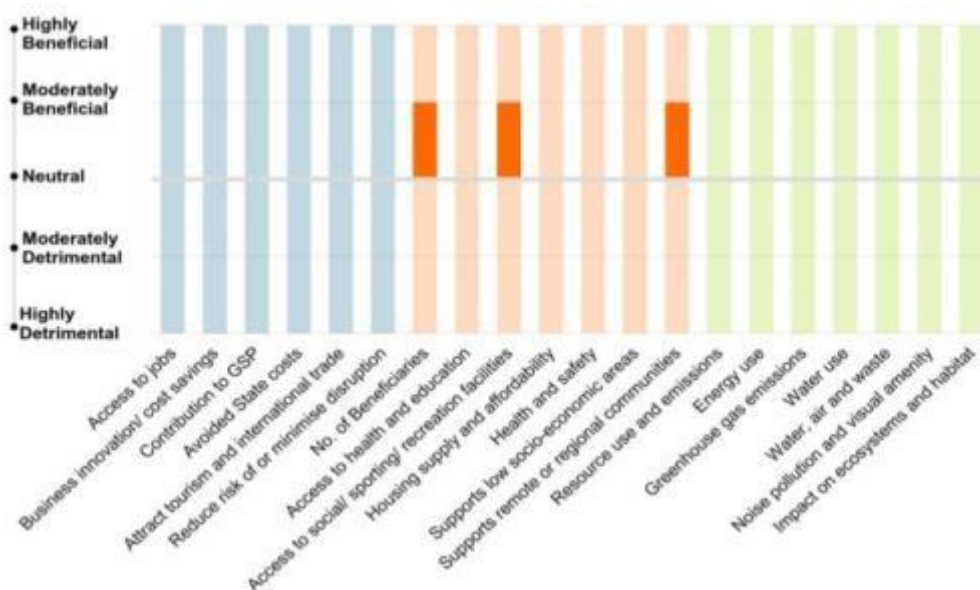
How does this option perform under different scenarios?

Supercity	Neutral
Westside Story	Neutral
Regional Cities	Neutral
Accelerated Climate Change /Mitigation	Neutral
Prolonged/ Severe Economic Downturn	Neutral
Biosecurity Threat	Neutral

How does this option work with others?

If more land was made available for public use such as through community and public space utilisation and deregulation (CSU), more events could be programmed in these spaces.

What are the economic, social and environmental impacts of this option?



Risks and opportunities

The risk for this option is that the range of potential stakeholders may not see the benefit of coordinated planning. Councils have a deeper understanding about their own communities and community needs; there is a risk for the state having a coordinating role without this local knowledge or understanding.

Evidence base

AECOM/PwC, *Assessment 2: Economic, social and environmental assessments and option relationship mapping*, 2016

Deloitte/Aurecon, *Assessment 1: Options analysis report*, 2016

Community and public space utilisation deregulation CSU

Option type

Better use through regulation

Better use through refurbishment of existing assets

Location

Statewide

Sector

Cultural, civic, sporting, recreation and tourism

Certainty of evidence

Medium

Direct option cost

\$10 million–\$25 million

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 1: Address infrastructure demands in areas with high population growth; and

Need 2: Address infrastructure challenges in areas with low or negative growth; and

Need 5: Provide public spaces where communities can come together

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

Need 4: Enable physical activity and participation

Low	Low	Low	Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option seeks to improve the utilisation of state or local public spaces through a review of financial and planning regulations and barriers to broader community use. This would target the barriers to accessing underutilised public spaces and increase their use through reducing 'red-tape' to allow for:

- Installation of community infrastructure
- Hosting/programming of activities and events
- Use by not-for profits and micro-industries.

This option would include the identification of underutilised spaces such as waterways, school ovals and Victrack land which could be used for community use, green infrastructure or informal active recreation. Better use of public and community spaces has an added benefit of activating underutilised spaces and reducing antisocial behaviour (further detail in *What is this option? cont'd*).

What is the level of community support?

There was a high level of discussion of this option during consultation. Responses were generally positive. Both citizen juries made recommendations in support of this option.

What do we think of this option and why?

This option was recommended in the strategy (ref. 1.4.1 and 5.2.1) with a focus initially on state government land because activating underutilised land will make a moderate contribution to needs 1, 2 and 5. In areas where there is high demand for land (such as inner city areas) government should undertake an audit to identify short, medium and longer-term opportunities to make land available for wider community use. Given the scale of state government owned land currently provided on school sites, an early opportunity is to make existing school grounds available for use outside school hours. Other priority areas should include identifying land where leases, licences and similar arrangements are expected to expire and where access to public land is restricted for security and safety reasons. For example, whether any restriction is proportionate to the level of risk and the opportunity cost of that land not being made available for wider community use. Ideally local government will undertake a similar process.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contribute to implementing policy
Plan Melbourne refresh 2015	Relates to key point/options for discussion
Regional Growth Plans	Contributes to implementing policy

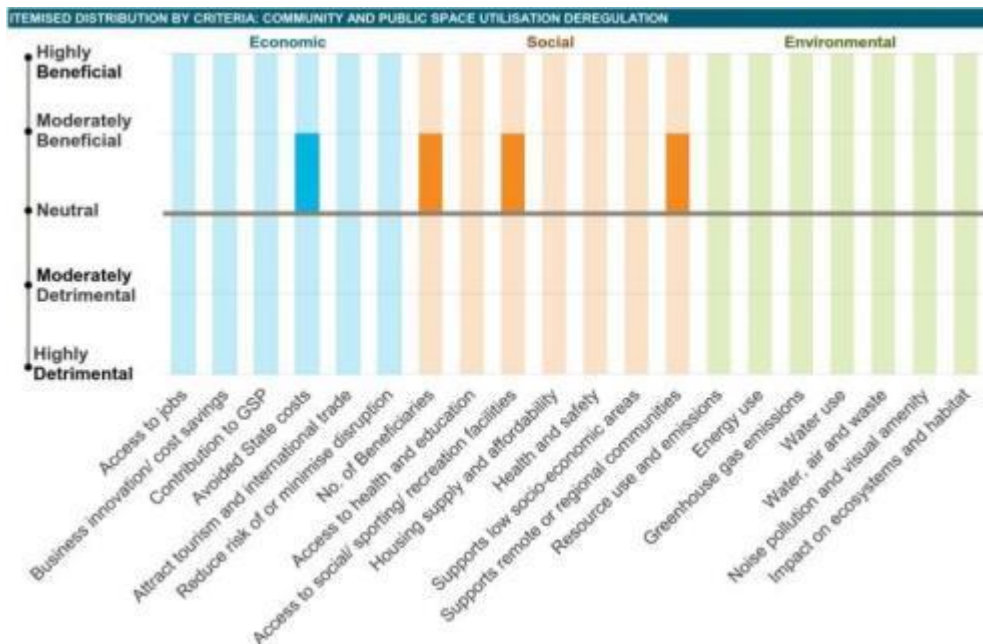
How does this option work with others?

This option supports better use of school facilities for wider community use (SCF). An audit of underutilised spaces could identify spaces that could be appropriate for green infrastructure (UFF).

How does this option perform under different scenarios?

Supercity	+	Better use of available land
Westside Story	+	Better use of available land
Regional Cities	+	Better use of available land
Accelerated Climate Change /Mitigation	Neutral	
Prolonged/ Severe Economic Downturn	+	Better use of available land
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



Commentary:

Increasing access to under-utilised spaces will increase access to social and community spaces. Activating underutilised spaces can reduce opportunities for anti-social behaviour.

What is this option? (cont'd)

This option is particularly relevant for areas where there is limited available open space and land values are high. Examples for where land /spaces could be used for wider community use include:

- Land underneath freeways which could be refurbished as skate parks, or green corridors
- School ovals
- Utility reservations
- Vacant upper level floor spaces for delivery of community services or spaces for artists such as the Renew Newcastle model.

Risks and opportunities

State government would need to develop effective governance to ensure a range of stakeholders commit to deregulation of spaces and encourage community use. Incentives may be required to encourage participation. There would also be a requirement for sharing of data and mapping tools to enable a consistent approach to any auditing of underutilised places.

There is opportunity to demonstrate the wider benefit of activating public spaces and the likely reduction in antisocial behaviour such as vandalism.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then we have provided additional information about the initial focus of the recommendation, in response to new evidence about the quantum of restricted public land in Melbourne.

We have also emphasised the importance of this recommendation in areas where land is in high demand as well as its relationship to green infrastructure.

Next steps

1. Audit state government land in areas where there is high demand for land (such as inner city areas) and in areas where green infrastructure is required. Including where there is an opportunity for wider community use of state owned land that may best be divested to another land manager such as local government. The findings from the audit should be published.
2. Review requirement for sale of surplus government land to ensure that there is an ability for government to consider wider community uses before selling land.
3. Department of Education and Training reduce barriers to accessing school grounds outside school hours.
4. Where school grounds, and other state government land, can be transitioned to become available for shared use with the wider community use, co-investors in the management and maintenance of the shared spaces will need to be identified. For example, local governments may need to contribute to maintenance of school ovals for wider community use. This should be managed through shared use agreements (CSS1).

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

VPA, *Melbourne's open space land data*, 2016

Community wind farms

CWF

Option type

Better use through contractual processes

Better use through subsidies

Location

Statewide

Sector

Energy

Certainty of evidence

Medium

Evidence base

Deloitte/Aurecon, *Assessment 1: Options analysis report*, 2016

Direct option cost

<\$100 million

Contribution to meeting the need

Need 18. Transition to low carbon energy supply and use –
Low

What is this option?

This option considers the development of a legislative framework to assist community wind farm projects to obtain planning approvals.

This framework could include planning, contract and procurement assistance to help community teams to develop wind farm projects. Subsidies to access professional assistance could also be provided along with establishing tender supply lists. With this assistance more small-scale community developed wind farms could be progressed.

What is the level of community support?

There was limited to no discussion of this option during public consultation. This option was recommended by the metropolitan citizen jury.

What do we think of this option and why?

This option was not recommended in the strategy because it was considered that the facilitation of wind technology is sufficiently represented through large scale wind and solar (WSE). This option is based on a delivery mechanism that may still occur with development wind resources. We acknowledge that wind is likely to be a major low emissions energy source developed in the short to medium term. This is based on the maturity of wind technology and its increasing cost effectiveness.

Doncaster bus improvement DBI

Option type

Incremental expansion of existing assets

Location

Melbourne eastern subregion

Melbourne eastern state-significant transport corridor

Sector

Transport

Certainty of evidence

Medium

Direct option cost

\$250 million–\$500 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 10: Meet growing demand for access to economic activity in central Melbourne

Low	Low	Low	Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Upgrade the Doncaster Area Rapid Transit (DART) bus services to inner Melbourne by improving the frequency, capacity and efficiency of the bus links. This option would include the provision of additional dedicated lanes, supporting infrastructure such as increased depot capacity, interchange facilities and new rolling stock as needed. This could also include upgrade of the entire corridor from Melbourne CBD to Doncaster to Bus Rapid Transit standards with dedicated bus lanes in the central median of the Eastern Freeway (further detail in *What is this option? cont'd*).

What is the level of community support?

There was limited to no discussion of this option during public consultation. This option was recommended by the metropolitan citizen jury.

What do we think of this option and why?

This option was recommended in the strategy (ref. 10.6.4) because it will mean more people can be carried more quickly between Doncaster and the city at a moderate cost. Our assessment is that it will adequately meet the needs of the Doncaster corridor which we expect will not grow as strongly as corridors in the north and west. The DART provides some of the highest quality public transport services in Victoria, even though it is delivered with buses rather than rail. The number of people using DART buses approaches patronage on the Upfield line and yet there are still pinch points where buses merge in with general traffic both in Hoddle Street and around on-ramps on the Eastern Freeway. This option was recommended for delivery in the 5-10 year timeframe. Future developments in automated vehicles may eliminate the need for on-road priority of high capacity vehicles such as buses, however, given current demand on this corridor it is worth proceeding with this option until these technological changes are fully developed. Action to address these limitations on the service will stand the corridor in good stead for the long term.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent	Notes
Plan Melbourne refresh 2015	N/A	Notes
Regional Growth Plans	N/A	Notes

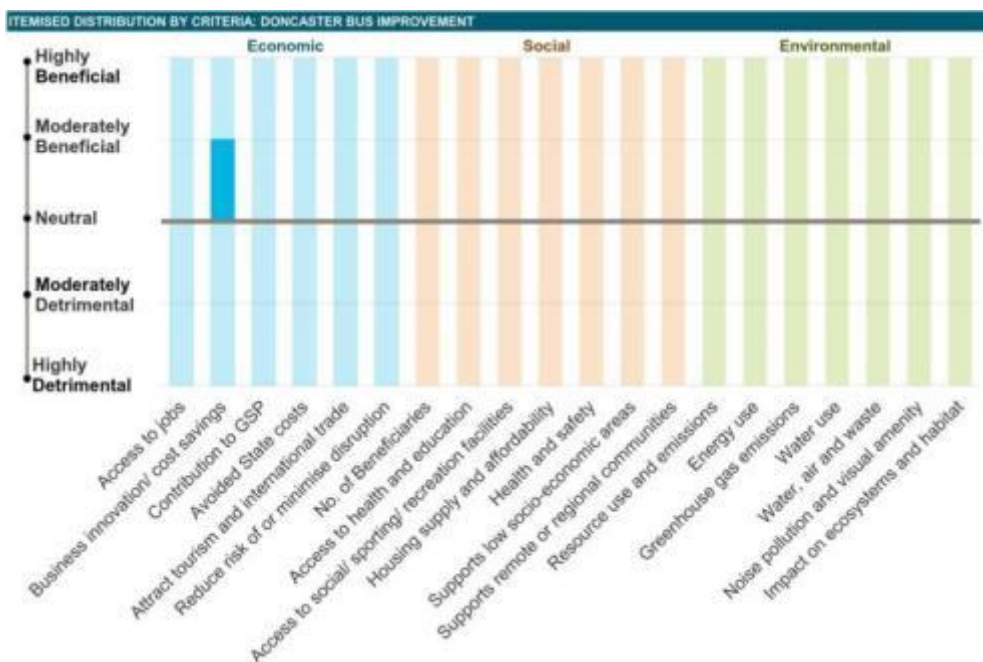
How does this option perform under different scenarios?

Supercity	++	Supports mode shift to address congestion
Westside Story	-	
Regional Cities	+	Supports mode shift to address congestion
Accelerated Climate Change /Mitigation	+	Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	+	More affordable transport options
Biosecurity Threat	Neutral	

How does this option work with others?

This option is an alternative to Doncaster heavy rail line (DHR). It is unlikely both would be required, unless DHR were to happen well after this option, such that the latter could offer benefits for a reasonable period of time. Transport Network Pricing (TNP) would strengthen mode shift to upgraded bus services on the Doncaster corridor, improving passenger throughput.

What are the economic, social and environmental impacts of this option?



Commentary:

Due to the limited population catchment and predicted patronage of this service, along with this transport requirement being somewhat met by the existing DART service, this option is expected to have limited impacts on most criteria.

What is this option? (cont'd)

Basic upgrades could entail implementing measures to support increased reliability and capacity particularly during the congested peak hours, including:

- Dedicated bus lanes between the CBD and Eastern Freeway, specifically on Hoddle Street in the northbound direction
- Dedicated bus lanes between Doncaster Hill and the Eastern Freeway
- Traffic signal priority on dedicated lanes or partial 'queue-jump' lanes
- A dedicated bus-only approach lane on the entry ramp from northbound Hoddle Street to the eastbound Eastern Freeway, supported by dedicated bus signalling/metering allowing priority bus access onto the freeway
- A dedicated bus-only approach lane on the entry ramp from westbound Doncaster Road to the westbound Eastern Freeway, supported by dedicated bus signalling/metering allowing priority bus access onto the freeway
- Additional buses/services to increase the capacity and frequency of DART.

The full Bus Rapid Transit option could include grade-separated access onto and off the Eastern Freeway in the form of dedicated bus ramps directly into/out of the freeway central median. However, we have not specifically recommended this design solution, as it would require assessment against alternative designs. The use of the freeway central median for dedicated bus services would also need to be coordinated with the needs of other transport options such as North East Link (NEL) which is likely to require widening of the Eastern Freeway by one or two lanes in sections.

Enhancements to the Doncaster bus corridor will enable a faster and more efficient service to the city from the Doncaster area to access jobs and services.

Risks and opportunities

There are risks from undertaking construction in an existing freeway corridor that would need to be managed during the option delivery phase.

This option will provide a similar service to the Doncaster heavy rail line, however at a significantly reduced cost.

Additional notes

Next steps

In response to stakeholder feedback during the draft strategy phase, there was a clear message in support of improving the Doncaster bus service but also to preserve the central median for future conversion to a heavy rail link. In developing the most effective scope of works for the bus upgrade, there could be an advantage in considering the role that future transport technologies, including rail, could play in supporting projected patronage growth. This should be a factor in assessing the range of potential upgrade design options, although given the poor case for Doncaster rail, it should not be a design requirement.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Eddington, R, *Investing in transport: East West Link needs assessment*, 2008

Public Transport Victoria, *Fact sheet: Doncaster area rapid transit*, 2008

Data centre location planning

DCD

Option type

Better use through coordination processes

Location

Statewide

Sector

ICT

Certainty of evidence

Medium

Direct option cost

\$500 million–\$750 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 19: Improve the resilience of critical infrastructure

Moderate	Moderate	Moderate	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

To ensure adequate provision for the long-term needs of the digital economy, this option proposes that the state government play a coordinating role to assist the private sector in identifying appropriate sites for the location of future data centres, as well as introducing planning protection for these sites.

What is the level of community support?

There was limited to no discussion of this option during consultation. Both citizen juries made recommendations in support of this option.

What do we think of this option and why?

This option was not recommended in the strategy, because there is no clear evidence of the need for state government intervention at this stage. Feedback on this option highlighted that industry could face a challenge in securing future sites for the establishment of data centres in diverse locations which adequately manage the risks to data management of catastrophic events. However, the requirements for the location of a data centre are set by industry, and we could find limited evidence of a state-level regulatory barrier to the identification and securing of appropriate sites.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

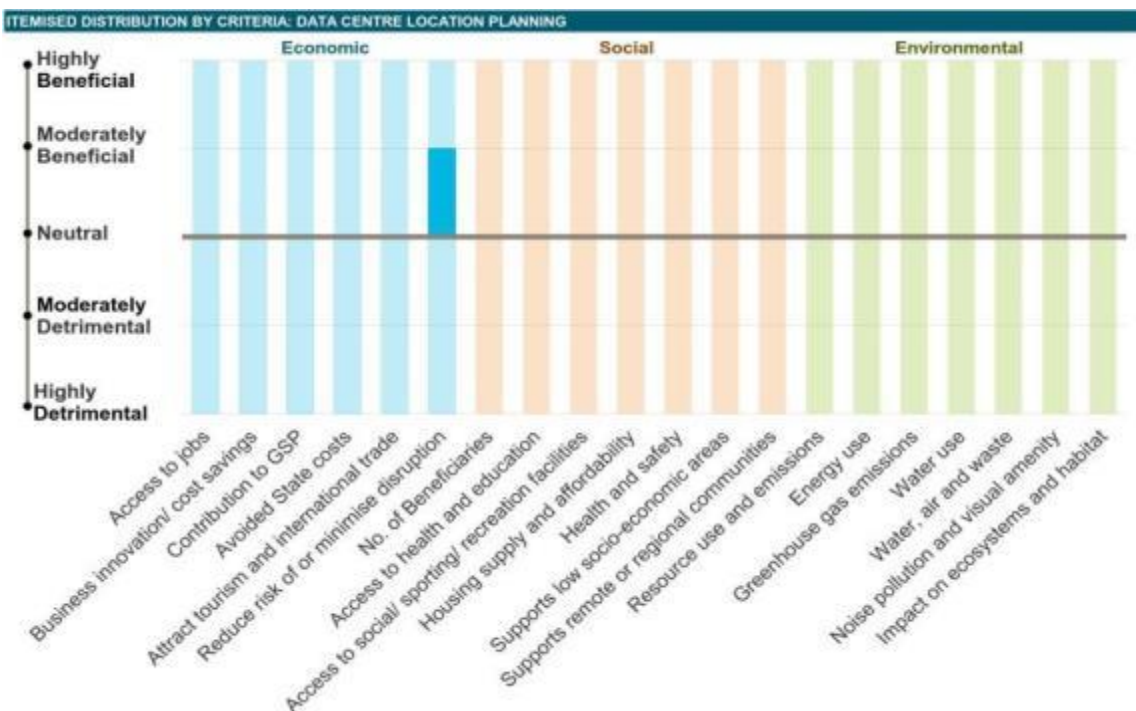
How does this option work with others?

As this option would support the use of data in the management of systems and assets across multiple sectors, it would indirectly support a wide range of options relying on the use and management of data.

How does this option perform under different scenarios?

Supercity	+	Supports effective data management
Westside Story	+	Supports effective data management
Regional Cities	+	Supports effective data management
Accelerated Climate Change /Mitigation	+	Supports effective data and asset management
Prolonged/ Severe Economic Downturn	+	Supports effective data and asset management
Biosecurity Threat	+	Supports effective data management

What are the economic, social and environmental impacts of this option?



Risks and opportunities

This option may not be implemented in time to protect against an impending risk. No matter how large the investment in the data centre is, security can still be breached and there is the risk of digital susceptibility which cannot be mitigated through spatial diversification.

There are opportunities to reduce exposure to risk, increase resilience against disasters (physical and technological) and optimal performance (including standby capability) for data centre users.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Driverless car and ride sharing

DCR

Option type

Changing behaviour through technological innovations

Location

Statewide

Sector

Transport

Certainty of evidence

Low

Direct option cost

\$10 million–\$25 million

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 10: Meet growing demand for access to economic activity in central Melbourne; and

Need 11: Improve access to middle and outer metropolitan major employment centres

Very Low	Very Low	Low	Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Once fully driverless passenger vehicles reach the market, it is widely expected that many of them could be made available by their owners to other transport users (performing much the same function as taxis and Uber do today, but without a driver).

This option is to facilitate and promote this practice through incentives and regulation. The aim is to increase the availability of on-demand, door-to-door mobility to a wide range of people, including vulnerable transport users. Further, with the assistance of smartphone technology (or the like), passengers would be incentivised to share a 'driverless taxi' where shared destinations make this convenient (in the same way that car-pooling apps operate today).

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option was not recommended in the strategy, as more research and industry engagement will need to take place over the next 10 years to gain a clearer picture of government's role in regulating a future market for driverless vehicles and the model by which mobility services are delivered. It also still unclear how the commercial availability of fully driverless technology will likely shape the future market for road vehicles (in terms of vehicle ownership).

It is important to note that we have treated major technology change as a central consideration in developing the strategy. The lack of a recommendation simply reflects the need for further work to determine the appropriate actions by government (further detail in *What do we think of this option and why? cont'd*).

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Consistent

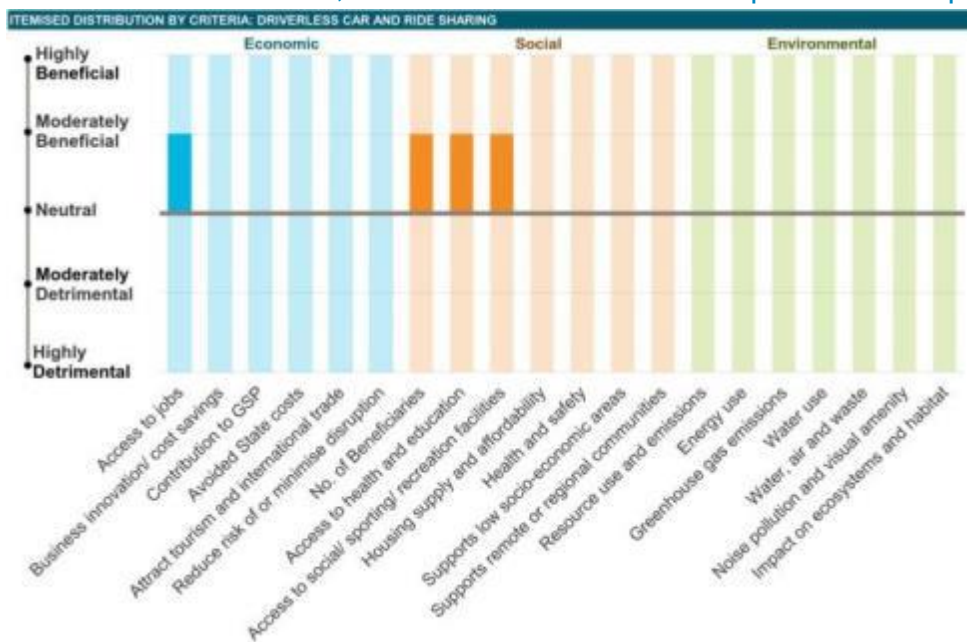
How does this option perform under different scenarios?

Supercity	++	Improves access, transport options
Westside Story	++	Improves access, transport options
Regional Cities	++	Improves access, transport options
Accelerated Climate Change /Mitigation	+	Smoother traffic flows (depends on containing induced demand)
Prolonged/ Severe Economic Downturn	+	Reduced reliance on vehicle ownership
Biosecurity Threat	Neutral	

How does this option work with others?

This option is enabled by Automated Vehicle Technology (ACT) and Advanced Driver Assistance (ADA), and is complementary to Integrated Transport Control Centre (ICT).

What are the economic, social and environmental impacts of this option?



What do we think of this option and why? (cont'd)

There is a growing commentary and debate on how a market for driverless vehicles might unfold. It has been suggested that an eventual shift to driverless technology will enable many more households to reduce or eliminate entirely their ownership of cars, as the availability of 'robo-taxis' could satisfy much of their mobility needs. The benefits of this shift away from private vehicle ownership to commercial fleet ownership are said to include: less need for parking spaces at origins and destinations, resulting in a better use of land, improved mobility options, and less household investment in underutilised assets. With the removal of this 'sunk cost' and the introduction of a possible pay-per-use model for robo-taxis, driverless vehicles may also facilitate more efficient and affordable transport choices (e.g. walking and cycling for shorter distances, public transport where this might be convenient).

A shift to a potential user-pays model for on-demand driverless transport could also lead to a greater role for 'shared mobility', with an increasing blurring of the line between public and private transport - e.g. shared on-demand robo-taxis could play a feeder role to higher-capacity, fixed route services (which in this future, might also likely be driverless). Analysis already undertaken by the OECD and Swinburne University indicates that sharing of trips in driverless vehicles could reduce congestion.

Moreover, the overall size of the total vehicle fleet would also likely decrease significantly, with each vehicle likely being used more constantly than the average car is today, leading to a shorter life-cycle for vehicles and a resulting quicker fleet turnover that could enable faster uptake of new technology platforms (i.e. where merely updating software wirelessly may be insufficient).

While some commentators have doubts as to how many households in the future would be willing to give up private vehicle ownership, others have argued that economics will be a strong driver for households to embrace 'robo-taxis', with private ownership likely to decline significantly over time. On this basis, it is arguable that it may be unnecessary for government to offer people incentives to abandon household vehicle ownership so as to maximise the community benefits of driverless technology, but it is too early to tell what government's role should be in this regard.

For now, it is clear that Uber and other car-share operators are investing heavily in driverless technology, with driverless 'robo-taxi' trials happening in Singapore and Pittsburgh. Uber, in particular, has made it clear that it considers its future to be driverless.

Risks and opportunities

Delivery challenges include developing a model that is financially viable to car owners whilst also being inclusive of all socio-economic demographics. This would need to ensure the delivery model does not divide people based on digital capability and digital access, manages liability and insurance claims, and manage the risks associated with under or over estimating demand and thus how the option contributes to transport network mode share. A final risk is the possibility that there will be a shift from active transit modes (walking and bicycle) to road transit, which may have human health and climate implications.

There is a possibility that car sharing will reduce demand for car parking in Melbourne's CBD, which will provide an opportunity to redesign footpaths, bicycle paths and roads to, from and within the CBD. This option may also enable those unable to drive to access cheaper and safer means of commuting, as well as enable parents to remain at work while their children manage their own transport to/from home.

Additional notes

Transport Modelling

Infrastructure Victoria commissioned KPMG, Jacobs and Arup to undertake transport modelling for a number of options being considered for the strategy, including a variety of 'build' and 'non-build' transport options. This allowed major transport projects to be quantitatively assessed alongside several technology, policy and reform options.

This analysis was undertaken on a different basis and produced different results to what is presented in previous pages, which was prepared by AECOM/PwC with the intention of allowing a mixture of qualitative and quantitative assessment across the full range of options, across all sectors and needs.

While on the face of it these two analyses reference similar metrics, different assumptions and methodologies have been applied. In particular, the KPMG/Jacobs/Arup assessment provided purely relative ratings of each option's contribution to the needs, with the ratings scale set by the performance of only the select range of options modelled. This had the result of showing some transport options as making a "high" contribution to Need 18 (transition to lower carbon energy supply and use) simply because they were the highest of the options modelled; however, in Infrastructure Victoria's judgement most transport sector options will make a much lower contribution than energy sector options, as transport comprises a much smaller proportion of total carbon emissions. It provides a useful assessment for sorting the relative contribution of the options modelled, but should not be taken as an absolute assessment. In contrast, the assessments developed in the AECOM/PwC assessment considered the full range of options identified for each need and provided more of an 'absolute' assessment.

With these caveats in mind, however, the results of this alternative analysis are helpful inputs into Infrastructure Victoria's 'global' assessment, and in preparing the strategy we have come to a considered view based on the totality of evidence available to us.

The impact of driverless cars used as 'robo-taxis' was modelled using an Outline Model derived from the Victorian Integrated Transport Model (VITM) (i.e. a simpler version of the VITM model). This modelling found that in a scenario assuming 100 per cent of vehicles were autonomous, and operating as robo-taxis, there was a reduction in total person-hours travelled, an average reduction in average car trip distance and mode shift to public transport.

However, under a different scenario when this robo-taxi fleet was also 100 per cent electric, the results were more mixed, as the lower operating costs for electric vehicles resulted in an increase in total person-hours travelled by motorised modes, and mode shift away from public transport.

Further, in another scenario where ride-sharing was minimal and Melburnians continued to own their own vehicles, but 100 per cent of the fleet was autonomous and incorporated electric vehicle technology, there was a significant increase in demand for road infrastructure, with more person-hours travelled in motorised modes and longer average travel distances.

These results indicate that the use of autonomous vehicles as robo-taxis could potentially result in increases in motor vehicle travel, possibly also necessitating the implementation of demand-based pricing to manage their overall transport system impact. The network impact of driverless robo-taxis is a subject warranting further investigation, including the application of other modelling platforms.

For more detail, consult the KPMG/Arup/Jacobs 'Economic appraisal and demand modelling' report to Infrastructure Victoria.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

KPMG/Arup/Jacobs, *Economic appraisal and demand modelling*, 2016

Driverless freight vehicles DFV

Option type

Changing behaviour through technological innovations

Location

Statewide

Sector

Transport

Certainty of evidence

Medium

Direct option cost

\$1 million–\$10 million

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 13: Improve the efficiency of freight supply chains

Very Low	Very Low	Very Low	Very Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Support the deployment of driverless freight vehicles, including facilitating trials of driverless technologies such as vehicle platooning (which involves a series of 'drone' vehicles being wirelessly led by a lead vehicle with a driver). This technology enables trucks (or other vehicles) to have shorter following distances, which can significantly reduce fuel consumption by reducing drag. The use of this technology could, in the future, reduce freight costs further by reducing the need for drivers. It could also improve road safety, particularly on long-haul routes, and help reduce the impact of congestion.

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option was recommended in part in the strategy (ref. 13.2.2). Specifically, we recommend the removal of any regulatory barriers to the testing and deployment of driverless truck technology, including truck platooning, within 0–15 years, with trialling to be led by the private sector.

Once deployed, these technologies have the potential to reduce the need for infrastructure expansion, reduce carbon intensity of road freight and reduce costs for operators and consumers alike through supply chain efficiencies. Moreover, when complemented with the rollout of advanced driver assistance systems (ADA), automated vehicle technology (ACT) and advanced traffic management (ATM), driverless freight vehicles could help make Victorian motorways be both safer and more efficient for all users. Regulatory changes enabling testing and deployment should allow the freight industry to take advantage of these technologies as they become available.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Consistent

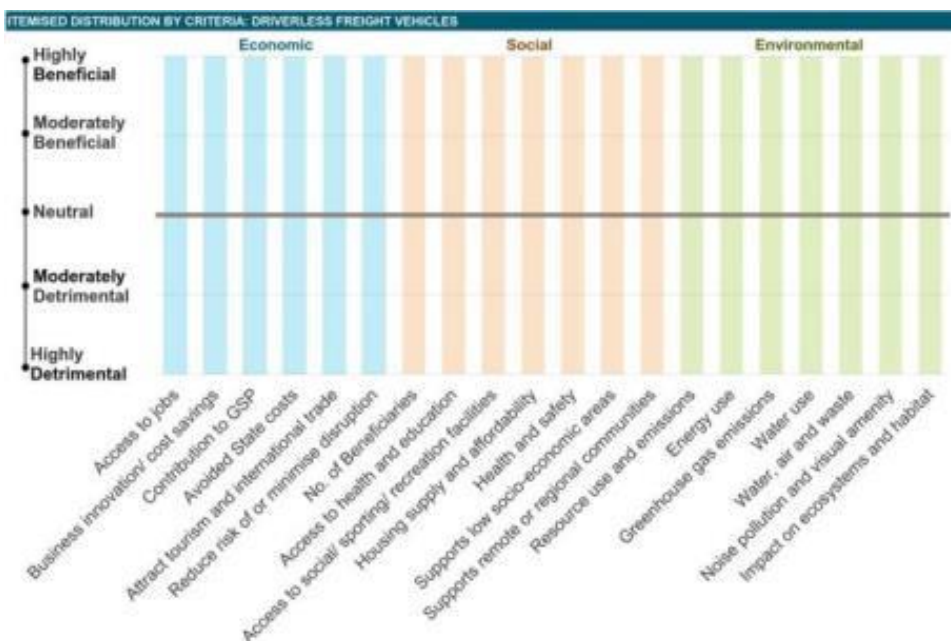
How does this option work with others?

When complemented with the rollout of advanced driver assistance systems (ADA), automated vehicle technology (ACT) and advanced traffic management (ATM), driverless freight vehicles could help make motorways be both safer and more efficient for all users.

How does this option perform under different scenarios?

Supercity	++	Improves access for freight, even with more demand
Westside Story	++	Improves access for freight, even with more demand
Regional Cities	++	Improves access for freight, even with more demand
Accelerated Climate Change /Mitigation	++	Reduces carbon intensity of freight transport
Prolonged/ Severe Economic Downturn	-	Less demand for heavy freight
Biosecurity Threat	+	Minimises risk of contagion from freight transport
Bay west	+	Potential supply chain efficiency increase
Hastings	+	Potential supply chain efficiency increase

What are the economic, social and environmental impacts of this option?



Commentary:

No net impacts identified, due to the low impact of this initiative.

Risks and opportunities

Driverless freight vehicles may raise public concerns over road safety, particularly given recent accidents involving driverless cars. This option may also require significant changes to regulations governing use of the road network for driverless freight vehicles, and it may encounter resistance from labour unions.

This option may help to address existing and future shortages of long haul truck drivers, and increase the overall capacity and utilisation of the road network. Greater use of automated vehicles may also decrease the number of accidents on the road, and reduce overall fuel consumption.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Domestic greywater recycling DGR

Option type

Better use through coordination processes
Better use through land use and planning controls

Location

Statewide

Sector

Water and waste

Certainty of evidence

Medium

Direct option cost

\$1 million-\$10 million

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 14: Manage threats to water security, particularly in regional and rural areas

Low	Low	Low	Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Increasing greywater recycling in greenfield developments through water management policy. Greywater, or all wastewater produced in households except from toilets, can be re-used for a range of non-potable (non-drinking) purposes. The scope of re-use is dependent on the level of treatment. Rinse water from washing cycles for example can be used for gardening with minimal treatment. With treatment various greywater sources can be used for additional purposes such as laundry and irrigation of food crops.

This option proposes strengthening of water management policy to encourage broader implementation of greywater systems in new developments. This would reduce pressure on mains water supplies and provide a reliable source of water to meet non-potable residential needs particularly during dry periods.

What is the level of community support?

There was limited discussion of this option during public consultation. This may be as it was not recommended in the draft strategy.

What do we think of this option and why?

This option was not recommended in the strategy because there was uncertainty around broader application with regards to effective water cycle management. The option has been rated as making a low contribution to water security because it was assumed to be an 'opt-in' policy mechanism. Greywater recycling is an important component of the integrated water cycle management approach. More evidence is however required to recommend large scale application. This evidence would consider cost effective levels of treatment, scalability and impacts on wastewater management processes from reduced sewerage flows.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

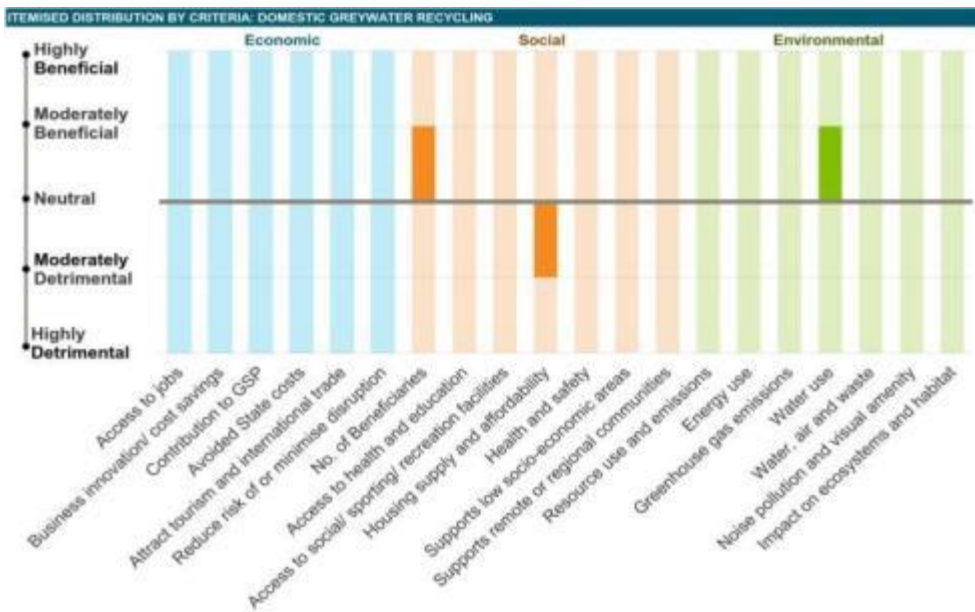
How does this option perform under different scenarios?

Supercity	+	Heightened need to conserve water resources
Westside Story	+	Heightened need to conserve water resources
Regional Cities	+	Heightened need to conserve water resources
Accelerated Climate Change /Mitigation	++	Acute need to conserve water resources
Prolonged/ Severe Economic Downturn	Neutral	
Biosecurity Threat	Neutral	

How does this option work with others?

In the context of integrated water management, this option should be considered alongside other options that seek to conserve water resources. This includes stormwater harvesting (SRH) and recycling treated wastewater (RTH and RWW).

What are the economic, social and environmental impacts of this option?



Risks and opportunities

There is a risk that greywater is applied to uses for which it is not appropriate or safe. There is also a risk that widespread use of individual home unit greywater treatment and use facilities could have significantly higher costs to operate than water or wastewater treatment plants, thus imposing greater costs on the community.

There is an opportunity to ensure that greywater treatment and recycling systems are part of new housing builds, reducing the need for potable water for uses such as watering gardens.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Victorian Department of Environment, Land, Water and Planning, *Using greywater*, 2016

Environmental Protection Authority Victoria, *Code of Practice – onsite water management*, 2016

Doncaster heavy rail line DHR

Option type

New assets

Location

Melbourne eastern subregion and Melbourne central subregion

Melbourne eastern state-significant transport corridor

Sector

Transport

Certainty of evidence

Medium

Direct option cost

\$3 billion–\$5 billion

Option lead time

5–10 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 10: Meet growing demand for access to economic activity in central Melbourne

Low	Low	Low	Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Construction of a new heavy rail link that will extend from Doncaster Hill along the Eastern Freeway before connecting with the Clifton Hill heavy rail trunk near Collingwood Station. The new rail link would connect middle suburbs through eastern Melbourne. The operation of the Doncaster Heavy Rail Service is dependent on the reallocation of capacity in the Clifton Hill Loop Line through the construction of a new tunnel from Clifton Hill via Parkville to Southern Cross Station for the South Morang – Southern Cross Line (MMS). This region is currently serviced by the Doncaster Area Rapid Transit (DART) bus system. The construction of this rail extension would provide the first rail line to the City of Manningham and provide a link to the city from the Doncaster area for people to access jobs and services

What is the level of community support?

There was a high level of discussion of this option during consultation. Responses were generally positive. This option was opposed by the metropolitan citizen jury.

What do we think of this option and why?

This option was not recommended in the strategy because it provides only a low contribution to need 10 at a high cost, and for many people in the Doncaster area it actually provides a less efficient journey than they currently have with the Doncaster Area Rapid Transit (DART) buses because of the need to start interchanging between bus and rail. The limited benefit, combined with significant capital cost leads to a poor preliminary cost benefit result. Even though this option has general community support, the evidence does not support its inclusion in the strategy.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

How does this option work with others?

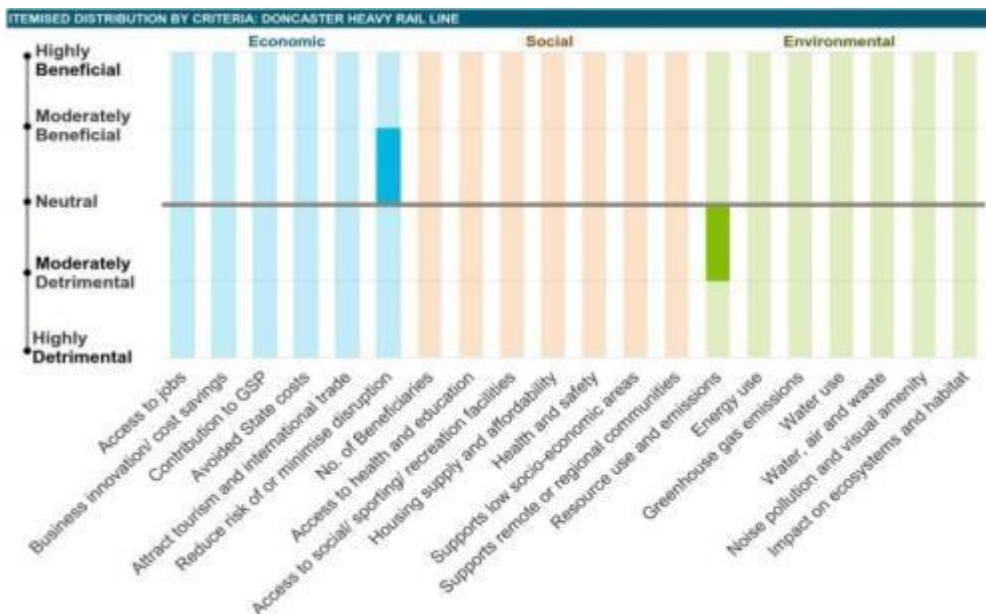
This option is an alternative to Doncaster bus improvement (DBI). It is unlikely both would be required, unless this option were to happen well after DBI, such that the latter could offer benefits for a reasonable period of time.

This option is dependent upon the additional capacity between Clifton Hill and city that could be provided by Melbourne Metro 2 (MMS) to allow for Doncaster services.

How does this option perform under different scenarios?

Supercity	+	Supports mode shift to address congestion
Westside Story	Neutral	
Regional Cities	+	Supports mode shift to address congestion
Accelerated Climate Change /Mitigation	+	Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	-	Less demand for mass transit
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



Commentary:

In the studies for this project, it has been estimated that the majority of travellers would be drawn from existing public transport services in the area, such as the DART buses. With limited mode shift, the option's impacts on environmental criteria and on access to jobs and social infrastructure are likely to be positive, but overall small.

Risks and opportunities

Elements of construction will be along an active rail and road corridor, as well as complex tunnelling activities. It is assumed these risks will be managed in the development stage.

There is an opportunity for housing densification along the new rail corridor through areas that currently have a relatively low density, although this may be constrained by existing planning controls.

Additional notes

Project discussion

The City of Manningham, being the primary catchment area for this proposal, is characterised by low housing density, above average household income and slow historical and projected growth compared to other areas of metropolitan Melbourne.

Currently four SmartBus routes (905-908) known as Doncaster Area Rapid Transit (DART) provide access between the central city and the City of Manningham. These services are direct, frequent and use modern accessible buses. The SGS *Current and Future State of Victoria* report (2016) describes these services as high-quality.

According to the 2011 Census, private vehicle trips (driver or passenger) accounted for 70.3 per cent of journey to work trips, compared to the Greater Melbourne average of 64.9 per cent. The low public transport share for journey to work trips is particularly prominent for central city commuters.

However, the *Doncaster Rail Study Phase One Recommendations Report* (2015) noted that delivery of Doncaster heavy rail would primarily attract current public transport users (50 per cent DART users and 48 per cent who travel on other rail services), with only an anticipated two per cent of passengers who currently travel by private vehicle transitioning to rail (2011 Census). With forecast daily patronage of 56,000 in 2031, that two per cent translates to 1,120 passengers per day, or about 1,000 car trips per day. That's a very small pay-off in the context of the estimated cost of the line. Without generating any material mode-shift, the rail line would not lower congestion on the Eastern Freeway significantly and the public transport services relieved by the option have sufficient capacity to accommodate growth with relatively modest upgrades over time. Furthermore, replacement of the existing DART buses (which splay out across the Doncaster region, providing four routes with direct access to central Melbourne) with feeder buses to a new rail line would require passengers who currently have access to the city without interchange to start changing services, making it less desirable for many users. Overall, this option is expected to have a low contribution to this need.

The *Doncaster Rail Study Phase One Recommendations Report* determined that to connect the Doncaster heavy rail branch into the existing rail network, significant investment in capacity enhancing projects would be required to the South Morang/Mernda and Hurstbridge services lines. The capacity-enhancing projects could be achieved through delivery of the Melbourne Metro 2 (a new rail tunnel from Clifton Hill through to the city via Fitzroy, diverting South Morang services from the existing Clifton Hill trunk).

Over the longer term, growth in the Doncaster area is low compared to average metropolitan growth. We therefore do not anticipate a materially different result over a 2046 horizon to the 2031 modelling results provided in the *Doncaster Rail Study Phase One Recommendations Report* (2015) for this established corridor.

Transport modelling and economic analysis

Infrastructure Victoria commissioned KPMG, Jacobs and Arup to undertake transport modelling for a number of options being considered for the strategy, including a variety of 'build' and 'non-build' transport options. This allowed major transport projects to be quantitatively assessed alongside several technology, policy and reform options. In addition, economic analysis was undertaken for the 'build' options to estimate a cost benefit ratio, including for this option. The options were modelled individually, mostly on a standalone basis, with a number of options then also tested in various combinations.

This analysis is distinguishable from that represented on the previous pages, which was conducted by AECOM/PwC, in that while they reference similar metrics, different assumptions and methodologies have been applied in the process of assessment. In particular, the KPMG/Jacobs/Arup assessment provided purely relative ratings of each option's contribution to the needs, with the ratings scale set by the performance of only the select range of options modelled. This had the result of showing some transport options as making a "high" contribution to Need 18 (transition to lower carbon energy supply and use) simply because they were the highest of the options modelled; however, in Infrastructure Victoria's judgement most transport sector options will make a much lower contribution than energy sector options, as transport comprises a much smaller proportion of total carbon emissions. It provides a useful assessment for sorting the relative contribution of the options modelled, but should not be taken as an absolute assessment. In contrast, the assessments developed in the AECOM/PwC assessment considered the full range of options identified for each need and provided more of an 'absolute' assessment.

These separate analyses have been considered by Infrastructure Victoria as inputs into its own assessment, to which other considerations have also been applied. We have then come to a considered view based on the totality of evidence available to us.

In terms of the demand analysis of this option, modelling indicates that the introduction of a heavy rail line to Doncaster Hill could slightly improve accessibility to health, education, and employment, including in the CBD and the NECs, with some slight improvement in average travel times to the CBD. However, most of the patronage increase for rail resulted from a shift away from bus travel rather than from road travel, with limited benefits therefore in terms of road decongestion. Further, it was found that a Doncaster heavy rail service would have limited ability to draw patronage at some stations.

The economic analysis found that the cost benefit for Doncaster Hill heavy rail line is very low, at 0.1 - 0.2 with wider economic benefits (WEBs) included. Low total project benefits in present value terms of approximately \$500 million are the main driver for this result, particularly given the total costs are \$3.1 billion to \$4.3 billion in present value terms (discounted to 2025 at 7 per cent per annum). This suggests that the current bus service operating in the Doncaster area is performing well, and that adding a rail connection is not economically viable.

For more detail, consult the *Economic appraisal and demand modelling* report.

In response to stakeholder feedback during the options phase, a number of improvements to the Doncaster Rail Study modelling were suggested. This included using the latest population forecasts and extending the service through to Doncaster Hill, where the previous study recommended terminating at Doncaster Park and Ride. Both of these changes were incorporated into the economic modelling for Doncaster rail undertaken by KPMG/Jacobs/Arup as summarised above.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

KPMG/Arup/Jacobs, *Economic appraisal and demand modelling*, 2016

Public Transport Victoria, *Public Transport Victoria's response: Doncaster rail study phase one recommendations report*, 2015

Public Transport Victoria, *Network development plan: Metropolitan rail*, 2012

Doncaster tram service DTS

Option DTS is addressed in TNE – Tram network extensions

Early childhood education availability ECE1

Option type

Changing behaviour through subsidies

Location

Statewide

Sector

Education and training

Certainty of evidence

Low

Evidence base

Deloitte/Aurecon, *Assessment 1: Options analysis report*, 2016

Direct option cost

\$5 billion–\$10 billion

Contribution to meeting the need

Need 9. Provide access to high-quality education infrastructure to support lifelong learning – **Negative/very low**

What is this option?

This option seeks to increase availability of early childhood education programs. Financial incentives currently exist in the form of rebates and subsidised funding for children in the year before school. This policy would be expanded to cover two years before school. This option would increase demand for three-year-old places in existing and proposed early childhood facilities through removal of financial barriers to participation in three-year-old early learning programs.

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option was not recommended in the strategy because decisions about the scope of early childhood education that should be funded by government is a matter for education policy, and not an infrastructure strategy. If government chose to fund kindergarten programs for two years before school this would result in demand for additional three-year old kindergarten programs in existing kindergarten facilities. Many existing facilities would not have sufficient capacity to accommodate the additional three-year old programs. Quality early years programs for three-year olds can already be provided in long day care settings.

Early childhood education centralised planning model ECE2

Option type

Better use through funding agreements

Better use through information

Location

Statewide

Sector

Education and training

Certainty of evidence

Low

Direct option cost

<\$100 million

Contribution to meeting the need

Need 9. Provide access to high-quality education infrastructure to support lifelong learning – **Moderate**

What is this option?

The establishment of a body to oversee planning from multiple levels of government that will undertake demand and supply analysis to inform decision-making by all government and non-government investment in early childhood facilities. Improved planning would assist to ensure resources are spent in the areas in most need.

The body will undertake demand projections to inform where funding investments should be targeted as well as supporting the private providers to understand where councils intend to plan and deliver additional early childhood facilities. This option relates to planning for childcare as well as long day care centres that provide a teacher-led kindergarten program.

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were polarised.

What do we think of this option and why?

This option was not recommended in the strategy. Further investigations have revealed that if local government and private providers require better data for planning purposes, it is already available from the Department of Education and Training. There is no need for a new planning body or any regulatory and legislative changes. Three levels of government and the private sector have a role in either planning, funding, regulating and delivering early childhood facilities or services. With the private sector now playing a more significant role in the provision of new childcare facilities there is however a greater need for improved data sharing and planning to ensure timely delivery of facilities in the right locations at the right time.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

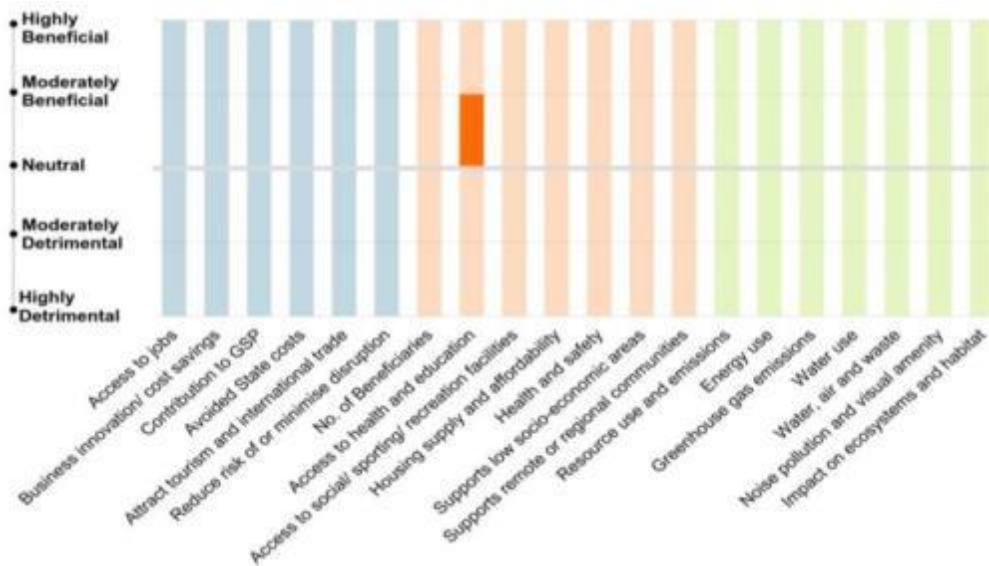
How does this option perform under different scenarios?

Supercity	Neutral
Westside Story	Neutral
Regional Cities	Neutral
Accelerated Climate Change /Mitigation	Neutral
Prolonged/ Severe Economic Downturn	Neutral
Biosecurity Threat	Neutral

How does this option work with others?

No key relationships with other options have been identified.

What are the economic, social and environmental impacts of this option?





Risks and opportunities

As this option needs to be done jointly with the private sector, there could be concerns about sharing commercially sensitive information. This would need to be managed.

There would be an increased opportunity for the private sector to make better investment decisions. In particular, a clearer signal to the private providers that there is growing demand for services and where councils are not planning to provide additional facilities.

Evidence base

AECOM/PwC, *Assessment 2: Economic, social and environmental assessments and option relationship mapping*, 2016

Deloitte/Aurecon, *Assessment 1: Options analysis report*, 2016

Early childhood education corporate office facilities ECE3

Option type

Changing behaviour through subsidies

Location

Statewide

Sector

Education and training

Certainty of evidence

Low

Direct option cost

\$100 million–\$500 million

Contribution to meeting the need

Need 9. Provide access to high-quality education infrastructure to support lifelong learning – **Low**

What is this option?

This option would involve developing agreed criteria to prioritise targeting of incentives for building owners to offer discounted rental/purchase agreements in high demand locations for accommodating early childhood education (ECE) facilities.

This would include facility purchase and construction costs to reflect locating in corporate areas. Maintenance and operational grants are also likely.

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option was not recommended in the strategy because it would be a form of childcare subsidy to corporate offices and their staff. This would be an inequitable investment as workers in offices (who are often professionals with higher paying jobs) could be provided with a subsidy that workers who do not work in corporate offices would not be able to access.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

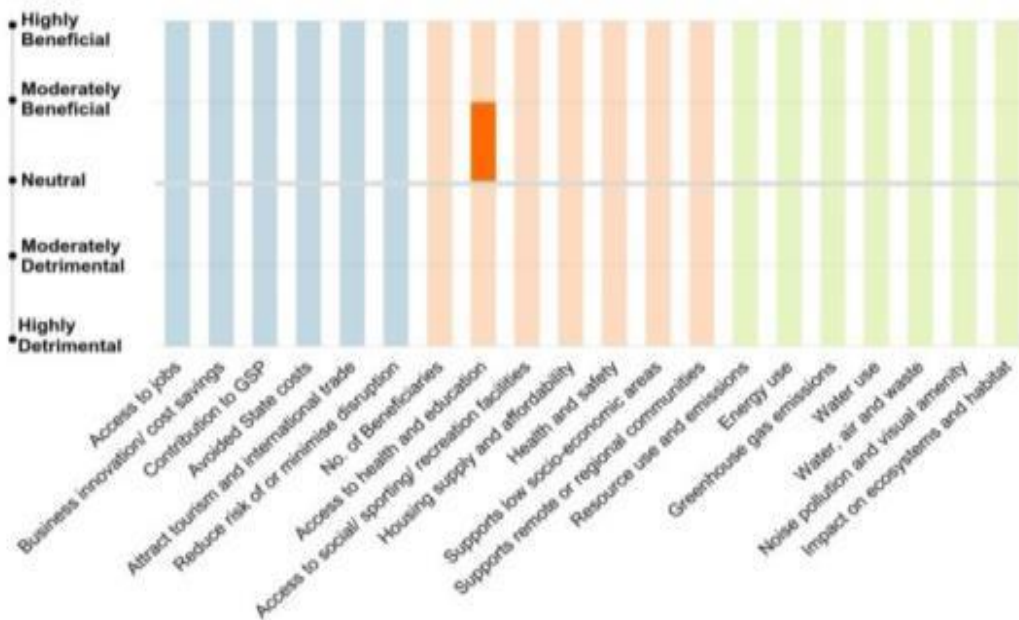
How does this option perform under different scenarios?

Supercity	Neutral
Westside Story	Neutral
Regional Cities	Neutral
Accelerated Climate Change /Mitigation	Neutral
Prolonged/ Severe Economic Downturn	Neutral
Biosecurity Threat	Neutral

How does this option work with others?

No key relationships with other options were identified.

What are the economic, social and environmental impacts of this option?



Risks and opportunities

The risk for this option would be that there is potentially a real or perceived equity issue where parents working for larger corporations would potentially receive subsidised care, whereas other parents who may be earning lower incomes would not receive the same level of subsidy.

This option assumes that parents would prefer to have their children located close to them at work. This may suit parents of very young children as it could support working mothers who are breastfeeding. Depending on hours of operation, it could also support shift workers such as hospital staff etc. However, for many parents they prefer children to remain in their communities and not at their place of work.

Evidence base

Deloitte/Aurecon, *Assessment 1: Options analysis report*, 2016

AECOM/PwC, *Assessment 2: Economic, social and environmental assessments and option relationship mapping*, 2016

Enhanced cyber security ECS

Option type

Better use through regulation

Better use through contractual processes

Better use through funding agreements

Location

Statewide

Sector

ICT

Certainty of evidence

Medium

Direct option cost

\$10 million–\$25 million

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 19: Improve the resilience of critical infrastructure

Moderate	Moderate	Moderate	Moderate
----------	----------	----------	----------

0-5 yrs

5-10 yrs

10-15 yrs

15-30 yrs

What is this option?

Invest in upgraded operational cybersecurity control systems for critical infrastructure, with investments to be made on a 'catch up' and 'keep up' basis (i.e. maintaining international best practice). This option would include:

- Regulatory change to introduce standards for cybersecurity for operators of critical infrastructure
- Adequate incorporation of cybersecurity needs assessments in state government IT business cases and provision of ongoing cybersecurity maintenance funding.
- Promotion of stronger cybersecurity controls for private sector government providers, by including cyber security requirements within franchise agreements and procurement contracts.

The approach would be similar to that adopted when quality assurance and occupational health and safety standards were introduced across industry.

What is the level of community support?

There was limited discussion of this option during public consultation.

What do we think of this option and why?

This option was recommended in the strategy (ref. 19.1.1), because the security of control systems will be increasingly important in the future 'internet of things'. In particular, it reflects the need to address the rising problem of malicious actions directed against ICT systems and users. Assessed as making a moderate contribution to improving the resilience of critical infrastructure, the actions proposed in this option will support the state government and other sectors to understand the magnitude of the cyber threat, and to identify potential means to protect infrastructure against potential malicious actions.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

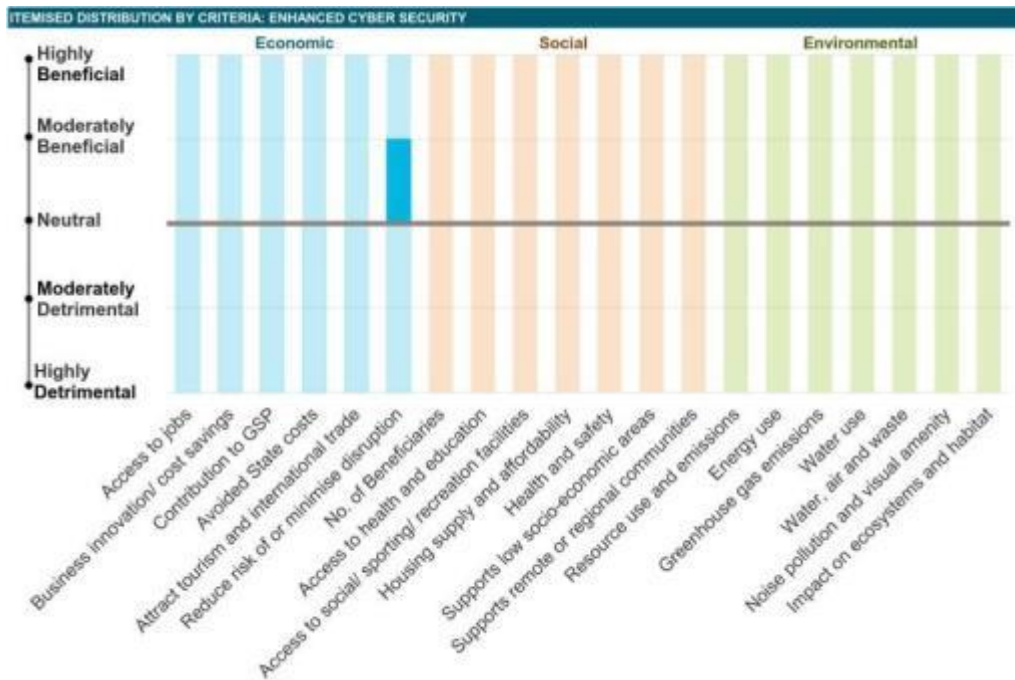
How does this option perform under different scenarios?

Supercity	Neutral
Westside Story	Neutral
Regional Cities	Neutral
Accelerated Climate Change /Mitigation	Neutral
Prolonged/ Severe Economic Downturn	Neutral
Biosecurity Threat	Neutral

How does this option work with others?

As this option seeks to protect critical infrastructure from cyber breaches which could impair the delivery of essential services, it is complementary to Infrastructure resilience assessment test (IRA).

What are the economic, social and environmental impacts of this option?



Risks and opportunities

There is a risk that strategies and initiatives for this issue being developed by the state and commonwealth governments, as well as private organisations, will not be consistent or coordinated. There is also a risk that initiatives will not be able to keep pace with technology being used by those intent on malicious cyber actions.

There is an opportunity to work with other jurisdictions and the private sector to ensure that policies and actions are coordinated and effective.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Energy use efficiency

EDM1

Option type

Changing behaviour through information

Better use through information

Location

Statewide

Sector

Energy

Certainty of evidence

Medium

Direct option cost

\$50 million–\$100 million

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 18: Transition to low carbon energy supply and use

Low	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Extend energy use efficiency programmes for the commercial and industrial sectors via public sector leadership and demonstration in energy efficiency program implementation. This means, for example, retro-fitting existing public sector buildings to reduce energy consumption.

The commercial and industrial sector makes up about two-thirds of energy use in Victoria. Government can lead the way in addressing information and viability barriers to extend energy efficiency from current applications (e.g. lighting) to more sophisticated interventions (e.g. integrated building management) (further detail in *What is this option? cont'd*).

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive.

What do we think of this option and why?

This option was recommended in the strategy (ref. 18.1.2) because government leadership in improving energy efficiency in existing developments can have a major influence on the commercial and industrial sector, a sector that accounts for an estimated two-thirds of energy use in Victoria. While most of this energy usage may represent more complex applications than in buildings, there is still potential for energy use efficiency gains. Setting an example would raise the minimum standard, and in doing so government can go further than the range of existing initiatives. International examples demonstrate some of the benefits of this option. In the United States government requirements for energy efficient computers and products played a key role in the commercialisation of these technologies. In the Netherlands government realised significant cost savings for itself after setting energy savings targets.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

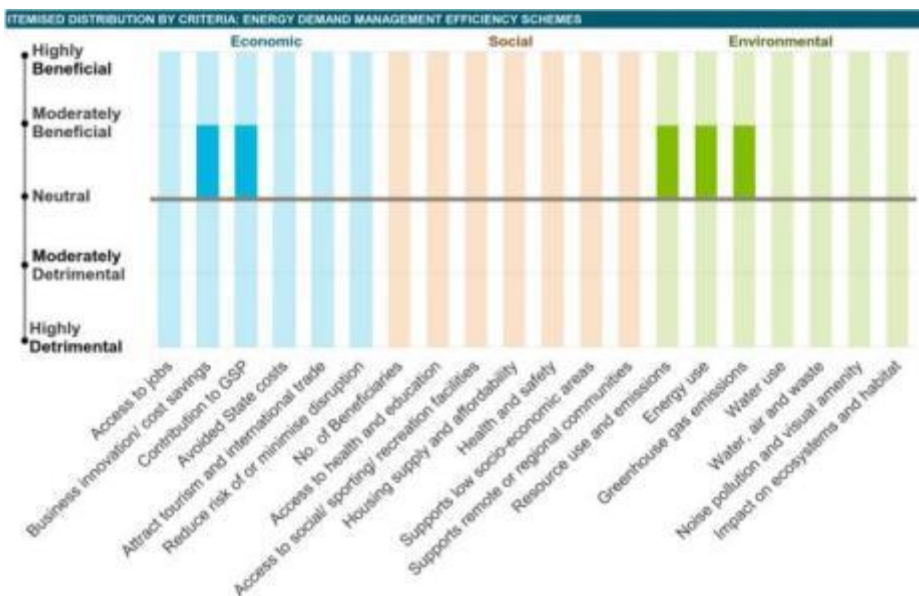
How does this option work with others?

This option complements initiatives to manage energy demand through cost-reflective tariff structures (EDM2).

How does this option perform under different scenarios?

Supercity	++	Addresses increased demand for energy
Westside Story	+	Addresses increased demand for energy
Regional Cities	+	Addresses increased demand for energy
Accelerated Climate Change /Mitigation	++	Increased need to reduce carbon emissions
Prolonged/ Severe Economic Downturn	+	Could reduce electricity costs
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



What is this option? (cont'd)

Energy efficiency programs lower energy consumption over the long term, reduce the need for new infrastructure investment and contribute to reducing greenhouse gas emissions. Schemes such as the Victorian Energy Efficiency Target (VEET) have seen significant uptake of more energy efficient fixtures in some homes for example.

Risks and opportunities

With most businesses already operating in a cost-conscious environment, there is a risk that further incentives in this area may not be effective.

There is an opportunity for efficiency programs to drive broader innovation in related areas such as energy storage. This combined with the potential to lower total consumption could positively impact on the development of lower emission energy sources.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

European council for an energy efficient economy, *Summer study: What works and who delivers, Public sector leadership: Transforming the market for efficient products and services*, 2005

Energy demand management tariff reform

EDM2

Option type

Changing behaviour through economic charging

Location

Statewide

Sector

Energy

Certainty of evidence

Medium

Direct option cost

\$10 million–\$25 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 18: Transition to low carbon energy supply and use

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option proposes electricity tariff reform to drive higher uptake of cost-reflective electricity tariffs. Cost-reflective tariffs can be used to change customer usage patterns and achieve better use of infrastructure. Over time, these changes would reduce the need for new generation infrastructure to meet peak demand.

Currently, in Victoria application of flexible prices is “opt-in”. This limits the ability of tariff reform and the rollout of smart meters to result in more beneficial consumer participation in the electricity market. Requiring more customers to move to flexible tariffs will result in broader changes in consumer behaviour and reduce the need for new capacity investments over time. This could contribute to reducing the cost of assets required to manage system reliability and security as a result of more investment in renewable generation (further detail in *What is this option? cont'd*).

What is the level of community support?

There was a high level of discussion of this option during consultation. Responses were generally negative. This option was opposed by the metropolitan citizen jury.

What do we think of this option and why?

This option was recommended in the strategy (ref. 18.1.1) because applying cost reflective tariffs to all Victorians would incentivise reduction in peak energy demands, leading to a reduced need for infrastructure upgrades and investment. This option can result in short-term cost savings for households and businesses as customers are incentivised to reduce peak energy demand, with the potential to prompt further behavioural changes through choosing energy efficient appliances. With the roll out of smart meters, Victoria is well placed for more customer engagement on energy demand management. Public consultation indicates that this option might not be well received, and experiences overseas indicate that customers generally resist a move to cost reflective pricing (further detail in *What do we think of this option and why? cont'd*).

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

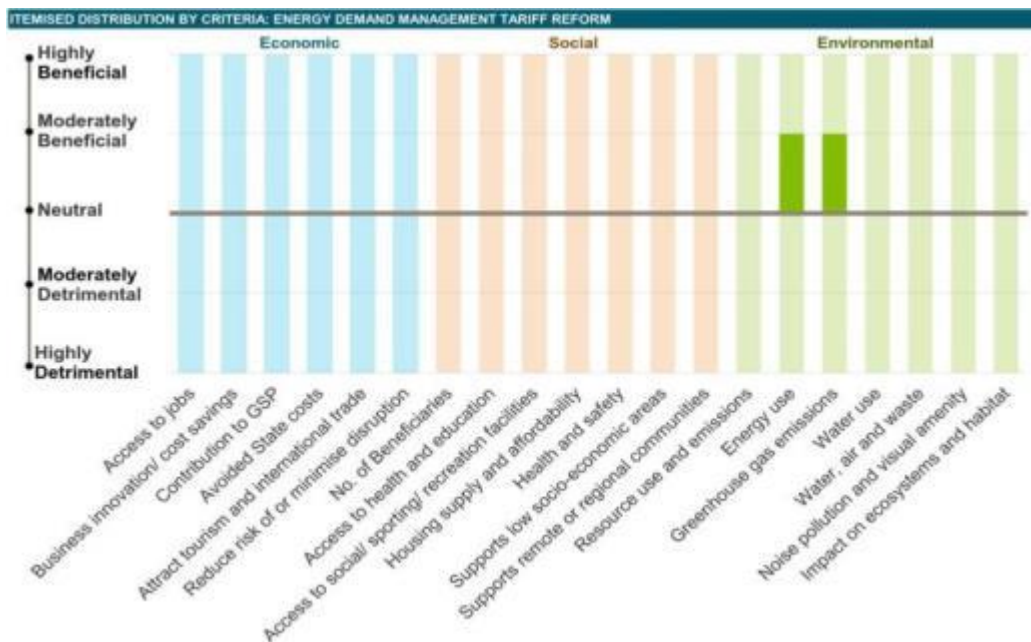
How does this option perform under different scenarios?

Supercity	++	Increased need to manage peak energy demand
Westside Story	+	Increased need to manage peak energy demand
Regional Cities	+	Increased need to manage peak energy demand
Accelerated Climate Change /Mitigation	++	Increased need to manage peak energy consumption
Prolonged/ Severe Economic Downturn	Neutral	Could reduce electricity costs
Biosecurity Threat	Neutral	

How does this option work with others?

This option complements energy use efficiency measures in greenfield (EED) and existing (EDM1) developments.

What are the economic, social and environmental impacts of this option?



What is this option? (cont'd)

This option would use price signals to increase consumer awareness of energy consumption. It also reflects the national electricity regulator's objectives and enables Victorian consumers to benefit from innovation that is occurring internationally but not in Victoria. Specifically, in other markets consumers have greater engagement and choice regarding their energy consumption. This option unlocks the potential of smart meters through transparent pricing that allows customers to manage energy consumption throughout the day. Under current arrangements, only customers who benefit are likely to opt-in, resulting in cross-subsidisation across the customer base.

What do we think of this option and why? (cont'd)

Roll out of this option would need to be accompanied by significant community engagement. The costing of this option assumes that one to ten million dollars would be required for research on tariff reform structures, policy design, and community engagement. Following implementation, costs to government over a 30-year timeframe are expected to be minimal, but an allowance of less than one million dollars per year has been included. Implementation of this option is likely to see cost savings for customers with financial incentives to reduce peak energy consumption. It is noted that while the metropolitan citizen jury did not support this option, they noted this was because it was targeted at the commercial and industrial sector. We have expanded the scope of this option (as discussed below) and it now includes the residential sector.

Risks and opportunities

This option could result in higher electricity costs for some consumers who have a need for significant energy consumption demand during peak pricing periods.

This option could contribute to more efficient investment in the energy supply sector, by reducing electricity demand peaks, and thereby attenuating the need for increases in overall peak demand capacity. It could make a strong contribution to the need when combined with other options that address mechanisms to increase low carbon energy supply, or manage energy use.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then we have further highlighted the role of implementing this recommendation.

Consensus

This option is consistent with previous recommendations by national bodies and academic think tanks. For example, the Council of Australian Governments, the Australian Energy Market Commission, the Australian Energy Regulator and academic research bodies such as the Grattan Institute all propose a move towards cost reflective pricing structures to enable more demand side participation in the energy market. Effort will be required to build customer knowledge and awareness on the benefits of cost reflective pricing structures.

Scope change

Following release of *All Things Considered* the scope of this option was updated to reflect all energy users, rather than just the commercial and industrial sector, and to propose that all customers be required to move to a cost reflective tariff structure in place of the current 'opt-in' approach. This follows evidence that more customer engagement can impact on energy demand profiles and the need for infrastructure upgrades, and recognition that the full benefits of the roll out of smart meters in Victoria are yet to be realised.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Australian Energy Market Commission, *New rules for cost-reflective network prices*

Australian Energy Regulator, *AER Public Forum Demand tariffs*, 2016

Australian Energy Regulator, *Tariff reform – Toward more efficient energy pricing*

Council of Australian Governments, *Energy market reforms*

Grattan Institute, *Fair pricing for power*, 2014

Ryan, H., *Rolling out residential demand charges*, 2015

Digital health embedded across the health system

EEA

Option type

Better use through technological innovations

Location

Statewide

Sector

Health and human services

ICT

Certainty of evidence

High

Direct option cost

\$1 billion–\$3 billion

Option lead time

5–10 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 3: Respond to increasing pressures on health infrastructure, particularly due to ageing; and

Need 12: Improve access to jobs and services for people in regional and rural areas

Moderate	Significant	Significant	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Develop digital health across the Victorian health system by:

- Completing the implementation of digital clinical services across Victorian public hospital and health services by 2026, incorporating patient administration systems and electronic medical records.
- Establishing a Clinical Information Exchange (CIE) which will provide a repository for key clinical information and enable the electronic transfer of information, including referrals and discharge summaries, across organisations within a region, community or hospital system.
- Establishing a Research Information Exchange (RIE), that will provide de-identified data from the CIE that can be used for applied research and analytics.
- Accessing a resilient, secure network that enables the operation of the CIE, RIE and digital clinical services.

What is the level of community support?

The topic was addressed in an earlier version of this option Health care alternative delivery (HCA) and Health care big data leverage (HCT1). Both citizen juries made recommendations in support of the option HCA and the metropolitan citizen jury made recommendations in support of the HCT1.

What do we think of this option and why?

This option was recommended in the strategy (ref. 3.1.1 and 12.1.5) to be delivered within 0–10 years because, although expensive, it will make a significant contribution to need 3. Adoption of digital health systems will enable patient information to be shared within and between health service providers and the research community (further detail in *What do we think of this option and why? cont'd*).

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

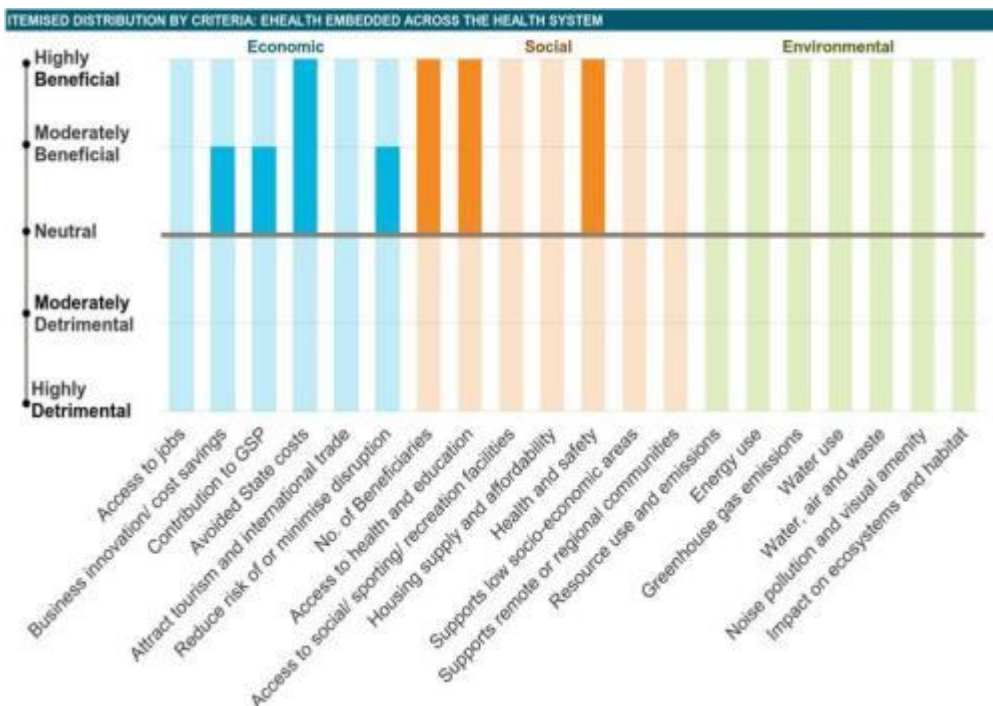
How does this option perform under different scenarios?

Supercity	Neutral	
Westside Story	Neutral	
Regional Cities	+	As services are less in regional areas
Accelerated Climate Change /Mitigation	Neutral	
Prolonged/ Severe Economic Downturn	Neutral	
Biosecurity Threat	++	As enhanced systems will aid addressing the threat

How does this option work with others?

This option is required to support technology enabled health care (TEH) through providing communication connectivity and the ability to share information. Enhanced telecommunication performance (ETP) is an enabler for this option as it can facilitate the provision of the secure network.

What are the economic, social and environmental impacts of this option?



Commentary:

Whilst this is a high cost option, it is noted that it has the benefit of avoided state costs resulting from safety and productivity gains.

What do we think of this option and why? (cont'd)

Sharing information will improve quality and safety, facilitate coordination of services and enable developments in medical research, diagnosis, treatment and technology. It is recommended that each component of the system be subject to a business case process and only proceed based on merit.

Risks and opportunities

This option involves the streamlining and coordination of many parties with different objectives and requirements. It also involves adopting different methods of operation and new technology. The project therefore involves a moderate level of risk, however this option has already partially commenced implementation in Victoria and has been fully implemented in other jurisdictions in Australia and overseas and consequently the risks are relatively well known and can be managed. This option will need to achieve a critical mass of registered patients and health care professionals across sectors to be effective. Issues around patient privacy concerns and data sharing will also need to be resolved.

Funding

Should government choose to pursue this program, it will then need to consider funding options. Below is a range of potential funding mechanisms which could be examined to help fund the program.

Potential funding mechanisms

General government revenue	User charges	Beneficiary charges	Property development	Asset sales
✓	✓			

General government revenue will continue to be a major source of funding for programs like digital health embedded across the health system as achieving and improving social objectives and outcomes benefits the broader community.

Opportunities for user charging could be examined, such as charging private sector researchers for access to de-identified data through the Research Information Exchange, as users may receive private or commercial benefits from such information. In considering such an approach government would need to ensure it is consistent with the *Health Records Act 2001* and the DataVic Access Policy.

Additional notes

Next steps

The state government is currently preparing a draft strategy and operating model for health sector ICT investment to 2040, which is forecast to be completed in 2016. Once the strategy is endorsed, the next steps for government will be to develop the detailed scoping of all components to be delivered in the 0-10 year time frame and progress to business case on all components to be delivered in the next five years. A key component of the implementation is to develop a unique identifier for each person. This should be developed to directly link to the commonwealth 'My Health Record Identifier' and have the capacity to be linked to other state government identifiers such as social service in the future.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Victorian Department of Health and Human Services, *Statewide system design, service and infrastructure plan for Victoria's health system, Stakeholder discussion paper*, 2016

Energy efficient development

EED

Option type

Changing behaviour through regulation

Location

Statewide

Sector

Energy

Certainty of evidence

Medium

Direct option cost

\$10 million – \$25 million

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 18: Transition to low carbon energy supply and use

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option entails reform of building regulations to improve energy efficiency for new buildings, both residential and commercial. This would require new developments to assess whole of life greenhouse gas levels and aim for targeted levels at the time of construction. This work would build on existing initiatives such as the National Construction Code and the work being undertaken by the Victorian Building Authority targeting building design, construction and use, to ensure good practice for new Victorian buildings. The benefits of this option would be less dependency on a prescriptive approach to energy use efficiency, consistency in requirements for new buildings and allowing the market to determine cost effective and site specific methods to achieve energy use efficiency.

What is the level of community support?

There was a high level of discussion of this option during consultation. Responses were generally positive.

What do we think of this option and why?

This option was recommended in the strategy (ref. 18.1.3) because it influences energy development for the long term and allows the market to determine cost effective solutions to energy efficient development. There are a range of measures in place to incorporate energy efficient choices in new buildings. This option complements this but goes further by being less prescriptive about how energy use efficiency should be considered and instead uses greenhouse gas emission targets for new buildings to encourage more holistic consideration of energy requirements while allowing the market to provide cost effective solutions. This enables consideration of trade-offs that can be made to achieve energy use efficiency in a manner that is cost effective. This would also minimise impacts on housing prices.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

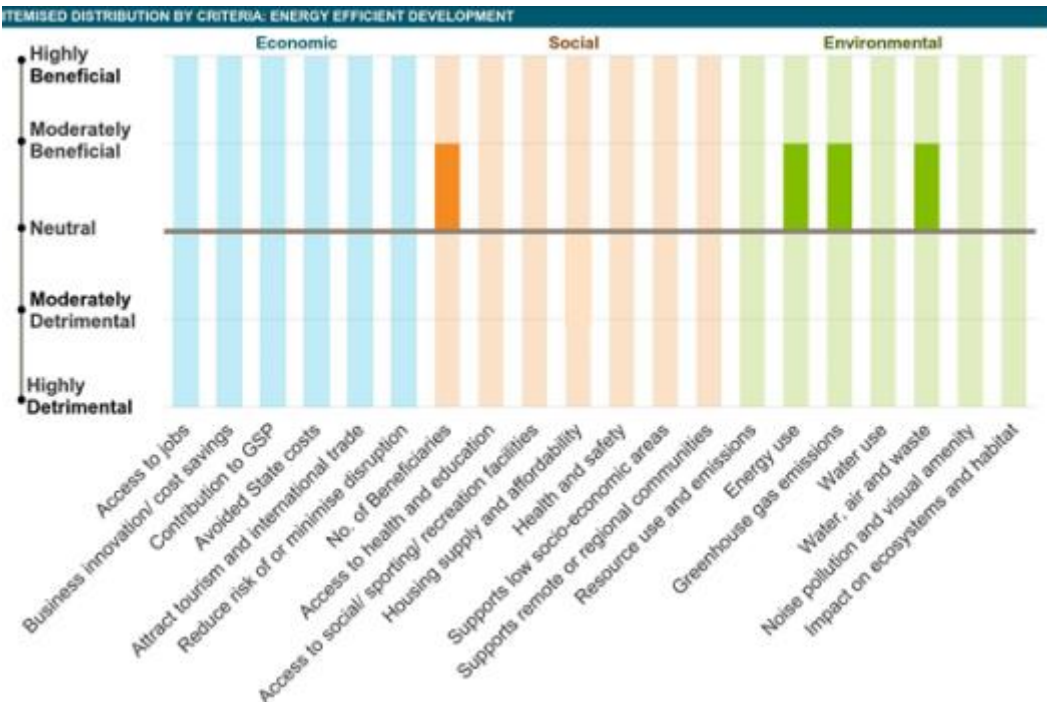
How does this option work with others?

This option complements initiatives to engage customers in managing energy demand, for example through cost reflective electricity pricing (EDM2).

How does this option perform under different scenarios?

Supercity	++	Increased need to manage peak energy demand
Westside Story	+	Increased need to manage peak energy demand
Regional Cities	+	Increased need to manage peak energy demand
Accelerated Climate Change /Mitigation	++	Increased need to manage peak energy demand
Prolonged/ Severe Economic Downturn	-	Less demand for energy
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



Risks and opportunities

There is a risk that this option could lead to unintended impacts on housing prices. The intention of the option is however to move from a prescriptive approach to energy efficiency requirements to utilising a target and allowing the market to determine cost effective solutions.

Should a carbon price be introduced at the national level this option may be less efficient. This is because a carbon price would enable the costs to the environment (greenhouse gas emissions) of energy use to be better reflected

Improved energy efficiency could have productivity benefits, for example making firms adopting energy efficient practices more competitive. There is also an opportunity to achieve cost savings in energy bills over the long term.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then we have clarified the benefits of the recommendation following further consultation.

Carbon price

In the absence of a carbon price this option would provide a more streamlined yet more sophisticated method of reducing the significant amounts of energy use in buildings. Previous changes in national policy, for example the introduction of a carbon price in 2012 and subsequent repeal in 2014, have demonstrated the need for state based policies to be adaptable. Policy design would need to consider carbon price scenarios. Policy design would also need to adopt the objective of complimenting state and national greenhouse gas emission targets along with the need to address equity impacts and minimal impacts to house prices.

Next steps

Policy design for this option would require research and consultation on appropriate greenhouse gas (GHG) emission targets for different types of buildings. Analysis will be required on the optimal GHG targets that ensure environmental benefits while minimising economic impacts. Investigation will also be required on how to best align policy with existing energy use efficiency initiatives and ensure a continued role of these initiatives in providing information to the market.

Initial steps to implementing this option would be further research on countries that have adopted versions of the proposed mechanism, for example the “London Plan” which, as part of policies to respond to climate change, outlines a table of targets for carbon dioxide emissions reduction in buildings. The targets cover both residential and non-residential buildings. Other mechanisms that have been proposed are a carbon budget approach.

Following this research, a review of existing building standards and rating schemes in Australia will be required to consider how to best complement this work and maintain an ongoing long-term role for agencies and organisations providing research and methodologies to the market. An example of work that provides a wealth of knowledge and would need to be supported is the National Australian Built Environment Rating Scheme.

Policy can then be designed in consultation with relevant agencies, the market and the community to outline greenhouse emissions targets for new buildings in a manner that allows the market to determine cost effective outcomes.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Australian Government Department of the Environment and Energy, *Repealing the Carbon Tax*

Australian Sustainable Built Environment Council, *Low carbon high performance: How buildings can make a major contribution to Australia's emissions and productivity goals*, 2016

The London Plan, *The spatial development strategy for London consolidated with alterations since 2011*, 2016

UNEP Sustainable Buildings and Climate Initiative, *Buildings and climate change: Summary for decision makers*, 2009

Energy generation from biomass

EGB

Option type

Better use through technological innovation
 Better use through refurbishment of existing assets

Location

Statewide

Sector

Energy

Certainty of evidence

Medium

Direct option cost

\$1 billion–\$3 billion

Option lead time

5–10 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 18: Transition to low carbon energy supply and use

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option entails generation of energy from biomass in the Latrobe Valley. This option seeks to utilise existing coal assets for low emission generation, by converting existing coal fired generation assets to biomass fired generation assets that operate as co-firing plants or dedicated biomass facilities. This option proposes to use native wood waste from existing forestry activities as a fuel source for the power stations. In the future, if found to be practical for Victoria, fast-growth plantations may be developed as a fuel source.

What is the level of community support?

There was limited discussion of this option during public consultation. This may be as it was not recommended in the draft strategy.

What do we think of this option and why?

This option was not recommended in the strategy because utilising biomass for energy generation at the scale proposed by this option is yet to be tested in Australia, and also because in the long term the market is likely to adopt this option without government intervention if it is cost effective. While there is potential for this option to deliver economic efficiencies through utilisation of existing assets, further assessment of viability is required including the availability of different sources of biomass. Where fast growth plantations are being considered, community engagement is recommended as part of project feasibility studies. If found to be viable this option would have economic benefits for the Latrobe valley community by sustaining energy generation in the Gippsland region. Having said that, if found to be feasible energy generation from biomass can occur anywhere in the State.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

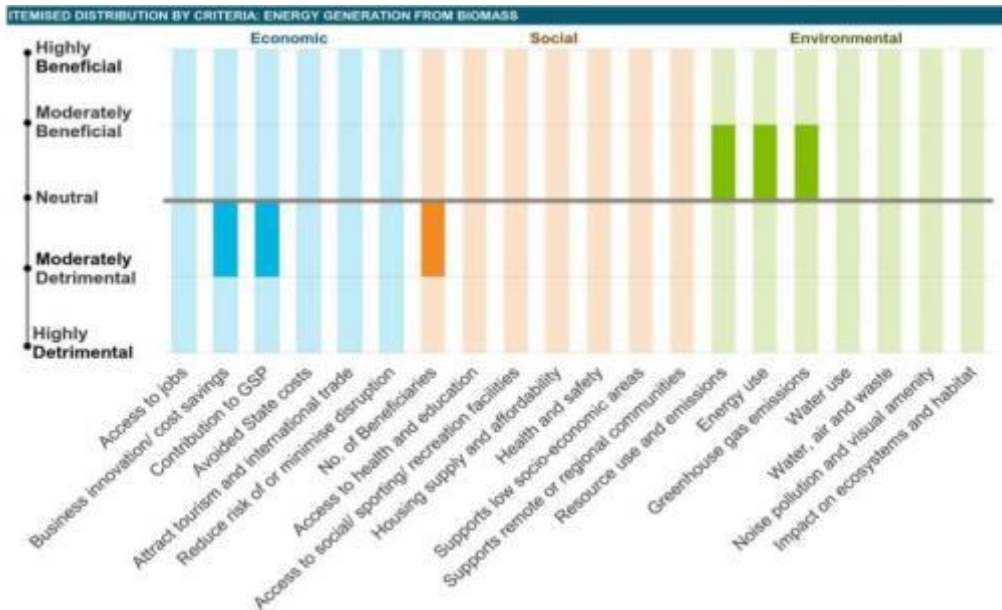
How does this option perform under different scenarios?

Supercity	+	Increased need for more reliable baseload supply
Westside Story	+	Increased need for more reliable baseload supply
Regional Cities	+	Increased need for more reliable baseload supply
Accelerated Climate Change /Mitigation	++	Increased need to reduce carbon emissions
Prolonged/ Severe Economic Downturn	-	Less demand for energy
Biosecurity Threat	Neutral	

How does this option work with others?

This option could complement energy from waste (EGW) where wood waste material is used.

What are the economic, social and environmental impacts of this option?



Risks and opportunities

A long-term supply of biomass would be required to support a conversion. The potential for use of fast growth or native forests for woody biomass may result in community opposition.

Woody biomass is often regarded as carbon neutral, including under the United Nations carbon rules, as new forests are grown to replace the wood consumed to make woody biomass. Some groups contest this claim of carbon neutrality, as plantings of new trees need to mature before they can be said to absorb as much carbon as an established forest.

The use of biomass to generate energy could, however, be an alternate use of low value forestry outputs, and biomass conversions have been successful overseas.

Additional notes

The utilisation of existing coal fired power stations for generation from woody biomass would utilise existing generation assets and transmission infrastructure, support regional economies and provide low emission baseload generation. Biomass from fast growth plantation timber is playing a critical role in many countries meeting greenhouse gas (GHG) emission targets. Stringent standards have been developed in Scandinavia and Western Europe for regulating the measurement of GHG levels to ensure the electricity generated meets GHG targets.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

United Nations, *United Nations framework convention on climate change clean development mechanism, Executive board report (EB23) Annex 18: definition of renewable biomass*, 2006

Expansion of gas as an energy source

EGE

Option type

Better use through regulation
Incremental expansion of existing assets

Location

Statewide

Sector

Energy

Certainty of evidence

Medium

Direct option cost

\$10 million–\$25 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 18: Transition to low carbon energy supply and use

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Review operation of the gas market to enable a greater role for gas as an energy source with a transition away from brown coal generation. This may include a decision on the moratorium on gas exploration in Victoria.

Gas can assist in Victoria's energy transition away from brown coal generation. The use of gas as baseload could provide an alternative source of primary generation. This could be done by better utilising gas generation already on the National Electricity Market. Deployment of renewable energy sources such as wind and solar can create supply intermittency issues which can be addressed through the use of gas peaking plants. These plants can increase and decrease generation quickly to complement deployment of additional renewable energy.

What is the level of community support?

There was limited discussion of this option during public consultation. This may be as it was not recommended in the draft strategy.

What do we think of this option and why?

This option was not recommended in the strategy because in our assessment, there is no infrastructure constraint to expansion of gas if deemed commercially viable. A significant amount of work is being led by the Council of Australian Governments and carried out by the Australian Energy Market Commission to reform operation of the gas market. The outcomes of this work should enable clearer price signals and in doing so better inform demand and supply side decisions. With regards to on-shore gas exploration in Victoria, there was limited evidence to link the potential contribution of additional supply in Victoria to the need to transition to a low carbon future in light of access to resources in Queensland. We acknowledge that the issue of on-shore gas exploration requires specific evidence and community feedback to otherwise inform a recommendation (further detail in *What do we think of this option and why? cont'd*).

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

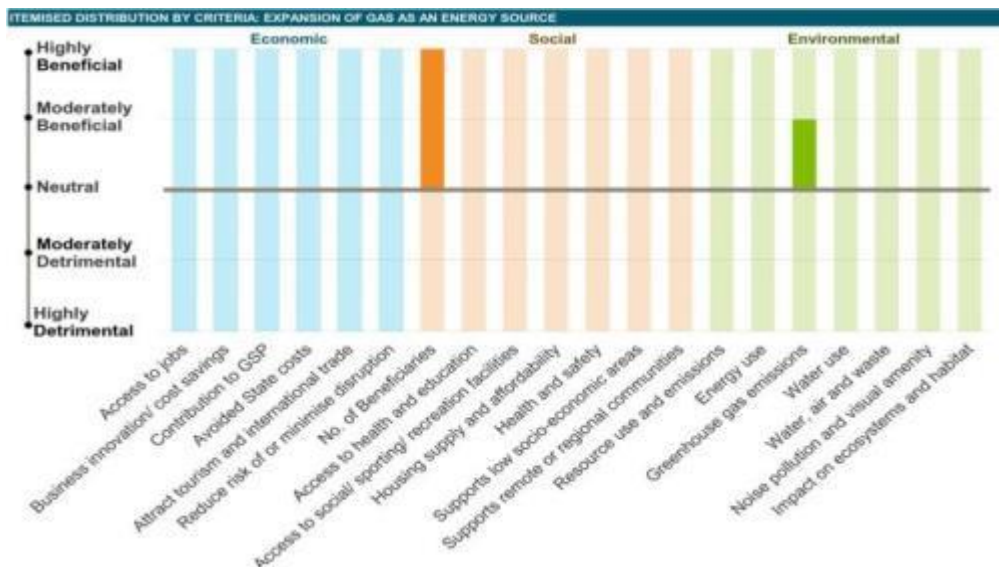
How does this option work with others?

This option can complement low emission technologies with intermittent energy generations such as wind and solar (WSE).

How does this option perform under different scenarios?

Supercity	++	Increased need for more reliable baseload supply
Westside Story	++	Increased need for more reliable baseload supply
Regional Cities	+	Increased need for more reliable baseload supply
Accelerated Climate Change /Mitigation	++	Acute need to reduce carbon emissions
Prolonged/ Severe Economic Downturn	-	Less demand for energy
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



What do we think of this option and why? (cont'd)

Gas is likely to play a key role in a transition away from reliance on brown coal generation due to its ability to meet baseload demands and scale up supply relatively quickly. Victoria is part of the east coast gas market which is connected to liquefied natural gas supplies in Queensland.

The comprehensive on going reviews of operation of the eastern gas market should address any market distortions in utilising gas resources.

Risks and opportunities

Future utilisation of gas as an energy source in Victoria is likely to depend on export prices with production from liquefied natural gas resources in Queensland. This would expose the domestic market to fluctuations in international prices.

This option could support policy development with regards to renewable energy sources. Gas can play a key role in providing baseload energy supply enabling reduced brown coal energy generation.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Australian Energy Market Commission, *Stage two final report: East coast wholesale gas markets and pipeline frameworks review*, 2016

Australian Energy Market Commission, *Review of the Victorian declared wholesale gas market, Draft final*, 2016

Australian Energy Market Operator, *State of the energy market*, 2015

Commonwealth Department of the Environment, *State and Territory greenhouse gas inventories*, 2015

Grattan Institute, *Gas at the crossroads: Australia's hard choice*, 2014

Victorian Government, *Gas market taskforce: Final report and recommendations*, 2013

Energy generation from waste

EGW

Option type

New assets

Location

Statewide

Sector

Energy

Certainty of evidence

Medium

Direct option cost

\$3 billion–\$5 billion

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 15: Manage pressures on landfill and waste recovery facilities

Low	Low	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

Need 18: Transition to low carbon energy supply and use

Low	Low	Low	Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option proposes to generate energy from waste. All types of waste including industrial waste, household and green waste, and tyres can be incinerated and used to produce heat and/or energy. In the case of organic waste this could come from the significant amounts of organic waste sent to landfill or sewerage and sludge disposal.

What is the level of community support?

There was limited discussion of this option during public consultation. This may be as it was not recommended in the draft strategy.

This option expands on organic waste to energy (OWE) which was recommended by both citizen juries.

What do we think of this option and why?

This option was not recommended in the strategy because there is no clear role for the state. With adequate pricing signals and planning provisions the market is best placed to respond to innovative opportunities to utilise and manage waste. Our water pricing recommendation (ref. 15.1.3) and waste site recommendation (ref. 15.2.2) may enable this technology to be adopted. European countries such as Sweden have successfully adopted waste incineration and conversion to energy. Closer to home Melbourne Water's Western Treatment Plant uses biogas (from decomposition of sewage) to meet nearly all of the plant's electricity needs. In considering the potential for further uptake of this option, the market's response would take into account optimal volumes of waste that justify investment levels.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Consistent

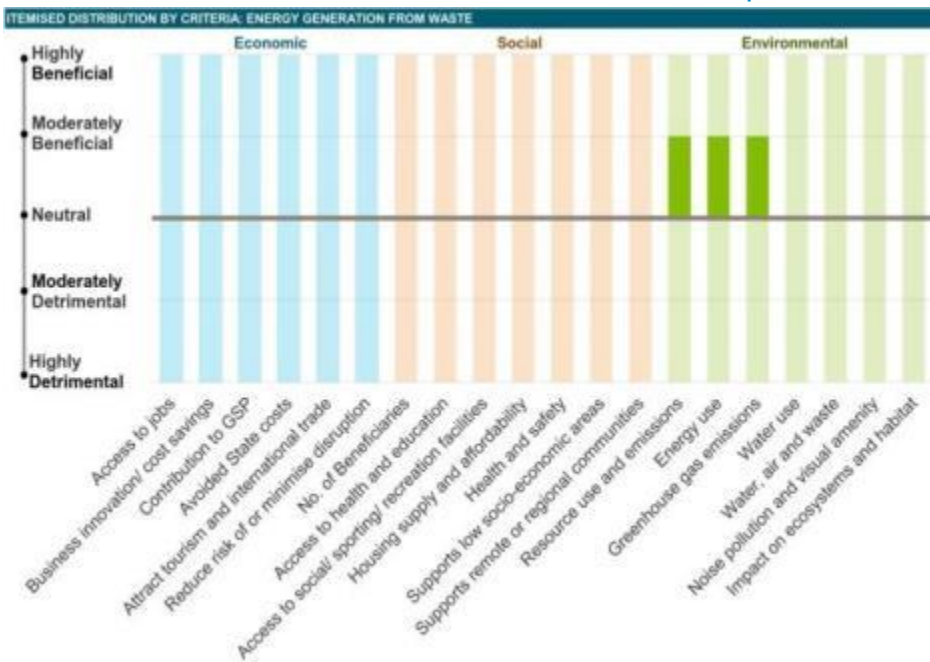
How does this option perform under different scenarios?

Supercity	++	Increased need for more reliable baseload supply
Westside Story	++	Increased need for more reliable baseload supply
Regional Cities	+	Increased need for more reliable baseload supply
Accelerated Climate Change /Mitigation	++	Acute need to reduce carbon emissions
Prolonged/ Severe Economic Downturn	-	Less demand for energy
Biosecurity Threat	Neutral	

How does this option work with others?

This option complements organic waste management (OWM) and is enabled by future planning for waste management facilities (FWL).

What are the economic, social and environmental impacts of this option?



Risks and opportunities

With the use of both organic and inorganic waste to generate energy there may be community concerns about localised pollution.

Energy generation from waste can provide a consistent supply of electricity if sufficient waste volumes are available and generation of electricity can be controlled in response to demand. This means that the option can play a more flexible role in energy supply than other forms of renewable generation with intermittent supply.

Better separation of waste streams (e.g. organics only waste collection) could support the viability of this option.

Additional notes

The Australian bioenergy and energy from waste market

The Clean Energy Finance Corporation (CEFC) conducted a market report on bioenergy and energy from waste and found that this market is underdeveloped. At the time these technologies contributed only 0.9 per cent of Australia's electricity output compared to an average output of 2.4 per cent across comparable countries. CEFC outline significant potential for growth of the bioenergy and energy from waste market, and note that these renewable energy sources can also contribute to lower waste disposal costs and reduced pollution from particulate emissions. In particular, opportunities are highlighted for urban waste, intensive livestock and food processing and plantation forest residues. A number of case studies are discussed in the report providing an overview of the status of bioenergy and energy from waste projects and signalling emerging opportunities. This option considers that these technologies will play a key role in waste management in the future.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Clean Energy Finance Corporation, *The Australian bioenergy and energy from waste market*, 2015

European Energy Agency, *Municipal Waste Management in Sweden*, 2013

Sustainability Victoria, *Victorian organics resource recovery strategy*, 2015

Western Australian Department of Environment and Conservation, *Waste technologies: Waste to energy facilities*, 2013

Electricity network infrastructure capability ENI

Option type

Better use of existing assets

Location

Statewide

Sector

Energy

Certainty of evidence

Medium

Direct option cost

<\$1 million

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 18: Transition to low carbon energy supply and use

Low	Low	Low	Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option entails a detailed review of the technical capabilities of Victoria's electricity network infrastructure. Such a review would provide insights into the capabilities of existing infrastructure and better inform renewable energy investment decisions.

The Australian Energy Market Operator (AEMO) with support from the Victorian Government may be best placed to undertake this review which could be combined with other relevant Victoria-specific planning information. The objective would be improved certainty for project developers and network operators. The review could be developed into a framework that is regularly updated and is an input to ensuring renewable generation is built in the most cost effective locations with flexibility for future policy and technological developments (further detail in *What is this option? cont'd*).

What is the level of community support?

There was limited discussion of this option during public consultation.

What do we think of this option and why?

This option was recommended in the strategy (ref. 18.2.2) because providing information on network congestion, areas capable of absorbing additional capacity and areas suited to upgrades should improve the likelihood that new low emission energy generation projects are proposed in well suited locations. This should streamline planning processes and potentially lead to further innovation as the market is better informed about the operation of Victoria's electricity network. As the energy sector undergoes significant transformation, timely information provision would increase the effectiveness and efficiency of new project developments (further detail in *What do we think of this option and why? cont'd*).

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

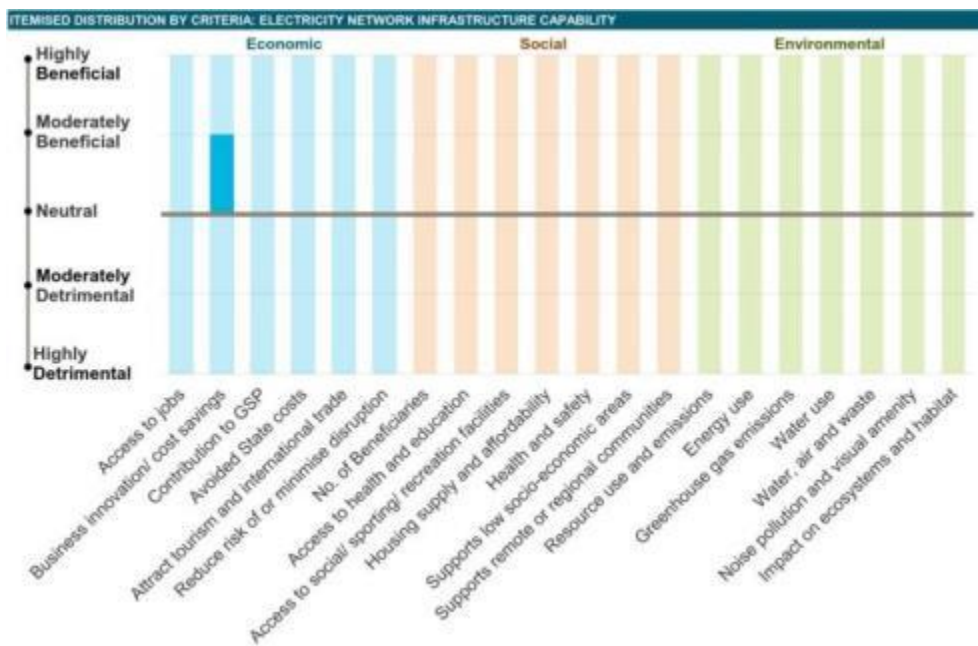
How does this option work with others?

This option better enables implementation of a range of options addressing lower emission energy generation technologies.

How does this option perform under different scenarios?

Supercity	++	Increased need for timely, renewable energy generation to meet peak demand
Westside Story	+	Increased need for timely, renewable energy generation to meet peak demand
Regional Cities	+	Increased need for timely, renewable energy generation to meet peak demand
Accelerated Climate Change /Mitigation	++	Increased need for timely, renewable energy generation to meet peak demand
Prolonged/ Severe Economic Downturn	-	Less demand for energy
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



What is this option? (cont'd)

The objectives of the proposed network review would be to:

- Provide information to renewable energy project developers on where network assets are capable of absorbing additional generation
- Identify opportunities for augmentations that would unlock energy resources
- Identify the potential for interconnector upgrades.

The review would provide renewable energy developers with information relating to locations in the grid that are capable of absorbing additional renewable generation. This would be beneficial for efficient long-term planning. The review could also identify opportunities to unlock Victoria's renewable energy resources and overlay this information with planning and land use information to further increase the effectiveness of investigations into new renewable energy projects. Finally the review could provide insights on potential benefits of augmenting interconnection with neighbouring regions. This option would increase the level of detail of information available to project developers considering renewable energy projects in Victoria.

What do we think of this option and why? (cont'd)

The Australian Energy Market Operator (AEMO) is best placed to inform, design and implement this option including opportunities to add value based on national grid analyses already being undertaken. State government liaison with AEMO is recommended. There is a likelihood that this option will occur naturally over time as part of the AEMO activities. AEMO's annual planning report, for example, assesses the electricity transmission network and identifies new projects and required infrastructure developments for the next 10–20 years. There is benefit, however, in ensuring a review is available and of sufficient detail for investigation of renewable projects in Victoria in the short-term.

Risks and opportunities

There is an opportunity to increase the efficiency and effectiveness of renewable project developments through this option, particularly through clearer information on areas of the network experiencing congestion and where the network has the capacity to absorb additional generation.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then we have better articulated the intent and benefits of the recommendation.

Grid development

Brown coal generation is available and has been developed into energy in one geographic region in Victoria. This has however influenced the physical development of the electricity grid. Lower emission energy generation technologies are influenced by different geographic and natural resource factors. There is benefit in providing information to assist in determining how uptake of these newer technologies may influence, or be limited by, grid connectivity.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Australian Energy Market Operator, *Victorian annual planning report: Electricity transmission network planning for Victoria*, 2016

Employment outside central city incentivisation

EOC

Option type

Better use through coordination processes
 Better use through land use and planning controls
 Changing behaviour through subsidies

Location

Statewide

Sector

Transport

Certainty of evidence

Low

Direct option cost

\$1 billion–\$3 billion

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 10: Meet growing demand for access to economic activity in central Melbourne; and

Need 11: Improve access to middle and outer metropolitan major employment centres; and

Need 13: Improve the efficiency of freight supply chains

Low	Low	Low	Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Provide a suite of planning, infrastructure investment and financial incentives to encourage businesses to locate outside the central city to metropolitan employment centres and regional centres.

This would include relocating government services to regional cities such as Geelong, Bendigo and Ballarat and to employment centres such as Monash, Latrobe and Sunshine, and future expansion in Werribee as employment grows.

What is the level of community support?

There was a high level of discussion of this option during consultation. Responses were generally positive. This option was recommended by the regional citizen jury.

What do we think of this option and why?

This option was not recommended in the strategy because there is limited evidence to suggest that high cost initiatives, similar to this option have successfully relocated substantial economic activity away from central cities or produced a net benefit in jobs for the centres or regions (see additional notes). We note that this option received a lot of community support, including recommendation from the regional citizen jury, but the evidence was not available to justify its inclusion in the strategy. We agree with recent VAGO findings that governments need to improve how they record the net jobs gained when investments are made to designated centres and cities.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	Relates to key point/option for discussion
Regional Growth Plans	N/A

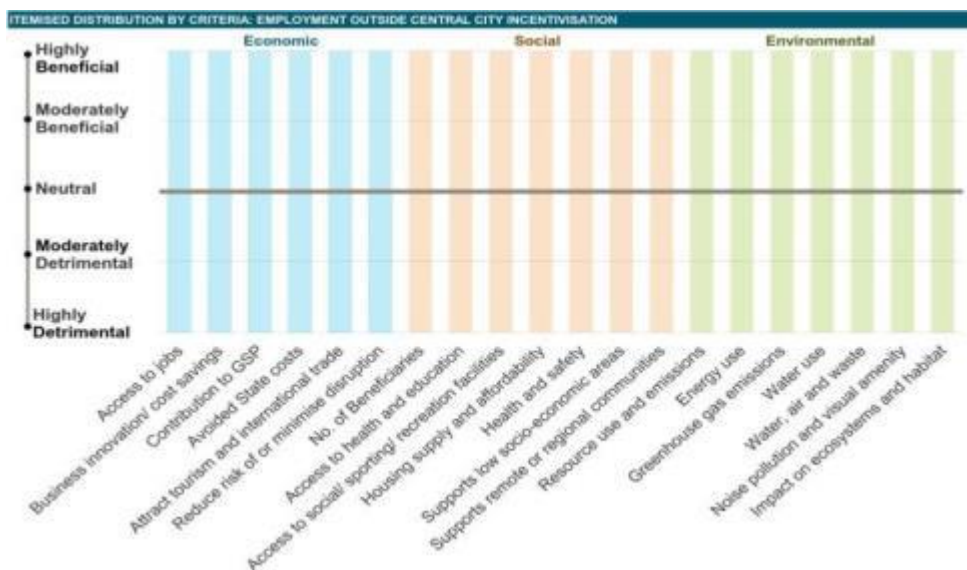
How does this option work with others?

This option would have a relationship with options that support increased travel to employment centres and regional cities, such as arterial roads for major employment centres metropolitan (ARN).

How does this option perform under different scenarios?

Supercity	+	More efficient use of transport capacity
Westside Story	+	More efficient use of transport capacity
Regional Cities	+	More efficient use of transport capacity
Accelerated Climate Change /Mitigation	+	Supports more carbon efficient travel
Prolonged/ Severe Economic Downturn	-	Less demand for travel, less congestion
Biosecurity Threat	+	

What are the economic, social and environmental impacts of this option?



Commentary:

This option is not anticipated to have a significant impact on distribution of employment across Victoria. There is no evidence that similar schemes have had a significant impact and as such it has received a neutral rating.

Risks and opportunities

There may be some risks associated with decentralising services, including the potential for job losses within metropolitan areas, labour shortages, and potential loss of leadership and experience within organisations.

If the relocation of economic activity away from metropolitan areas is large enough, this option may stimulate overall regional growth (through the greater need for ancillary businesses) and strengthen communication infrastructure between regional and city areas.

Additional notes

There is limited evidence available which indicates that initiatives similar to this option introduced by governments have successfully relocated substantial economic activity away from central cities. Some examples are listed below.

- The Jobs Action Plan was implemented in 2011 by the NSW Government with the target to create 40,000 jobs in non-metropolitan areas. Initially, the Plan provided a \$4,000 two stage payroll tax rebate for new jobs created and maintained for at least two years. However, by 2013, business reaction to the Jobs Action Plan had been largely negative. The main criticism of the scheme was businesses were unlikely to benefit from a \$4,000 rebate while paying an ongoing salary. By 2013, only 13,115 positions had been registered under the Plan, compared to initial estimates that 25,000 jobs would be created per year (NSW Business Chamber, 2013). The rebate was increased to \$5,000 in 2013 (Lawrence, 2015).
- The Regional Relocation Scheme provided by the NSW government has not been particularly effective. The Scheme was generally considered to be too broad, and to encompass too wide a pool of potential applicants. Another issue with the scheme is that the program is aimed at encouraging the general public to make a tree change to regional areas where jobs can be limited for many professions, and as such can often only accommodate one position, when many of the successful applicants for relocation schemes are couples or families, that require at least one additional job (NSW Business Chamber, 2013).
- When the Traffic Accident Commission moved from Melbourne to Geelong, the government announced 600 jobs had relocated to Geelong. This represented just 0.03 per cent of Geelong population and 0.06 per cent of its labour force (Grattan Institute 2011). There is little evidence to evaluate how many jobs were actually relocated and at what cost. In their book, Kelly and Donegan suggest that of the 650 Melbourne TAC staff, 400 took redundancy or were redeployed and this resulted in significant loss of corporate knowledge. The staff who did relocate received a \$15,000 loyalty bonus, \$30,000 housing assistance, payment of stamp duty and legal fees, 10 per cent salary bonus and reimbursement of some school and childcare fees. These costs exclude any capital costs.

The VAGO report *Regional Growth Fund Outcomes and Learnings 2015* recommends that government consider better practice on reporting on net jobs, rather than gross jobs, by adjusting for:

- Deadweight—for projects that would have happened without the funding
- Displacement—job losses elsewhere due to the funded project
- Leakage—jobs taken by people that were not intended to benefit
- Substitution—following recruitment to a funded project someone else loses their job.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Grattan Institute, *Investing in regions: Making a difference*, 2011

Kelly, J. and Donegan, P., *City limits*, 2015

Lawrence, J. *NSW Payroll tax rebate: Jobs action plan*, 2015

NSW Business Chamber, *A decade of decentralisation NSW: Business Chamber response to the decentralisation task force*, 2013

Victorian Auditor-General, *Regional Growth Fund outcomes and learnings*, 2015

Energy storage infrastructure

ESI

Option type

Changing behaviour through technological innovations

Better use through subsidies

New greenfield assets

Location

Statewide

Sector

Energy

Certainty of evidence

Medium

Direct option cost

\$25 million–\$50 million

Option lead time

5–10 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 18: Transition to low carbon energy supply and use

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option incentivises long-term uptake of grid-scale battery storage infrastructure. Pilot programs are proposed to increase understanding of the role of batteries in managing renewable generation intermittency and in deferring or removing the need for network infrastructure augmentation. The long-term expansion in grid-scale storage will depend on technological advancement, in particular the rate at which costs reduce over time. In the shorter-term, there is the potential for the government to invest in the development of large-scale battery solutions in Victoria. The objective of this would be to increase understanding of how battery storage could operate as part of the national electricity market, in the provision of both regulated and unregulated services (further detail in *What is this option? cont'd*).

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option was not recommended in the strategy because while the benefits of battery storage are clear, there is no clear role for the state. The estimated costs for a grid scale pilot were also not justifiable. Battery storage technology will have a critical role to play in addressing reliability of supply where lower emission energy sources with intermittent supply such as wind and solar are developed. Recent analysis by the Australian Energy Market Operator (AEMO) of battery storage technology in north-west Victoria, however, indicated that cost effectiveness can be a limitation. With further innovation, and given the potential role battery storage can play, it is likely that the market will develop and respond with cost effective grid scale solutions.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

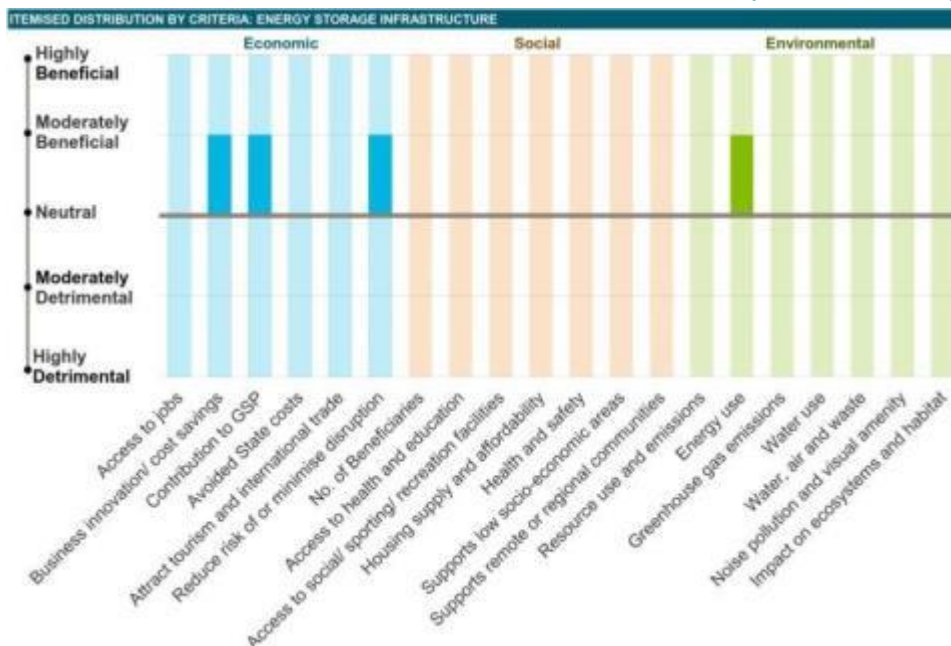
How does this option perform under different scenarios?

Supercity	+	Increase need for timely, renewable energy generation to meet peak demand
Westside Story	+	Increase need for timely, renewable energy generation to meet peak demand
Regional Cities	+	Increase need for timely, renewable energy generation to meet peak demand
Accelerated Climate Change /Mitigation	++	Enables better utilisation of renewable energy generation
Prolonged/ Severe Economic Downturn	-	Less demand for energy
Biosecurity Threat	Neutral	

How does this option work with others?

This option enables uptake of a range of renewable energy technologies that provide an intermittent supply, notably wind and solar (WSE).

What are the economic, social and environmental impacts of this option?



Commentary:

This option provides large scale storage infrastructure to improve the performance of electricity networks. In doing so, it is anticipated to benefit electricity costs, and electricity supply, with benefits for business costs and resilience.

What is this option? (cont'd)

The uptake of battery storage will contribute to the transition to a low carbon energy supply by improving system reliability and security in the absence of brown coal generation. Large-scale storage infrastructure has the capability to manage the intermittency of renewable generation and increase security of supply. These roles could be critical to facilitate the transition to lower carbon energy supply. Large-scale storage can also provide regulated network services by reducing the need for investment in or replacement of network infrastructure. In this role, battery storage could also support the development of additional renewable generation, particularly in areas where network capacity is low.

Risks and opportunities

There is a risk of inefficient investment where large scale investments in battery storage technologies are made prior to anticipated technological innovations.

Battery storage technology can help defer network upgrades and meet peak capacity needs without relying on additional supply of energy. Battery storage could also accelerate the uptake of electric vehicles as households would be able to re-charge their cars on their energy stores without demanding additional electricity.

Additional notes

The amount of battery storage capacity installed in Australia is anticipated to grow 50-fold over the next 10 years (Climate Council, 2015). The Climate Council predicts Australia will be a key market for battery adoption, thanks to a combination of high-cost electricity, high solar uptake and solar feed-in tariffs. Energia (2015) predicts Australian households and businesses will be installing battery systems at a rate of 55,000 a year by 2025. There is already a pilot program underway in the ACT providing grants to companies contracted to deliver battery storage to households.

At the grid level, a battery storage facility was connected to the grid in Buninyong, Victoria by Powercor in 2016 in a pilot program that aims to reduce stress on the network, improve reliability of supply and reduce maintenance costs. This could help defer network upgrades and meet peak capacity needs. In Thomastown, Victoria AusNet Services is undergoing a two-year trial for the use of a 1 MWh utility-scale battery storage system to test whether the network battery system is a cost-efficient solution for meeting peak demand (Climate Council, 2015).

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Australian Energy Market Operator, *Victorian annual planning report: Electricity transmission network planning for Victoria*, 2016

Climate Council, *Powerful potential: Battery storage for renewable energy and electric cars*, 2015

Energia, *Sound and Fury: Australia's distributed energy storage market to 2025*, 2015

Emergency traffic management

ETM

Option type

Changing behaviour through technological innovations

Location

Statewide

Sector

Transport

Certainty of evidence

Medium

Direct option cost

\$25 million–\$50 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 3: Respond to increasing pressures on health infrastructure, particularly due to ageing; and

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

Need 19: Improve the resilience of critical infrastructure

Very Low	Very Low	Very Low	Very Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Emergency vehicle priority (EVP) is a technology aimed at improving emergency response times and the safety of frontline officers by enabling emergency vehicles (such as ambulances, fire services and police) to automatically trigger traffic light sequences to change along the most direct route when responding to an emergency call. This will help to reduce the risk of emergency vehicles colliding with other vehicles at intersections.

What is the level of community support?

There was limited to no discussion of this option during public consultation. However, this option was recommended by the metropolitan citizen jury.

What do we think of this option and why?

This option was not recommended in the strategy, as it did not align with our strategic framework (specifically the infrastructure needs including need 19, in terms of assessing its improvement to the resilience of critical infrastructure against the relevant metrics). However, this option does have merit and it is open to government to consider using transport signals to prioritise emergency vehicles responding to emergency calls. This can shorten travel times for these vehicles and has the potential to save lives (by getting people more quickly to trauma centres).

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

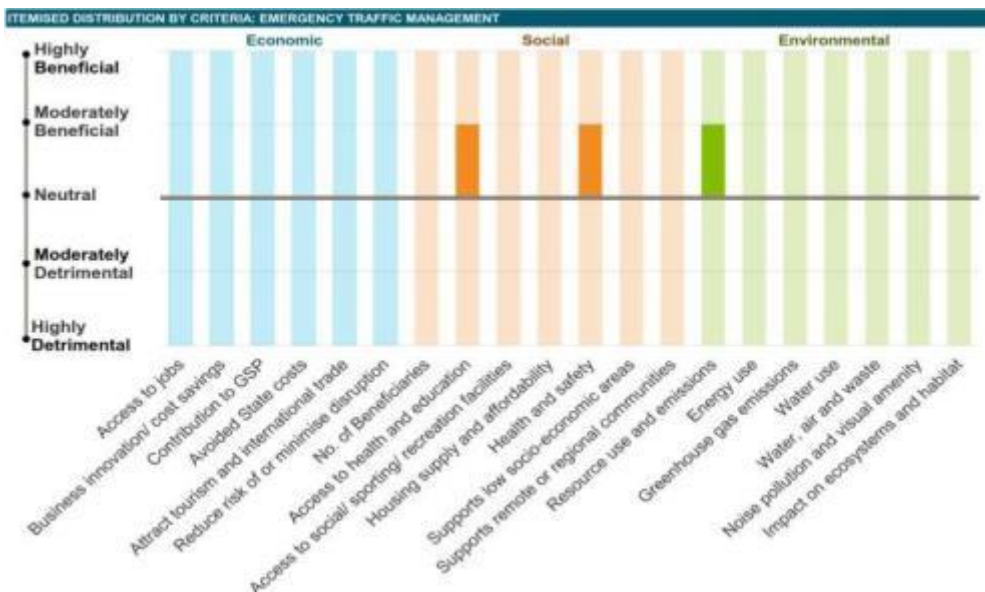
How does this option perform under different scenarios?

Supercity	+	Reduces the impact of congestion
Westside Story	+	Reduces the impact of congestion
Regional Cities	+	Reduces the impact of congestion
Accelerated Climate Change /Mitigation	Neutral	
Prolonged/ Severe Economic Downturn	Neutral	
Biosecurity Threat	++	Reduced delay for emergency vehicles

How does this option work with others?

This option can be considered complementary with critical asset centralised risk management (CAR) due to the common goal of improving emergency management services. The implementation of this option is unlikely to have significant impact on other road users, particularly when combined, eventually, with automated car technologies (ACT) and advanced driver assistance (ADA).

What are the economic, social and environmental impacts of this option?



Risks and opportunities

There are risks with the implementation of EVP technology as it has not been extensively trialled in Victoria recently. This can lead to project delays and cost overruns.

There may be an opportunity to manage the road network in real time to advise road users of alternative pathways around an incident area in addition to allowing faster access for emergency vehicles. This can reduce the disruption and congestion on the broader road network resulting from vehicle accidents. Management of ETM technology could be a key responsibility of an integrated transport control centre (ITC).

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Enhanced telecommunication performance ETP

Option type

Better use through coordination processes

Location

Statewide

Sector

ICT

Certainty of evidence

Low

Direct option cost

\$10 million–\$25 million

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 9: Provide access to high-quality education infrastructure to support lifelong learning; and

Need: 12: Improve access to jobs and services for people in regional and rural areas; and

Need 19: Improve the resilience of critical infrastructure

Low	Low	Low	Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Achieve improved internet and mobile telephony services across Victoria, particularly in major economic centres and rural and regional areas, by leveraging off the state-owned communications infrastructure base and services purchasing power. This would require a whole-of-government approach to maximise the benefits of Commonwealth initiatives and coordinate state government ICT services procurement and infrastructure investment. The option is not directed at achieving group purchasing benefits, but at leading the strategic development of state communications infrastructure. The options would direct that responsibility for undertaking the state role in one central group, who would be accountable for the planning and coordination of core telecommunications investment across all state government departments (further detail in *What is this option? cont'd*).

What is the level of community support?

There was a high level of discussion of the recommendation ICT infrastructure which includes this option. Responses were generally positive.

What do we think of this option and why?

This option was recommended in the strategy (ref. 12.1.3 and 19.1.2) as internet and mobile phone connectivity will be critical to Victoria's success over the coming decades as the role of technology increases. While this option has been assessed as making a low contribution, this is based on a conservative assessment of the potential benefits of state government coordination activities. While communications infrastructure in Australia is predominantly delivered by the private sector and regulated by the commonwealth, limiting the role of the state to some extent, our recommendation focuses on using the Victorian Government's existing communications infrastructure base and significant purchasing power. This will enable government to maximise benefits from the NBN roll-out (and other Commonwealth initiatives) and ventures by private sector telecommunications providers.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

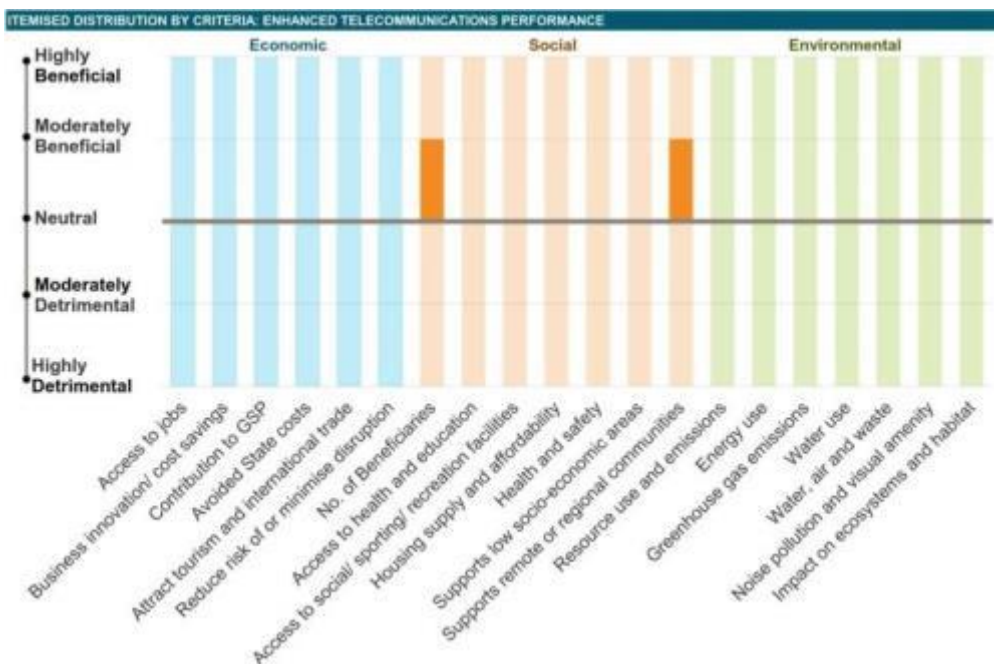
How does this option perform under different scenarios?

Supercity	Neutral	
Westside Story	Neutral	
Regional Cities	+	As services are less in regional areas
Accelerated Climate Change /Mitigation	Neutral	
Prolonged/ Severe Economic Downturn	Neutral	
Biosecurity Threat	++	As enhanced systems will aid addressing the threat

How does this option work with others?

This option will act as an enabler to the majority of ICT projects and also technology based initiatives, particularly in the transport sector. For example, advanced driver assistance (ADA), advanced traffic management (ATM) and transport network pricing (TNP).

What are the economic, social and environmental impacts of this option?



Commentary:

This option does not show significant impacts as the option is an enabler and the impacts will only be realised though the option being coupled with other initiatives.

What is this option? (cont'd)

Under this option state government agencies would still be responsible for developing and determining their ICT requirements and a response; however the overarching strategic development and coordination would be led by the central group. Immediate priorities for this central group would be to:

- Coordinate with large scale private sector and commonwealth infrastructure programs (such as the NBN rollout) to maximise mutual benefits for the state and the program provider.
- Stimulate the private sector to provide improved internet performance for government services and business, particularly in regional areas, through partnership models that leverage government owned telecommunications infrastructure (such as mobile communications towers, fibre assets and spectrum), passive assets (such as tram and light poles, conduits and land parcels required as infrastructure corridors) and service demand.
- Participate in resolving policy, regulatory and coordination barriers which exist at both a state and federal level to ensure that regional telecommunications policies, cross-subsidies and spending are targeted and utilised most efficiently.
- Invest in mapping the location of existing infrastructure and the location of business and government demand in the future, to enable forward preparation and facilitation of the uptake of new technologies.
- Identify ways to use existing technology better across Victoria, but particularly in regional and rural areas.

Risks and opportunities

There are risks that this approach would reduce the ability of agencies to develop bespoke telecommunications approaches to suit their particular needs. The focus of the central group would be on transmission systems and protocols however, enabling state government agencies to lead the development of middleware and terminal devices to suit their particular needs. The commonwealth government is responsible for regulation of the telecommunications industry nationally. The state government does, however, have some important levers for improving ICT connectivity across Victoria. It is both a communications infrastructure owner and a significant purchaser of ICT services. The state government has the ability to use these levers to influence the shape of commonwealth initiatives and private sector ventures to get better outcomes for all parties and for the people of Victoria. For example, VicTrack operates Victoria's second largest telecommunications network, providing primary telecommunications services for the transport sector. Included in its asset portfolio is a network of base stations and towers running along train lines. Opportunities therefore exist to partner with private communications providers to upgrade these assets for mutual benefit. There are also potential opportunities arising from the expected transition of emergency management communications from existing traditional radio networks, which cover 96 percent of the land mass and 99 percent of the population, to new mobile systems that will enable greater interconnectivity and data sharing. Whatever solution is pursued, enhanced communications coverage will be required, which could be of broader benefit to the community.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then we have changed the title of the recommendation from 'ICT' to 'communications' to avoid jargon and show that the recommendation includes internet and mobile phone infrastructure.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Environmental water delivery infrastructure

EWD

Option type

New assets

Location

Statewide

Sector

Water and waste

Science, agriculture and environment

Certainty of evidence

Medium

Direct option cost

\$500 million–\$750 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 16: Help preserve natural environments and minimise biodiversity loss;

Low	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

Need 17: Improve the health of waterways and coastal areas

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option considers the use of infrastructure to deliver effective watering for the environment.

There are a number of initiatives currently being explored to improve water availability for the environment. The objective of these initiatives is to restore natural flows and flow variability in rivers and waterways as far as is practicable. This option considers how infrastructure can be used to optimise the quantity and timing of water delivery to the environment. For example, pumps, levee banks and regulators can be used to deliver water at a beneficial time and in a controlled quantity to floodplain areas (further detail in *What is this option? cont'd*).

What is the level of community support?

There was limited to no discussion of this option during public consultation. This option was recommended by the regional citizen jury.

What do we think of this option and why?

This option was recommended in part in the strategy (ref. 16.3.3 and 17.2.2) because infrastructure solutions can reduce the otherwise significant quantities of water required to deliver flows to wetlands and flood plain areas. Specifically, we think there should be a focus on the utilisation of infrastructure to optimise environmental watering over the long-term where further research identifies specific sites that would benefit from this measure. Infrastructure solutions can in this case however be costly, and this option may only be feasible in areas with high environmental values. In the short to medium term research is likely to improve understanding of optimal environmental watering requirements. Following this, cost effective infrastructure solutions to deliver water to the environment can be identified and implemented in the medium to long term.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

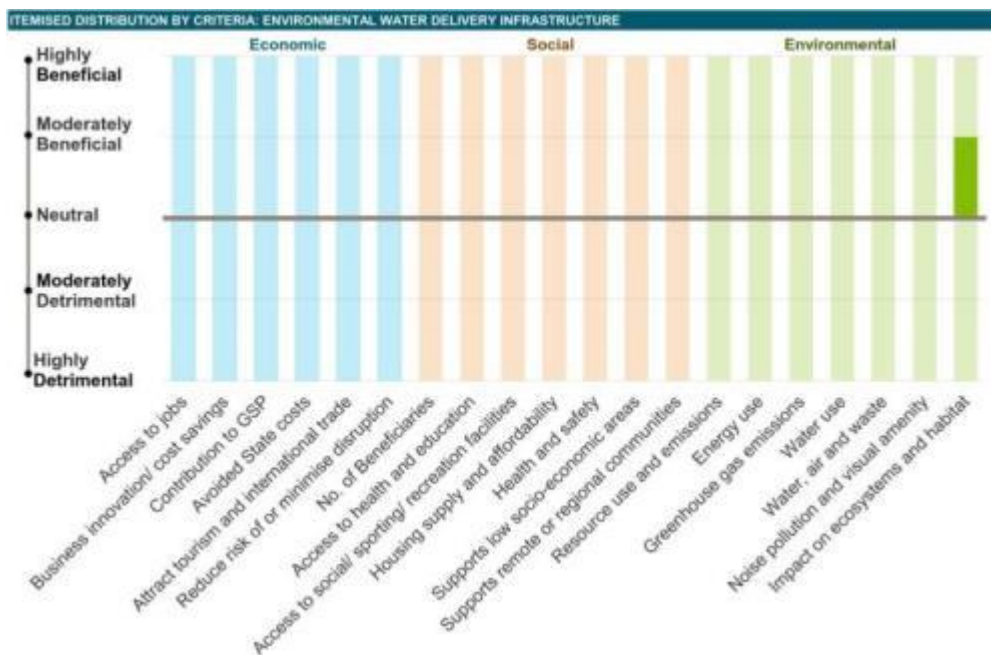
How does this option perform under different scenarios?

Supercity	Neutral	
Westside Story	Neutral	
Regional Cities	+	Heightened need to conserve water resources
Accelerated Climate Change /Mitigation	++	Increased need to effectively provide water for the environment
Prolonged/ Severe Economic Downturn	-	Less demand and competition for water
Biosecurity Threat	Neutral	

How does this option work with others?

This option can complement water secured for the environment for example from increased water delivery efficiency (WDE). This however depends on the location and funding arrangements for both options.

What are the economic, social and environmental impacts of this option?



What is this option? (cont'd)

The quantity and variability of stream-flows is important in maintaining ecosystem health, and even more so in extended dry periods. This includes enabling fish breeding and supporting aquatic habitats, influencing bird breeding particularly in wetland areas, and supporting vegetation on river banks. Arrangements are in place and are continuously being improved to release water for the environment in regulated systems (i.e. releasing water for the environment from dams and weirs).

Risks and opportunities

There is ongoing work to better understand optimal watering requirements for the environment. This would inform the scope of this option. The cost effectiveness of infrastructure solutions may also be limited by the environmental value of waterways. For example, costs may be more justifiable for environmental sites of significance. Infrastructure solutions still depend on water availability.

There is an opportunity for this option to significantly conserve water resources by delivering water for the environment more effectively.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Murray Darling Basin Authority, *Basin-wide environmental watering strategy*, 2014

Victorian Department of Environment, Land, Water and Planning, *Water for Victoria: Water plan*, 2016

Victorian Environmental Water Holder, *How do we know it works?* 2016

Eastern Freeway to CityLink connection

EWE

Option type

New assets

Location

Melbourne central subregion

Melbourne City Bypass state-significant transport corridor

Sector

Transport

Certainty of evidence

Medium

Direct option cost

\$5 billion–\$10 billion

Option lead time

5–10 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 10: Meet growing demand for access to economic activity in central Melbourne; and

Need 11: Improve access to middle and outer metropolitan major employment centres; and

Need 13: Improve the efficiency of freight supply chains

Low	Low	Low	Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Improve road connectivity across the city from east to west. While there are a number of possible solutions (alignment, length of tunnel, number of lanes, etc.), for the purpose of an initial assessment the option is assumed to be a six lane (total) road link from the Eastern Freeway to CityLink, with a substantial amount of tunnelling. It includes capacity expansion on the Eastern Freeway and localised works to improve inner north public transport and amenity. This concept of the option draws, in particular, on the *East West Link Needs Assessment* (Eddington Review, 2008). It also draws on the East West Link (Eastern Section) Project. The name has been generalised noting that the existing business case design could be revisited.

What is the level of community support?

There was a high level of discussion of this option during consultation. Responses were generally positive, though there were a number of stakeholders that opposed the option, including local councils in affected areas. The citizen juries had a mixed view of this option.

What do we think of this option and why?

This option was recommended for further planning in the strategy within 0-5 years (ref. 11.5.8 and 13.5.4) because there is some likelihood the option may be needed in the latter part of the 15–30-year period. Introducing transport network pricing would particularly attenuate demand on links to, and through, the congested central areas of Melbourne. However, emerging transport technologies and other uncertainties could increase the need for this link, by increasing the relative benefit offered by motorways. The low contribution to improving the capacity of the freight network, relates to the fact that the Eastern Freeway is a less direct link for industry in the south east than the M1 or the North East Link (NEL) if implemented. A new port would increase cross town freight movements, increasing the importance of this option. The new link has potential also to support accessibility to major employment centres as an alternative corridor to the M1 Monash and M80 Ring Road. Further work would be needed to identify the appropriate sequencing between this link and the more westerly section from CityLink to the Western Ring Road (EWW).

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent	Included in <i>Plan Melbourne 2014</i>
Plan Melbourne refresh 2015	Not consistent	Indicates project will be removed from <i>Plan Melbourne</i>
Regional Growth Plans	N/A	

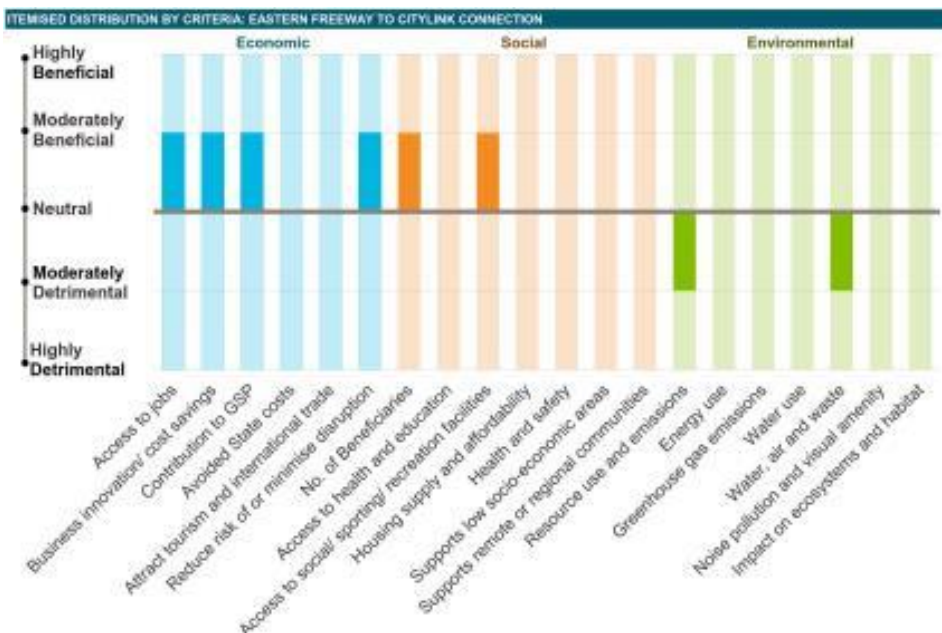
How does this option work with others?

This option could be complemented with transport network pricing (TNP) and advanced traffic management (ATM) to manage any potential induced travel impacts, or those options could be an alternative to this one. Other options which could be potential alternatives include the North East Link and driverless vehicles (ACT). This option could have a range of other relationships, including with the CityLink to Western Ring Road (EWW), and a second port (NCP).

How does this option perform under different scenarios?

Supercity	+	Could improve cross city travel
Westside Story	+	Could improve cross city travel
Regional Cities	+	Could improve cross city travel
Accelerated Climate Change /Mitigation	Potentially negative	Risk of induced travel and dispersed land use
Prolonged/ Severe Economic Downturn	-	Less demand for heavy freight
Biosecurity Threat	Neutral	
Bay West	+	Supports deliveries to the east
Hastings	+	Supports deliveries to the west

What are the economic, social and environmental impacts of this option?



Risks and opportunities

There are risks to be managed during delivery, commensurate with major underground construction, including around ground conditions and impacts to utility services.

There is an opportunity with the construction of the new road tunnel to deliver amenity upgrades where traffic is reduced and support urban redevelopment.

Funding

Though this option has only been recommended for further planning work, should government choose to pursue this project, it will then need to consider funding options. Below is a range of potential funding mechanisms which could be examined to help fund the project.

Potential funding mechanisms

General government revenue	User charges	Beneficiary charges	Property development	Asset sales
✓	✓	✓		

Funding for projects like Eastern Freeway to CityLink connection (EWE) should include user charges as those who use it will be direct beneficiaries of the new asset. These user charges could be applied as part of a broader transport network pricing regime, or ahead of such a reform, tolls could be charged. Contracting terms for any new tolls should consider favouring flexibility to allow for a transition to an integrated transport network pricing regime.

Infrastructure Victoria is examining transport network pricing as part of our research program. We think that the primary objective of a transport network pricing regime – where users pay to access and use the transport network – should be to manage demand, rather than to recover costs for infrastructure. We are focusing on examining road pricing regimes in metropolitan Melbourne as a first step towards a comprehensive transport network pricing regime that includes roads and public transport. Careful consideration must be given to the design of the regime to ensure it is efficient, fair and sustainable.

Investing in major road links such as EWE could also have a positive impact on land values in the vicinity of the project from improved transport accessibility and travel time savings. This means residents and commercial land holders benefit from the new road whether or not they use it. Charging betterment levies to capture a portion of the benefits that accrue to these indirect beneficiaries could occur following investigations to clarify whether those indirect beneficiaries in established areas experience significant uplift in land value.

Beneficiary charges seek to capture indirect benefits, while user charges seek to capture direct benefits by aligning the cost of infrastructure with those that use it. If betterment levies and user charges are both considered by government, it should ensure that new charges do not unfairly duplicate each other or any existing charges.

General government revenue may still be needed to contribute to funding based on the broader community and economic benefits delivered by the project.

Additional notes

Further notes on assessment

Infrastructure Australia has listed an Eastern Freeway to CityLink connection as a high priority initiative (to address a problem within five years), which appears to be at variance with our assessment that the connection should not be precluded as it may be required in the later part of the 15-30 year period. However, our analysis differs from that of Infrastructure Australia which focused on problem definition, including extensive modelling corridor by corridor. While we agree with their assessment that there is substantial congestion in this corridor, a project solution was not confirmed as there was no submission put to them proposing one. In contrast, we have evaluated a range of possible solutions and

made a suite of recommendations, including for transport pricing reform which could go a way towards addressing this problem, and for this option, which we have considered alongside the full range of calls for infrastructure investment in the state in determining our recommendation on timing.

Relationship to state planning strategies

The presence or absence of this project from successive versions of land use plans has, in our view, more to do with the government of the day's position on the project than its inherent role in supporting or not supporting those plans. As such this has not played a significant part in our assessment.

Transport Modelling and Economic Analysis

Infrastructure Victoria commissioned KPMG, Jacobs and Arup to undertake transport modelling for a number of options being considered for the strategy, including a variety of 'build' and 'non-build' transport options. This allowed major transport projects to be quantitatively assessed alongside several technology, policy and reform options. In addition, economic analysis was undertaken for the 'build' options to estimate a cost benefit ratio, including for this option. The options were modelled individually, mostly on a standalone basis, with a number of options then also tested in various combinations.

This analysis was undertaken on a different basis and produced different results to what is presented throughout the options book, which was prepared by AECOM/PWC with the intention of allowing a mixture of qualitative and quantitative assessment across the full range of options, across all sectors and needs. While on the face of it these two analyses reference similar metrics, different assumptions and methodologies have been applied. In particular, the KPMG/Jacobs/Arup assessment provided purely relative ratings of each option's contribution to the needs, with the ratings scale set by the performance of only the select range of options modelled. This had the result of showing some transport options as making a "high" contribution to Need 18 (transition to lower carbon energy supply and use) simply because they were the highest of the options modelled; however, in Infrastructure Victoria's judgement most transport sector options will make a much lower contribution than energy sector options, as transport comprises a much smaller proportion of total carbon emissions. It provides a useful assessment for sorting the relative contribution of the options modelled, but should not be taken as an absolute assessment. In contrast, the assessments developed in the AECOM/PwC assessment considered the full range of options identified for each need and provided more of an 'absolute' assessment.


With these caveats in mind, however, the results of this alternative analysis are helpful inputs into Infrastructure Victoria's 'global' assessment, and in preparing the strategy we have come to a considered view based on the totality of evidence available to us.

In terms of the analysis of this option, transport modelling indicated that the Eastern Freeway to CityLink Connection will provide congestion relief to parts of the existing road network (particularly in the inner region), but will not have a significant impact at a network-wide level, with little effect on overall road and public transport demand. This is likely because it is located in a region with already high levels of demand on the road network and good existing public transport connections.

The economic analysis demonstrated that the Eastern Freeway to CityLink Connection delivers a modest preliminary cost benefit ratio of 1.1 – 1.4 with Wider Economic Benefits (WEBs) or 0.7 – 0.9 without WEBs, where the ranges represent the impact of cost estimate ranges. If expansions to the Eastern Freeway are removed from the scope of the option, the preliminary cost benefit ratio reduces to 0.8 - 1.0 with Wider Economic Benefits (WEBs) or 0.6 - 0.7 without WEBs, a poor result.

It should be noted that these results cannot be directly compared to other economic analyses of this option, due to a wide range of differences in the analysis.

In terms of its contribution to the needs, the transport modelling indicated that the project makes a low contribution to Need 13 in terms of improving the efficiency of freight supply, with freight spending round 1 per cent less time overall



travelling on the road network. The modelling indicated that the project would deliver a low to medium level of improvement to access to middle and outer suburban employment centres, and a low contribution to access to Central Melbourne.

For more detail, consult the 'Economic appraisal and demand modelling' report to Infrastructure Victoria.

Next steps

Extensive work has already been completed considering design options for this link and developing one of those options to an advanced stage. We are not proposing this work be repeated in the short-term, but closer to the time of implementation it would be necessary to update it.

In the shorter term, planning for this link could simply involve:

- Including it in strategic transport and land use plans to ensure overall city development (including planning for other transport links) allows for its potential longer-term delivery
- Undertaking a high level review and update of the existing work on alternative corridor alignments, and identifying any risks which might preclude the eventual construction of those design options
- Determining whether any such risks identified warrant a level of corridor protection and if so, implementing the necessary planning controls

We do not have a view on whether existing properties in state government ownership should be retained or disposed of, noting that alternative design solutions may be pursued and that the steps above would be needed to determine criticality of any sites.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

KPMG/Arup/Jacobs, *Economic appraisal and demand modelling*, 2016

E-waste services

EWS

Option type

Better use through subsidies

Location

Statewide

Sector

Water and waste

Certainty of evidence

High

Evidence base

Deloitte/Aurecon, *Assessment 1: Options analysis report*, 2016

The Economist, *Global e-waste systems: Insights for Australia from other developed countries*, 2015

Victorian Department of Environment, Land, Water and Planning, *Managing e-waste in Victoria: Starting the conservation*, 2015

Direct option cost

\$500 million—\$1 billion

Contribution to meeting the need

Need 15. Manage pressures on landfill and waste recovery facilities – **Low**

What is this option?

This option provides a role for government in electronic waste (e-waste) management infrastructure. All reprocessing and material recovery facilities in Victoria are privately owned and operated. In recent years, the private sector has had less appetite for risks associated with long-term investment in waste management facilities. There is, however, a growing need for solutions to manage problematic waste streams such as e-waste. Management of e-waste by recycling for example is currently not profitable when compared to the low costs of sending this waste to landfill. Over time, e-waste can take up significant landfill capacity.

There is potential for the government and private sector operators to better develop infrastructure to process problematic waste streams such as e-waste.

What is the level of community support?

There was limited to no discussion of this option during public consultation. This option was recommended by the metropolitan citizen jury.

What do we think of this option and why?

This option was not recommended in the strategy because it is now considered base case following the release of the government's *Managing e-waste in Victoria* consultation paper. We will monitor implementation of actions developed from consultation on this paper and progress on the government's commitment to banning e-waste.

CityLink to Western Ring Road connection

EWV

Option type

New assets

Location

Melbourne central subregion

Melbourne western state-significant transport corridor

Sector

Transport

Certainty of evidence

Low

Direct option cost

>\$10 billion

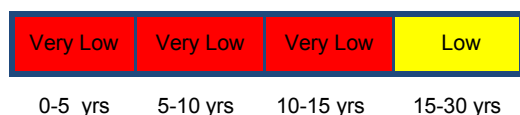
Option lead time

5–10 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 10: Meet growing demand for access to economic activity in central Melbourne; and

Need 11: Improve access to middle and outer metropolitan major employment centres



Need 13: Improve the efficiency of freight supply chains



What is this option?

Construction of a road link between CityLink and the Western Ring Road M80. This option targets east-west links for road freight movement, including in and around the Port of Melbourne. This option is essentially the East West Link (Western Section) but the name has been generalised to encompass a range of alternative sections and alignments.

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive.

What do we think of this option and why?

This option was recommended for further planning in the strategy (ref. 11.5.8 and 13.5.4) because there is some likelihood the option will be needed in the latter part of the 15–30 year period. Introducing transport network pricing would particularly attenuate demand on links to, and through, the congested central areas of Melbourne. However, emerging transport technologies and other uncertainties could increase the need for this link. Therefore, it is prudent to review potential alignments and protect the corridor where appropriate. This option has the potential to improve freight access to the Port of Melbourne, provide an alternative corridor to the M1 Monash and M80 Ring Road, improve access to central Melbourne and middle and outer metropolitan areas, and reduce the demands on infrastructure and remove trucks from local streets. Further work would be needed to identify the appropriate sequencing between this link and the more easterly section from the Eastern Freeway to CityLink.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

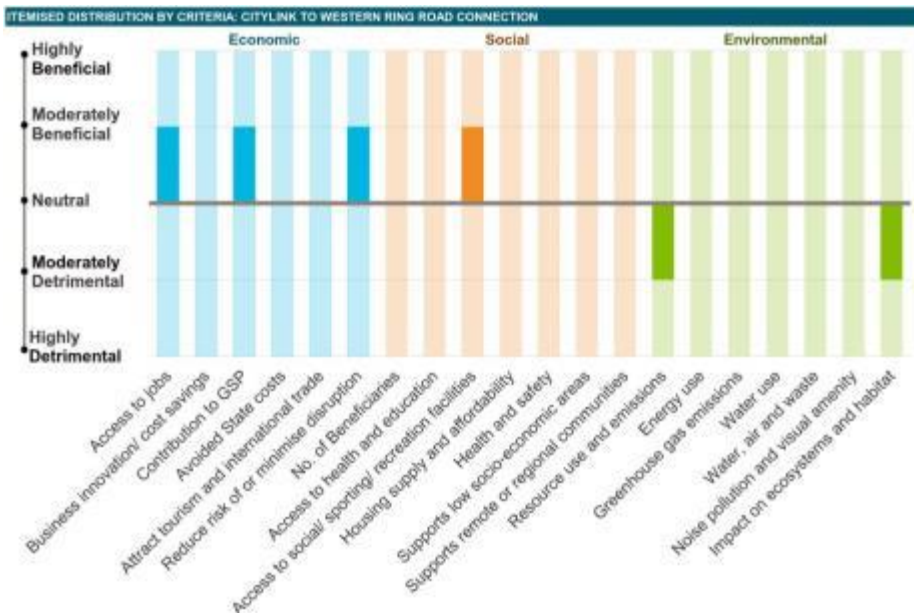
How does this option work with others?

This option is complementary to CityLink to Western Ring Road Connection (EWE). To prevent the benefits of this option being eroded by induced traffic, it could also be complemented with advanced traffic management (ATM) and transport network pricing (TNP). It could also increase its value once driverless vehicles become a mainstream mode of transport (ACT, DFV).

How does this option perform under different scenarios?

Supercity	+	Could improve cross city travel
Westside Story	+	Could improve cross city travel
Regional Cities	+	Could improve cross city travel
Accelerated Climate Change /Mitigation	Potentially negative	Risk of induced travel and dispersed land use
Prolonged/ Severe Economic Downturn	-	Less demand for heavy freight
Biosecurity Threat	Neutral	
Bay West	+	Additional freeways assist in freight movement
Hastings	+	Additional freeways assist in freight movement

What are the economic, social and environmental impacts of this option?



Risks and opportunities

There are risks to be managed during delivery, commensurate with major underground construction, including around ground conditions and impacts to utility services. There may be a risk of disruption to the existing road network, depending on alignment and construction method. This option could create opportunities for urban redevelopment and amenity improvements where traffic is reduced. It could also result in an increase to job accessibility.

Funding

Though this option has only been recommended for further planning work, should government choose to pursue this project, it will then need to consider funding options. Below is a range of potential funding mechanisms which could be examined to help fund the project.

Potential funding mechanisms

General government revenue	User charges	Beneficiary charges	Property development	Asset sales
✓	✓	✓		

Funding for projects like CityLink to Western Ring Road connection (EWW) should include user charges as those who use it will be direct beneficiaries of the new asset. These user charges could be applied as part of a broader transport network pricing regime, or ahead of such a reform, tolls could be charged. Contracting terms for any new tolls should consider favouring flexibility to allow for a transition to an integrated transport network pricing regime.

Infrastructure Victoria is examining transport network pricing as part of our research program. We think that the primary objective of a transport network pricing regime – where users pay to access and use the transport network – should be to manage demand, rather than to recover costs for infrastructure. We are focusing on examining road pricing regimes in metropolitan Melbourne as a first step towards a comprehensive transport network pricing regime that includes roads and public transport. Careful consideration must be given to the design of the regime to ensure it is efficient, fair and sustainable.

Investing in major road links such as EWW could also have a positive impact on land values in the vicinity of the project arising from improved transport accessibility and travel time savings. This means residents and commercial land holders benefit from the new road whether or not they use it. Charging betterment levies to capture a portion of the benefits that accrue to these indirect beneficiaries could occur following investigations to clarify whether those indirect beneficiaries in established areas experience significant uplift in land value.

Beneficiary charges seek to capture indirect benefits, while user charges seek to capture direct benefits by aligning the cost of infrastructure with those that use it. If betterment levies and user charges are both considered by government, it should ensure that new charges do not unfairly duplicate each other or any existing charges.

General government revenue may still be needed to contribute to funding based on the broader community and economic benefits delivered by the project.

Additional notes

Transport modelling

This option was modelled by KPMG, Jacobs and Arup in VITM, in an indicative manner to reflect a maximum capacity uplift scenario (partially duplicating Western Distributor) in order to test the Eastern Freeway to Citylink (EWE) option, given that these options together create a full cross-town corridor. This scenario forecast improved travel times to the CBD and other employment centres and minor improvements in accessibility to health, education and employment. However, it should be treated with caution, as its primary purpose was to test option EWE, not to present an evaluation of EWW.

For more detail, consult the 'Economic Appraisal and Demand Modelling' report to Infrastructure Victoria.

Next steps

Greater clarity will be needed as to how the Western Distributor might impact on the future scope and design of this link.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

KPMG/Arup/Jacobs, *Economic appraisal and demand modelling*, 2016

Freight consolidation centres FCC

Option type

New assets

Location

Statewide

Sector

Transport

Certainty of evidence

Low

Direct option cost

\$10 million–\$25 million

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 13: Improve the efficiency of freight supply chains

Low	Low	Low	Low
-----	-----	-----	-----

0-5 yrs

5-10 yrs

10-15 yrs

15-30 yrs

What is this option?

Government to play a coordinating role to identify existing and future potential precincts requiring planning protection in respect of freight operations, including those related to first and last-mile freight delivery to assist the private sector.

What is the level of community support?

There was limited discussion of this option during public consultation. This may be as it was not recommended in the strategy.

What do we think of this option and why?

This option was not recommended in the strategy, as it was not clear that there is a need for government intervention in identifying and securing potential sites for freight consolidation centres. More specifically, while freight consolidation centres could play a useful role in the future in terms of promoting supply chain efficiencies in urban areas, it was not clear as to what barriers there might be in the current planning system to the securing of appropriate sites.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

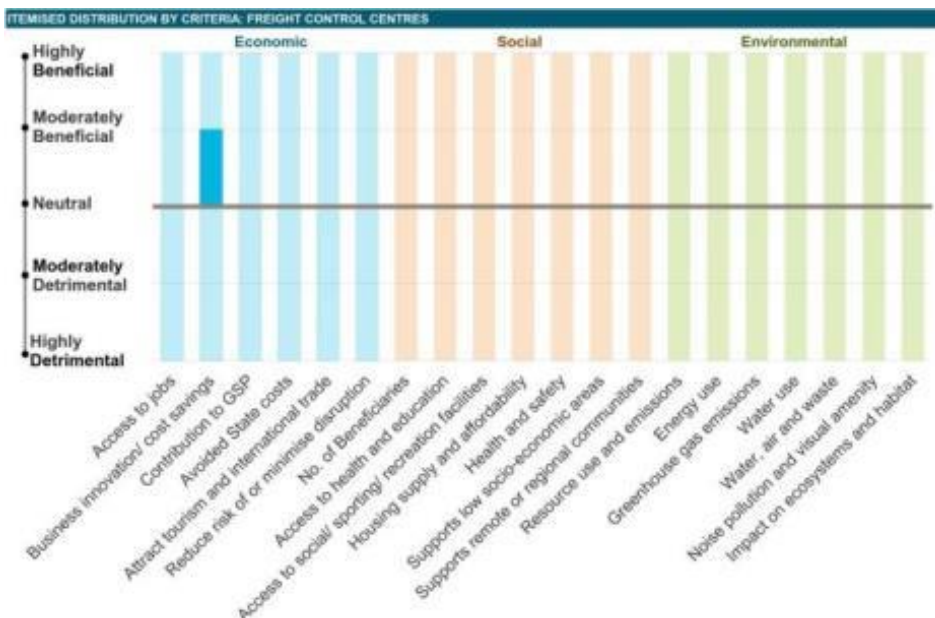
How does this option work with others?

This option is complementary to freight precinct land use planning (FPL).

How does this option perform under different scenarios?

Supercity	++	Reduces impact of increased freight volumes on urban amenity
Westside Story	+	Reduces impact of increased freight volumes on urban amenity
Regional Cities	+	Reduces impact of increased freight volumes on urban amenity
Accelerated Climate Change /Mitigation	+	Enables more carbon efficient last-mile delivery
Prolonged/ Severe Economic Downturn	Neutral	
Biosecurity Threat	Neutral	
Bay West	+	Potential supply chain efficiency increase
Hastings	+	Potential supply chain efficiency increase

What are the economic, social and environmental impacts of this option?



Risks and opportunities

There is a risk that government may not be able to gain alignment between market players about the location of a new freight centre.

This option provides an opportunity for a more cost effective outcome for freight businesses, through coordinating identification of an appropriate site for a freight centre.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Waste landfill site land buffers

FLS

Option type

Changing behaviour through land use and planning controls

Location

Statewide

Sector

Water and waste

Certainty of evidence

Medium

Direct option cost

\$10 million–\$25 million

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 15: Manage pressures on landfill and waste recovery facilities

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option would clarify landfill site buffer zones, ensure information on landfill locations and buffer distances is made publicly available, and apply buffer zone requirements. This will prevent further land use conflicts and secure existing landfill capacity.

This option involves a regulatory review and provision of information. However, enforcement of required buffer zone distances may mean that land already being used for other purposes is re-zoned or in some cases repurchased (further detail in *What is this option? cont'd*).

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive. This option was recommended by the metropolitan citizen jury.

What do we think of this option and why?

This option was recommended in part in the strategy (ref. 15.2.1) because at a relatively low cost it provides a major contribution to securing existing landfills and preventing future land use conflicts. A component of this option, clarifying where measurement of buffer distances should start, has begun to be addressed through the *Assessing planning proposals near landfills draft guideline* (EPA 2016). Action is still required to ensure planning provisions and related decision making processes provide clearer guidance and apply these buffer zone requirements. These actions are part of the recommendation. Given that Melbourne in particular is already highly urbanised and is projected to develop even further, there is a need to manage existing land use conflict and reduce the encroachment of landfill sites. This option helps to ensure that existing landfill sites are not prematurely closed (further detail in *What is this option? cont'd*).

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

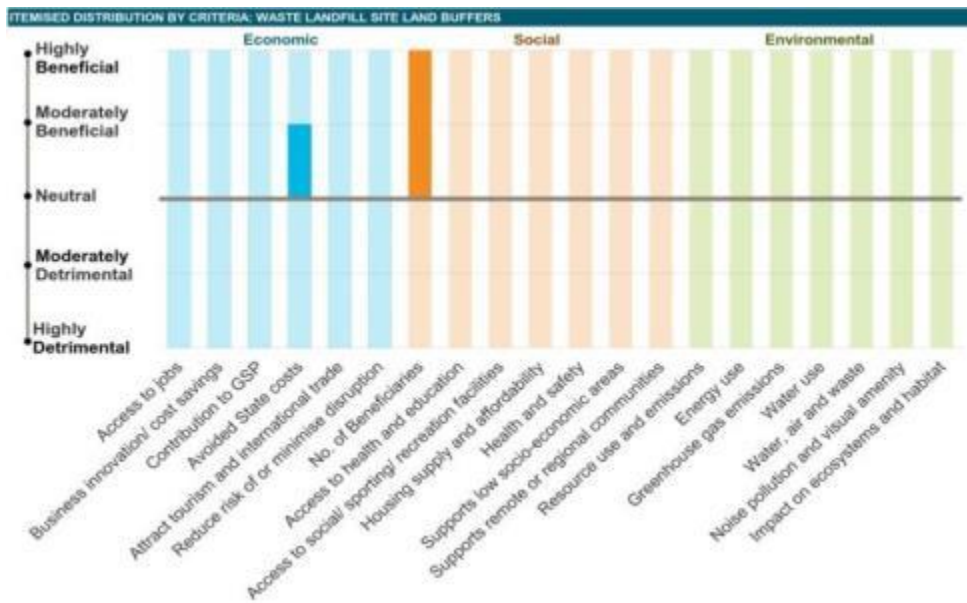
How does this option work with others?

This option could delay or preclude the need to secure new landfill or waste management sites (FWL).

How does this option perform under different scenarios?

Supercity	++	Increased likelihood of land use conflicts
Westside Story	++	Increased likelihood of land use conflicts
Regional Cities	+	Increased likelihood of land use conflicts
Accelerated Climate Change /Mitigation	Neutral	
Prolonged/ Severe Economic Downturn	Neutral	
Biosecurity Threat	+	Increased need to contain biosecurity risks

What are the economic, social and environmental impacts of this option?



What is this option? (cont'd)

Landfill sites are currently vital to the management of waste and encroachment is a particular issue in metropolitan Melbourne. Some landfill sites are in areas of urban growth, resulting in land use conflicts. Currently, buffer zones around landfill sites are close to 500 metres. It is not clear, however, where these buffer distances should start. Providing clarity around buffer distances and ensuring this information as well as the location of landfill sites is easily accessible to planners and the public will assist to ensure that existing landfill sites are not prematurely closed down due to land use conflicts.

What do we think of this option and why? (cont'd)

Consultation on this option has revealed that information on landfill locations and the buffer distances required around them is not easily accessible to the broader community. By clarifying information in planning provisions and ensuring clear links with buffer zone requirements, this option increases transparency with the community and enables further engagement with the community on the future of waste management. Further analysis will be required to determine specific impacts of implementing this option. For example, a case by case assessment will be required to determine actions where land is already being used for other beneficial purposes.

Risks and opportunities

There is a risk that this option may be costly to implement in areas that are already highly developed.

There is an opportunity for this option to trigger broader industry and community interest in reducing the amount of waste to landfill particularly when trade-offs are being made to increase landfill capacity or to use high value land for other purposes.

Additional notes

Landfill buffer zone requirements

While landfill sites provide waste management services for Victorians, they impact on the environment and surrounding communities by emitting gases and odours. Buffer zones manage the risks associated with these impacts by requiring minimum distances from landfills for purposes such as residential land use. The *Assessing planning proposals near landfills* draft guideline (EPA 2016) now includes information on how to measure the default 500 metre or 200 meter gas migration distance depending on the type of waste accepted by a landfill. These guidelines are however currently not legally binding.

Without clear consideration of landfill and sensitive land use buffer zone requirements in planning controls and related decision making, the risk of unintended land use conflicts continues to exist. For example, in 2008 over 25 houses in Brookland Greens Estate, Cranbourne, were evacuated as a result of a gas leak from Stevensons Road landfill. A review of the event noted that a previously reduced buffer zone requirement had impacted on the location of some of these houses (Victorian Ombudsman, 2009).

This option proposes to ensure that unintended land use conflicts are mitigated by integrating and enforcing buffer zone requirements in planning decisions and increasing information provision for the community. Buffer areas around facilities that do not have existing land use conflict with sensitive uses should be enforced and sensitive uses prohibited. However, we recognise that there are existing facilities where the buffer area has already been encroached by sensitive uses. In these instances, enforcement of the buffer area may require a different approach to manage land use conflict and there should be a greater onus on the modification or restriction of future uses proposing to locate within the buffer area.

Next steps

Land use conflicts with sensitive land uses could be managed by applying the 'reverse amenity' principle. This aims to ensure that sensitive land uses are not located or designed in ways that would expose people to unacceptable amenity impacts. The use of zones, overlays and particular provisions could also be considered to streamline, create consistency and improve decision-making processes.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Sustainability Victoria, *Statewide waste and resource recovery plan: Victoria 2015-44*, 2015

Victorian Environment Protection Authority, *Assessing planning proposals near landfills: Draft guideline*, 2016

Victorian Ombudsman, *Brookland Greens Estate – Investigation into methane gas leaks*, 2009

Freight precinct land use planning FPL

Option type

Better use through land use and planning controls

Location

Statewide

Sector

Transport

Certainty of evidence

Medium

Direct option cost

\$1 million–\$10 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 13: Improve the efficiency of freight supply chains

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option would ensure appropriately zoned land is available for freight and logistic activities around key freight infrastructure. This includes land rezoning and precinct structure planning to facilitate the development of future precincts which require good access to the principal freight network, freight terminals and intermodal terminals. Previous government policies have promoted such precincts in the Port/Dynon area, Altona/Truganina, Lyndhurst and Somerton/Beverage.

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive.

What do we think of this option and why?

This option was recommended in part in the strategy (ref. 13.3.2) because protecting freight corridors and logistics centres from sensitive uses, such as housing, will lead to a more efficient freight network over the longer term. This option has been scaled-down as further work is required before initiating zoning or other planning changes. This work should identify key existing and future freight precincts and corridors requiring planning protection, beyond the port environs that have already been identified for protection. Ideally this would form part of broader freight network strategies and actions. The identification of priority precincts will inform government's planning response in the short, medium and long term. It can determine the need for specific intervention, protection buffers or longer-term planning for emerging freight locations, particularly in greenfield growth areas.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

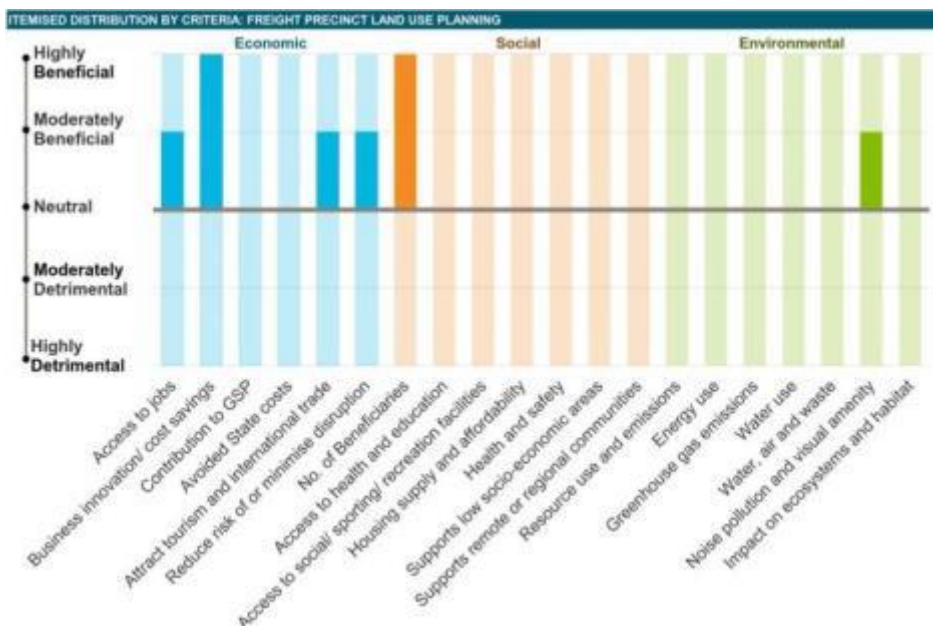
How does this option work with others?

This option then further enables, through effective planning, Port of Melbourne rail shuttle (PMM), Webb Dock freight rail access (WDF) and Western Interstate Freight Terminal (WIF) which also encourage improvement in efficiency of the freight supply chain. This option also further enables the Melbourne to Brisbane freight rail line (MBF) which may be required in the long term, as well as supporting intermodal freight hubs (IFH). The land use planning in this option works with those listed above to ensure an effective freight network.

How does this option perform under different scenarios?

Supercity	+	Increased demand for freight, likelihood of land use conflicts
Westside Story	+	Increased demand for freight, likelihood of land use conflicts
Regional Cities	+	Increased demand for freight, likelihood of land use conflicts
Accelerated Climate Change /Mitigation	Neutral	
Prolonged/ Severe Economic Downturn	-	Less demand for heavy freight
Biosecurity Threat	Neutral	
Bay West	+	Minimises potential for land use conflicts
Hastings	+	Minimises potential for land use conflicts

What are the economic, social and environmental impacts of this option?



Risks and opportunities

Some of the major freight precincts, such as ports in Melbourne, sit alongside areas that have significant urban renewal opportunities. This option could pose a risk to the development of some of these precincts. There is a need to carefully manage these trade-off decisions.

In Victoria, several key decisions on port and other freight precincts are yet to be determined. Until these decisions are made, land use rezoning cannot be undertaken with confidence.

This option could be used to identify and protect appropriate sites through planning mechanisms for a number of options including a third Melbourne airport, a second container port and a Western Interstate Freight Terminal.

Additional notes

Next steps

When implementing this option, the government should also investigate other freight infrastructure for protection across Victoria, such as significant intermodal terminals, locomotive service centres, rail yards, key road and rail links on the Principle Freight Network. We have also identified the potential to formalise Avalon Airport's curfew-free status.

Although the Beveridge intermodal freight terminal (BIF) was not recommended for delivery in the final strategy, it should be one of the high priority locations for precinct structure planning and potential land reservation under this option. This facility may be required to support freight operations in the longer term.

Planning for freight activities should consider links to distribution and export hubs. It should also be made with an understanding of the pipeline of appropriately located industrial zoned land, consider future freight demands, and plan for increases to the capacity of the network.

Consultation with local government and industry is an important part of implementing this option. Some stakeholders consider freight precinct planning a high priority to contribute to maintaining a freight and logistics competitive edge in Victoria.

Policy context

In 2012, in response to the recommendations of the Port and Environs Advisory Committee (PEAC), the government announced an initiative to provide consistent and robust protection against encroachment of sensitive uses on the efficient operation of Victoria's four commercial trading ports. This approach applies the 'reverse amenity' principle, which requires that sensitive land uses, such as new housing, not be established where amenity standards are unsatisfactory.

The 2014 freight plan, *Victoria the freight state; the Victorian freight and logistics plan*, identifies the need to plan for new freight activities particularly in the growth areas. The designation of freight terminals in precinct structure planning enables the early identification of key locations and incorporation of appropriate amenity planning.

Plan Melbourne also recognises the need for a more consistent and informed approach to land use planning for freight activity. In particular, to ensure that sensitive land uses are not located or designed in such a way that would expose people to unacceptable amenity impacts (*Plan Melbourne 2014* initiative 3.5.3).

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Victorian Department of Environment, Land, Water and Planning, *Victoria in the Future: Population and household projections*, 2015

Victorian Department of Transport, Planning and Local Infrastructure, *Plan Melbourne*, 2014

Victorian Government, *Victoria the freight state: The Victorian freight and logistics plan*, 2013

Flemington Racecourse rail line activation

FRA

Option type

Better use through refurbishment of existing assets

Location

Melbourne central subregion

Sector

Transport

Certainty of evidence

Medium

Direct option cost

\$250 million–\$500 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 10: Meet growing demand for access to economic activity in central Melbourne

Very Low	Very Low	Very Low	Very Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Activate regular passenger rail services on the Flemington Racecourse rail line to connect new residential development around the existing spur line with the city. The scope of work would include upgrades to the existing stations at Showgrounds and Flemington Racecourse, removal of one level crossing, purchase of additional rolling stock and upgrades to the signalling and track work to support regular peak services on the line. Activation of this line for regular services will support residential growth in this area and potential development sites such as those proposed at Flemington Racecourse. This option will provide direct and efficient access from this growing area to the central city to access jobs and services.

What is the level of community support?

There was limited discussion of this option during public consultation. This may be as it was not recommended in the draft strategy.

What do we think of this option and why?

This option was not recommended in the strategy because it would significantly reduce the capacity of the highly utilised Craigieburn Line. While this option would benefit higher density residential developments along the existing Flemington Line (currently only used for race days and special events), residents can already use local bus and trams services that connect with Ascot Vale and Newmarket train stations. Serving this short line with heavy rail would result in underutilised services displacing heavily used services on the Craigieburn Line, which is experiencing rapid growth. As a result, this option has been assessed as providing a very low contribution to meeting need 10. No economic, social and environmental impact assessment was undertaken (further detail in *What do we think of this option and why? cont'd*).

What do we think of this option and why?

The Flemington Rail Line Activation was considered as part of a Ministerial Advisory Committee (MAC) reviewing the urban redevelopment at Flemington Racecourse. PTV advised the MAC by letter dated 20 November 2015 that 'a regular commuter rail service to Flemington Racecourse is regrettably not supported, due to the need to reserve train paths for patronage growth along the Craigieburn rail corridor and the expense involved in upgrading rail infrastructure'.

Risks and opportunities

Without significant investment in the rail network, the proposal may reduce the capacity of the Craigieburn Line.

The option could provide an expansion of the metropolitan rail network at minimal cost.

Additional notes

There is an alternative proposal relevant to this option, put forward in submissions and considered (but not preferred) in the Melbourne Airport Rail Link Feasibility Study, to extend the Flemington line out to Melbourne Airport. We have not examined this proposal in detail, as we consider it is best addressed through further consideration of all options for providing a link to Melbourne Airport (MAH).

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Fuel reserve regulation

FRR

Option type

Better use through licensing

Location

Statewide

Sector

Energy

Certainty of evidence

Low

Evidence base

Commonwealth Department of Industry and Science, *Energy white paper*, 2015

Deloitte/Aurecon, *Assessment 1: Options analysis report*, 2016

Senate standing committee on rural and regional affairs and transport, *Australia's transport energy resilience and sustainability*, 2015

Vlado, V., *Running on empty: Australia's risky approach to oil supplies*, 2014

Direct option cost

\$100 million—\$500 million

Contribution to meeting the need (assumes instantaneous implementation)

Need 19. Improve the resilience of critical infrastructure – **Low**

What is this option?

This option considers introducing requirements to hold minimal fuel reserves. This option proposes Victorian regulation to ensure standards to hold minimum fuel reserves for the state are comparable to international standards for fuel reserves. The government can analyse supply side vulnerabilities with respect to shipping, ports, refineries and domestic distribution and, where warranted, conduct an appropriate level of contingency planning.

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option was not recommended in the strategy because it is not clear that increasing fuel reserves from current levels is a critical issue with regards to resilience. The International Energy Agency requires that 90 days' worth of fuel reserves are held by member countries, including Australia. There is ongoing discussion on the implications of Australia's reserves being below this requirement. For example, some argue that Australia's supply is secure due to diversified international supplies, existing Australian stock and significant volumes of stock on water. Further evidence would be required to develop a recommendation and to consider specific impacts for Victoria. It is noted that fuel reserve obligations are primarily considered by the Commonwealth rather than state governments.

Future waste management and landfill site locations

FWL

Option type

Better use through land use and planning controls

New assets

Location

Statewide

Sector

Water and waste

Certainty of evidence

Medium

Direct option cost

<\$1 million

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 15: Manage pressures on landfill and waste recovery facilities

Significant	Significant	Significant	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option seeks to secure locations for future landfill, waste recovery and waste processing sites in planning instruments. This will provide certainty to industry in investing further in waste management in Victoria. Importantly, it will help to prevent land use conflicts in the future.

This option proposes a regulatory review to provide greater transparency around planning for future landfill and waste management facilities (further detail in *What is this option? cont'd*).

What is the level of community support?

There was limited to no discussion of this option during public consultation. This option was recommended by the metropolitan citizen jury.

What do we think of this option and why?

This option was recommended in the strategy (ref. 15.2.2) because it significantly influences the ability to transparently plan for future landfill and waste management sites. Clarifying planning provisions and requirements for future waste management and landfill sites will provide industry with the certainty it needs to undertake long-term planning while triggering more robust engagement by both government and industry with the community on future waste management alternatives. Consultation on *All Things Considered* reiterated that unclear planning provisions were a hindrance to long-term planning in the waste sector. A proactive approach by government to clearly incorporating waste management requirements in planning instruments will prevent future land use conflicts and may lead to further benefits as the community better appreciates competing land use demands.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

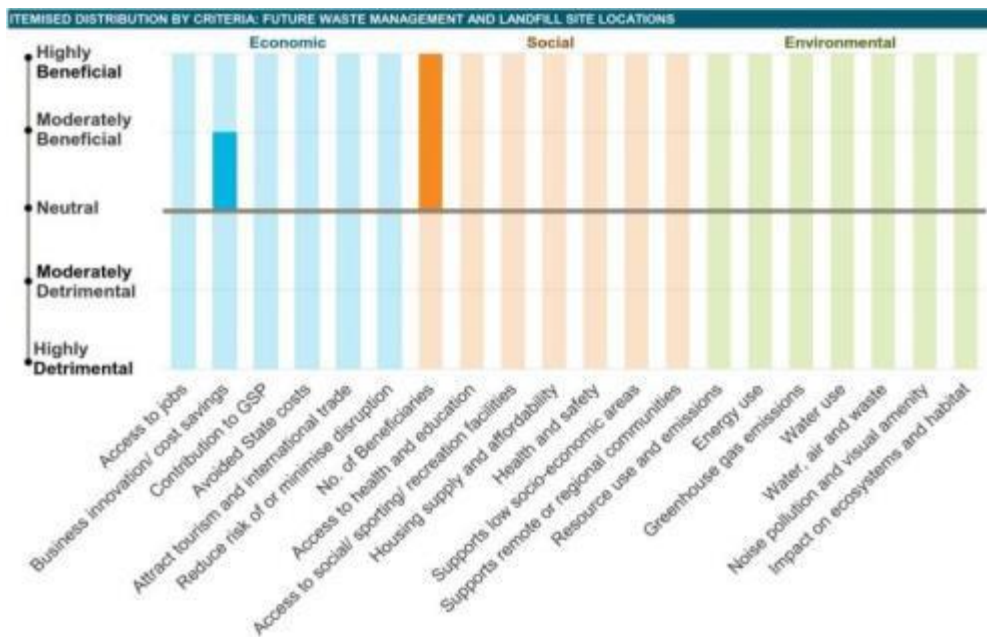
How does this option work with others?

Implementing this option better enables planning and community engagement for future waste management and recovery facilities such as waste incinerators (EGW).

How does this option perform under different scenarios?

Supercity	++	Increased demand for waste disposal services, sites
Westside Story	++	Increased demand for waste disposal services, sites
Regional Cities	+	Increased demand for waste disposal services, sites
Accelerated Climate Change /Mitigation	Neutral	
Prolonged/ Severe Economic Downturn	-	Less demand waste services
Biosecurity Threat	+	Increase demand for disposal of hazardous waste

What are the economic, social and environmental impacts of this option?



What is this option? (cont'd)

Future waste management sites will only be required as existing sites reach their capacity. However, early planning and securing of appropriate locations is important in mitigating issues associated with land use encroachment. Currently, while information to assist future planning is available through the statewide infrastructure plans and EPA guidelines, planning instruments do not adequately enable long-term investment in waste management.

For example, EPA approval of new landfills is dependent on relevant sites being identified in regional planning instruments. Information on the process to determine potential sites in regional planning instruments is however not clear or easily accessible, creating uncertainty for industry and the broader community. Similarly, the need to allow for expanded waste recovery and processing facilities with development is not well recognised in planning instruments. This option seeks to address these issues.

Risks and opportunities

There is a risk that existing landfills and waste management sites reach their capacity prematurely. Existing waste management planning relies heavily on these sites being available to provide waste management capacity. Disruptions can include natural disasters that lead to unforeseen volumes of waste material being landfilled for example. There is also a risk that transportation and logistics costs have a higher than anticipated influence on suitable waste management and landfill locations in the future. And finally, there is a risk of lack of community support for future landfill and waste management sites.

There is an opportunity to better integrate development with waste management requirements. For example, waste management sites can be zoned close to non-conflicting land uses and progressively updated with development and population growth forecasts.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then we have clarified that the intent of the recommendation is to have transparency in decision making processes in addition to planning provisions.

Next steps

A key step to implementing this option would be integrating the waste planning framework objectives and outputs into the Victorian Planning Provisions.

Liaison with agencies, industry and the community will also be required to determine the extent to which clarification of planning provisions will be successful in increasing certainty for industry and the community. For example, where decision making is implicit in planning documents, processes or frameworks, this may need to be made transparent and feedback from stakeholders and the community on the suitability of this taken into account.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Metropolitan Waste and Resource Recovery Group, *Local buffer support program*

Sustainability Victoria, *Statewide waste and resource recovery plan: Victoria 2015-44*, 2015

Victorian Environmental Protection Authority, *Landfill best practice environmental management guidelines: Siting, design, operation and rehabilitation of landfills*, 2015

Growth area train station upgrade and provision GAT

Option type

Incremental expansion of existing assets

Location

Statewide

Sector

Transport

Certainty of evidence

Medium

Direct option cost

\$250 million–\$500 million

Option lead time

5–10 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 1: Address infrastructure demands in areas with high population growth; and

Need 10: Meet growing demand for access to economic activity in central Melbourne; and

Need 11: Improve access to middle and outer metropolitan major employment centres

Low	Low	Low	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Provision of new stations such as Truganina and Black Forest, Sayers and Davis Roads in growth areas on the Regional Rail Link corridor and upgrades to existing under-capacity stations, including safety, amenity and car-parking. New stations should be prioritised in areas where residential development is approaching the rail corridor (such as Black Forest Road) and areas with a layout and land character capable of absorbing higher-intensity development with a transit-supportive design character (such as Boundary Road in Truganina or Sayers Road in Tarneit). Upgrades to existing stations should likewise be prioritised in locations with the potential to absorb future growth to support walkability and public transport use, offset from the influence of car-centric development and exhibit sufficient available land for mixed-use development (such as Donnybrook and Baxter), or that have significant passenger capacity constraints (such as Rockbank and Leawarra). This would enable greater accessibility to central city employment and services for the growing population along existing corridors.

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive. Both citizen juries made recommendations in support of this option.

What do we think of this option and why?

This option was not recommended in the strategy because the need for station upgrade and provision will be adequately met through existing station upgrade programs and new stations with the specific rail extensions and electrifications recommended in the strategy. Adding new stations to the existing rail network provides a low to moderate contribution to meeting needs 1, 10 and 11 for a relatively low cost and records a range of social, economic and environmental benefits. However, new stations and station upgrades need to be considered in the context of the unique requirements and opportunities provided by the individual projects (further detail in *What do we think of this option and why? cont'd*).

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

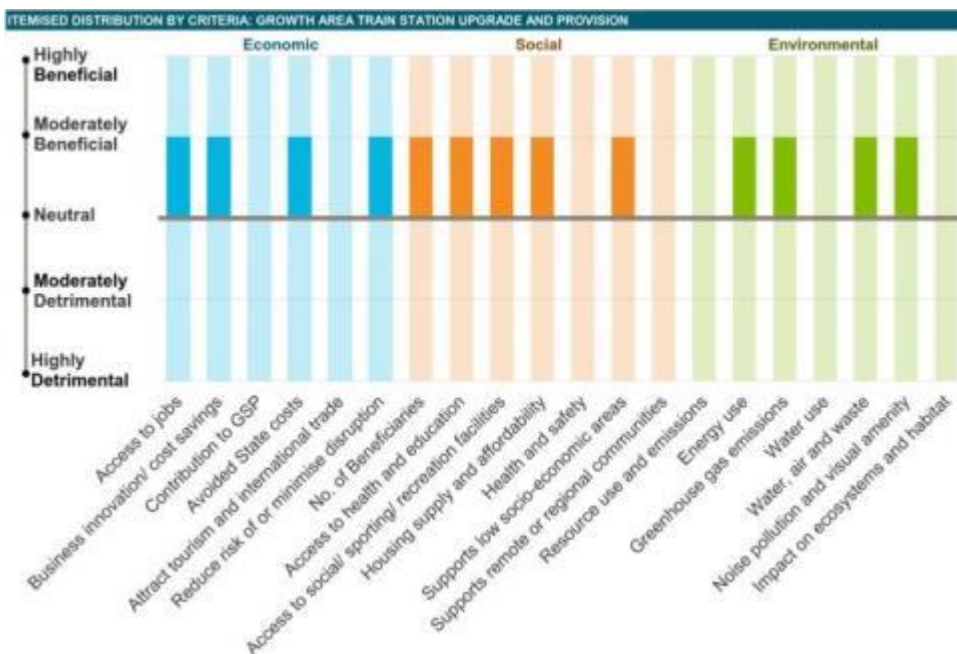
How does this option perform under different scenarios?

Supercity	+	Supports mode shift to address congestion
Westside Story	+	Supports mode shift to address congestion
Regional Cities	+	Supports mode shift to address congestion
Accelerated Climate Change /Mitigation	+	Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	-	Less demand for mass transit
Biosecurity Threat	Neutral	

How does this option work with others?

Upgrading train stations is complementary with installing bike cages under active lifestyle infrastructure provision (ALP) and with greater provision of parking facilities at train stations through train station car parking improvement (TSC).

What are the economic, social and environmental impacts of this option?



What do we think of this option and why? (cont'd)

The majority of the stations considered under this option are already covered by the scope of work of other options recommended in the strategy such as Wallan rail extension (WRE1) and Geelong and Werribee rail upgrade (GWR). In addition, there are existing programs for the upgrade and provision of new stations in growth areas such as the proposed works at Caroline Springs and Rockbank. Where station developments are proposed, consideration should be given to the development of a transparent process for the assessment of the relative benefits and costs and appropriate timing for construction. This can help provide greater public understanding of the selection and development of new stations and station upgrades.

Risks and opportunities

There are risks from undertaking construction in an existing operational rail corridor that would need to be managed during the delivery phase.

There is an opportunity to integrate land use and transport planning and infrastructure, and utilise the proposed train stations as local economic and community hubs.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Public Transport Victoria, *Network development plan: Metropolitan rail*, 2012

Government data sharing GDS

Option type

Better use through information

Location

Statewide

Sector

ICT

Certainty of evidence

Medium

Direct option cost

\$1 million–\$10 million

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 1: Address infrastructure demands in areas with high population growth; and

Need 2: Address infrastructure challenges in areas with low or negative growth; and

Need 3: Respond to increasing pressures on health infrastructure, particularly due to ageing; and

Need 10: Meet growing demand for access to economic activity in central Melbourne; and

Need 11: Improve access to middle and outer metropolitan major employment centres; and

Need 12: Improve access to jobs and services for people in regional and rural areas; and

Need 19: Improve the resilience of critical infrastructure

Low	Low	Low	Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Legislate to require state government departments and agencies to release up-to-date data quickly, for example the New South Wales *Data sharing (Government Sector) Act 2015* to facilitate big data analysis by the private sector and the development of third party applications that could have positive economic, social and environmental outcomes. This option would build on the Victoria's DataVic Access Policy.

What is the level of community support?

There was limited discussion of this option during public consultation. This may be as it was not recommended in the draft strategy.

What do we think of this option and why?

This option was not recommended in the strategy because while a similar initiative has recently been legislated in New South Wales, it is too early to determine what impact that legislation will have in terms of enabling more efficient use of existing infrastructure.

When government departments share their data in a timely manner this can maximise the use and impact of data to enable quicker, more informed and higher quality decision-making, which could improve the allocation of resources by both public and private providers of infrastructure.

Infrastructure Victoria will review the impact of the New South Wales legislation for consideration the next Infrastructure Victoria strategy update.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

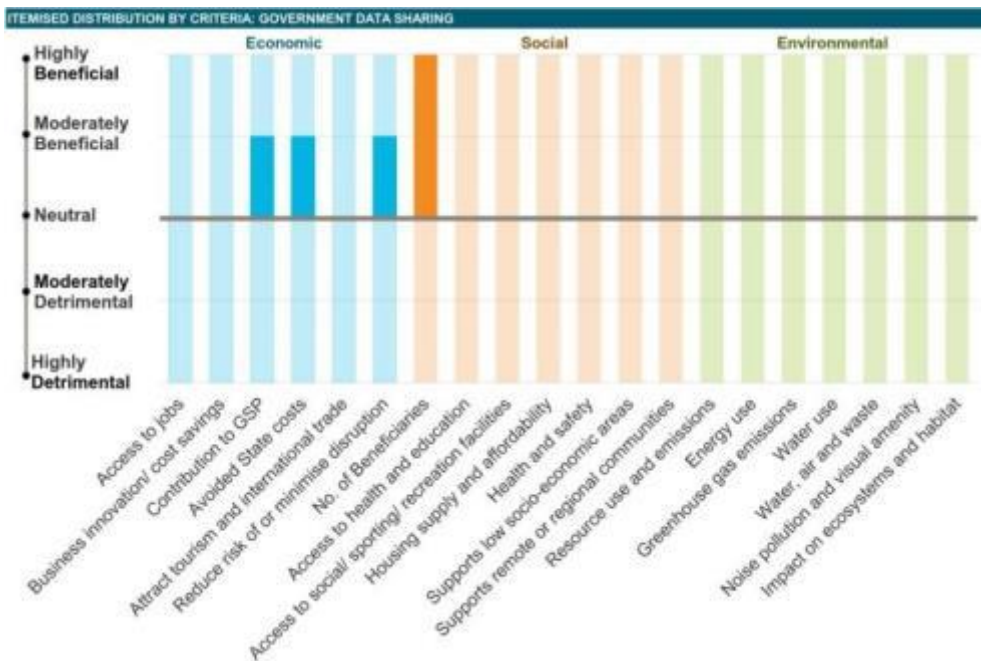
How does this option perform under different scenarios?

Supercity	+	Supports efficient delivery of services
Westside Story	+	Supports efficient delivery of services
Regional Cities	+	Supports efficient delivery of services
Accelerated Climate Change /Mitigation	+	Supports efficient delivery of services
Prolonged/ Severe Economic Downturn	+	Supports efficient delivery of services
Biosecurity Threat	+	Could support optimise remote service delivery

How does this option work with others?

This option is complementary to the Victorian data analytics centre (VDA) and access to services through ICT (AST).

What are the economic, social and environmental impacts of this option?



Risks and opportunities

Government ICT projects are automatically classified as high value, high risk under the Victorian Treasury's project assessment processes, reflecting the risk of delivery challenges.

Citizen data would need to be appropriately desensitised to build the community's trust in the option and protect the identities of specific individuals.

There are substantial opportunities for better policy development between different levels of government, different state government departments, community groups and the private sector.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Geelong fast rail

GFR

Option type

New assets

Location

Barwon region and Geelong regional city

Melbourne central subregion and Melbourne western subregion

Melbourne – Geelong state-significant transport corridor

Sector

Transport

Certainty of evidence

Low

Direct option cost

\$5 billion–\$10 billion

Option lead time

5–10 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 10: Meet growing demand for access to economic activity in central Melbourne; and

Need 12: Improve access to jobs and services for people in regional and rural areas

Moderate	Moderate	Moderate	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Implementation of a fast rail service (less than 30 minutes) between Geelong and Melbourne (Southern Cross Station). Using examples from international rail operators and new technologies, this option would encourage greater mode shift from cars and ‘regional commuting’ from Geelong. This would enable greater accessibility to central city employment opportunities for the growing population in the Geelong region. It also enables people to more easily access Geelong from Melbourne for employment and recreation. The High Speed Rail Study Phase 2 Report put the cost of the Melbourne-Sydney section at \$50 billion. The commonwealth government has received two reports (The High Speed Rail Study Phase 1 and Phase 2) on the implementation of a HSR network on the east coast of Australia. Recently the commonwealth announced plans to revisit the project with ‘value capture’ financing.

What is the level of community support?

There was limited to no discussion of this option during public consultation. This option was recommended by the metropolitan citizen jury.

What do we think of this option and why?

This option was not recommended in the strategy because it is a very high cost solution and other solutions can better meet the need at a lower cost. In addition, it is not clear that the Geelong rail corridor would be the highest priority across Victoria for the delivery of high speed rail, particularly when considering that travel times to central Melbourne from Geelong are currently better than some growth area suburbs within Melbourne. It would also be a very large investment in a single corridor. While this option has been assessed as potentially making a significant contribution to meeting the needs in the 15-30-year timeframe, we have recommended a package of improvements to the Geelong rail corridor (ref. 1.3.4) which together will upgrade and protect a high quality rail service for Geelong, but at a much lower cost.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Consistent

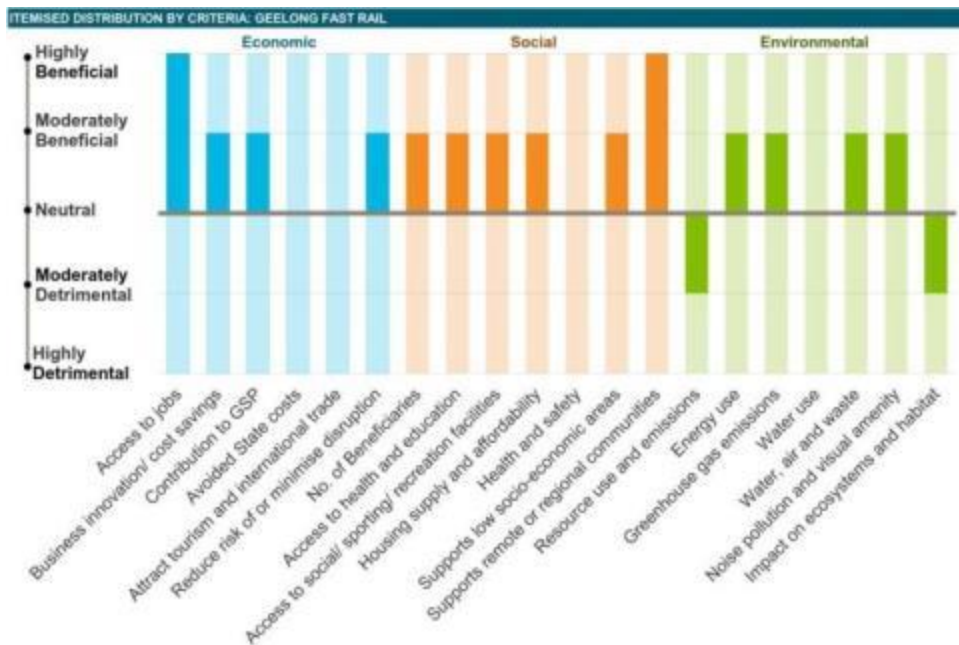
How does this option work with others?

GFR is an alternative to Geelong rail electrification (GRE). It should not proceed together with GRE. GFR could complement or be combined with the construction of high speed rail (HSR).

How does this option perform under different scenarios?

Supercity	+	Supports mode shift to address congestion
Westside Story	+	Supports mode shift to address congestion
Regional Cities	++	Supports mode shift to address congestion
Accelerated Climate Change /Mitigation	+	Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	-	Less demand for mass transit
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



Risks and opportunities

As population growth in the west continues, there is a risk that it may become difficult to identify a suitable corridor and acquire land as needed. There is also the potential for disruption to other transport services during construction.

This could be a testing concept for fast rail in Australia, with the potential to encourage similar developments if successful.

This option would warrant consideration as part of any federal government proposal to introduce high speed rail.

Additional notes

Next steps

Over the much longer term, it's possible that revolutionary new technologies become available that bring down the cost and provide a much faster service than current technologies allow. These developments should be tracked, and may change the case for this option. In the interim, further investigation is required to determine a high speed rail policy for Victoria and to coordinate with other jurisdictions to better understand the level of need for a high speed rail solution.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

High Speed Rail advisory group, *On track: Implementing high speed rail in Australia*, 2013

Greenfield development sequencing

GFS

Option type

Better use through land use and planning controls

Better use through coordination process

Location

Melbourne southern subregion, Melbourne western subregion and Melbourne northern subregion

Sector

All

Certainty of evidence

Low

Direct option cost

<\$1 million

Option lead time

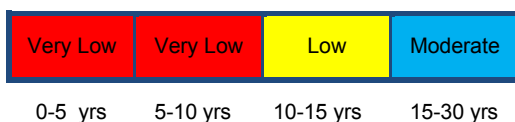
<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 1: Address infrastructure demands in areas with high population growth; and

Need 5: Provide public spaces where communities can come together; and

Need 9: Provide access to high-quality education infrastructure to support lifelong learning



What is this option?

In greenfield areas, the existing Precinct Structure Plans (PSPs) and Developer Contribution Plans provide for minimum standards of infrastructure planning such as future bus provision, green spaces and community infrastructure. However, there are often multiple growth fronts under development at the same time which places pressure on local and state government resources and can leave communities with delays in infrastructure provision. This option would seek to further improve the coordination and sequencing of infrastructure in greenfield areas in two ways; firstly, through greater emphasis and direction when planning for sequencing of infrastructure and staged land release in PSPs. This would include the consideration of infrastructure when making approvals in isolated locations; secondly, increasing the ability for local government to manage sequencing and alignment of new development with infrastructure through the planning process or other mechanisms.

What is the level of community support?

There was a moderate level of discussion on this option during consultation. Councils agreed that actively managing the number of growth fronts under development at any one time could optimise their capacity to provide infrastructure in a timely manner. On the other hand, the property development sector suggested that whilst it is appropriate for government to guide and monitor greenfield development, it is not appropriate to over regulate sequencing.

What do we think of this option and why?

This option was not recommended in the strategy because although the direct cost of reducing the number of growth fronts would be relatively low (and allow for more efficient infrastructure delivery), the unintended consequences for housing affordability could be significant. These consequences have not been quantified sufficiently to understand the trade-off. We will monitor government policy development in this area for consideration in the next Infrastructure Victoria strategy update.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	Relates to key point/option for discussion
Regional Growth Plans	N/A

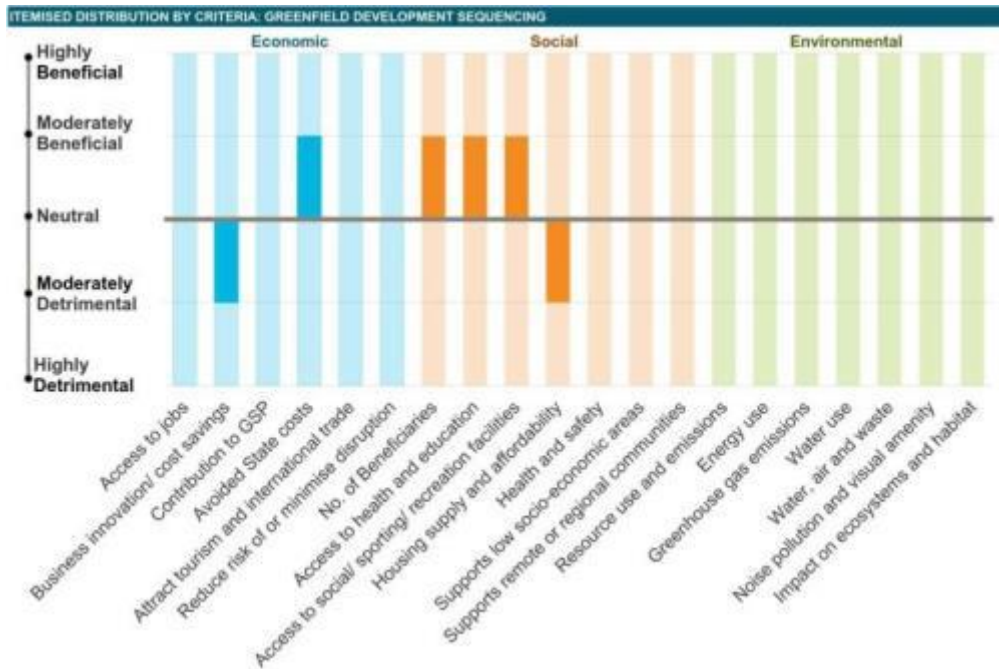
How does this option perform under different scenarios?

Supercity	+	More greenfield expansion
Westside Story	++	More greenfield expansion
Regional Cities	+	More greenfield expansion of regional cities
Accelerated Climate Change /Mitigation	Neutral	
Prolonged/ Severe Economic Downturn	Neutral	
Biosecurity Threat	Neutral	

How does this option work with others?

This option would complement compact urban development (UDC) because both options propose that housing growth should be targeted to areas that are already well serviced with infrastructure. In a greenfield context this would mean prioritising new development to occur next to existing services and infrastructure, rather than occurring in an isolated way.

What are the economic, social and environmental impacts of this option?



Commentary:

There is potential for improved social impact if access to services increases. There are also potential for increased costs to business and households should housing supply be more tightly regulated.

Risks and opportunities

There may be variability in the capacity of local government to take on the role described in this option. Specifically, there is limited scope to influence the way the market chooses to behave in terms of timing of release of land, as this is driven by market forces that can change quickly and be subject to global shocks.

There is a risk of unintended consequences of reduced housing supply impacting on the overall cost of housing for the community. The existing precinct structure planning processes to plan for greenfield areas is a mature process and can be reviewed to improve sequencing.

Additional notes

Next steps


Additional research and evidence is required before a government decision is made about reducing growth fronts in order to better manage infrastructure sequencing and delivery. In the short-term, state and local government could work together to ensure there is a balance between more tightly managing growth fronts on the fringe of Melbourne and maintaining a competitive housing market, while making new suburbs healthy, sustainable and liveable. The following information and evidence would assist government to achieve this balance:

- The extent of infrastructure demand management improvement that could be made if the number of growth fronts were to be reduced.
- The most appropriate mechanisms to better manage sequencing such as existing precinct planning processes and existing land use planning controls.
- How to work with the private sector to better manage the timely release of land designated for future community infrastructure.
- How adequate is the current State Planning Policy Framework for growth areas, specifically the requirement to 'deliver timely and adequate provision of public transport and local and regional infrastructure, in line with a preferred sequence of land release' (Clause 11). Is there an agreed definition of 'timely and adequate'?
- Should development proponents, at the subdivision stage of the land development process, be required to prepare social, environmental, economic and health impact assessment for out of sequence developments?

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

SGS *Economics and Planning, Comparative costs of infrastructure across different development settings*, 2016



Government owned and managed social housing provision to increase stock GOM

Option GOM is addressed in SHS – Social housing stock extension

Gippsland-Pakenham rail shuttle

GPR

Option type

Incremental expansion of existing assets

Location

Gippsland region

Melbourne southern subregion

West Gippsland state-significant transport corridor

Sector

Transport

Certainty of evidence

Low

Direct option cost

\$1 million–\$10 million

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 10: Meet growing demand for access to economic activity in central Melbourne

Very Low	Very Low	Very Low	Very Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

Need 12: Improve access to jobs and services for people in regional and rural areas

Low	Low	Low	Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Provide increased services on the Gippsland Line to connect with metropolitan services at Pakenham by maintaining existing metro through services to Melbourne and adding a shuttle service between Gippsland and Pakenham. This shuttle would include improving the regional service frequency by increasing services but terminating all peak period services at Pakenham (improving regional service frequency, reducing metropolitan crowding, but imposing an interchange for regional customers in peak periods). At Pakenham, the terminating services from the Latrobe Valley would connect with the high capacity, high frequency services on the Dandenong corridor. This option would benefit travel within the Latrobe Valley and increase access to the central city for Gippsland and the south eastern suburbs.

What is the level of community support?

There was limited to no discussion of this option during public consultation. The option was recommended by the regional citizen jury. The metropolitan jury had a mixed view of this option.

What do we think of this option and why?

This option was not recommended in the strategy because it is too early to make a call on what is a relatively detailed operational decision, which is potentially not needed until the longer term. While it would offer benefits to the metropolitan services in terms of reducing peak crowding (particularly on services which immediately follow a regional service), there are other measures which could meet patronage growth over the medium term, including the committed Caulfield to Dandenong Upgrade and our recommendation to introduce 10 car trains (ref. 10.5.2). While this option would benefit travel within the Latrobe Valley if it involved a termination of all peak services at Pakenham, it would also lead to longer travel times between Melbourne and Gippsland (further detail in *What do we think of this option and why? cont'd*).

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

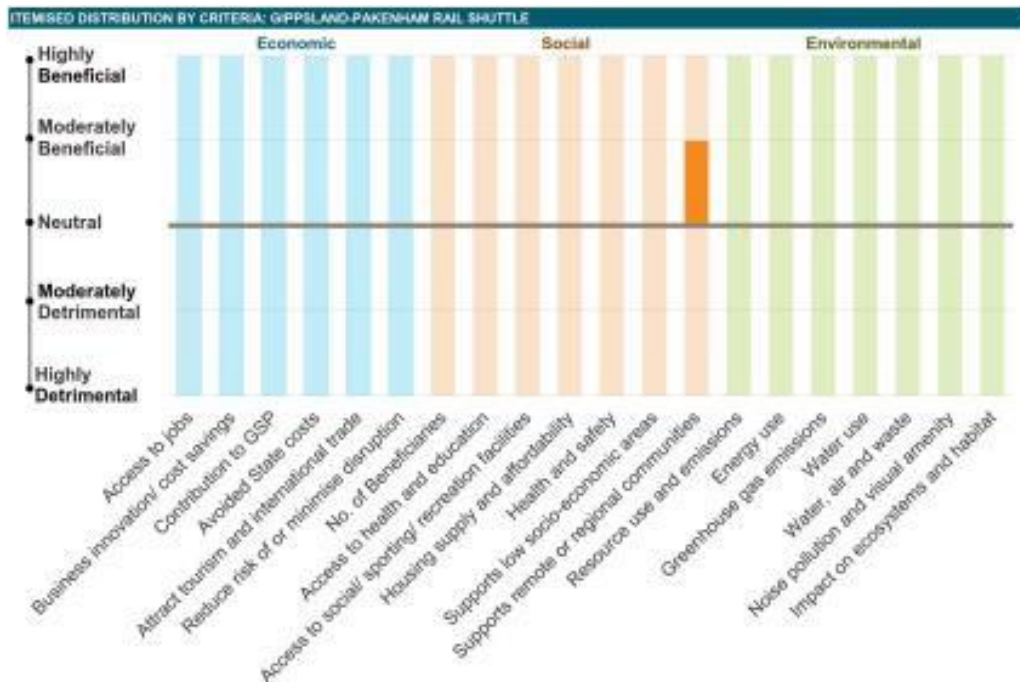
How does this option perform under different scenarios?

Supercity	+	Supports mode shift to address congestion
Westside Story	Neutral	
Regional Cities	+	Improves access
Accelerated Climate Change /Mitigation	+	Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	+	Less demand for travel
Biosecurity Threat	Neutral	

How does this option work with others?

GPR is an alternative to regional rail eastern corridor dedicated rail track (RRE1). It should not proceed together with RRE1.

What are the economic, social and environmental impacts of this option?



What do we think of this option and why? (cont'd)

There is no easy long-term solution to improve rail services to Gippsland while addressing crowding on the Dandenong corridor. In assessing additional tracks for this corridor (recommendation 12.3.3 and 13.5.5), this option may warrant detailed investigation.

This option was assessed on the basis of the continued through running of existing services to and from Gippsland. The termination and commencement of services at Pakenham for Gippsland trains disadvantages passengers from this region but would benefit a large number of metro passengers through additional services between Pakenham and the city. This alternative service plan would likely make a much greater contribution to meeting need 10.

Risks and opportunities

Increased journey time and lack of complete single-seat services to Melbourne may encourage access to Melbourne by road for Gippsland residents.

Opportunities include a greater number of services on the Dandenong and Pakenham-Bairnsdale corridors (including trips between regional towns).

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Geothermal power supply GPS

Option type

Incremental expansion of existing assets

New assets

Location

Statewide

Sector

Energy

Certainty of evidence

Medium

Direct option cost

\$250 million–\$500 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 18: Transition to low carbon energy supply and use

Low	Low	Low	Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option considers further development of geothermal energy resources. Victoria has geothermal energy resources that can be explored to use in energy production. Geothermal energy provides a low-emission energy supply that has an advantage in being able to provide a baseload energy source. The most developed sources of geothermal energy internationally are from hot springs related to volcanic activity. While Australia does not have active volcanoes, there is potential for geothermal energy generation from hot rock and hot sedimentary aquifer reserves.

What is the level of community support?

There was limited to no discussion of this option during public consultation. This option was recommended by the metropolitan citizen jury.

What do we think of this option and why?

This option was not recommended in the strategy because there is no clear role for the state and the viability of geothermal resource use will depend on market forces. Geothermal projects in Australia have struggled for financial and technical viability. While Victoria may have geothermal resources, the choice of technology to explore these resources may be a key factor in economic feasibility. This may change with further technological development and with better understanding of Victorian resources through drilling. Key benefits of geothermal energy are provision of a low emissions source which also provides a continuous supply. The market is best placed to determine the viability of increased investment in this resource in response to potential withdrawal of brown coal generation capacity.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

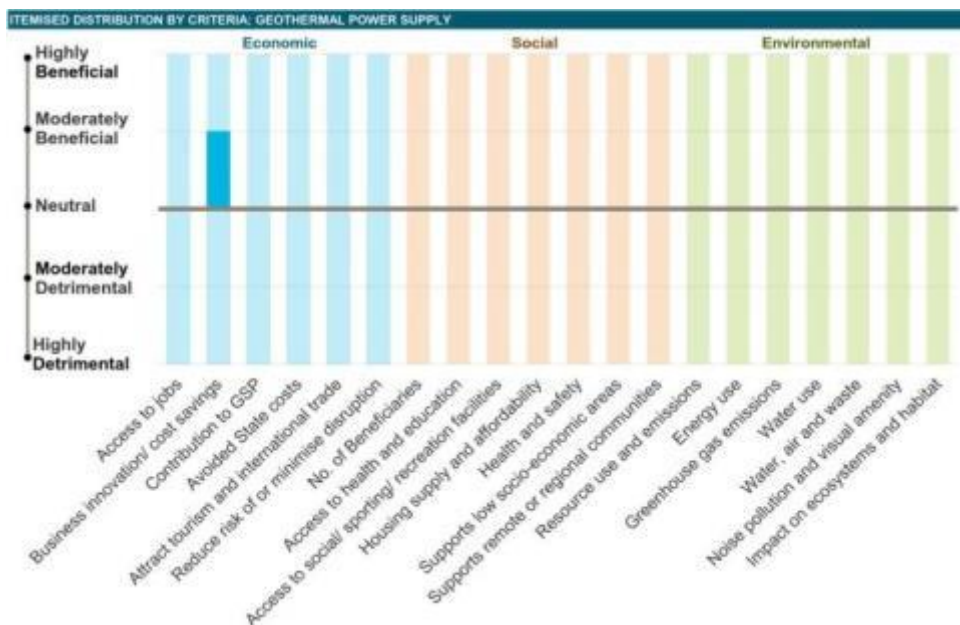
How does this option perform under different scenarios?

Supercity	++	Increased need for more reliable baseload supply
Westside Story	++	Increased need for more reliable baseload supply
Regional Cities	+	Increased need for more reliable baseload supply
Accelerated Climate Change /Mitigation	++	increased need to reduce carbon emissions
Prolonged/ Severe Economic Downturn	-	Less demand for energy
Biosecurity Threat	Neutral	

How does this option work with others?

No key relationships have been identified.

What are the economic, social and environmental impacts of this option?



Risks and opportunities

Given the geological conditions in Victoria, it is likely that utilisation of geothermal energy sources would require the use of less mature techniques such as Enhanced Geothermal Systems (EGS) which have had technical and commercial challenges.

Geothermal energy could play an important role as a low emissions energy supply source with the ability to provide a consistent source of supply, for example to meet baseload demands.

Additional notes

Current status of geothermal energy in Australia

A review of geothermal energy potential in Australia by an international group of experts commissioned by the Australian Renewable Energy Agency highlighted a number of findings including that:

- Australia has large geothermal potential.
- The principal strengths of geothermal energy are provision of a dispatchable power source with a low environmental footprint, while the major weaknesses are immature commercial readiness levels and both highly uncertain and relatively high development costs.
- The greatest opportunities for geothermal energy are in new and off the grid markets, while the primary threats are low demand growth for electricity and continued lower costs of alternative renewable energy sources.

Evidence base

Australian Renewable Energy Agency, *Looking forward: Barriers, risks and rewards of the Australian geothermal sector to 2020 and 2030*, 2014

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Geoscience Australia, *Geothermal energy*, 2009

Geodynamics, *Habanero geothermal project field development plan*, 2014

United States Energy Information Administration, *Geothermal explained: Geothermal energy and the environment*, 2016

Geelong rail electrification GRE

Option type

Incremental expansion of existing assets

Location

Barwon region, Geelong regional city

Melbourne central subregion and Melbourne western subregion

Melbourne – Geelong state-significant transport corridor

Sector

Transport

Certainty of evidence

Low

Direct option cost

\$1 billion–\$3 billion

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 10: Meet growing demand for access to economic activity in central Melbourne

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

Need 12: Improve access to jobs and services for people in regional and rural areas

Low	Low	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Electrification of the Geelong Line and operation of high-capacity electrified rolling stock from Grovedale via the recently constructed Regional Rail Link to improve capacity and reliability. This will enable the line to be fully integrated into the metropolitan system and create through-running opportunities for passengers to reach the wider CBD area without changing train services.

This provides greater accessibility to central city employment opportunities for the growing population in the Geelong region. It also enables people to more easily access Geelong from Melbourne for employment and recreation.

What is the level of community support?

There was a moderate level of discussion of the recommendation Geelong Werribee Wyndham rail, which includes this option. Responses were generally positive.

What do we think of this option and why?

This option was recommended in the strategy (ref. 1.3.4, 10.8.2 and 12.3.1) because of the need to provide a higher capacity service to meet the projected growth in demand on the Geelong–Melbourne transport corridor and improve travel times. The delivery of an electrified service between Geelong and Melbourne makes a low to moderate contribution over time and a strong contribution across the economic, social and environmental indicators. This option was recommended for delivery within 5-15 years when the demand for the existing service schedule is likely to lead to overcrowding and increased travel times, particularly along the new Regional Rail Link section between West Werribee and Deer Park West. In order to provide a medium-term solution to the transport task on this corridor, GRE is recommended for implementation with options Geelong and Werribee rail upgrade (GWR) and Wyndham Vale to Werribee rail extension (WVW). The final sequence and timing of these individual options requires further investigation and development.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Consistent

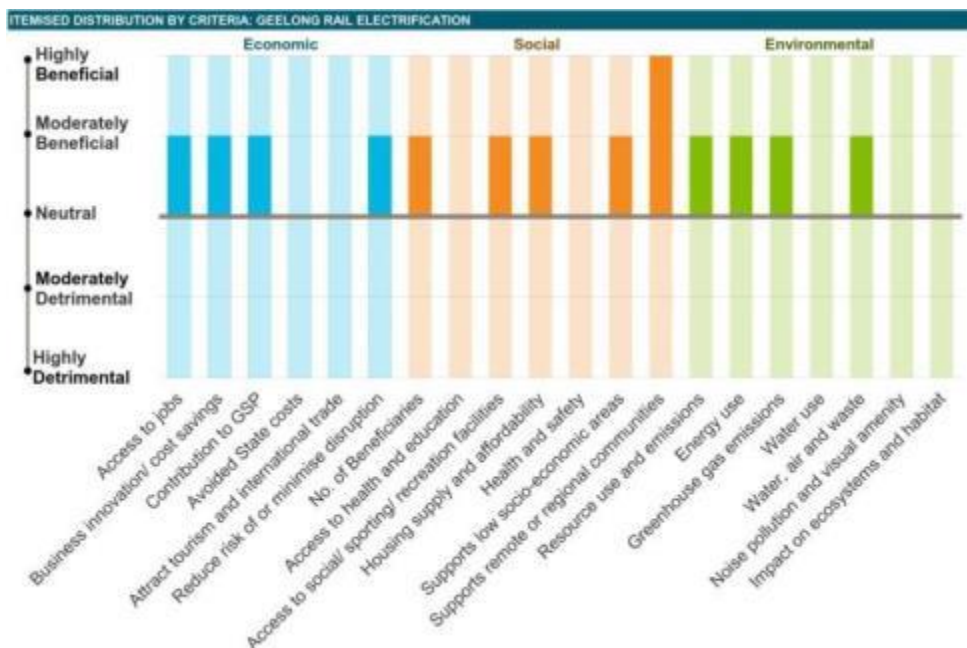
How does this option perform under different scenarios?

Supercity	+	Supports mode shift to address congestion
Westside Story	+	Supports mode shift to address congestion
Regional Cities	++	Supports mode shift to address congestion
Accelerated Climate Change /Mitigation	+	Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	-	Less demand for mass transit
Biosecurity Threat	Neutral	

How does this option work with others?

If option Regional rail electrification (RRE2) was completed, this option would not be required as the scope is covered by RRE2. This option is dependent upon regional rolling stock (RRS) to support these new electrified services.

What are the economic, social and environmental impacts of this option?



Risks and opportunities

There are risks from undertaking construction in an existing operational rail corridor that would need to be managed during the delivery phase.

The electrification of the Geelong Line would provide an opportunity for the earlier retirement of the diesel rolling stock servicing this line. This would reduce future operation costs, as the diesel rolling stock is more expensive to purchase and operate than the electrically powered fleet.

Funding

Should government choose to pursue this project, it will then need to consider funding options. Below is a range of potential funding mechanisms which could be examined to help fund the project.

Potential funding mechanisms

General government revenue	User charges	Beneficiary charges	Property development	Asset sales
✓	✓			

General government revenue is likely to continue to be a major source of funding for projects like Geelong rail electrification as the benefits are shared across a broad area between the Geelong region and Melbourne's CBD.

Existing user charges (public transport fares) should continue to be charged but are only expected to cover a portion of ongoing operating costs.

Infrastructure Victoria is examining transport network pricing as part of our research program. We think that the primary objective of a transport network pricing regime – where users pay to access and use the transport network – should be to manage demand, rather than to recover costs for infrastructure. We are focusing on examining road pricing regimes in metropolitan Melbourne as a first step towards a comprehensive transport network pricing regime that includes roads and public transport. Careful consideration must be given to the design of the regime to ensure it is efficient, fair and sustainable.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Public Transport Victoria, *Network development plan: Metropolitan rail*, 2012

Geelong and Werribee rail upgrade GWR

Option type

Incremental expansion of existing assets

Location

Melbourne central subregion and Melbourne western subregion

Melbourne – Geelong state-significant transport corridor

Sector

Transport

Certainty of evidence

Low

Direct option cost

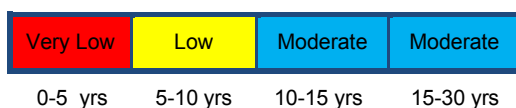
\$1 billion–\$3 billion

Option lead time

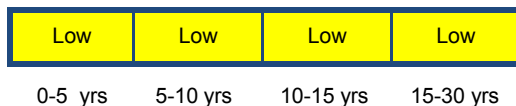
1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 10: Meet growing demand for access to economic activity in central Melbourne



Need 12: Improve access to jobs and services for people in regional and rural areas



What is this option?

Provide a new track pair to quadruple the tracks from Deer Park to West Werribee via Tarneit and Wyndham Vale stations, and provide additional stations along this corridor. This will provide additional capacity for regional services to be added to the high growth Geelong corridor. It will also allow for future express services from Geelong and additional 'short starting' services from the growth suburbs in western Melbourne. The works will facilitate additional access to employment, such as the Sunshine National Employment Cluster, and services in the central city.

What is the level of community support?

There was a moderate level of discussion of the recommendation Geelong Werribee Wyndham rail, which includes this option. Responses were generally positive. This option was recommended by the metropolitan citizen jury.

What do we think of this option and why?

This option was recommended in the strategy (ref. 1.3.4, 10.8.2 and 12.3.1) because of the projected growth in demand on the Geelong-Melbourne transport corridor and to improve travel times. The delivery of additional tracks between Geelong and Melbourne makes a very low to moderate contribution over time to meet the needs and makes a strong contribution across the economic, social and environmental indicators. This option was recommended for delivery within 5-15 years when the demand for the existing service schedule is likely to lead to overcrowding and increased travel times, particularly along the new regional rail link section between West Werribee and Deer Park West. It will allow for the separation of through services from Geelong and additional short-starting services through the growing western suburbs. In order to provide a medium term solution to the transport task on this corridor, GRE is recommended for implementation with options Geelong and Werribee rail upgrade (GWR) and Wyndham Vale to Werribee rail extension (WVW). The final sequence and timing of these individual options requires further investigation.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Consistent

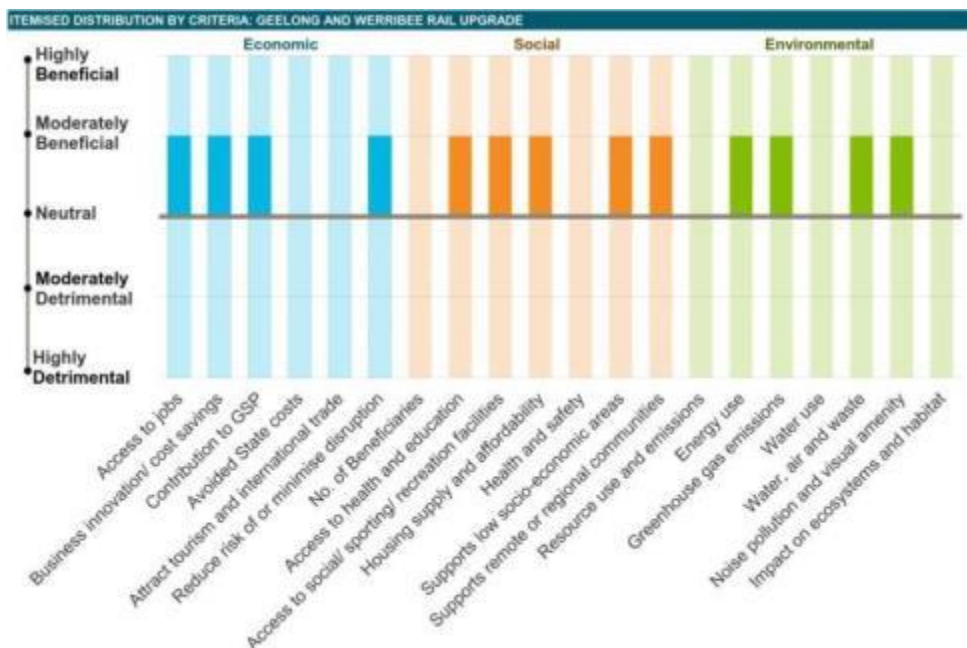
How does this option work with others?

This option complements other upgrade options for this corridor including Geelong rail electrification (GRE) and Wyndham Vale to Werribee rail extension (WVW).

How does this option perform under different scenarios?

Supercity	++	Supports mode shift to address congestion
Westside Story	++	Supports mode shift to address congestion
Regional Cities	++	Supports mode shift to address congestion
Accelerated Climate Change /Mitigation	+	Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	-	Less demand for mass transit
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



Risks and opportunities

There are risks from undertaking construction in an existing operational rail corridor that would need to be managed during the delivery phase.

There is an opportunity with the train station redevelopments, as part of constructing the additional tracks, to create new housing and business developments above the station precinct. This will allow direct connections between where people live and jobs and services in the central city.

Funding

Should government choose to pursue this project, it will then need to consider funding options. Below is a range of potential funding mechanisms which could be examined to help fund the project.

Potential funding mechanisms

General government revenue	User charges	Beneficiary charges	Property development	Asset sales
✓	✓	✓	✓	

General government revenue is likely to continue to be a major source of funding for projects like Geelong and Werribee rail upgrade as the benefits are shared across a broad area between the Geelong region and Melbourne's CBD.

Beneficiary charges could be considered if there is a substantial uplift in land values and business activity in the vicinity of any new train stations. These include developer contributions, which could be levied on new developments near new train stations. Government could also examine whether existing developer contributions could be used, such as the Growth Areas Infrastructure Contribution. Betterment levies on commercial and/or residential properties in the vicinity of new train stations could also be explored. If new developer contributions and betterment levies are both considered by government, it should ensure that new charges do not unfairly duplicate each other or any existing charges.

Property development could also be considered, for example, by selling or leasing land and air rights surplus to government requirements at new train station sites for commercial, residential or retail development. Property development can assist in putting underutilised government land and space to higher and better uses, creating added value through improved amenity and access to services.

Existing user charges (public transport fares) should continue to be charged but are only expected to cover a portion of ongoing operating costs.

Infrastructure Victoria is examining transport network pricing as part of our research program. We think that the primary objective of a transport network pricing regime – where users pay to access and use the transport network – should be to manage demand, rather than to recover costs for infrastructure. We are focusing on examining road pricing regimes in metropolitan Melbourne as a first step towards a comprehensive transport network pricing regime that includes roads and public transport. Careful consideration must be given to the design of the regime to ensure it is efficient, fair and sustainable.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Public Transport Victoria, *Network development plan: Metropolitan rail*, 2012

Health and aged care repurposing of facilities HAC

*Option HAC is addressed in HIM - Health service
modernisation and expansion*

Health care not-for-profit and private sector involvement HAP

Option type

Better use through coordination processes

Better use through contractual processes

Location

Statewide

Sector

Health and human services

Certainty of evidence

High

Direct option cost

<\$100 million

Contribution to meeting the need

Need 3. Respond to increasing pressures on health infrastructure, particularly due to ageing – **Low**

What is this option?

This option seeks to extend and increase the involvement of the not-for-profit and private sector providing health infrastructure through increased partnership arrangements. A longer-term collaborative planning approach will create opportunities to enhance access to high-quality services utilising public and private sector resources more efficiently. Issues identified include providing longer-term contracts rather than short-term tendered contracts to fill public health service gaps, and greater coordination around the shared use of specialist facilities and equipment. This is not an infrastructure response, however it has the potential to enable more efficient use of existing infrastructure, reducing or delaying the need for additional infrastructure.

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option was recommended in the strategy (ref. 3.2.1) because better sharing of specialist health infrastructure between the public, private and not-for-profit systems will enable more efficient health service delivery. The completion of the state government Victorian Statewide Design, Service and Infrastructure plan will provide greater opportunities for government and other parties to form partnerships in a more structured, longer-term manner. While this option has been assessed as only making a low contribution, this is based on a conservative assessment of the potential benefits of state government coordination activities. The actual contribution could be higher, but would be dependent on both the quality of the coordination and the opportunities identified.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

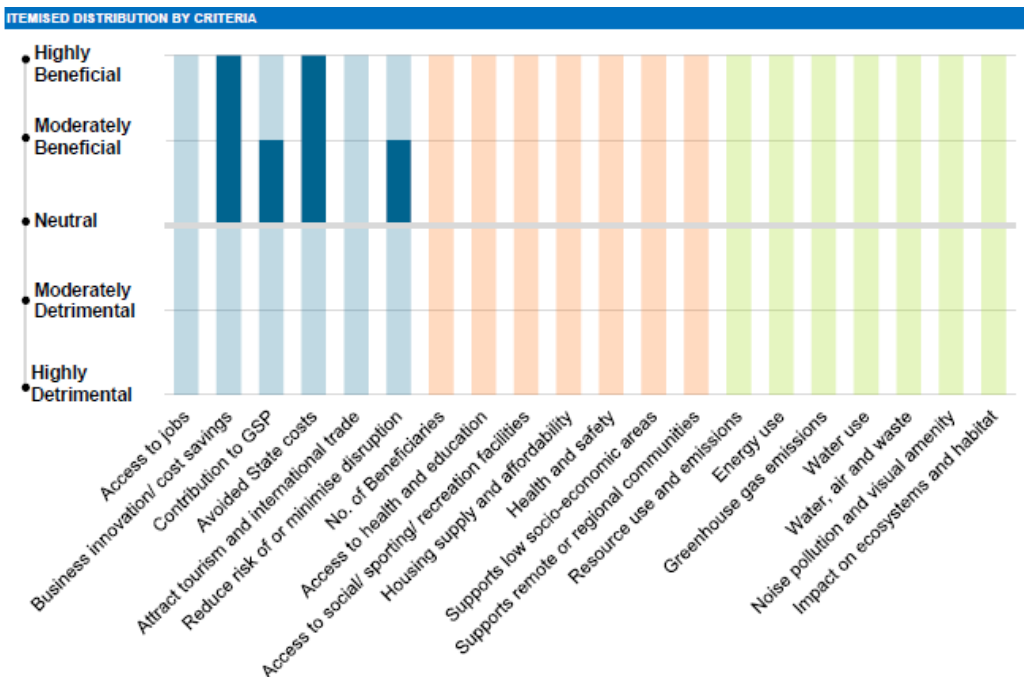
How does this option perform under different scenarios?

Supercity	+	Reflecting population growth
Westside Story	+	Reflecting population growth
Regional Cities	+	Reflecting population growth
Accelerated Climate Change /Mitigation	Neutral	
Prolonged/ Severe Economic Downturn	-	
Biosecurity Threat	+	As involves health facilities that will be affected

How does this option work with others?

Health infrastructure coordinated planning (HIC) is a key enabler for this option. The completion of this strategy will provide an outline of government’s long term approach to health care delivery, facilitating better coordination with the non-government and private sector.

What are the economic, social and environmental impacts of this option?



Commentary:

This option contains a range of possibilities for greater involvement of the private sector in health services. Enhanced productivity of the health sector is likely to support economic growth and resilience.

Risks and opportunities

A perceived risk with this option is that some private and not-for-profit organisations will select the most profitable services or restrict which patients they will treat to maximise their profits. These issues can, however, be addressed by the way service provision is structured.

Evidence base

AECOM/PwC, *Assessment 2: Economic, social and environmental assessments and option relationship mapping*, 2016

Deloitte/Aurecon, *Assessment 1: Options analysis report*, 2016

Victorian Department of Health and Human Services, *Statewide system design, service and infrastructure plan for Victoria's health system, Stakeholder discussion paper*, 2016

Health care alternative delivery options

HCA

Option HCA is addressed in EEA - Digital health embedded across the health system and TEH – Technology enabled health care

Health care delivery role change HCD

Option type

Better use through regulation

Location

Statewide

Sector

Health and human services

Certainty of evidence

Medium

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Direct option cost

\$1 million–\$10 million

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 3: Respond to increasing pressures on health infrastructure, particularly due to ageing

Low	Low	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option focuses on shifting health service delivery from traditional sources to nurses, pharmacists and allied health professionals to reduce the demand on hospital emergency units.

The role of state and commonwealth governments will be:

- To influence the relevant medical bodies and create a rethink around what services the various trained medical professionals are able to deliver.
- To determine the numbers of adequately trained people who could provide this increase in services.
- To determine the impact this would have on existing health care service such as infrastructure and funding mechanisms.

It is noted that this is not an infrastructure response, however, it has the potential to reduce the requirement to provide infrastructure by reducing demand on highly utilised emergency departments.

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive. This option was recommended by the regional citizen jury.

What do we think of this option and why?

This option was not recommended in the strategy because Infrastructure Victoria has determined that this option is beyond the scope of an infrastructure strategy. This option could lead to a more efficient health system which will in turn enable better use to be made of existing infrastructure and free resources for other new build solutions. This may be a policy worth considering as part of a broader health policy focus, but needs to be led from a service planning perspective, not an infrastructure strategy. No economic, social and environmental impact assessment was undertaken.

Health care decentralised delivery model HCD2

*Option HCD2 is addressed in ICP- Integrated
community based health hubs*

Habitat corridor link expansion and improvement

HCL

Option type

- Changing behaviour through licencing
- Better use through land use and planning controls
- Better use through subsidies
- Better use through contractual processes
- Incremental expansion of existing assets

Location

Statewide

Sector

Science, agriculture and environment

Certainty of evidence

Medium

Direct option cost

\$500 million–\$750 million

Option lead time

5–10 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 4: Enable physical activity and participation

Very Low	Very Low	Low	Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

Need 16: Help preserve natural environments and minimise biodiversity loss

Low	Low	Moderate	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Habitat areas are often poorly linked. This can cause significant impacts on the migration of key species. This option would expand and improve habitat corridors through a range of mechanisms such as planning overlays, land acquisition, corridor boundary fencing, riparian fencing, revegetation, private land covenants and other land measures such as the reservation of unreserved Crown land or changing/removing licences or leases on Crown land. These mechanisms would be based on identified priorities to create habitat corridors where they are most needed.

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive. Both citizen juries made recommendations in support of this option.

What do we think of this option and why?

This option was recommended in the strategy (ref. 16.3.2) because emerging challenges, including from climate change, can be mitigated by allowing safe movement of species through expanded and improved habitat corridors. These corridors across public and private land will take some time to plan and deliver. Vegetation alone can take many years to flourish and agreements for private land protection or rehabilitation can be challenging as well. That is why linking biodiversity to remnant vegetation, rivers and forested areas such as roadsides is a key first step. These corridors could potentially extend to urban areas if green infrastructure (UFF) is increased. A low contribution to need 16 in the first 10 years will increase over time to moderate and significant as pressure increases on biodiversity and these corridors become established. This option will also support greater opportunities for physical activity and participation over time, with evidence that a connection with nature has many broader benefits, particularly for health.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	Relates to key point/option for discussion
Regional Growth Plans	Consistent

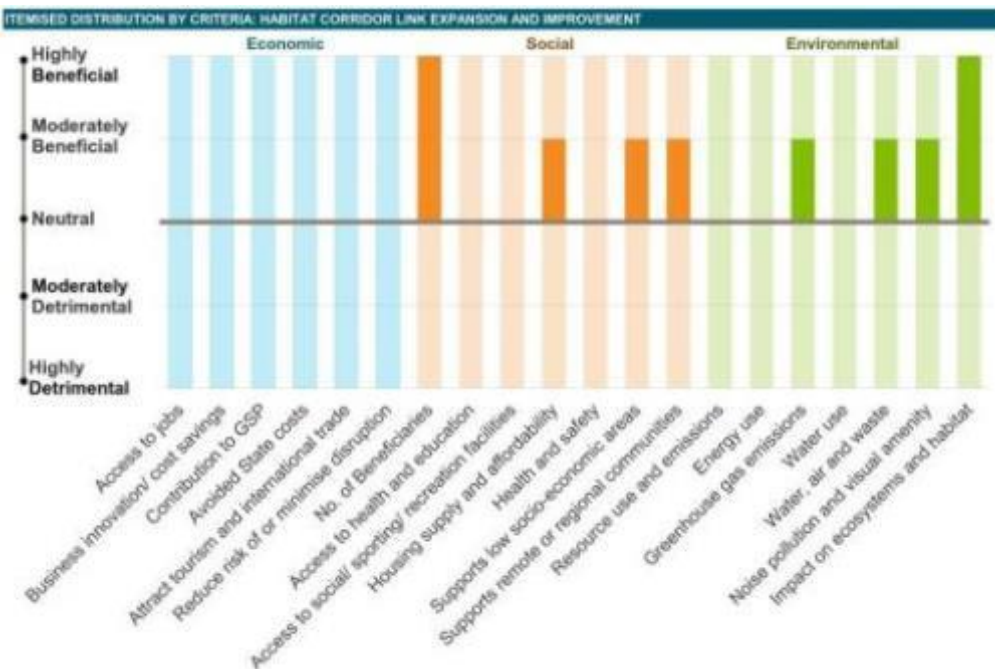
How does this option work with others?

This option is complementary with the development of green infrastructure (UFF) which will create corridors in urban environments that could link well with habitat corridors which adjoin, for example, the green wedges of metropolitan Melbourne. This option is also complementary to the implementation of riparian fencing (RFI) and may provide opportunities to utilise these fenced areas to support movement of species and improve access to water and healthy ecosystems.

How does this option perform under different scenarios?

Supercity	+	Minimises impacts of urban growth on biodiversity
Westside Story	+	Minimises impacts of urban growth on biodiversity
Regional Cities	+	Minimises impacts of urban growth on biodiversity
Accelerated Climate Change /Mitigation	++	Would reduce harm to biodiversity from extreme weather
Prolonged/ Severe Economic Downturn	Neutral	
Biosecurity Threat	+	Depends on ecosystem impact

What are the economic, social and environmental impacts of this option?



Commentary:

Increasing the amount of protected land is also anticipated to have additional environmental benefits, for example, on greenhouse gas emissions and amenity.

Risks and opportunities

There is a risk that ongoing management of sites is insufficient to maintain quality despite planning protections, for example, weeds or feral species could affect the quality of protected corridors over time. Fire events also pose a significant risk. More generally, there is a risk that this effort could compromise the protection of existing habitats if appropriate management resources are not provided.

The opportunity for this option comes through the social impacts. It could create more open space for the community, however, this would need to be balanced against the primary need of providing environmental benefits.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Commissioner for Environmental Sustainability Victoria, *State of the environment report 2013*, 2013

Health care patient subsidised travel program extension HCP

Option type

Changing behaviour through economic charging

Better use through subsidies

Location

Regional and rural Victoria

Sector

Health and human services

Certainty of evidence

Medium

Direct option cost

\$500 million–\$750 million

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 3: Respond to increasing pressures on health infrastructure, particularly due to ageing

Low	Low	Low	Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

Need 12: Improve access to jobs and services for people in regional and rural areas

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option would extend the existing Victorian Patient Transport Assistance Scheme (VPTAS) to provide increased financial subsidies to people in regional communities, assisting them to access health services that cannot be efficiently provided in their local community. The existing system subsidises travel over distances of more than 100 kilometres to see a specialist. The existing system allows for utilising private vehicles and existing transport systems including taxis and public transport. Under current arrangements VPTAS is reviewed on a biannual basis to align the system with developments in health service delivery. Under this option the system could be extended to cover shorter trips less than 100 kilometres, be applicable for a broader range of health service visits or provide an increased level of reimbursement of cost.

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive. Both citizen juries made recommendations in support of this option.

What do we think of this option and why?

This option was not recommended in the strategy because it is considered to be business as usual, with the system reviewed every two years. Any further need to extend the program will be captured and addressed during this review. We will monitor this for future strategies.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policies

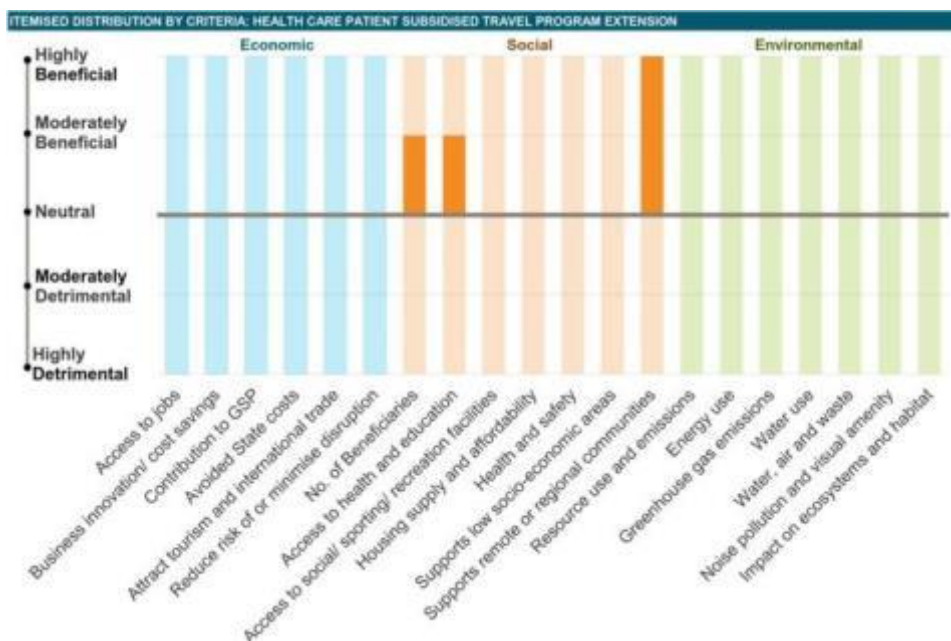
How does this option perform under different scenarios?

Supercity	Neutral	
Westside Story	Neutral	
Regional Cities	+	Increased requirement for travel
Accelerated Climate Change /Mitigation	Neutral	
Prolonged/ Severe Economic Downturn	Neutral	
Biosecurity Threat	Neutral	

How does this option work with others?

This option would support health services being relocated away from an existing location under health service modernisation and expansion (HIM) by providing assistance to access health services. The option would also be supported by mobility as a service (MAS), which would provide more flexible alternatives for the provision of transport in areas with a low level of public transport support.

What are the economic, social and environmental impacts of this option?



Commentary:

This option is anticipated to benefit remote and regional communities, as well as increase access to health services.



Risks and opportunities

This option carries the risk that existing transport systems are unable to efficiently support the travel demand created by this option. Existing transport networks may not be available in the area or alternatively be able to respond in a timely manner. The capability of existing transport networks will be an important criterion in assessing which locations are suitable to implement this option. Increasing funding and eligibility alone may therefore not address all access issues.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Health care smart facilities HCS

*Option HCS is addressed in HIM - Health service
modernisation and expansion*

Health care big data leverage HCT1

Option HCT1 is addressed in EEA - Digital health embedded across the health system and TEH – Technology enabled health care

High capacity trains – 10 car HCT2

Option type

Incremental expansion of existing assets

Location

Melbourne

Sector

Transport

Certainty of evidence

Medium

Direct option cost

\$5 billion–\$10 billion

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 10: Meet growing demand for access to economic activity in central Melbourne

Moderate	Moderate	Significant	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Procurement of 10-car high capacity metro trains (HCMT) for the metropolitan network. Whereas existing six-car train sets involve the joining of two three-car sets, these HCMT trains are a new type of train, specifically designed to be either seven or ten cars. Significant works would be required on the network to accommodate 10-car trains. The works would include associated major upgrades to power, stabling yards, platform lengths and other ancillary assets. A potential roll out across the network would need to be staged and prioritised to those corridors experiencing the most significant capacity constraints. It is currently planned that the future Sunbury-Dandenong rail corridor created by the Melbourne Metro rail tunnel would be the first to use the 10-car trains, followed by the Melbourne Metro 2 (MMS) tunnel if that proceeds. Lines continuing to use the City Loop would not be able to deploy the 10-car arrangement.

What is the level of community support?

There was limited to no discussion of this option during public consultation. This option was recommended by the metropolitan citizen jury.

What do we think of this option and why?

This option was recommended in the strategy (ref. 10.5.2) because it expands capacity on some of the fastest growing corridors in the rail network. It leverages the investment in Melbourne Metro, allowing the full length of the new underground stations to be utilised to carry more passengers. This option complements Melton Electrification (ref. 1.3.6 and 10.8.3) and in combination these two options have a very strong preliminary cost benefit ratio. HCT2 could also play a role in enabling Melbourne Airport Rail Link (ref. 10.9.2 and 11.4.2), depending on final network configuration. It should be delivered within 10-15 years,

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

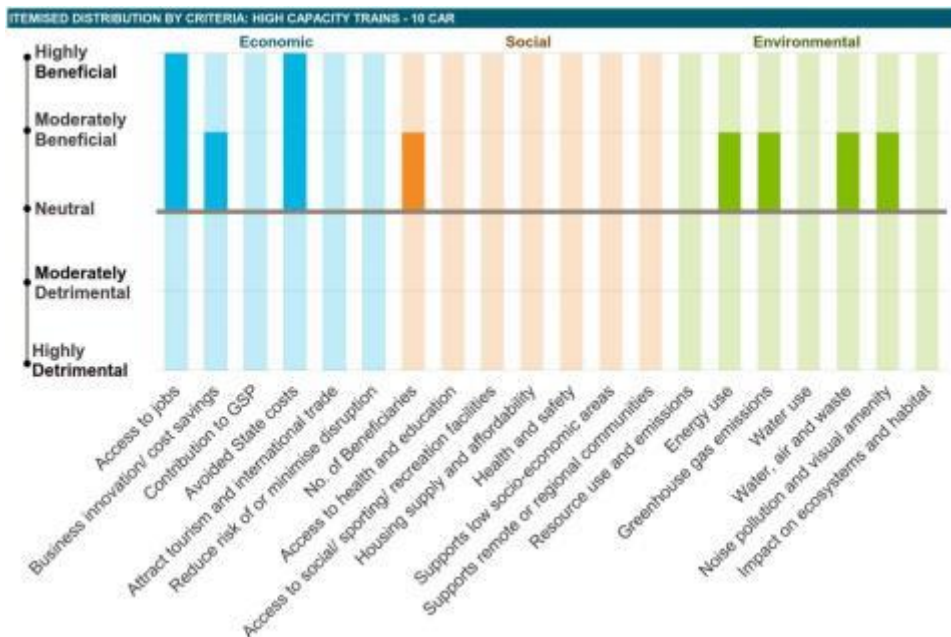
How does this option perform under different scenarios?

Supercity	++	More efficient use of transport capacity
Westside Story	+	More efficient use of transport capacity
Regional Cities	+	More efficient use of transport capacity
Accelerated Climate Change /Mitigation	+	Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	-	Less demand for mass transit
Biosecurity Threat	Neutral	

How does this option work with others?

This option is complementary to Melton rail electrification (MRE1) and Melbourne Metro 2 (MMS). It would be an enabler for Rowville heavy rail line (RHR), and depending on network configuration, Melbourne Airport heavy rail line (MAH). HCT2 complements rail signals and fleet upgrade (RSF) by improving network performance and capacity.

What are the economic, social and environmental impacts of this option?



Risks and opportunities

There is a risk that the platform lengthening and other supporting improvements required to enable the longer trains to operate on the network could be greater than predicted. This could lead to delays in rolling out the new high capacity trains and increased costs for the supporting works. These trains will add extra capacity to the rail network, which will be essential in peak periods, increasing access to jobs in the central city and surrounding employment centres along the Pakenham-Sunbury corridor.

Funding

Should government choose to pursue this program, it will then need to consider funding options. Below is a range of potential funding mechanisms which could be examined to help fund the program.

Potential funding mechanisms

General government revenue	User charges	Beneficiary charges	Property development	Asset sales
✓	✓			

General government revenue is likely to be the major source of funding for High capacity trains – 10 car as the benefits of the program are shared by all users on the Sunbury and Dandenong train lines and could provide some relief to related road networks, like the Monash and Calder Freeways.

Existing user charges (public transport fares) should continue to be charged but are only expected to cover a portion of ongoing operating costs.

Infrastructure Victoria is examining transport network pricing as part of our research program. We think that the primary objective of a transport network pricing regime – where users pay to access and use the transport network – should be to manage demand, rather than to recover costs for infrastructure. We are focusing on examining road pricing regimes in metropolitan Melbourne as a first step towards a comprehensive transport network pricing regime that includes roads and public transport. Careful consideration must be given to the design of the regime to ensure it is efficient, fair and sustainable.

Additional notes

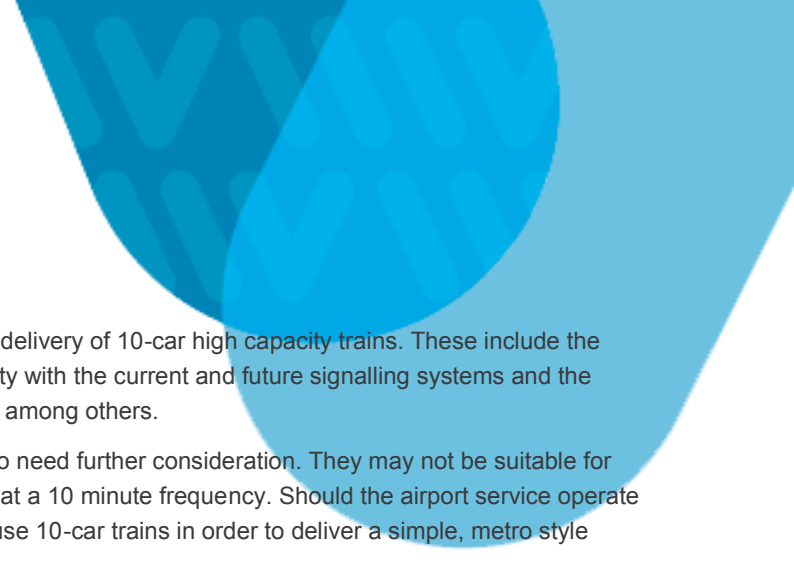
Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then we have refined the wording to align with the Melbourne Airport rail link recommendation, through the inclusion of the word 'potentially'. This reflects that the configuration, alignment and rolling stock for that project requires further investigation.

Economic assessment

The Melbourne Metro Business Case shows how the economic results of that project are enhanced by the inclusion of Melton Rail Electrification (MRE1) and High capacity trains - 10 car (HCT2). By considering the business case economic assessment, incremental economic results for these two options together can be identified. Key economic results for MRE1 and HCT2 (at a 7 per cent p.a. discount rate) are as follows, with ranges reflecting figures with and without Wider Economic Benefits (WEBs):

- Present value of benefits: \$4.5-6.4 billion
- Present value of costs: \$1.4 billion
- Net Present Value: \$3.1-5 billion
- Cost Benefit Ratio: 3.2-4.6



A number of interface issues will need to be resolved for the delivery of 10-car high capacity trains. These include the greater mass of the new rolling stock on the rails, compatibility with the current and future signalling systems and the capacity for existing stations to manage the passenger flows among others.

The suitability of 10-car trains operating to the airport will also need further consideration. They may not be suitable for this route due to the potential excess capacity when running at a 10 minute frequency. Should the airport service operate via Sunshine and Melbourne Metro, it may be necessary to use 10-car trains in order to deliver a simple, metro style operation on this corridor.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

KPMG/Arup/Jacobs, *Economic appraisal and demand modelling*, 2016

Public Transport Victoria, *Network development plan: Metropolitan rail*, 2012

Victorian Department of Economic Development, Jobs, Transport and Resources, *Melbourne Metro business case*, 2016

Victorian Department of Premier and Cabinet, *Rolling stock strategy: Trains, trams, jobs 2015-2026*, 2015

High capacity trains – 7 car HCT3

Option type

Incremental expansion of existing assets

Location

Melbourne

Sector

Transport

Certainty of evidence

Medium

Direct option cost

>\$10 billion

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 10: Meet growing demand for access to economic activity in central Melbourne

Moderate	Moderate	Significant	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Procurement of seven-car high capacity metro trains (HCMT) for the metropolitan network, beyond current commitments. Whereas existing six-car train sets involve the joining of two three-car sets, the HCMT trains are specifically designed to be seven cars and, as such, are a new type of train. This option includes associated minor upgrades to track and stations and provides stabling and maintenance, including, potentially, the upgrade and electrification of the existing line from Frankston to Baxter for a stabling and maintenance facility. These trains would be allocated to the lines with the greatest demand. However, other lines will benefit as the newer rolling stock is redeployed and allows for the retirement of older train sets. Future rolling stock procurement and stabling requirements are contained in the PTV *Network Development Plan – Metropolitan Rail* (2012) and the *Victorian Rolling Stock Strategy*.

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive. Both citizen juries made recommendations in support of this option.

What do we think of this option and why?

This option was recommended in part in the strategy (ref. 10.5.1) because it offers a moderate to significant contribution to meeting need 10 in its own right and is an essential enabler for metropolitan rail network extensions and capacity expansions – without additional trains, additional services cannot run. However, with an existing rolling stock strategy in place, we have assumed continued purchase of new rolling stock will occur over time as a business as usual activity. Our recommendation is therefore targeted at a more strategic level in building on the existing work to institute an asset management based approach to procurement that supports the continuous build of new rolling stock, avoiding the small-order, stop-start procurement of recent decades.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

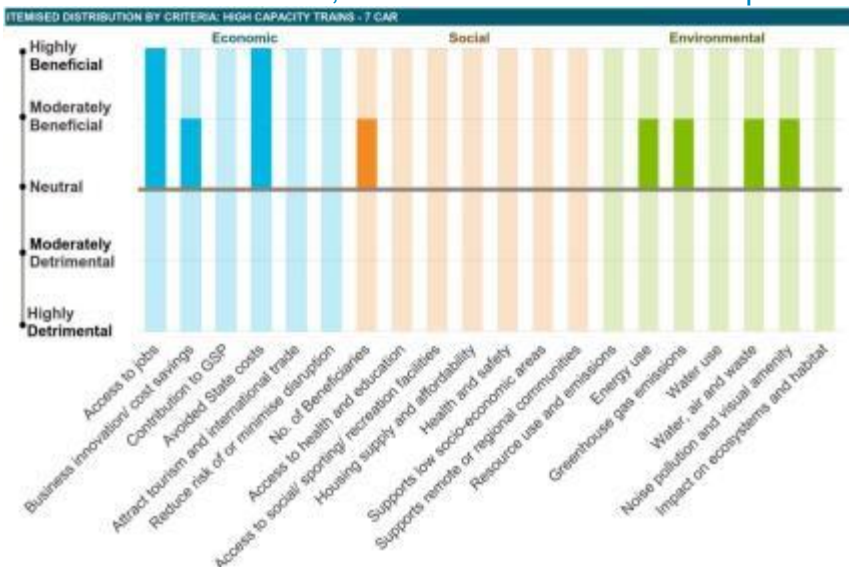
How does this option perform under different scenarios?

Supercity	++	More efficient use of transport capacity
Westside Story	+	More efficient use of transport capacity
Regional Cities	+	More efficient use of transport capacity
Accelerated Climate Change /Mitigation	+	Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	-	Less demand for mass transit
Biosecurity Threat	Neutral	

How does this option work with others?

This option is an enabler for a broad range of rail capacity and network extension options, including Rail signals and fleet upgrade (RSF), City Loop reconfiguration (CLR) and Wallan rail electrification (WRE1).

What are the economic, social and environmental impacts of this option?



Risks and opportunities

There is a risk that the platform lengthening and other supporting improvements required to enable the longer trains to operate on the network could be greater than predicted. This could lead to delays in rolling out the new high capacity trains and increased costs for the supporting works.

These trains will add extra capacity to the rail network, which will be essential in peak periods, increasing access to jobs in the central city and surrounding employment centres.

Funding

Should government choose to pursue this program, it will then need to consider funding options. Below is a range of potential funding mechanisms which could be examined to help fund the program.

Potential funding mechanisms

General government revenue	User charges	Beneficiary charges	Property development	Asset sales
✓	✓			

General government revenue is likely to be the major source of funding for high capacity trains – 7 car as the benefits of the program are shared by many public transport users across the electrified train network and could provide some relief to related road networks.

Existing user charges (public transport fares) should continue to be charged but are only expected to cover a portion of ongoing operating costs.

Infrastructure Victoria is examining transport network pricing as part of our research program. We think that the primary objective of a transport network pricing regime – where users pay to access and use the transport network – should be to manage demand, rather than to recover costs for infrastructure. We are focusing on examining road pricing regimes in metropolitan Melbourne as a first step towards a comprehensive transport network pricing regime that includes roads and public transport. Careful consideration must be given to the design of the regime to ensure it is efficient, fair and sustainable.

Additional notes

Extension of the electrified services from Frankston to Baxter to provide additional stabling with the introduction of new rolling stock will provide broader benefits to the region. Development of the Frankston Metropolitan Activity Centre (MAC) would benefit from the removal of the existing stabling facilities in the Frankston CBD. In addition, the rail corridor from Frankston to Baxter will benefit from a higher quality rail service that will provide better access to jobs, services and education. However, this is a relatively low growth corridor and there is the potential for undesirable land use outcomes through attracting additional development to the Mornington Peninsula. These factors will need to be considered in the finalisation of the project scope to ensure the best outcome for the state and the region. Overall, the leading objective for the electrification to Baxter would be better stabling and to support the operational requirements of the rail network.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

KPMG/Arup/Jacobs, *Economic appraisal and demand modelling*, 2016

Public Transport Victoria, *Network development plan: Metropolitan rail*, 2012

Victorian Department of Economic Development, Jobs, Transport and Resources, *Melbourne Metro business case*, 2016

Victorian Department of Premier and Cabinet, *Rolling stock strategy: Trains, trams, jobs 2015-2026*, 2015

High capacity trams HCT4

Option type

Incremental expansion of existing assets

Location

Melbourne wide

Sector

Transport

Certainty of evidence

Medium

Direct option cost

>\$10 billion

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 10: Meet growing demand for access to economic activity in central Melbourne

Moderate	Moderate	Moderate	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Procurement of additional high capacity trams for the metropolitan light rail network, beyond current commitments. These new trams would be allocated to routes with the greatest demand. However, other routes will benefit as the newer rolling stock is redeployed and allows for the retirement of older fleet models (particularly the Z-Class). Planned future rolling stock procurement is contained in the *Victorian Rolling Stock Strategy*. This option includes supporting infrastructure such as bridge strengthening, new depots, new substations and other enabling upgrades. Delivery of additional new high capacity trams will increase the capacity of the network and enable the movement of growing numbers of transport users to access the central city area (further detail in *What is this option? cont'd*).

What is the level of community support?

There was limited discussion of this option during public consultation.

What do we think of this option and why?

This option was recommended in part in the strategy (ref. 10.5.1) because it offers a moderate to significant contribution to meeting need 10 in its own right and is an essential enabler for tram network extensions and capacity expansions – without additional trams, additional services cannot run. However, with an existing rolling stock strategy in place, we have assumed continued purchase of new rolling stock will occur over time as a business as usual activity. Our recommendation is therefore targeted at a more strategic level in building on the existing work to institute an asset management based approach to procurement that supports the continuous build of new rolling stock, avoiding the small-order, stop-start procurement of recent decades (further detail in *What do we think of this option and why? cont'd*).

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

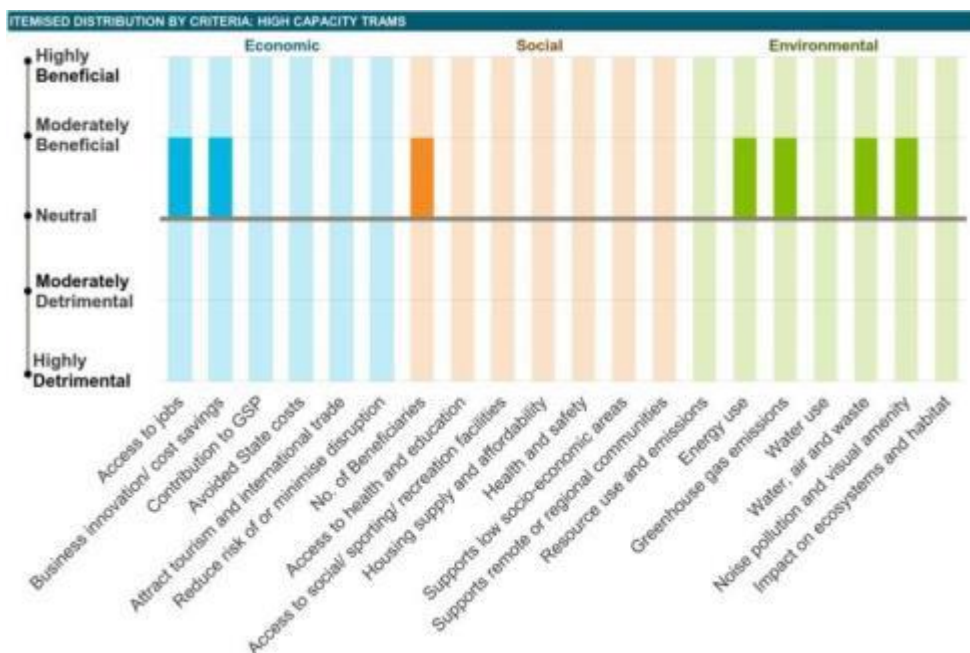
How does this option perform under different scenarios?

Supercity	++	More efficient use of transport capacity
Westside Story	+	More efficient use of transport capacity
Regional Cities	+	More efficient use of transport capacity in Melbourne
Accelerated Climate Change /Mitigation	+	Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	-	Less demand for mass transit
Biosecurity Threat	Neutral	

How does this option work with others?

This option enables extensions to the tram network through tram network extensions (TNE) and central city tram network extension (CCT). Road space allocation changes (RSA) will act as a complement to the procurement of additional high capacity trams in improving tram capacity and operations.

What are the economic, social and environmental impacts of this option?



What is this option? (cont'd)

The current tram fleet is ageing and the range and age of the fleet increases operation and maintenance costs. Both additional high capacity and smaller capacity trams will be needed to meet network capacity demands and replace old rolling stock. Further work is required to determine the appropriate mix of rolling stock over the longer term, including the size and operating requirements for the next generation tram after the current E-class tram program.

What do we think of this option and why? (cont'd)

The institution of the asset management based approach to a long-term program of tram rolling stock procurement should be delivered within 0-5 years to ensure the contractual processes and service planning are completed before the end of the current procurement commitments. The new trams will provide additional capacity to the tram network and increase accessibility options for all Victorians.

Funding

Should government choose to pursue this program, it will then need to consider funding options. Below is a range of potential funding mechanisms which could be examined to help fund the program.

Potential funding mechanisms

General government revenue	User charges	Beneficiary charges	Property development	Asset sales
✓	✓			

General government revenue is likely to be the major source of funding for high capacity trams as the benefits of the program are shared by many public transport users across Melbourne's tram network and could provide some relief to related road networks.

Existing user charges (public transport fares) should continue to be charged but are only expected to cover a portion of ongoing operating costs.

Infrastructure Victoria is examining transport network pricing as part of our research program. We think that the primary objective of a transport network pricing regime – where users pay to access and use the transport network – should be to manage demand, rather than to recover costs for infrastructure. We are focusing on examining road pricing regimes in metropolitan Melbourne as a first step towards a comprehensive transport network pricing regime that includes roads and public transport. Careful consideration must be given to the design of the regime to ensure it is efficient, fair and sustainable.

Risks and opportunities

There is a risk that length of platforms required to enable the longer trams to operate on the network could be greater than predicted. This could lead to delays in rolling out the new rolling stock and increased costs for the supporting works. If not implemented in combination with road space allocation changes (RSA) it could produce lower benefits or require more trams to be purchased just to deliver the same level of service, due to trams spending longer in traffic.

These vehicles will add extra capacity to the tram network, which will be essential in peak periods, providing the opportunity for increased access to jobs in the central city and surrounding employment centres and facilitating local public transport trips.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Victorian Department of Premier and Cabinet, *Rolling stock strategy: Trains, trams, jobs 2015-2026*, 2015

Health education programs HEP

Option type

Changing behaviour through information

Location

Statewide

Sector

Health and human services

Certainty of evidence

Medium

Evidence base

Deloitte/Aurecon, *Assessment 1: Options analysis report*, 2016

Direct option cost

<\$100 million

Contribution to meeting the need

Need 3. Respond to increasing pressures on health infrastructure, particularly due to ageing – **Moderate**

What is this option?

Deliver preventative public health education programs targeted at the 15-25 year old age group. The implementation of this option aims to improve the number of people living healthy lifestyles, to in turn reduce the number of people needing to access the health system. The early onset of obesity increases the likelihood of obesity as an adult and increases risk factors for a number of adult diseases, including heart disease, type 2 diabetes, stroke, several types of cancer and osteoarthritis.

Between the ages of 15 and 25, people start making their own decisions around eating habits. The option is focused at creating a long-term prevention trend by creating healthy lifestyle habits in early life. Education would be delivered through school programs (road show tours) and targeted advertising campaigns at this specific demographic group. These campaigns would provide focus around preventative health care and general healthy living.

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive.

What do we think of this option and why?

This option is not recommended in the strategy because Infrastructure Victoria has determined that the option is beyond the scope of an infrastructure strategy. Although these programs may have downstream effects on the use of infrastructure, we do not have sufficient evidence to draw the link between infrastructure planning and this intervention. This may be a policy worth considering as part of a broader health policy focus, but needs to be led from a health policy perspective, not an infrastructure strategy.

Health infrastructure coordinated planning HIC

Option type

Better use through coordination processes

Location

Statewide

Sector

Health and human services

Certainty of evidence

Medium

Direct option cost

\$1 million–\$10 million

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 3: Respond to increasing pressures on health infrastructure, particularly due to ageing

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Develop and publish a 30-year health infrastructure plan guided by a systems approach to service planning that responds to forecast population growth and incorporates all components of the health system. The plan would be structured around the role and planned development of existing and future facilities. On a 0–10 year horizon the plan would identify specific projects to be implemented. On the 10–30-year horizon the plan would be pitched at a higher level and identify the locations for change and development across the asset base, in particular noting the requirement for new facilities or the changed role of existing facilities.

The option covers the cost of initially developing the plan and continuing to refresh it on a regular basis. The cost does not include the funding of items identified in the strategy (further detail in *What is this option? cont'd*).

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive. This option was recommended by the regional citizen jury.

What do we think of this option and why?

This option was not recommended in the strategy because it is now considered to be business as usual. In August 2016 (following the release of *All things considered*) the state government outlined their intent and approach to developing a statewide system design, service and infrastructure plan for Victoria's health system which is likely to meet the goals of this option. The effectiveness of this planning process will be considered in future Infrastructure Victoria strategy updates.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

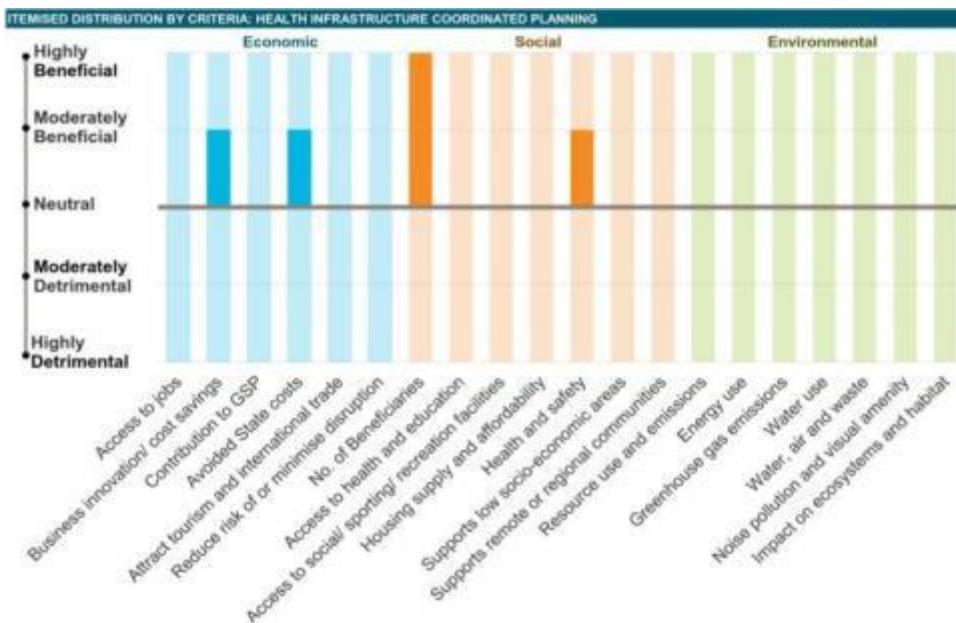
How does this option perform under different scenarios?

Supercity	+	Reflecting population growth
Westside Story	+	Reflecting population growth
Regional Cities	+	Reflecting population growth
Accelerated Climate Change /Mitigation	Neutral	
Prolonged/ Severe Economic Downturn	+	Better allocation of reduced funds
Biosecurity Threat	+	As involves health facilities that will be affected

How does this option work with others?

This option is a critical enabler for all health options, as it would provide the clear direction for health service delivery and infrastructure for the next 30 years.

What are the economic, social and environmental impacts of this option?



Commentary:

The number of beneficiaries is noted as high as the impact is statewide. This rating is qualified with the comment that the benefit will only be realised if the strategy is implemented.

What is this option? (cont'd)

The plan will clarify the role of health facilities in providing a safer and more efficient health service that can be more easily navigated by the community. Identification of service gaps will also enable stronger partnerships to be formed with the non-government and private sectors to deliver services and infrastructure. The plan would cover:

- public and private systems
- all levels of care including primary, secondary and tertiary services (funded by commonwealth and state governments)
- health, aged care, community health, alcohol and other drug services and mental health services
- facilities, high cost medical equipment and clinical ICT systems
- forecast population change including localised decline and increase in key cohorts
- adoption of new models of care and technology
- the condition of existing assets.

Risks and opportunities

A challenge with this option is to adequately address the diverse range of facilities that support health service delivery and the many variables that determine what should be built where and when. In particular, health service delivery will also change significantly over the 30-year horizon and the plan will be required to respond to this change. There is a risk that the plan will be criticised for evolving over time, particularly by local communities or the private sector, if organisations have made decisions based on the plan and this risk will have to be managed through how the plan is structured.

Health sector infrastructure planning will enable better coordination with complementary land use and transport planning. This option may also take some of the politics out of decision-making as well as providing greater transparency to the public on services planned in different locations.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Victorian Department of Health and Human Services, *Statewide system design, service and infrastructure plan for Victoria's health system, Stakeholder discussion paper*, 2016

Health service modernisation and expansion HIM

Option type

Better use through refurbishment of existing assets

Incremental expansion of existing assets

New assets

Location

Statewide

Sector

Health and human services

Certainty of evidence

High

Direct option cost

\$5 billion– \$10 billion

Option lead time

5–10 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 3: Respond to increasing pressures on health infrastructure, particularly due to ageing

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option encompasses the ongoing refurbishment, repositioning and expansion of acute, sub-acute and ambulatory care public facilities across Victoria. This development is required to support population growth generally, repurpose facilities to meet the needs of particular catchment areas, enable uptake of advancement in technology and models of care as well as deliver upgrades as part of ongoing maintenance. Acute and sub-acute bed gaps already exist across the system and the need for additional services will continue to grow as the population increases. This growth in the short-term (0-15 year period) should be focused in Melbourne's north, west and outer south-east, as well as parts of regional Victoria in particular central Victoria and central highlands. During this period, an additional inner city facility will also be required to support the growth of the inner city population and avoid the more specialised inner city tertiary hospitals being diverted from their complex and specialist functions.

What is the level of community support?

There was a moderate level of discussion on this topic during consultation addressed to the northern metropolitan corridor health service expansion (NHE) and health care smart facilities (HCS). Responses were generally positive. HCS was recommended by the metropolitan citizen jury.

What do we think of this option and why?

This option was recommended in part in the strategy (ref. 3.2.2) because it will be a necessary efficiency improvement to meet the community's current geographic imbalance in service provision and growing future health demand over the next 30-years. Under a business as usual model of health service delivery, we estimate that Victorian health infrastructure would need to increase by about 1.5 times the current infrastructure to meet population growth over 30-years. To maintain the quality of Victoria's health services within a constrained funding environment, however, we will need to look to new models of care, respond to developments in technology and advancements flowing from medical research utilising Victoria's facilities more effectively.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

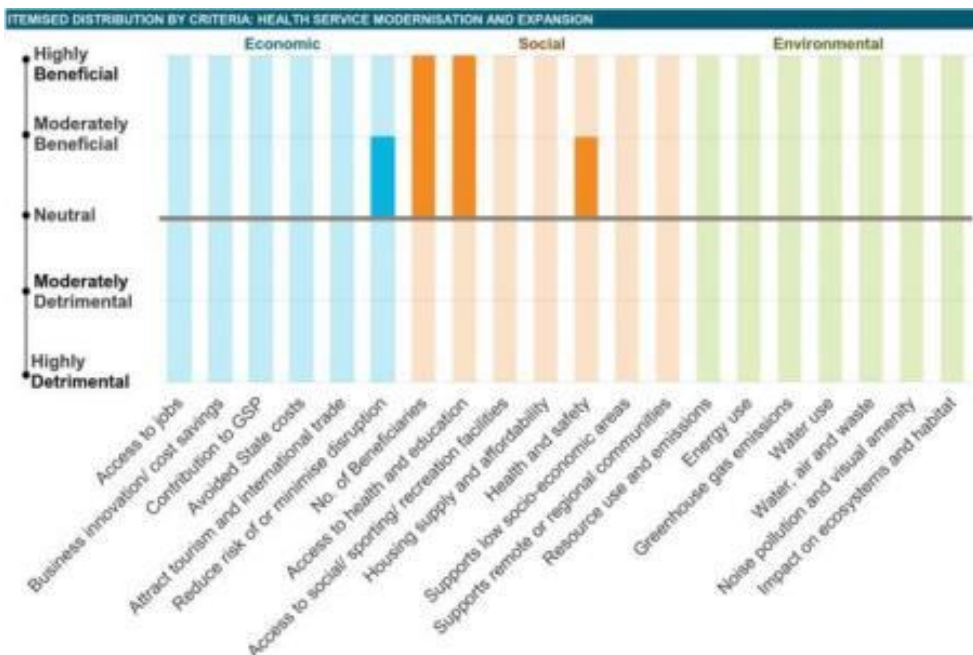
How does this option work with others?

This option is enabled by health infrastructure coordinated planning (HIC) and complementary to major hospital redevelopments (THR). The evolution of hospital facilities will also be dependent on the outcomes of technology in health service delivery (options TEH and EEA).

How does this option perform under different scenarios?

Supercity	+	Reflecting population growth
Westside Story	+	Reflecting population growth
Regional Cities	+	Reflecting population growth
Accelerated Climate Change /Mitigation	Neutral	
Prolonged/ Severe Economic Downturn	+	Increased service demand
Biosecurity Threat	+	Health facilities may be affected

What are the economic, social and environmental impacts of this option?



Commentary:

The capacity expansion offered in this option is expected to support the ability of hospitals to respond to shocks and adverse events and have strong benefits for access to health care for the community.

Risks and opportunities

Funding for services will affect the option's effectiveness over time.

This option could enable new models of care and service improvement through targeted implementation.

Funding

Should government choose to pursue this program, it will then need to consider funding options. Below is a range of potential funding mechanisms which could be examined to help fund the program.

Potential funding mechanisms

General government revenue	User charges	Beneficiary charges	Property development	Asset sales	Donations and Bequests
✓			✓	✓	✓

General government revenue will continue to be a major source of funding for programs like health service modernisation and expansion as the benefits from such investment are usually widely distributed across the community.

Property development could also be considered, for example, by commercially leasing parts of the premises within or around the refurbished hospital. Opportunities could range from retail (such as cafés and shops) to providing space for private health services providers. Property development can assist in putting underutilised government land and space to higher and better uses, creating added value through improved amenity and access to services. Property development has been used in previous significant hospital projects, such as the Royal Children's Hospital project where the new hospital provides expanded childcare facilities and includes a range of shops and services for staff, patients, families, carers and visitors.

Additionally, any hospital sites that are no longer fit-for-purpose and surplus to government requirements should be sold, which can provide a one-off funding boost. This has the additional benefit of allowing sites to be available for higher and better uses.

Donations and bequests should also continue to be pursued; however, we recognise that they will only ever make a small contribution to a project.

Additional notes

Future projected needs

Projected bed gaps for hospital beds have been developed by the Department of Health and Human Services (Victoria) to 2021/22 and the average growth per annum has been extrapolated to provide the estimates to 2046/47 to develop costs for this option. The rudimentary estimates indicate that the current number of points of care (defined as inpatient services or selected infrastructure used to deliver care) would need to increase by about 1.5 times the current number over the next 30-years (assuming no changes to the models of care in place). While some of this demand is currently being delivered within major capital developments across the state, the requirements are unsustainable. Therefore, alternative models of service delivery must be considered to provide a substitute for such levels of investment.

Regional locations have been noted as having a higher proportion of ageing facilities, which will require attention based on their ongoing role for health service delivery.

Scope change

This option was not presented in version one of the *Draft options book*, but was represented by a number of options including health and aged care repurposing of facilities (HAC), northern metropolitan corridor health service expansion

(NHE) and health care smart facilities (HCS). The options have been restructured to split apart different elements of the health service and more clearly identify health infrastructure types.

Next steps

The Victorian Government announced in the 2015/2016 budget that it will invest \$560 million in new public hospitals and equipment for Victoria. The new Western Women's and Children's Hospital and major expansions at Casey Hospital and Werribee Mercy Hospital are key components of the Government's pledge and will utilise a large component of the government's spend on health infrastructure for the next three years. The Victorian Government is currently developing a 20-year statewide design, service and infrastructure plan for Victoria's health system to be issued in 2017 which will outline the strategic direction for existing and new facility development. Once this is published, the next steps are to use the outputs of the plan to proceed to feasibility study (for projects identified for delivery in the 5-10 year period) and business case (for projects identified for delivery in the 0-5 year period).

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Victorian Department of Health and Human Services, *Statewide system design, service and infrastructure plan for Victoria's health system, Stakeholder discussion paper*, 2016

High productivity freight vehicle network completion HPFV

Option type

Better use through refurbishment of existing assets
Incremental expansion of existing assets
New assets

Location

Statewide

Sector

Transport

Certainty of evidence

High

Direct option cost

\$1 billion–\$3 billion

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 13: Improve the efficiency of freight supply chains

Moderate	Moderate	Moderate	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Deliver the statewide high productivity freight vehicle (HPFV) network referenced in the *Victorian Freight and Logistics Plan*. The focus of this option is on the upgrading of existing infrastructure, particularly bridges, to accommodate the heavier axle loads of HPFVs.

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive. This option was recommended by the regional citizen jury.

What do we think of this option and why?

This option was recommended in the strategy (ref. 13.4.3), as we think it will make a significant contribution to improving supply chain efficiency. As a first step we recommended government confirm the future HPFV network, then identify priority locations and works, with a prioritised program of upgrades to the road network, particularly bridges to accommodate heavier axle loads, to be rolled out over 5-15 years.

The recommended expansion of the high mass HPFV network should focus on the supply chains that will benefit most, be integrated with asset management plans and be undertaken in partnership with local government where appropriate. This will reduce the number of freight trips required, resulting in significant improvements to productivity, and will improve road safety and environmental performance.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

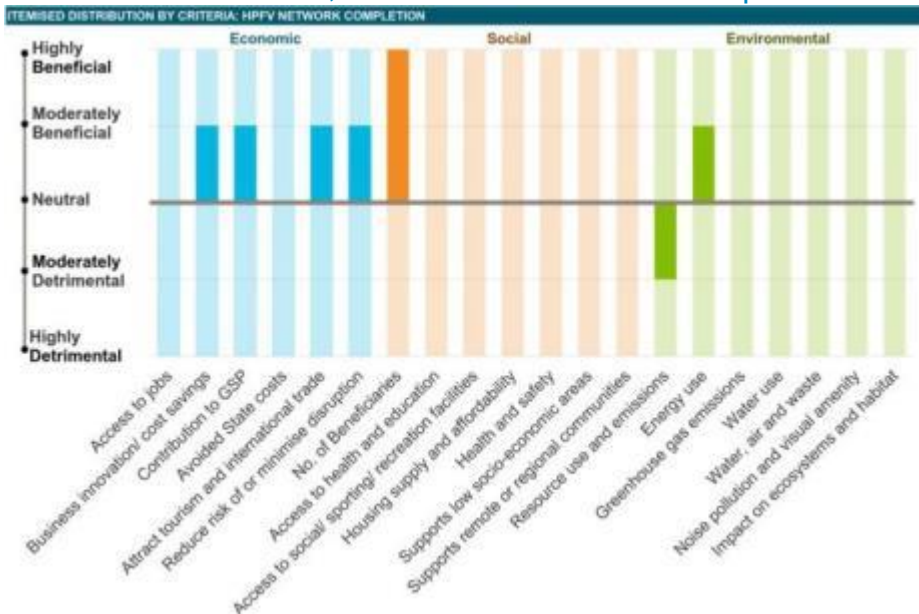
How does this option work with others?

For some freight movements this option could be regarded as an alternative to those options envisaging a greater proportion of containerised freight being carried on rail, such as the Port of Melbourne rail (PMM), Webb Dock rail (WDF) and Melbourne to Brisbane freight rail (MBF). In other respects, however, this option can complement rail-based options in improving freight efficiency. Complementing this option with advanced traffic management (ATM) and driverless freight vehicles (DFV) would also further strengthen freight network performance. The appropriate scope, scale, and staging of this option has a strong interdependency with future port and intermodal freight locations.

How does this option perform under different scenarios?

Supercity	++	Reduces the impact of congestion
Westside Story	+	Reduces the impact of congestion
Regional Cities	+	Reduces the impact of congestion
Accelerated Climate Change /Mitigation	Neutral	
Prolonged/ Severe Economic Downturn	-	Less demand for heavy freight
Biosecurity Threat	Neutral	
Bay West	++	Potential supply chain efficiency increase
Hastings	++	Potential supply chain efficiency increase

What are the economic, social and environmental impacts of this option?



Risks and opportunities

Differences between forecast and actual freight flows into the future could mean that upgrades to the existing road infrastructure to accommodate HPFVs may not fully meet the needs of the freight industry.

Upgrading the road network for HPFVs provides an opportunity to support improved roads, and road space allocation, for all modes (e.g. concurrent improvements in dedicated bus lanes). This creates better services for people to access employment and services in addition to the freight movement efficiencies.

Funding

Should government choose to pursue this program, it will then need to consider funding options. Below is a range of potential funding mechanisms which could be examined to help fund the program.

Potential funding mechanisms

General government revenue	User charges	Beneficiary charges	Property development	Asset sales
✓	✓			

General government revenue is likely to continue to be a major source of funding for programs like high productivity freight vehicle network completion (HPF). Victoria could explore opportunities to seek federal government contributions for projects such as HPF. The benefits of the project are shared by business and consumers across Victoria, but upgrades to routes, like the National Land Transport Network, provide national economic benefits.

Additionally, existing heavy vehicle user charges could contribute funding for HPF. Reforms to existing heavy vehicle user charges are needed so that charges are commensurate with the impact by those users. We recognise that this is underway through a national reform process.

Infrastructure Victoria is examining transport network pricing as part of our research program. We think that the primary objective of a transport network pricing regime – where users pay to access and use the transport network – should be to manage demand, rather than to recover costs for infrastructure. We are focusing on examining road pricing regimes in metropolitan Melbourne as a first step towards a comprehensive transport network pricing regime that includes roads and public transport. Careful consideration must be given to the design of the regime to ensure it is efficient, fair and sustainable.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Housing rental assistance and advocacy program extension

HRA

Option type

Better use through subsidies

Location

Statewide

Sector

Health and human services

Certainty of evidence

Medium

Direct option cost

\$3 billion–\$5 billion

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 7: Provide better access to housing for the most vulnerable Victorians

Low	Low	Low	Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option consists of the state government extending current private rental advocacy support programs and introducing new financial rental subsidies to support low income households to sustain a tenancy in the private rental market. The aim of this option is to reduce the demand for higher cost social housing options by assisting people in transition or crisis to enter or stay in the private housing market. This option is not an infrastructure response, however it has the potential to reduce the requirement to provide additional infrastructure. Financial support could include fixed term subsidies, one-off financial assistance or provision of guarantees to landlords/agents to support tenants facing significant barriers to securing a tenancy in the market. The 'family violence private rental assistance package' announced in April 2016 is an example of the type of initiatives proposed (further detail in *What is this option? cont'd*).

What is the level of community support?

There was a moderate level of discussion of the recommendation Housing rental assistance, which includes this option. Responses were generally positive.

What do we think of this option and why?

This option was recommended in the strategy in a scaled-down form (ref. 7.1.1), with a lesser volume of subsidies recommended. We have not nominated what this lesser amount is, as further analysis is required in the context of a broader affordable housing infrastructure plan (SCP). This option is recommended because there is strong evidence that at risk households are experiencing financial housing stress and providing support in this form can enable households to remain in the private market, relieving stress and reducing demand on the social housing sector. This option is a demand-side response, so while it may address the financial component of housing stress, it does not increase the supply, quality or location of affordable housing. Consequently if this approach is developed on a large scale it will not fully address accessibility issues and may have an inflationary effect on rental rates.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	Relates to key point/option for discussion
Regional Growth Plans	Contributes to implementing policy

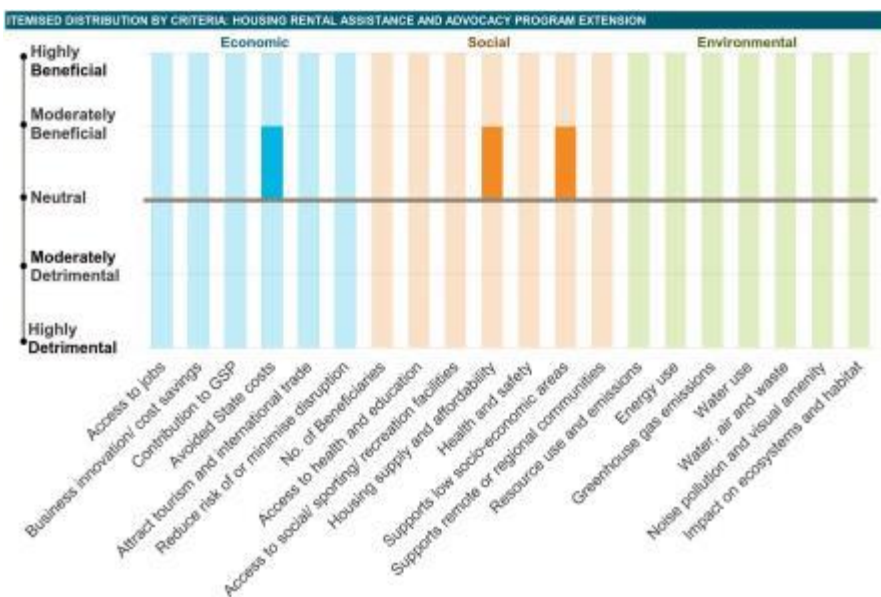
How does this option work with others?

The benefit of this option will only be fully realised if it is provided as part of a pathway of complementary housing solutions, rather than an isolated solution. Developing the affordable housing infrastructure plan (SCP) will be critical to determine the quantum, type and location of housing solutions required. The housing solution options that are complementary include affordable private rental stock (ARH), crisis housing expansion (CHP), residential tenancies reform (RTR), social housing expansion (SHE) and supportive housing responses (TSA).

How does this option perform under different scenarios?

Supercity	+	Reflecting population growth
Westside Story	+	Reflecting population growth
Regional Cities	+	Reflecting population growth
Accelerated Climate Change /Mitigation	++	Increased migration of climate refugees requiring housing
Prolonged/ Severe Economic Downturn	++	Increased number of households suffering housing stress
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



What is this option? (cont'd)

The type of support could include:

- Fixed term subsidies to enable people to enter the private rental market, or stay in the market in times of financial stress
- One-off financial assistance to support households to compete in the private rental market
- Provision of a financial guarantee to landlords or agents to support tenants facing significant barriers to securing a tenancy in the private market
- Skills training to support tenants to sustain private housing market tenancies particularly for tenants who are inexperienced in the Australian housing market or are young and entering adult housing pathways
- Rental brokerage services —to address systemic discrimination in the private rental sector experienced by some households.

Longer-term rental subsidies are provided by the commonwealth government to households suffering housing stress and the subsidy is called Commonwealth Rent Assistance (CRA). As approximately 120,000 households are in stress, the level of this subsidy is not meeting its objective, and whilst there is a role for the state government to work with the commonwealth government to determine a solution to this issue, this subsidy sits out side of the scope of this option. The commonwealth benefit is also noted to meet the cost of rental only and does not address the support proposed under this option to be provided by the state government.

If state government was to implement this option, it should undertake a needs assessment to determine the extent and quantum of its application. This will need to be undertaken in the context of a broader affordable housing strategy and market impact review.

Risks and opportunities

Housing subsidy programs need to be carefully considered to ensure they do not unintentionally contribute to increased spending capacity and demand, and subsequently result in increased rental prices. As the subsidies proposed under this option are to assist people in times of transition or crisis, rather than provide long-term support, the risk is not seen as significant; however it should be fully assessed.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Tually, S et al, *The role of private rental support programs in housing outcomes for vulnerable Victorians*, AHURI positioning paper No. 162, 2016.

Hoddle Street/Punt Road public transport prioritisation HSP1

Option type

Better use through refurbishment of existing assets

Location

Melbourne central subregion

Sector

Transport

Certainty of evidence

Medium

Direct option cost

\$50 million–\$100 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 10: Meet growing demand for access to economic activity in central Melbourne

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Prioritise public and active transport flows along and across Hoddle Street/Punt Road using traffic management systems and road space allocation changes, with a corresponding increase in capacity where warranted by travel-time savings and reliability. Proposed upgrades to Hoddle Street with continuous flow intersections will provide travel-time benefits to public transport services on this corridor.

Under this option, public transport capacity would need to be increased to accommodate growth in demand resulting from improved travel times and reliability (further detail in *What is this option? cont'd*).

What is the level of community support?

There was limited to no discussion of this option during public consultation. This option was recommended by the metropolitan citizen jury.

What do we think of this option and why?

This option was not recommended in the strategy because further work is required to determine if the Hoddle Street/Punt Road corridor has the greatest need for public transport prioritisation.

The prioritisation works on the Hoddle Street/Punt Road corridor were assessed as making a moderate contribution to need 10 across all time periods, however, it did not make any significant contributions in the economic, social and environmental assessments.

We think that the proposed treatments on the Hoddle Street/Punt Road have the capacity to make improvements to public transport along and across this corridor. Infrastructure Victoria supports low cost better use initiatives, however, this option could not be recommended in this strategy without a network-wide assessment to identify the highest priority locations.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

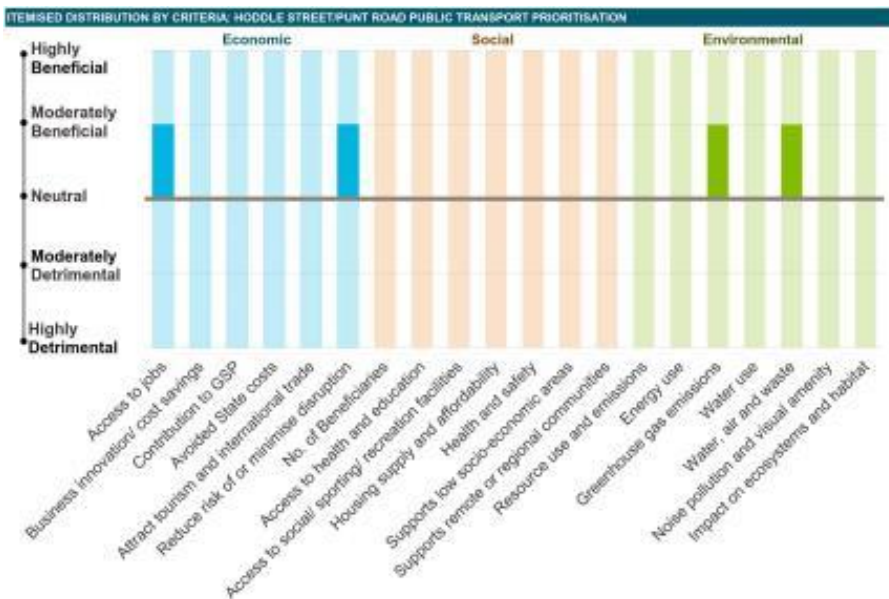
How does this option perform under different scenarios?

Supercity	++	Supports mode shift to address congestion
Westside Story	-	
Regional Cities	+	Supports mode shift to address congestion
Accelerated Climate Change /Mitigation	+	Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	-	Less demand for mass transit
Biosecurity Threat	Neutral	

How does this option work with others?

The benefits of this option can be maximised through the implementation of complementary options road space allocation (RSA), Punt Road traffic management systems (HSP2) and advanced traffic management (ATM), that will all assist to increase priority and reduce travel times for public transport in this corridor.

What are the economic, social and environmental impacts of this option?



What is this option? (cont'd)

The viability of these options varies with the specific issue/location to be addressed and could be summarised as follows:

- Bridge Road (Route 75 Tram): high priority/moderate difficulty (reconfigure lanes to complete the segregated tram lane between Moorhouse Street and Simpson Street)
- Victoria Street (Route 12, 30, 109 Tram): high priority/moderate difficulty (reconfigure lane geometries to extend protected tram lane to Jonas Street)
- Hoddle Street north of Victoria Street (Buses 302-305, 309, 318, 350; DART 905-908): high priority/high difficulty (reprogram parking and traffic lanes for an uninterrupted northbound bus lane to the Eastern Freeway; priority signalisation both directions)
- High Street (Route 6 Tram): moderate priority/moderate difficulty (extend westbound clearway for tram lane and priority signal)
- Commercial Road (Route 72 Tram; Buses 216, 219, 220): moderate priority/moderate difficulty (extend westbound clearway for tram/bus lane and priority signal)
- Toorak Road (Route 8 Tram): moderate priority/moderate difficulty (extend clearways for tram lane and priority signals)
- Swan Street (Route 70 Tram): moderate priority/high difficulty (consolidate traffic lanes for larger protected tram zones)
- Punt Road between Alexandra Parade and Swan Street (Buses 246, 605): moderate priority/high difficulty (reallocate traffic lanes for bus lanes).

Risks and opportunities

There is a risk that the prioritisation of the public transport links across Hoddle Street/Punt Road may have a significant impact on north-south public transport and road users.

An opportunity exists to combine the public transport prioritisation with timetabling changes. This would improve coordination between the different transport modes in addition to the works to increase the reliability and efficiency of the services in this region.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Punt Road traffic management systems HSP2

Option type

Better use through refurbishment of existing assets

Location

Melbourne central subregion

Sector

Transport

Certainty of evidence

Low

Direct option cost

\$500 million–\$750 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 10: Meet growing demand for access to economic activity in central Melbourne

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option considers the use of traffic management systems to prioritise traffic flow on Punt Road at a number of intersections, including Dandenong Road, High Street, Commercial Road and Toorak Road.

Proposed upgrades to Hoddle Street with continuous flow intersections will provide travel-time benefits to public transport services on this corridor.

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option has not been recommended in the strategy because it is encompassed already by advanced traffic management (ATM), which is being recommended.

However, as a standalone option, this option has the potential to improve travel times and the reliability of travel times along this important corridor, as well as reducing trade-offs in terms of cross routes, particularly in respect of the impact on tram travel times and reliability.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

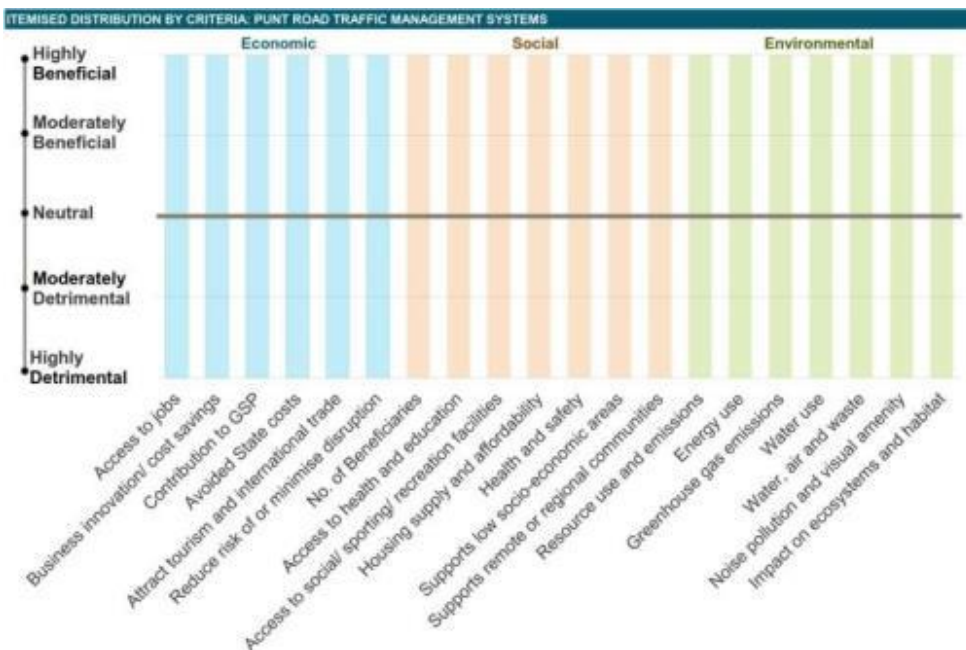
How does this option perform under different scenarios?

Supercity	++	Reduces impact of congestion
Westside Story	-	
Regional Cities	+	Reduces impact of congestion
Accelerated Climate Change /Mitigation	+	Smoother traffic flows reduces emissions per km
Prolonged/ Severe Economic Downturn	-	Less demand for mass transit
Biosecurity Threat	Neutral	

How does this option work with others?

This option is closely related to advanced traffic management (ATM), but is otherwise a standalone option.

What are the economic, social and environmental impacts of this option?



Commentary:
No net impacts identified.

Risks and opportunities

Potential impact on travel times and reliability along intersecting tram corridors on Toorak and Malvern Roads, and High Street are considered risks for this option.

Potential improvement in travel times along Punt Road.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

High speed rail from Sydney to Melbourne

HSR

Option type

New assets

Location

Goulburn and Ovens Murray regions

Melbourne central, western and northern subregions

Hume state-significant transport corridor

Sector

Transport

Certainty of evidence

Medium

Direct option cost

>\$10 billion

Option lead time

10-15 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 10: Meet growing demand for access to economic activity in central Melbourne; and

Need 12: Improve access to jobs and services for people in regional and rural areas

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Construct a high speed rail line between Melbourne and Sydney to provide an alternative to air travel. It is predicted that high speed rail would attract a high share of travel demand between Sydney and Melbourne, benefiting users of this new service, particularly for intercity business trips. In addition, the new high speed link would provide improved access from regional areas where stations are provided to jobs and services in the city centre. This project has been recommended by Infrastructure Australia for corridor protection. The Outer Metropolitan Ring transport corridor (OMR) has been planned with curves of a radius that would enable the operation of high speed trains, and would provide a suitable corridor through the growth areas of Kalkallo and Mickleham for such a rail link.

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive. Both citizen juries made recommendations in support of this option.

What do we think of this option and why?

This option was not recommended in the strategy because the moderate benefits it provides were judged to be outweighed by the very high costs - resources which could be better deployed on other pressing needs across the state. It would offer benefits to users of the new rail service, but overall would likely require substantial public funding to replace existing transport services (air) which operate without public subsidy.

Although this option was recommended by both citizen juries, we have not recommended it. However, should the commonwealth government or private sector seek to pursue such a scheme, the state government would need to be an active participant, including input to the alignment (including assisting in corridor protection) and guiding any land use development.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

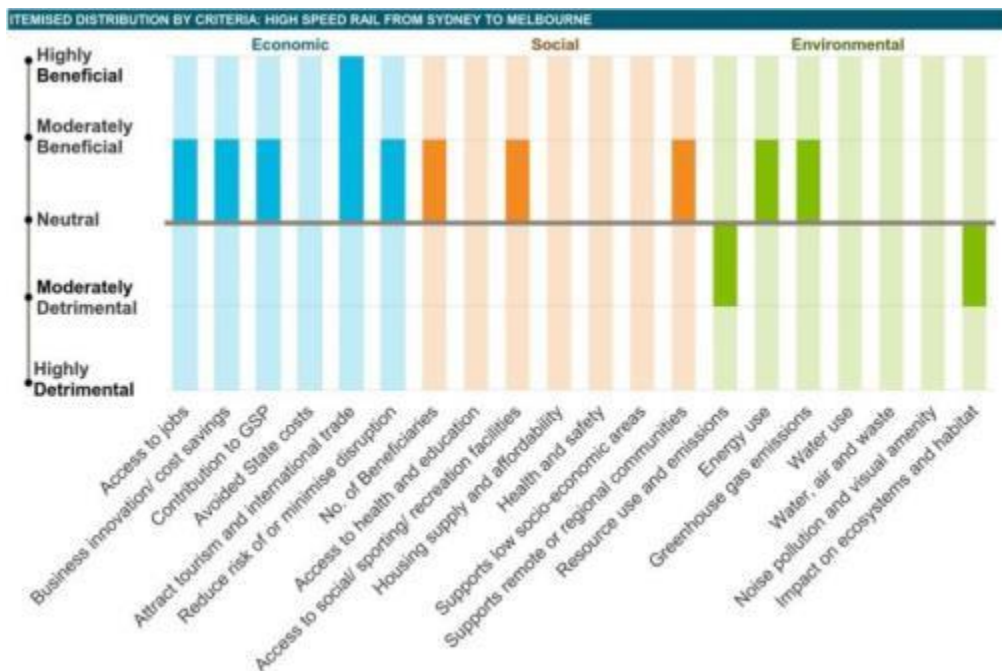
How does this option work with others?

This option could complement or be combined with the construction of Geelong Fast Rail (GFR).

How does this option perform under different scenarios?

Supercity	+	Improves access, intercity travel times
Westside Story	Neutral	
Regional Cities	+	Improves access, intercity travel times
Accelerated Climate Change /Mitigation	++	Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	-	Less demand for travel
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



Risks and opportunities

There is a risk that the structure of the pricing and number of services may not attract people to regional areas or reduce the demand for flights between Melbourne and Sydney. This could reduce the benefits from an option that involves a significant capital investment.

This option presents the opportunity of major development in regional areas focused around new stations, however, the potential for this to occur and whether it would provide net benefits is not clear (refer to *High Speed Rail Study* reports which found significant uncertainty on this issue and potential for both positive and negative outcomes in regional areas).

There is some prospect that over the longer term new technologies may become available that bring down the cost and improve the benefits of a rapid link between Melbourne and Sydney.

Additional notes

Commonwealth work

The Commonwealth Government has received two reports (*High Speed Rail Study Phase 1* and *High Speed Rail Study Phase 2*) from the strategic study on the implementation of a HSR network on the east coast of Australia. Recently the commonwealth government has announced plans to revisit the project with the assistance of 'value capture' financing.

The *High Speed Rail Study Phase 2* report put the cost of the Melbourne-Sydney section at \$50 billion.

Next steps

In the interim, further investigation is required to determine a high speed rail policy for Victoria and to coordinate with other jurisdictions to better understand the level of need for a high speed rail solution.

Over the much longer term, it's possible that revolutionary new technologies become available that bring down the cost and provide a much faster service than current technologies allow. These developments should be tracked, and may change the case for this option.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Commonwealth Department of Infrastructure and Regional Development, *High speed rail study phase 1*, 2011

Commonwealth Department of Infrastructure and Regional Development, *High speed rail study phase 2*, 2013

High Speed Rail Advisory Group, *On track: Implementing high speed rail in Australia*, 2013

Household waste disposal fees

HWD

Option type

Changing behaviour through economic charging

Location

Statewide

Sector

Water and waste

Certainty of evidence

Medium

Direct option cost

\$10 million–\$25 million

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 15: Manage pressures on landfill and waste recovery facilities

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option would restructure waste disposal fees from a fixed fee to a variable charge based on the amount of waste generated by a household. For example waste fees could be charged based on the weight of bins.

The current charging mechanism for waste is a fixed fee per household irrespective of the amount of waste generated. This option proposes to use a clearer price signal to better reflect the true cost of waste disposal. Similar approaches have been adopted in different forms internationally, for example through the ‘pay as you throw’ program in the United States. This could lead to less waste being generated at the source and to broader environmentally sustainable behavioural changes.

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally polarised. This option was recommended by the regional citizen jury, but was opposed by the metropolitan citizen jury. Only 23 per cent of people surveyed as part of consultation were supportive of households having waste being costed on weight.

What do we think of this option and why?

This option was recommended in part in the strategy (ref. 15.1.3) as clearer financial incentives for households to consider the amount of waste they generate and dispose are required. Specifically, we recommended a review of pricing mechanisms for waste disposal and this option is an example of a mechanism that can be investigated further. Determining the true cost of waste disposal is complex and involves consideration of environmental impacts as well as social impacts. Implementation of this option would require community engagement, knowledge building and information sharing. Lessons could be gained from successful adoption of variations of this option in the United States, Europe and New Zealand (further detail in *What do we think of this option and why? cont'd*).

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

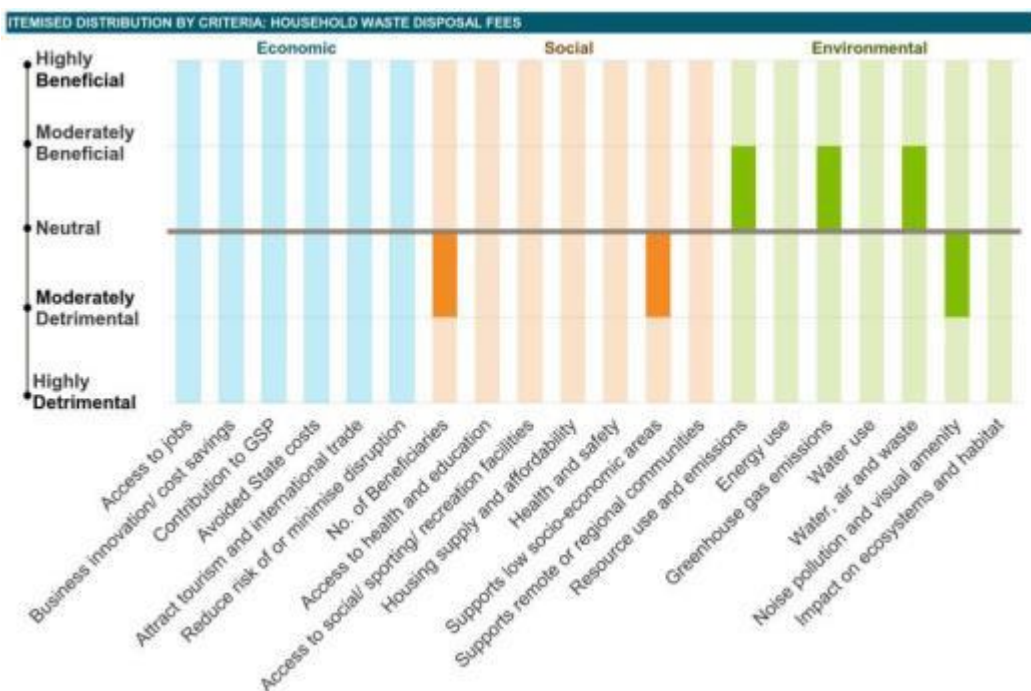
How does this option perform under different scenarios?

Supercity	++	Increased need to minimise waste disposal
Westside Story	++	Increased need to minimise waste disposal
Regional Cities	++	Increased need to minimise waste disposal
Accelerated Climate Change /Mitigation	+	Acute need to reduce carbon emissions
Prolonged/ Severe Economic Downturn	Increased likelihood of illegal dumping	
Biosecurity Threat	Neutral	

How does this option work with others?

This option is an alternative to other waste disposal pricing mechanisms such as the landfill levy (LLI).

What are the economic, social and environmental impacts of this option?



Commentary:

An increase in waste disposal fees can disproportionately affect low income households, and be experienced as a detriment by households in general.

What do we think of this option and why? (cont'd)

Transportation and energy costs mean that alternative waste disposal locations can be expensive. While this option may meet resistance from communities with concerns around increased costs of living, from industry with concerns around implementation and enforcement, and from the broader public with concerns about illegal dumping, there are examples of similar schemes successfully operating overseas such as the “pay as you throw” schemes in the United States and Europe. New Zealand adopts a version of this proposal by using pre-purchased rubbish-bins to collect waste. A key justification and benefit of these schemes is that they lead to reductions in waste disposal to landfill. The concerns raised around this option are however legitimate and in investigating a suitable policy mechanism a number of aspects would need to be considered including alternatives to achieving the same objective (better reflecting the true cost of waste disposal) and implementation.

Risks and opportunities

There is a risk of avoidance behaviour such as illegal dumping developing where households seek to minimise waste disposal costs. There is also a risk that significant enforcement activities will be required to implement this option.

There is an opportunity for this option to accelerate innovation in waste recovery and waste minimisation as households are incentivised to reduce waste disposal. This option could prompt further consumer choices and also prompt other parties in the supply chain to reduce packaging to increase product competitiveness.

Additional notes

A number of councils in Australia have implemented an alternative version of this proposal by providing households with different sized bins at different prices. There is, however, further potential for charging mechanisms to be more direct to end users.

Funding

Household waste disposal fees (HWD) is a major pricing reform that could aim to change behaviour to reduce waste going to landfill by better reflecting the true cost of waste disposal.

Government should consider a number of issues when designing HWD such as: ensuring that the user charge better reflects the costs of waste disposal; designing the charge to prevent creating perverse incentives like illegal dumping; and addressing equity concerns.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Kelleher et al, *Taking the trash out: How to allocate the costs fairly*, 2005

Productivity Commission, *Waste management*, 2006

Wellington City Council, *Information on buying official Council rubbish bags*

International airport in the south-east of Melbourne IAS

Option type

New assets

Location

Melbourne southern subregion

This option is expected to benefit the southern and eastern subregions of Melbourne in particular

Sector

Transport

Certainty of evidence

Medium

Direct option cost

\$3 billion–\$5 billion

Option lead time

5–10 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 1: Address infrastructure demands in areas with high population growth

Low	Low	Low	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option proposes the construction of a third international airport in the south-east of Melbourne to provide better access to an airport for nearby residents and people in south-east Victoria which would be undertaken by a private sector organisation. The role of government would be to facilitate the development, should there be a benefit to the state.

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive.

What do we think of this option and why?

Although the option of the state government investing in a new airport was not recommended in the strategy, it is open to the private sector to develop a new airport. This includes the proponent providing all landside infrastructure, including transport connections, and substantially contributing to the necessary upgrading of any existing infrastructure. The state government has a role to provide planning approvals and land use controls to facilitate proposed developments, subject to the usual standards. In similar developments Infrastructure Australia has recommended that curfews and other restrictions be avoided.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

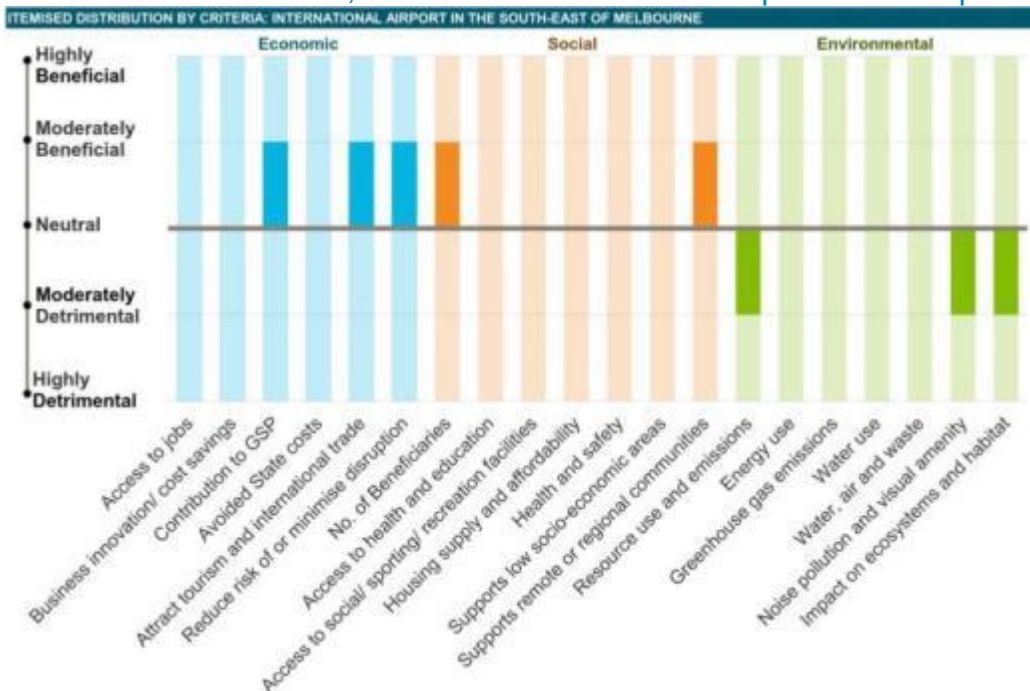
How does this option work with others?

No key relationships were identified for this option.

How does this option perform under different scenarios?

Supercity	++	Reduces need for cross-town trips
Westside Story	-	
Regional Cities	+	Reduces need for cross-town trips
Accelerated Climate Change /Mitigation	+	Reduces vehicle kms travelled
Prolonged/ Severe Economic Downturn	-	Less demand for car and air travel
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



Risks and opportunities

There is a risk of significant environmental and habitat consequences associated with a new airport development as well as the movement of aircraft and traffic.

There is an opportunity to develop a new tourism and travel hub in the southeast, reducing growth and traffic pressures on Tullamarine.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Integrated community based health hubs ICP

Option type

New assets

Location

Statewide

Sector

Health and human services

Certainty of evidence

Medium

Direct option cost

\$1 billion–\$3 billion

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 1: Address infrastructure demands in areas with high population growth

Significant	Significant	Significant	Significant
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0-5 yrs 5-10 yrs 10-15 yrs 15-30 yrs

Need 3: Respond to increasing pressures on health infrastructure, particularly due to ageing

Moderate	Moderate	Moderate	Moderate
----------	----------	----------	----------

0-5 yrs 5-10 yrs 10-15 yrs 15-30 yrs

What is this option?

Provide integrated facilities that deliver a combination of primary and community care services within local communities, developed in partnership with a mix of health providers and other complementary human services and justice service providers. Each centre would offer different services, tailored to that particular community's needs. Examples of these facilities include the Melton Community Health Hub (currently under development), Victorian aboriginal health service centres and the Laverton Community Hub. This is a statewide approach to providing community and primary care, however, delivery of these facilities should focus where there are the largest gaps in accessing these services. Analysis indicates that the regions where there is a substantial gap in the service profile are in the outer north, west and east of Melbourne and in outer regional locations throughout Victoria. This option also provides the opportunity to upgrade existing facilities and to repurpose existing regional and rural acute/hospital facilities in areas with reduced demand for health services. Facilities would be located where there are complementary facilities and strong connectivity to the public transport system.

What is the level of community support?

There was limited discussion of this option during public consultation.

What do we think of this option and why?

This option was recommended in the strategy (ref. 3.2.3 and 12.1.7) because the types of facilities proposed provide services outside of the hospital setting in a more accessible community location. The option will also provide a relatively low cost and rapid response in regions where there is a substantial gap in the service profile, in particular the outer north, west and east of Melbourne and outer regional areas throughout Victoria. The facilities are proposed to be provided continuously over the 5-30 year period, however as models of care and technology evolve, the value of these facilities as an alternative to patients accessing acute hospital facilities will become clearer over the next 10 years.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

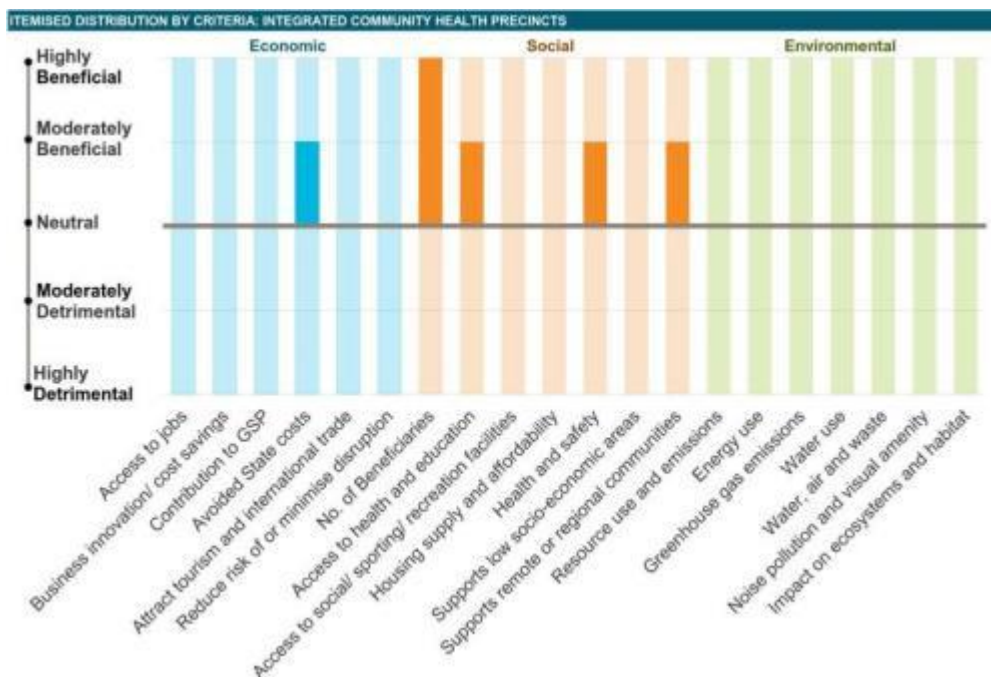
How does this option perform under different scenarios?

Supercity	+	Reflecting population growth
Westside Story	+	Reflecting population growth
Regional Cities	+	Reflecting population growth
Accelerated Climate Change /Mitigation	Neutral	
Prolonged/ Severe Economic Downturn	+	Increased demand for health services
Biosecurity Threat	+	As involves health facilities that will be effected

How does this option work with others?

This option is enabled by Health infrastructure coordinated planning (HIC), which will identify the requirements of the facilities proposed under this option. The evolution of health facilities will also be influenced by the outcomes of technology in health service delivery, outlined in options (TEH) and (EEA).

What are the economic, social and environmental impacts of this option?



Commentary:

The option is applied statewide to a broad range of beneficiaries. It also potentially relieves pressure of emergency facilities reducing state costs.

Risks and opportunities

The development and funding of these facilities is complex as it involves the coordination of state health service providers and private sector organisations funded by the state and commonwealth. The previous commonwealth GP super clinic initiative displayed the complexity associated with developing this type of facility. In response to this challenge, adequate time must be allowed for the integrated development of these facilities with all parties and contingency allowed for variation in the involvement of stakeholders throughout the life of the facility.

Funding

Should government choose to pursue this program, it will then need to consider funding options. Below is a range of potential funding mechanisms which could be examined to help fund the program.

Potential funding mechanisms

General government revenue	User charges	Beneficiary charges	Property development	Asset sales	Donations and bequests
✓			✓		✓

General government revenue will continue to be a major source of funding for programs like integrated community based health hubs.

Property development could be considered, for example, by selling or leasing parts of the premises within or around the integrated community health precinct. Opportunities could range from retail (such as cafés and shops) to providing space for private health service providers. Property development can assist in putting underutilised government land and space to higher and better uses, creating added value through improved amenity and access to services.

Donations and bequests should also continue to be pursued; however, we recognise that they will only ever make a small contribution to a program.

Additional notes

Changes to recommendations from the draft strategy


This option was recommended in the draft strategy. Since then we have clarified that integrated facilities should include 'complementary' services. This responds to stakeholder feedback about the potential detrimental effects of co-location with some justice services. We have also highlighted that integrated facilities need to be planned in line with the needs of the local community.

Next steps

The government is currently developing a 20-year statewide design, service and infrastructure plan for Victoria's health system to be issued in 2017, which will outline the strategic direction for existing and new facility development. This process will identify more clearly the short and long-term need for these types of facilities. Government should also monitor the performance of the new Melton Community Hub and other similar health services to determine the suitability of other similar health models and the ability to integrate with other complementary human service and justice services.

Scope change

In version one of the *Draft options book*, the option Health care decentralised delivery model (HCD2) was included, which proposed the adoption of a new health care model focused on offering decentralised community based care, rather than a model that concentrated services in large consolidated hospitals and health centres. The option was



assessed as having a low contribution and it was further highlighted that the Victorian system of health care networks already provides a form of decentralised health care delivery.

This option differs to HCD2, in that the type of facilities proposed will offer services that are complementary to hospital services, rather than decentralising and restructuring the existing health service delivery system.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Victorian Department of Health and Human Services, *Statewide system design, service and infrastructure plan for Victoria's health system, Stakeholder discussion paper*, 2016

Intermodal freight hubs for regional Victoria

IFH

Option type

Incremental expansion of existing assets

New assets

Location

Specific locations across Victoria that are well located between major freight rail, road and ports, such as Beveridge.

Sector

Transport

Certainty of evidence

Medium

Direct option cost

\$1 billion–\$3 billion

Option lead time

5–10 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 13: Improve the efficiency of freight supply chains

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Develop intermodal (rail and road) freight hubs at key locations across regional Victoria to enable a greater proportion of export goods to be transported by rail to Victorian ports and interstate.

What is the level of community support?

There was limited discussion of this option during public consultation. This may be as it was not recommended in the draft strategy.

What do we think of this option and why?

This option was not recommended in the strategy because while the development of regional intermodal terminals could lower the cost of the total freight task, it is not clear what government's role should be beyond addressing any potential planning or access barriers. It is notable that regional growth plans currently enable the provision of appropriately zoned land for freight purposes.

The issue is complicated by the matter of heavy freight road user charging and the impact of the current absence of such a charging regime on the commercial competitiveness of rail freight operations. Once this issue is resolved it will be open to government to consider what role it should play as part of a broader freight strategy.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

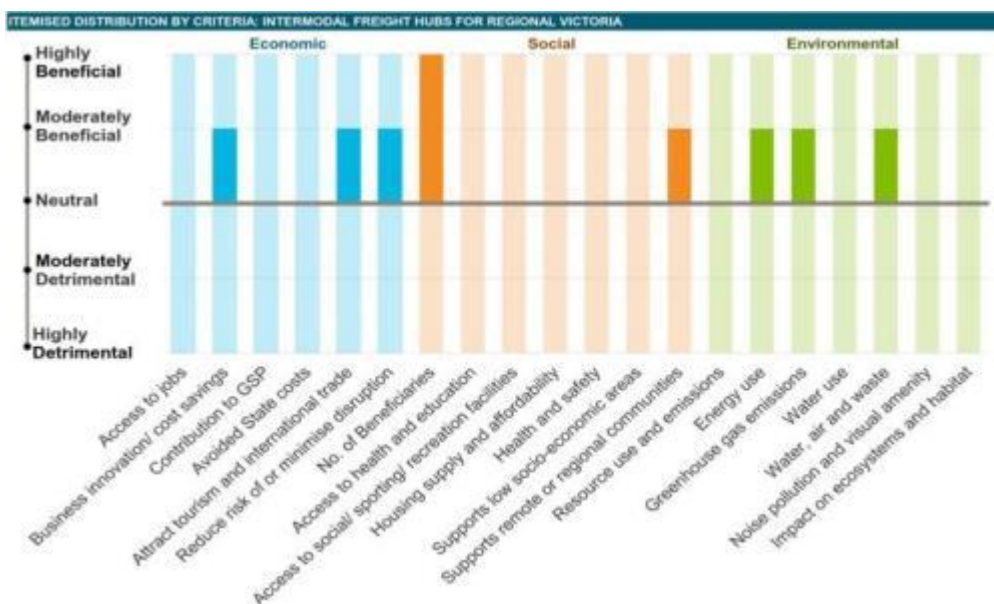
How does this option work with others?

This option is complementary to the Western Interstate Freight Terminal (WIF) and Beveridge intermodal freight terminal (BIF).

How does this option perform under different scenarios?

Supercity	+	Reduces conflicts between freight and road traffic
Westside Story	+	Reduces conflicts between freight and road traffic
Regional Cities	+	Reduces conflicts between freight and road traffic
Accelerated Climate Change /Mitigation	+	Facilitates more carbon efficient rail freight
Prolonged/ Severe Economic Downturn	-	Less demand for freight transport
Biosecurity Threat	Neutral	
Bay West	++	Supports port gate efficiencies due to fewer overall truck trips
Hastings	++	Supports port gate efficiencies due to fewer overall truck trips

What are the economic, social and environmental impacts of this option?



Risks and opportunities

There is a risk that this option may not be fully optimised if freight rail projects such as the Melbourne-Brisbane rail line are not undertaken.

The effectiveness of the option could be enhanced by supporting policy work to identify where terminals could be most effective. This would likely be where better terminal facilities would address some factors that reduce the competitiveness of rail compared to road-based transport, such as trip time, handling costs and trip time reliability.

Development could also be targeted to areas likely to have the high volume of freight to move, making rail services viable.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Integrated power supply IPS

Option type

Better use through coordination processes
Better use through subsidies
Better use through technological innovations

Location

Statewide

Sector

Energy

Certainty of evidence

Low

Direct option cost

\$1 million–\$10 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 18: Transition to low carbon energy supply and use

Low	Low	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Definition of a series of investments and withdrawals across generation technologies that meet specified emissions objectives. This option would outline an integrated power supply portfolio that relies primarily on lower emission energy sources but retains black coal generation in reserve to meet demand shortfalls. This would require a multi-jurisdictional approach.

A strategy of maintaining reserve coal generation while deploying low emission technologies can maintain security of supply until technological development and cost curves enable a transition to zero emission generation.

What is the level of community support?

There was limited to no discussion of this option during public consultation. This option was recommended by the metropolitan citizen jury.

What do we think of this option and why?

This option was not recommended in the strategy because under current operation of the electricity market there is a limited role for the state in stipulating types and quantities of generation technologies. This option lends itself to a national approach rather than a jurisdictional approach, and significant evidence would be required to justify directing operation of a largely privatised sector. The benefit of this option would however be effective utilisation of different natural resources across jurisdictions while minimising security and reliability risks. Costing of this option reflects policy development only.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

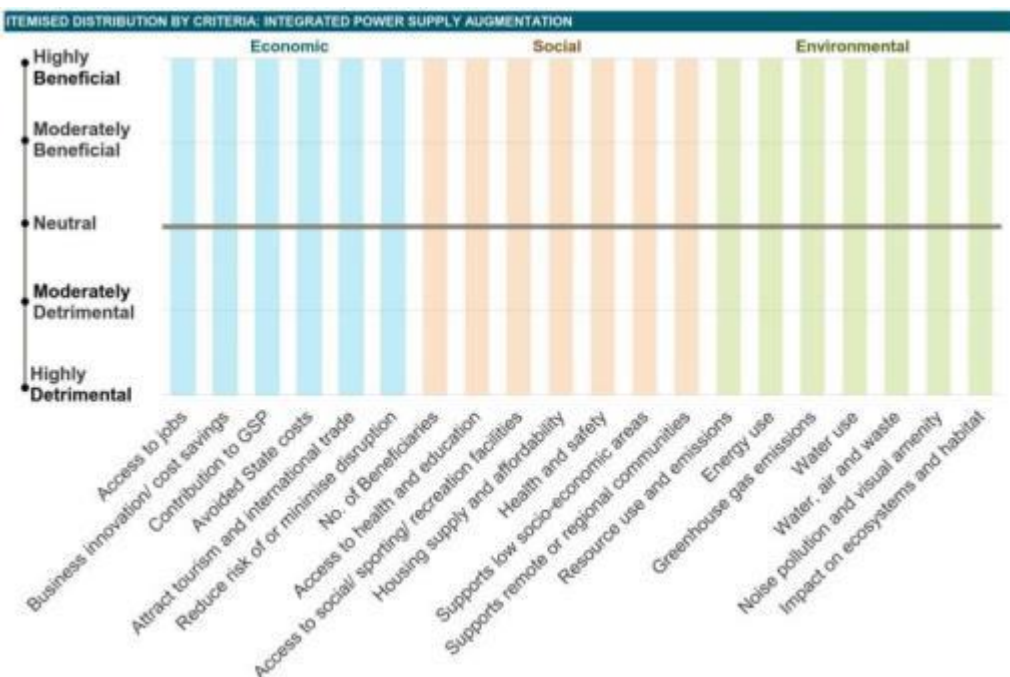
How does this option perform under different scenarios?

Supercity	++	Increased need for more reliable baseload supply
Westside Story	+	Increased need for more reliable baseload supply
Regional Cities	+	Increased need for more reliable baseload supply
Accelerated Climate Change /Mitigation	++	Acute need to reduce carbon emissions
Prolonged/ Severe Economic Downturn	-	Less demand for energy
Biosecurity Threat	Neutral	

How does this option work with others?

This option could be designed to complement mechanisms to transition out of brown coal generation (BCA, BCL).

What are the economic, social and environmental impacts of this option?



Commentary:

Assessed in isolation of other options or projects that could be enabled, this option is considered to have minimal appreciable impacts.

Risks and opportunities

This option may be incompatible with Victoria's participation in the National Electricity Market. Victoria also does not have black coal reserves.

Uncertainty around future state and national climate change policies could result in loss of investor confidence in the market, and delay investment in new generation, including renewables.

The opportunity provided by this option is that it presents a diversified energy supply portfolio that depends on lower emission sources in the first instance. This can focus investment on lower emission technologies while also allowing time for further innovation as these technologies are brought on line.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Australian Energy Market Commission, *Emissions reduction fund submissions: Consultation on the emissions reduction fund safeguard mechanism*, 2015

Infrastructure resilience assessment test IRA

Option type

Better use through public service delivery and approval processes

Location

Statewide

Sector

All

Certainty of evidence

Low

Direct option cost

\$25 million-\$50 million

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 19: Improve the resilience of critical infrastructure

Moderate	Moderate	Moderate	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option would require the development of an infrastructure resilience assessment test for new major capital works proposals. All proposals would be subject to modelling that indicates, through siting, design, specifications and construction, whether the infrastructure will be able to withstand a range of major shocks and/or the likely effects of climate change.

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive.

What do we think of this option and why?

This option was not recommended in the strategy because it is uncertain how the test would operate and its scope. The range of construction activities undertaken by government, including roads, hospitals and prisons, would make determining specific requirements very difficult. This could also be considered by industry as increasing the red tape burden and drive cost increases for public infrastructure. The option would have a moderate contribution increasing to significant in 15 years but we think more work needs to be done to understand the model before it is given further consideration. A narrower scope, such as climate change resilience, could be the focus.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	Relates to option for discussion
Regional Growth Plans	N/A

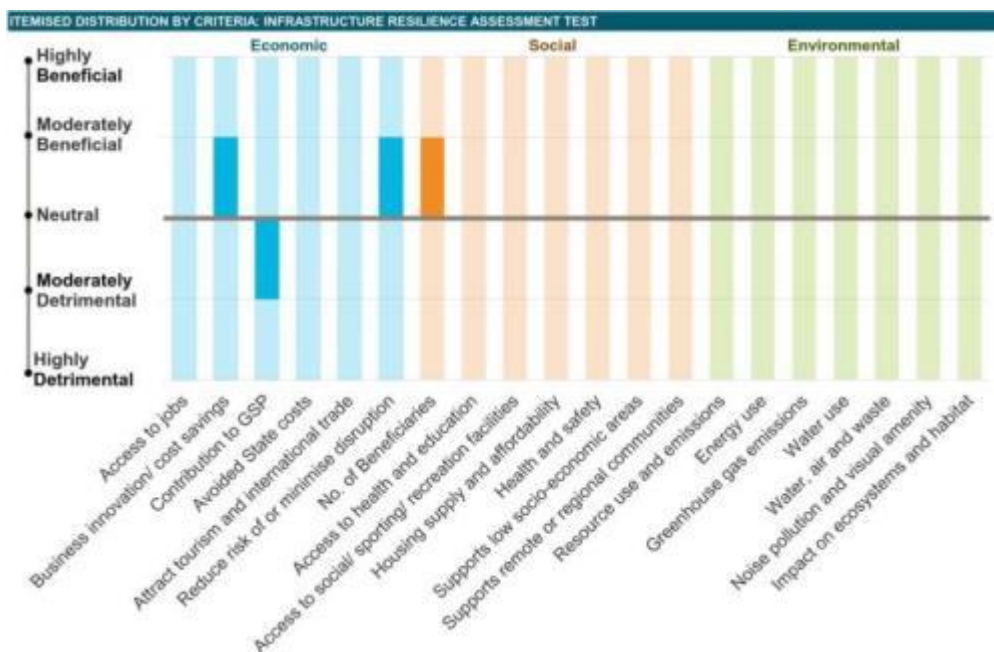
How does this option perform under different scenarios?

Supercity	+	Improved operational reliability
Westside Story	+	Improved operational reliability
Regional Cities	+	Improved operational reliability
Accelerated Climate Change /Mitigation	+	Improved operational reliability
Prolonged/ Severe Economic Downturn	+	Improved operational reliability
Biosecurity Threat	++	Improved operational reliability

How does this option work with others?

This option may work well with centralised risk management of critical infrastructure (CAR), as it would support a standardised and consistent approach to ensuring the resilience of critical infrastructure. It would also further strengthen the resilience of design and construction of coastal protection infrastructure (CPI) and the construction of all major infrastructure across sectors.

What are the economic, social and environmental impacts of this option?



Risks and opportunities

There is a risk of red tape imposition on business. There is an opportunity for this test to support the building of resilience across all new infrastructure against natural climate events in a steady and progressive way without major disruption.

Additional notes

Next steps

In the first instance, implementation of this option would require dedicated, specialist staff. Ongoing monitoring would require resourcing, and the establishment of penalties for non-compliance would need to be carefully managed.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Integrated transport control centre

ITC

Option type

Better use through technological innovations

Location

Melbourne

Sector

Transport

Certainty of evidence

Low

Direct option cost

\$50 million–\$100 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 19: Improve the resilience of critical infrastructure

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

To facilitate better system-wide management of transport and establish a fully integrated metropolitan control centre encompassing road traffic and public transport. This could be undertaken incrementally if planned carefully, as the various existing separate control centres become due for major renewal.

An optimally sited integrated control centre could also avoid the type of incident where active fire alarm evacuations in the building housing the Metrol control centre have resulted in temporary shutdowns of the metropolitan rail network.

What is the level of community support?

There was limited to no discussion of this option during public consultation. This option was recommended by the metropolitan citizen jury.

What do we think of this option and why?

This option was recommended in the strategy (ref. 19.2.4) for implementation progressively over 15-30-years because it will enable a more integrated approach to transport system management. This is likely to become more important in the future as the different modes work closer together to accommodate people's mobility needs. Moreover, this integrated approach will enable operators to proactively monitor and manage their networks in real time and undertake more effective incident management with reference to the full range of available modes. This can contribute to strengthening the ability of the transport system as a whole to respond to shocks (e.g. accidents or weather-related incidents), but also to facilitate real-time management of congestion generally, increasing the overall resilience of the network.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

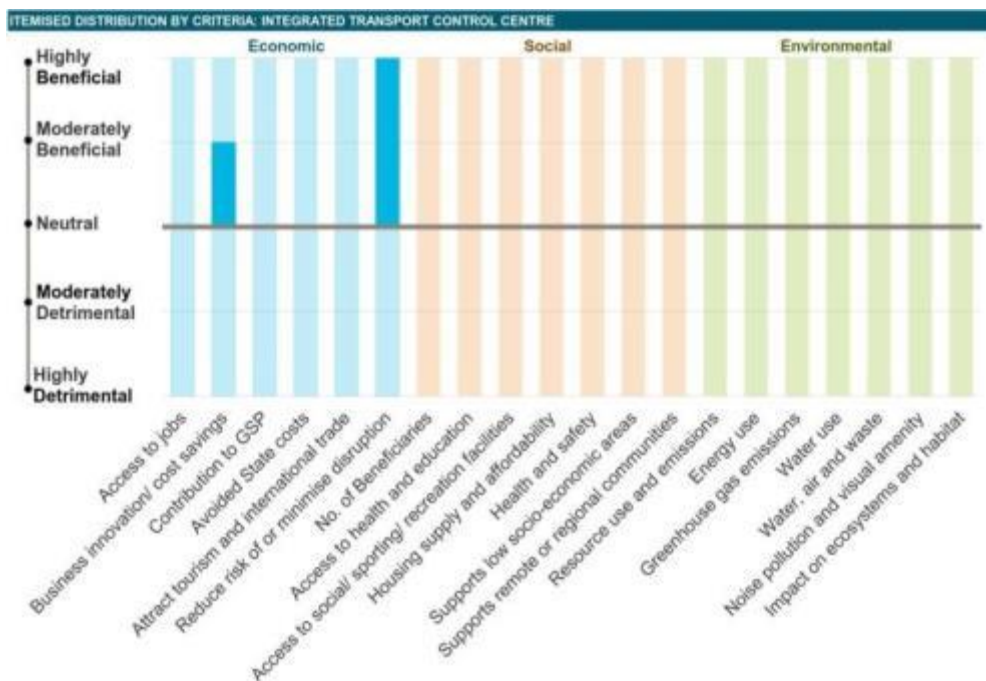
How does this option perform under different scenarios?

Supercity	++	Minimises disruptions
Westside Story	+	Minimises disruptions
Regional Cities	+	Minimises disruptions
Accelerated Climate Change /Mitigation	+	Reduces incident-related congestion
Prolonged/ Severe Economic Downturn	Neutral	
Biosecurity Threat	Neutral	

How does this option work with others?

This option is complementary to key movement corridor incident management (CRR1), advanced traffic management (ATM), advanced driver assistance (ADA), automated vehicle technology (ACT) and a Victorian data analytics centre (VDA).

What are the economic, social and environmental impacts of this option?



Risks and opportunities

Incremental transfer of responsibilities from existing control centres to a centralised centre would need to be planned carefully. This is to ensure that roles and responsibilities are clear, minimise duplication of effort and ensure sufficient coverage of all parts of the network.

This option could be designed in conjunction with Victorian Data Analytics (VDA) and Government data sharing (GDS) to ensure that the transport control centre maximises the use of all available information.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then we have made a change to acknowledge that a greater degree of functional integration across sectors (i.e. beyond transport) could strengthen system resilience in terms of the availability of levers to respond to system challenges and disruptions.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Increased telecommuting ITT

Option type

Changing behaviour through information

Location

Statewide

Sector

ICT

Certainty of evidence

Low

Direct option cost

<\$100 million

Contribution to meeting the need (assumes instantaneous implementation)

Need 10. Meet growing demand for access to economic activity in central Melbourne – **Low**

What is this option?

Provide CBD businesses with financial incentives to encourage telecommuting and remove barriers to telecommuting (such as occupational health and safety requirements that might discourage working from home). This could improve access to high-value central city employment, while also reducing demand on the transport network.

What is the level of community support?

There was limited to no discussion of this option during public consultation. This option was recommended by the regional citizen jury.

What do we think of this option and why?

This was not recommended in the strategy, as, although 'telecommuting' has some potential to alleviate transport congestion, it was not clear what role government should play in promoting this practice. While government could facilitate 'remote working' among its own employees (where appropriate), it has a limited role to play in encouraging the broader community to do so. It will be up to individual workplaces to determine what the scope for 'remote working' could be, and whether and how much it would be consistent with their business practices and employee agreements. However, we note that improvements to ICT connectivity more broadly (ETP) would enable more telecommuting.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

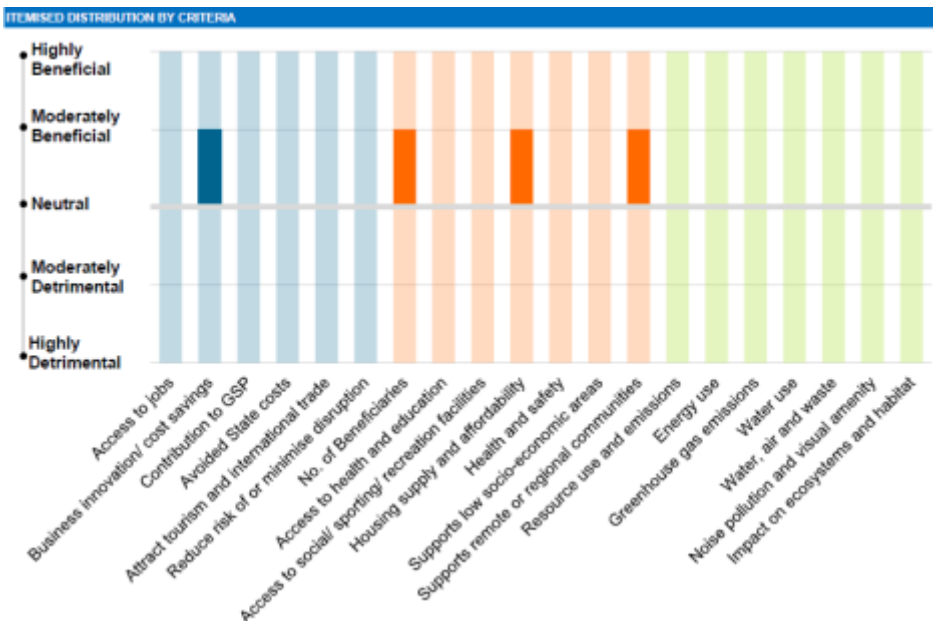
How does this option work with others?

Encouraging telecommuting may reduce demand across transport systems, supporting the intent of employment outside central city incentivisation (EOC) and a central city job cap (CCJ).

How does this option perform under different scenarios?

Supercity	+	Frees up capacity for other users
Westside Story	+	Frees up capacity for other users
Regional Cities	+	Frees up capacity for other users
Accelerated Climate Change /Mitigation	+	Could reduce road travel (powered by non-renewable sources)
Prolonged/ Severe Economic Downturn	-	Less need for travel
Biosecurity Threat	++	Could enable access to employment and services while reducing contagion risk

What are the economic, social and environmental impacts of this option?



Risks and opportunities

There may be some concerns that this should not disadvantage those with less ability to access or use such technology.

Evidence base

AECOM/PwC, *Assessment 2: Economic, social and environmental assessments and option relationship mapping*, 2016

Deloitte/Aurecon, *Assessment 1: Options analysis report*, 2016

Justice and human services integrated planning and delivery

JCS

Option type

Better use through coordination processes

Better use from public service delivery and approval processes

Location

Statewide

Sector

Justice and emergency services

Health and human services

Certainty of evidence

Low

Direct option cost

\$250 million–\$500 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 2: Address infrastructure challenges in areas with low or negative growth; and

Need 8: Address increasing demand on the justice system; and

Need 12: Improve access to jobs and services for people in regional and rural areas

Moderate	Moderate	Moderate	Moderate
----------	----------	----------	----------

0-5 yrs 5-10 yrs 10-15 yrs 15-30 yrs

What is this option?

There is an increasing awareness of the interrelationship between justice and human services – strengthened by the recommendations in the Royal Commission into Family Violence. There are examples of the two sectors working together, including co-location of courts or police facilities with relevant human services. This option would seek to normalise and extend this approach to drive integrated planning and delivery of services delivered by the justice and the human services sectors and with health (further detail in *What is this option? cont'd*).

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive. Both citizen juries made recommendations in support of this option.

What do we think of this option and why?

This option was recommended in the strategy (ref. 8.1.1) because increasing demand on the justice system cannot be addressed by the justice sector alone. Current service delivery models and infrastructure limit opportunities for integration between justice and human services that can address the causes of crime. While steps have been made which demonstrate the benefits of integration, this is a major reform that needs to be normalised by developing integrated service plans over the next five years before new investment occurs. The infrastructure changes that would flow from this integrated planning could be co-located facilities (using opportunities from police complexes and new courts) and/or infrastructure upgrades including ICT. The recommendation emphasises that the health sector, particularly drug and alcohol issues, must be included as part of this planning, as could access to complementary services such as legal services (eg Victoria Legal Aid or Justice Connect), employment assistance or financial services.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

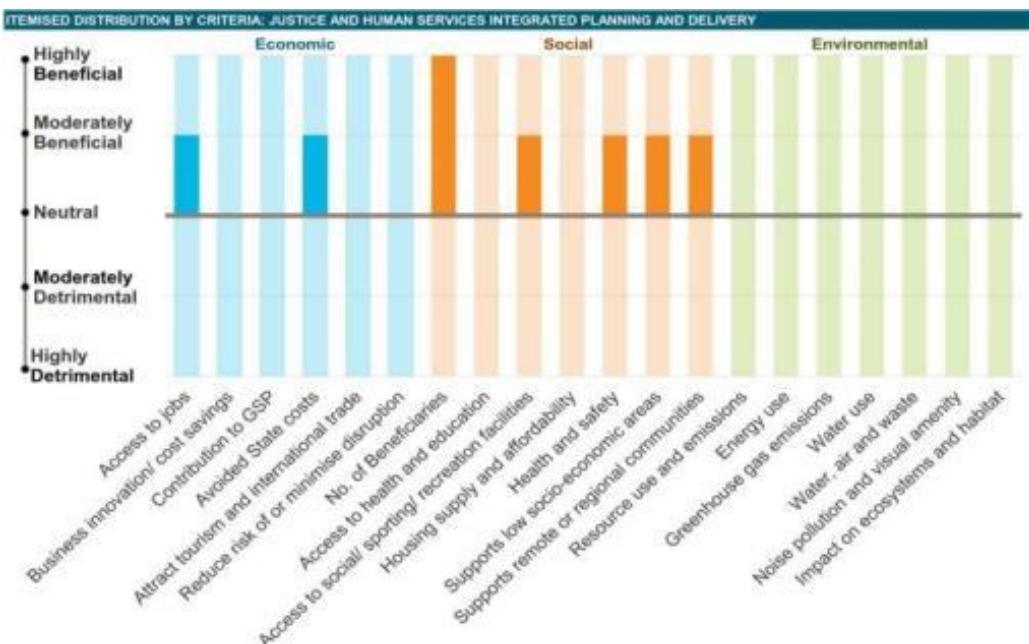
How does this option work with others?

This option has in some ways a dependent, or at least a complementary, relationship with two options. A program of both 24 new police complexes (PSS) and new and refurbished courts (JDG) provide opportunities to normalise the practice of justice facilities being planned and delivered as integrated facilities with other justice services as well as human services and health.

How does this option perform under different scenarios?

Supercity	+	Addresses heightened risk to social cohesion
Westside Story	+	Addresses heightened risk to social cohesion
Regional Cities	+	Addresses heightened risk to social cohesion
Accelerated Climate Change /Mitigation	Neutral	
Prolonged/ Severe Economic Downturn	++	More efficient and effective delivery of services for the vulnerable
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



Commentary:

This option is considered to support low socio-economic areas where high needs for government services may be clustered. Through innovative service design, this option may also improve access to services for regional and remote areas.

What is this option? (cont'd)

Integrated planning means looking ahead to the challenges in both sectors and considering the infrastructure and services that would support shared outcomes. One important outcome of this planning could be co-location. Co-location does not necessarily require a police complex or court to be given effect. In some cases, it may be more appropriate for police or other justice personnel (eg corrections) to be on-site to support an integrated service. This would be similar to the six multi-disciplinary centres (MDCs) across Victoria to address sexual assault. The planning may show that co-location works best in some communities by including justice services in broader health and human service-led facilities.

Integration of service provision would likely require changes to the operating models for the agencies involved. These would be designed to provide Victorians accessing multiple services at these sites or through ICT systems with one point of contact, such as a case manager on-site, who would then co-ordinate service delivery.

Integrated service delivery would provide access to a similar client base and, where possible, reduce demand on the justice and human services sectors, through increasing access to response and prevention services. In some areas this is happening already, and is likely to be strengthened following the Family Violence Royal Commission implementation.

There is also an opportunity to drive more effort in crime prevention by identifying and directing at risk groups in society to important services that could avoid further involvement in the justice system. Levels of service support could be tailored based on the needs of the client, for example, ongoing support could be provided to higher needs clients to ensure the consistency of their access.

The successful Neighbourhood Justice Centre model offers a domestic example of integrated provision of justice and human services and has the advantage of being evaluated. Internationally the most prominent models are Red Hook Justice Center (USA) which is a proven success and North Liverpool Justice Centre (UK), which had a more mixed evaluation of its results. The knowledge gained from the evaluations of these previous models should be applied when more detailed consideration is given to the implementation of this option.

In many cases, co-location may not be the answer, but rather the ICT infrastructure that support this integrated service delivery model. Over time, this model could draw in other related sectors, such as education.

In other cases, the planning will show that integrated service delivery simply requires, for example, stronger information sharing systems, improved referral pathways, partnerships between services (for example health-justice partnerships) and common intake systems.

There are other services that offer complementary services. For example, financial services could help families address acute financial pressures, and mitigate risks associated with family violence. Enabling access to legal assistance, such as legal aid, could assist vulnerable individuals with complex challenges such as evictions which can lead to homelessness. Such assistance could be seen as an essential aspect of legal problem containment and prevention.

Risks and opportunities

There is a risk that under current mechanisms funding and delivery of the facilities proposed in this option would be complex given the range of government service providers involved. There are also some groups in society, including the indigenous community, who may view police co-location with human services as potentially a problem. The justice and human services workforce would need to be adequately supported during the transition to the new model of service delivery. Investments in common ICT infrastructure are significantly risky unless operating models are aligned and infrastructure needs of individual and joint operations are catered for. The complexity of such arrangements needs to be carefully considered, planned and executed to ensure successful outcomes. Significant ICT investments may be required as existing ICT infrastructure is poorly placed to achieve this at present. There are also significant industrial and cultural issues involved in integrating the justice and human services workforces, and there may be some complexity dealing with service delivery for both sectors is done by funded agencies independent of government such as Legal Aid or Brotherhood of St Laurence.

There is an opportunity to leverage the Safety and Support Hubs recommended by the Royal Commission, to support more integrated service delivery. This approach could also leverage existing assistance programs which seek to bridge the justice, health and human sections. One example is the Health Justice Partnerships (HJPs) which enable lawyers and health professionals to provide better health outcomes and access to justice for patients with legal issues.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then we have clarified that integrated facilities should cover health as well as human services, but be targeted at 'complementary' services'. This responds to stakeholder feedback about the potential detrimental effects of co-location with some justice services. Also, a minor change has been made make clear that related services provided by government, community and private sector organisations to both victims and offenders should be considered in this planning.

Victoria Police Capability Plan 2016-2025

This option requires greater collaboration between different agencies and sectors to focus drivers of crime and will require a sophisticated service delivery approach. Importantly, Victoria Police have put this front and centre as part of their recently released Victoria Police Capability Plan 2016-2025. The plan calls for stronger partnerships and co-production with stakeholders to deliver more tailored and responsive services to the community. This includes a focus on working with other Victorian departments and agencies at a strategic level to tackle the range of complex problems that confront and drive demand for responses by Victoria Police. This work will be important to leverage in delivering the integrated planning envisaged by this option.

Wyndham Justice Precinct

The government is in the feasibility concept stage for the development of a Wyndham Justice Precinct. The Justice Precinct which is identified in the East Werribee Structure Plan looks at a broader integrated civic precinct, which includes a police complex, expanded law courts, community justice centre and health and human service providers.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Booth, Altoft, Dubourg, Gonçalves and Mirrlees-Black, *North Liverpool Community Justice Centre: Analysis of re-offending rates and efficiency of court processes*, 2012

Mair G & Millings M., *Centre for Crime and Justice Studies, Doing justice locally: The North Liverpool Community Justice Centre*, 2011

National Center for State Courts (USA), *A community court grows in Brooklyn: A comprehensive evaluation of the Red Hook Community Justice Center*, 2013

Neighbourhood Justice Centre, *Evaluating the neighbourhood justice centre in Yarra, 2007–2009*, 2015

Royal Commission into Family Violence, *Summary and recommendations papers*, 2016

Tobin Tyler, Elizabeth et al (eds) *Poverty, Health and Law, Readings and Cases for Medical-Legal Partnership*, Carolina Academic Press, 2011

Victorian Ombudsman, *Investigation into the rehabilitation and reintegration of prisoners in Victoria Discussion Paper*, 2014

Victoria Police, *Victoria Police Capability Plan 2016-2025: Capability framework*, 2016

Justice delivery in areas of growth

JDG

Option type

Incremental expansion of existing assets

New assets

Location

Statewide

Sector

Justice and emergency services

Certainty of evidence

Medium

Direct option cost

\$750 million–\$1 billion

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 1: Address infrastructure demands in areas with high population growth

Low	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

Need 8: Address increasing demand on the justice system

Moderate	Significant	Significant	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Victoria's significant population growth, in particular within the metropolitan corridors, means that new investment in justice facilities will be required to meet future needs to access justice services. This option considers the justice priorities of areas of high growth – Wyndham, Dandenong, Melton, Officer, Whittlesea, Craigieburn, Bendigo and Geelong. This option focuses particularly on the growing demand as it relates to existing courts and also the need for new courts. Importantly, the delivery of new capacity in these areas could also provide opportunities integrated facilities with other justice, health and human services.

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option was recommended in the strategy (ref. 8.1.2) because the growth of Melbourne, particularly in the west, means that new communities have a need for access to justice. In addition, areas like Geelong, Dandenong and Bendigo have existing court facilities that are struggling to cope with growing demand, in part due to having infrastructure that is not fit-for-purpose. Court Services Victoria has recently developed the *Strategic Asset Plan* showing strong growth and/or poor asset performance in eight areas. The immediate priorities are Wyndham, Dandenong and Bendigo in 0-5 years. We believe these facilities should be delivered in most instances as integrated facilities following the development of integrated service plans (JCS). Current work to develop a legal precinct in Wyndham is an example of a shift in the service delivery models and should be leveraged. As population grows in these areas, the contribution to need 8 increases from moderate to significant.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

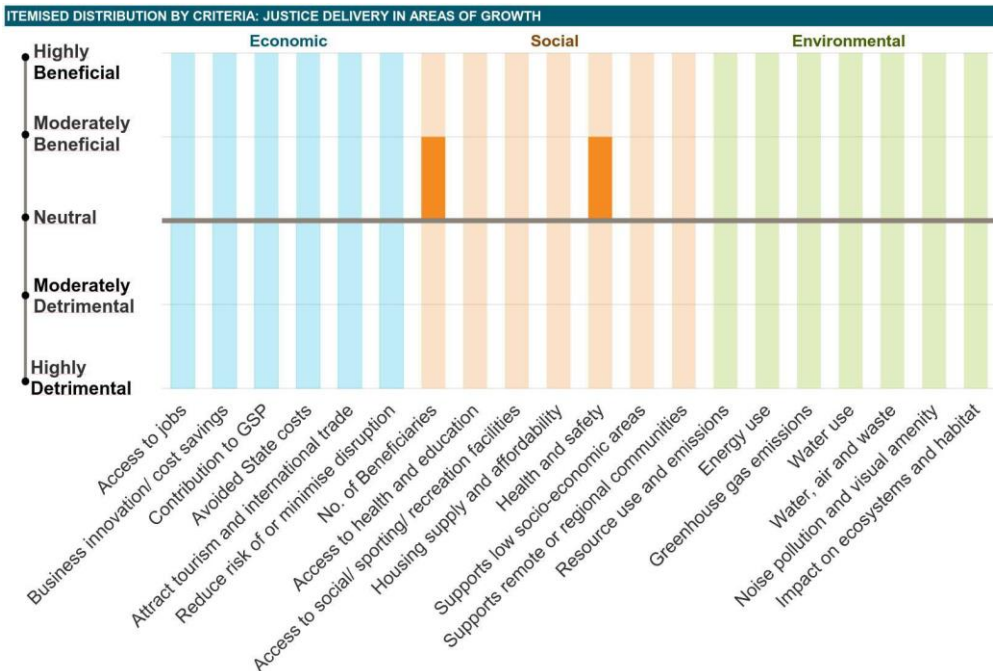
How does this option perform under different scenarios?

Supercity	+	Alleviates pressure on the central city
Westside Story	+	Alleviates pressure on the central city
Regional Cities	+	Alleviates pressure on the central city
Accelerated Climate Change /Mitigation	Neutral	
Prolonged/ Severe Economic Downturn	+	Increased demand for justice services
Biosecurity Threat	Neutral	

How does this option work with others?

This option complements justice and human services integrated planning and delivery (JCS) by providing an opportunity to deliver new integrated facilities to address broader outcomes and potentially defer demand for justice services over time.

What are the economic, social and environmental impacts of this option?



Risks and opportunities

There are risks associated with future policy and legislative change which could affect demand forecasts, and therefore project viability.

Currently approximately 19 per cent of justice assets are leased. Sites for new justice services could be leased where appropriate in the short-term to ensure services are provided to high growth areas. A particular opportunity exists with civic assets owned by local governments, such as former town halls, which are well located and often under-utilised. In addition, there have been pilots to use council chambers for VCAT hearings. Innovative financing opportunities, such as private public partnerships, could also be considered.

Funding

Should government choose to pursue this program, it will then need to consider funding options. Below is a range of potential funding mechanisms which could be examined to help fund the program.

Potential funding mechanisms

General government revenue	User charges	Beneficiary charges	Property development	Asset sales
✓			✓	✓

General government revenue will continue to be a major source of funding for programs like justice delivery in areas of growth as the benefits from such investment are usually widely distributed across the community.

Property development could be considered, for example, commercially leasing parts of premises within or around the justice facilities, such as cafés and shops. If delivered as part of a co-located supportive justice and human services model it could also include complementary businesses such as not-for-profit providers. Property development can assist in putting underutilised government land and space to higher and better uses, creating added value through improved amenity and access to services. Property development has been used in previous court projects. The Victorian County Court project involved construction by the private sector on land controlled by the state which was leased to the contractor over a long period, with a portion of the land to be used by the contractor for commercial development.

Additionally, any court sites that are no longer fit-for-purpose and surplus to government requirements should be sold which can provide a one-off funding boost. This could help fund new facilities and allow sites to be available for higher and better uses.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then the timing and location of this recommendation has changed based on new information on projected demand. The recommendation has been brought forward from 5-30 years to 0-15 years. We have also nominated Bendigo, Wyndham and Dandenong as initial priorities.

Justice demand

Court Services Victoria has undertaken modelling as part of the development of its Strategic Asset Plan 2016. Some key findings are:

- Increased service demand in CBD of 27 per cent by 2031.
- Increased service demand across metropolitan Melbourne (three subregions metropolitan west, metropolitan north and metropolitan south-east) of 1.6 per cent per year, but higher in the west (2.3 per cent).

- This pressure across metropolitan Melbourne falls to courts in Dandenong and Ringwood in the south-east, Sunshine in the west (70 per cent of demand in the west) and both Broadmeadows and Heidelberg in the north. These are areas which are failing to service the larger catchments out into the growth areas.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Deloitte/Aurecon, *Victorian infrastructure capability assessments: Justice and emergency services*, 2016

Court Services Victoria, *Strategic Asset Plan 2016*, 2016

Justice diversionary policy and programs

JDP

Option type

Better use through public service delivery and approval processes

Location

Statewide

Sector

Justice and emergency services

Certainty of evidence

Not determined

Evidence base

Not determined

Direct option cost

Not determined

Contribution to meeting the need

Likely to contribute to:

Need 8. Address expanded demand on the justice system

What is this option?

This option considers ways to defer criminal justice system and prison bed demand by:

- Strengthening diversion pathways for young people
- Creating stable accommodation for prisoners post-release to support reintegration and employment
- Introducing incentives to invest in proven outcomes to reduce recidivism
- Implementing a new approach to the community correctional services mode to create a credible alternative to imprisonment
- Improving transition and reintegration programs to meet demand for rehabilitation programs
- Delivering relevant, offence specific or prisoner-specific interventions to prisoners and offenders to support improved outcomes after release from custody.

What is the level of community support?

There was limited to no discussion of this option during public consultation. This option was recommended by the metropolitan citizen jury.


What do we think of this option and why?

This option was not recommended in the strategy because these diversionary programs were either too small scale or did not have a direct link to infrastructure. In recognising the high costs and high rates of recidivism in the criminal justice system, proven programs that can improve community safety and reduce demand on the system and for prison beds should be supported. We believe that the recommendation for integrated justice, health and human services planning and delivery (ref. 8.1.1) can serve to support the greater use of diversionary programs and other measures that seek to address the causes of crime.



Justice family violence response JFV

Option JFV is addressed in JSC - Justice and human services integrated planning and delivery and CMD – Courts maintenance and optimised use



Justice and human services joint planning JHS

Option JHS is addressed in JSC – Justice and human services integrated planning and delivery

Justice CBD legal precinct JLP

Option type

Better use through refurbishment of existing assets

Incremental expansion of existing assets

New assets

Location

Melbourne

Sector

Justice and emergency services

Certainty of evidence

Medium

Direct option cost

\$1 billion–\$3 billion

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 8: Address increasing demand on the justice system

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Melbourne's CBD legal precinct is of significant importance to Victoria and has supported the state's civic and economic development. This option considers different solutions to address demand on the precinct over the next 30 years:

- Delivering multi-jurisdictional use of the existing facilities in the CBD legal precinct to allow all trials to be held in all court buildings
- A new or redeveloped Supreme Court Victoria (increase the number of court rooms and appropriate improved facilities and technologies)
- Relocation of the Victorian Civil and Administrative Tribunal (VCAT) into the precinct
- A redeveloped and expanded Melbourne Magistrates' Court.

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option was recommended in part in the strategy (ref. 8.3.4) because there is evidence of increased demand on the CBD legal precinct that will necessitate investment in 15-30-years. However, we have not recommended any specific new court facilities themselves and the costs associated with a new Supreme Court are considerable. Efforts to optimise use and facilitate the sharing of facilities between court jurisdictions (Magistrates', County and Supreme) should be undertaken in the short to medium term. This includes our recommendation that government review the operating hours of these courts and tribunals to ensure that capacity is optimised. After this review, and consistent with our principles of seeking to better use assets, our recommendation is that in 10-30 years buildings in the precinct should be refurbished and shared so they can be used as multi-jurisdictional facilities which can hold an optimal combination of Magistrates', County and Supreme Court trials across the civil and criminal divisions.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

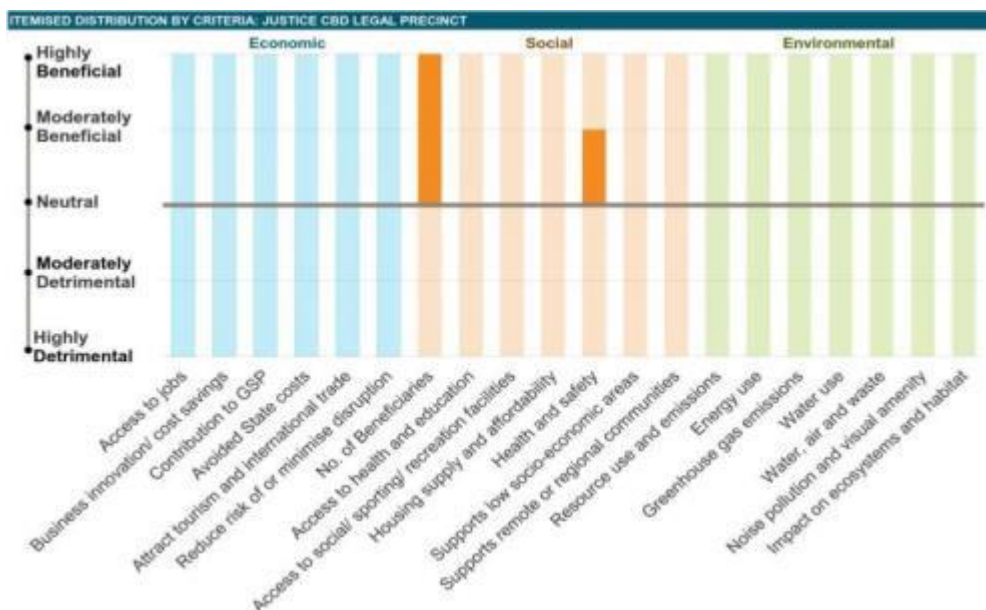
How does this option perform under different scenarios?

Supercity	++	Alleviates pressure on the central city
Westside Story	+	Alleviates pressure on the central city
Regional Cities	+	Alleviates pressure on the central city
Accelerated Climate Change /Mitigation	Neutral	
Prolonged/ Severe Economic Downturn	+	Increased demand for justice services
Biosecurity Threat	Neutral	

How does this option work with others?

This option is complementary to the delivery of new court facilities in areas of high growth (JDG) as there is potential for pressure to be taken off the CBD legal precinct through increased capacity for trials to be dealt within metropolitan and regional settings.

What are the economic, social and environmental impacts of this option?



Risks and opportunities

There is a risk of new capacity in the CBD legal precinct being cost prohibitive due to land costs and the management of heritage impacts.

The redevelopment of the Magistrates' Court could support the creation of family violence specific services and infrastructure to meet the recommendations of the Royal Commission into Family Violence.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then we have suggested there should be review of the operating hours, which would enable demand pressures to be accommodated sooner for low cost, in response to feedback that building works were not the only way these facilities could be optimised.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Court Services Victoria, *Annual report 2014-15*, 2015

Court Services Victoria, *Strategic asset plan*, 2016

Deloitte/Aurecon, *Victorian infrastructure capability assessments: Justice and emergency services*, 2016

Royal Commission into Family Violence, *Volume III*, 2016

Justice service delivery through technology

JSD

Option type

Better use through public service delivery and approval processes

Better use through technological innovation

Location

Statewide

Sector

Justice and emergency services

ICT

Certainty of evidence

Medium

Direct option cost

\$10 million–\$25 million

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 2: Address infrastructure challenges in areas with low or negative growth; and

Need 8: Address increasing demand on the justice system; and

Need 12: Improve access to jobs and services for people in regional and rural areas

Low	Low	Low	Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Innovative technology-led solutions have the potential to provide affordable and efficient pathways through the justice system, particularly for civil dispute resolution. This has the potential to take pressure off justice services, particularly courts, and provide access to justice where there is latent unmet demand as current dispute resolution processes are too slow and costly. This option would require the state government to support the take up of these technologies, including by removing any barriers that prevent the market providing these services.

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option was recommended in the strategy (ref. 8.2.2, 12.1.2) because online dispute resolution technologies will help to reduce pressure on court infrastructure and improve access to justice for many. There are moves internationally (such as the Netherlands) to support this technology being delivered by the private sector, including by removing any barriers. There are also moves for government to leverage this technology to provide new avenues to access justice in rapid and cost effective manner. While this option may not reduce overall demand for justice services it has the potential to take caseload pressure off courts. It may also provide improved access to justice where there is latent unmet demand as current dispute resolution processes can be too slow and costly. The contribution to meeting the need is low, as it is unlikely to reduce overall demand, but we believe the benefits to be greater than this assessment because of improved access to justice, in particular for rural and regional communities. We also recommend that the legal assistance sector be supported in moving to deliver many of its services in this format.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

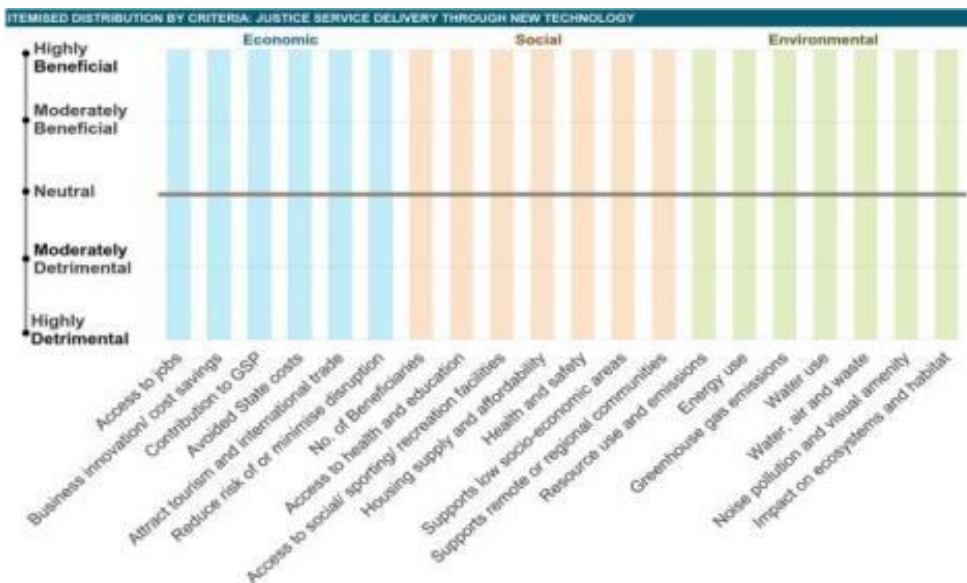
How does this option work with others?

This option could in part act as a substitute to the need for new capacity for courts in the CBD legal precinct (JLP) and other areas (JDG). However, it is expected that the progressive roll-out of this online service will mean both that existing demand will need to be accommodated.

How does this option perform under different scenarios?

Supercity	++	Alleviates pressure on the central city
Westside Story	+	Alleviates pressure on the central city
Regional Cities	++	Alleviates pressure on the central city
Accelerated Climate Change /Mitigation	Neutral	
Prolonged/ Severe Economic Downturn	++	Increased demand for justice services
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



Commentary:

Assessed as a standalone initiative, this option is considered unlikely to have other appreciable economic, social or environmental impacts.

Risks and opportunities

Alternative dispute resolution has been criticised for the potential for injustice relative to court determined outcomes if inequality of bargaining power is present between the parties. At a minimum, online dispute resolution systems may not be appropriate for high need or vulnerable Victorians.

Expanding access to alternative dispute resolution services via investment in video conferencing facilities (to expand services to regional and remote areas) or increased funding for individuals to use their services may be more effective for high need or vulnerable users.

The use of existing alternative dispute resolution procedures (for example, Consumer Affairs Victoria, industry ombudsman, tribunals) could be further promoted to the public.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then the scope of this recommendation has been expanded in response to feedback that it should consider facilitating the utilisation of these emerging technologies for government and the legal assistance sector.

Online dispute resolution for small civil claims – Access to justice model

The Victorian Department of Justice and Regulation recently undertook a review of access to justice. It proposes that government implement a system for the resolution of small civil claims within The Victorian Civil and Administrative Tribunal (VCAT). This would serve as a pilot for the wider use of online dispute resolution (ODR) in Victoria.

There would be three stages for the ODR:

1. Online portal for users to provide targeted information to users and identify the potential options available to them to solve the dispute.
2. Access to the online alternative dispute resolution for the parties to the claim. The dispute resolution will be facilitated by qualified alternative dispute resolution specialists, to reach agreement through the most appropriate communication channel. If agreement is reached there will be a provision for a VCAT member to approve and convert into a binding VCAT order.
3. Online adjudication conducted by a VCAT member. VCAT would consider the evidence and hear from the parties to make a decision enforceable in court with the same procedural fairness requirements.

Next steps

Legal policy work will be required to facilitate the deployment of more online dispute resolution systems in Australia. Online dispute resolution systems may not be appropriate for high need or vulnerable Victorians. Expanding access to alternative dispute resolution services via investment in video conferencing facilities (to expand services to regional and remote areas) or increased funding for individuals to use their services may be more effective for high need or vulnerable users.

Local case study - Settify

Developed in Melbourne, Australia, Settify is a program under development that will be an automated Online Family Law service for family law practices. Using artificial intelligence and Expert systems (software that emulates the decision-making of a human expert) it aims to assist people going through a marriage separation to divide their assets, reaching agreement on parenting arrangements, and changing their legal status.

Through clients completing a questionnaire, an algorithm enables the generation of advice on the likely outcomes that can be sought and then the system facilitates negotiations with the other side (if they agree). The Settify system is

designed to then draft the court documents and, after the clients have signed them with a lawyer present, submit them to the court. It is proposed that only a fixed fee would be paid and only if agreement has been reached.

International case study – Rechtwijzer - Netherlands

In its first inception, Rechtwijzer was a legal advice online tool for diagnosis and referral. It has since been expanded to assist in dispute resolution for divorce and separation cases, and recently can also assist in finding resolution between landlord and tenant, dismissals and debts. The improved access to justice from Rechtwijzer for users is delivered through users resolving their issues online rather than face-to-face or through potentially costly legal teams. It is a less adversarial process with a focus on collaboration, negotiation and outcomes. It enables people to be empowered and take control at their own pace, drawing on objective information and fixed prices to deliver an agreement which is legally binding. To assist in decision-making, neutral experts-mediators, legal reviewers and adjudicators can be drawn upon for a fixed price to deliver advice and final, legal decisions.

International case study – eBay

Around 60 million disagreements amongst traders on eBay are resolved every year using its online dispute resolution tool. There are two main processes involved. The parties are initially encouraged to resolve the matter themselves by online negotiation. They are assisted in this by clearly structured, practical advice on how to avoid misunderstandings and reach a resolution. Guidance is also given on the standards by which eBay assesses the merit of complaints. If the dispute cannot be resolved by negotiation, then eBay offers a resolution service in which, after the parties enter a discussion area to present their argument, a member of eBay's staff determines a binding outcome under its Money Back Guarantee. This e-adjudication process is fast with strict time limits. Disputes over feedback (reviews by buyers of sellers), which can include reviews that might otherwise lead to court based defamation claims, are dealt with by an independent company called Net Neutrals. Their service is called Independent Feedback Review (IFR). Using a separate discussion space for each dispute, a trained independent neutral reviews the evidence from both parties, invites fresh argument, and determines whether the feedback meets one of four criteria for removal. The process takes seven days and eBay removes the feedback pending the outcome.

Operational only in the Netherlands, a novel crowd-sourcing resolution process for feedback disputes is available for one of eBay's subsidiaries, Marketplaats. After arguments are exchanged, 21 'jurors' are randomly selected from a volunteer panel of experienced users of Marketplaats and shown the details of a dispute. The buyer is given 7 days to respond and the seller then has 2 days to rebut. The jurors, after that, have 10 days to review and they issue a decision as to whether the feedback should be withdrawn. Marketplaats acts in accordance with the majority decision.

International case study – Canadian Civil Resolution Tribunal

The Civil Resolution Tribunal is an online tribunal launched in 2015 that functions as an alternative pathway to the court system for resolving small claims (under \$25,000) in British Columbia. The online tribunal first helps users to explore possible solutions. Then the users will use the online negotiation platform, which has short timelines and templates for standard legal responses. If after the online negotiation process a settlement is not reached, a tribunal case manager will assist in reaching settlement through a mediation process that occurs online and/or over telephone. The final stage is adjudication; with an adjudicator contacting the users and then will make a final and legally binding decision based on information provided by both sides. This decision has the same power as a court order and can be enforced as such.

International case study – MyLawBC - Canada

MyLawBC is a legal aid service in British Columbia that uses an online system to resolve disputes for those who can't afford lawyers to solve ordinary legal problems. The platform provides guided pathways to diagnose issues and customised tools and resources for the user. The service provides assistance for the areas of wills and personal planning, mortgage debt, domestic violence and divorce.

The service builds on the Rechtwijzer platform for separating couples to chat online, exchange documents and create a separation agreement.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Alternative Dispute Resolution Journal, *Community legal centres' views on ADR as a means of improving access to justice – Part I*, 2011

Civil Justice Council UK, *Online dispute resolution for low value civil claims*, 2015

Court Services Victoria, *Strategic asset plan*, 2016

HiiL, *HiiL trend report IV online dispute resolution 2016 – ODR and The Courts: The promise of 100 per cent access to justice?* 2016

IBISWorld, *Alternative dispute resolution services in Australia*, 2016

Growth area bus service expansion LBS

Option type

Incremental expansion of existing assets
Better use through coordination processes

Location

Melbourne

Sector

Transport

Certainty of evidence

High

Direct option cost

\$100 million–\$250 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 1: Address infrastructure demands in areas with high population growth

Moderate	Moderate	Significant	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

Need 11: Improve access to middle and outer metropolitan major employment centres

Low	Low	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Provision of improved or new bus services in growth areas in outer Melbourne. Implement comprehensive bus services, including neighbourhood and connector routes (including routes with 20-minute frequency in the peak hours, similar to the recent changes in the Whittlesea growth area). These extensions support the provision of local area access to shops, services and jobs. This will have benefits in terms of social inclusion, as well as potentially reducing the impact of congestion (further detail in *What is this option? cont'd*).

What is the level of community support?

There was a high level of discussion of this option during consultation. Responses were generally positive. This option was recommended by the metropolitan citizen jury.

84 per cent of people surveyed as part of community research supported expanded bus services for outer suburban areas.

What do we think of this option and why?

This option was recommended in the strategy (ref. 1.3.2 and 11.5.2) for delivery over 15 years because providing a minimum 20-minute frequency on key routes would significantly increase the attractiveness of using the bus network and reduce car dependency. This can in turn reduce congestion and support social inclusion. Many outer and growth suburbs suffer from a lack of frequent bus services to connect with shops, services and the SmartBus and rail network. These new services will help connect people with the broader multi-modal network. This option has the advantage of being scalable to the demand. In addition, with low capital costs, new services can be delivered quickly and relocated easily. The need for local bus services should be re-evaluated beyond 15 years, based on the development of driverless vehicles and other transport technologies.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

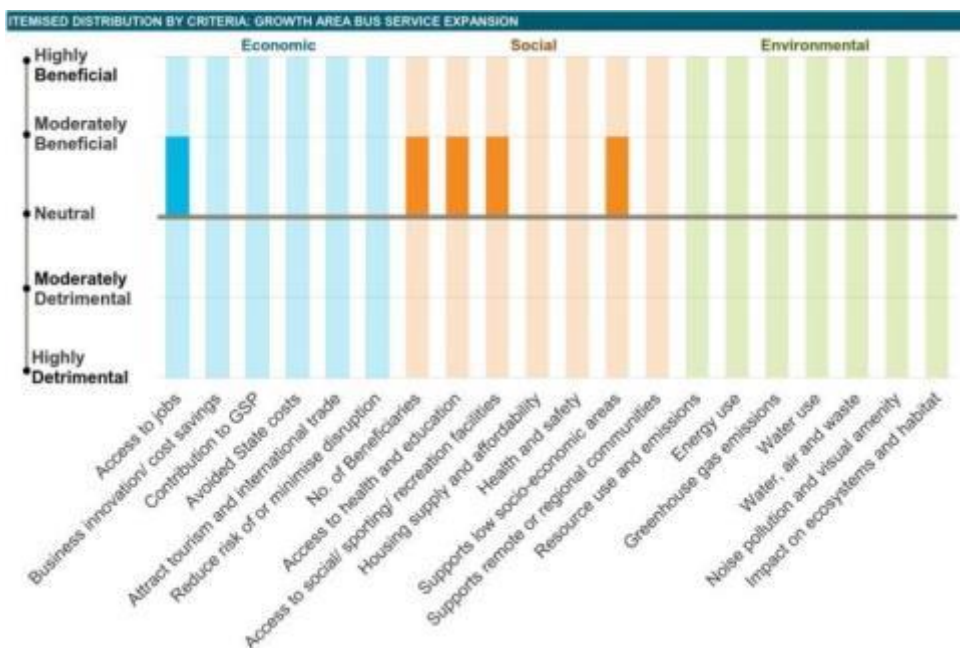
How does this option perform under different scenarios?

Supercity	++	Supports mode shift to address congestion
Westside Story	+	Supports mode shift to address congestion
Regional Cities	+	Supports mode shift to address congestion
Accelerated Climate Change /Mitigation	+	Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	-	Less demand for mass transit
Biosecurity Threat	Neutral	

How does this option work with others?

This option enhances connectivity in outer growth areas by complementing the additional services provided by the premium bus network in SmartBus network extensions and service increases (SNE) and employment centre mass transit network (MTN).

What are the economic, social and environmental impacts of this option?



What is this option? (cont'd)

Example connector services that could be delivered include:

- Mernda to University Hill via South Morang Station: high priority due to multiple activity generators (including major universities) currently served by multiple buses and shuttles.
- Melton via railway station, High Street and Woodgrove: high priority due to high population growth and low density residential development patterns.
- Mt Ridley to Craigieburn Railway Station: moderate priority due to current low-density residential development patterns and limited potential service area in the near term.
- Epping North to Epping Station: moderate priority due to current low-density residential development patterns and limited potential service area in the near term.
- A north-south service between the Cranbourne and Pakenham lines (at Narre Warren): moderate priority due to current car-oriented development patterns.

Risks and opportunities

There is a risk that the new services may not be supported without sufficient promotional coverage and linking to key attractions and services that people need to visit. Providing bus routes with very low passenger numbers takes a service away from other locations that may have a greater need.

An opportunity exists to coordinate additional bus services with train timetabling changes. This coordination would support more efficient journeys for passengers from their home to their destination.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

21st century libraries LLH

Option type

Incremental expansion of existing assets

New assets

Location

Statewide

Sector

Education and training

Cultural, civic, sporting recreation and tourism

Certainty of evidence

High

Direct option cost

\$1 billion–\$3 billion

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 1: Address infrastructure demands in areas with high population growth; and

Need 5: Provide public spaces where communities can come together; and

Need 9: Provide access to high-quality education infrastructure to support lifelong learning

Moderate	Moderate	Moderate	Moderate
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0-5 yrs 5-10 yrs 10-15 yrs 15-30 yrs

Need 12: Improve access to jobs and services for people in regional and rural areas

Low	Low	Low	Low
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0-5 yrs 5-10 yrs 10-15 yrs 15-30 yrs

What is this option?

Ensure appropriate funding and infrastructure to support lifelong learning. Library services can meet the whole spectrum of lifelong learning needs from early childhood to seniors benefiting all generations. Children have improved learning outcomes when they are exposed to books and literature from birth. Young people need places to socialise and learn at the same time, places for homework clubs and quiet study areas (particularly for students living in small or overcrowded housing). Adults require ongoing training and professional development, and small business start-ups require access to technology and research assistance. Older people benefit from continued and lifelong learning, including accessing and learning about digital technology which can reduce the potential for isolation as their level of mobility become reduced.

What is the level of community support?

There was a high level of discussion of the recommendation Public libraries, which includes this option. Responses were generally positive. Both citizen juries' made recommendations in support of this option.

What do we think of this option and why?

This option was recommended in part in the strategy (ref. 1.4.5, 5.4.3 and 9.4.3) because libraries are highly valued facilities and make a moderate contribution to needs 1, 5 and 9. The role of the 'traditional library' has been transformed to offer more than just books for loan. The state can play a greater role in supporting local governments and enabling community access to digital technology and the range of life-long learning opportunities that occur in modern libraries. This option was costed at \$3 million per library however, our recommendation scales this down. The current state government grant program has recently been increased to \$18 million over four years. A further increase in the order of 50 per cent to this fund could be an appropriate response to better recognise the important ongoing role of libraries. Moreover, as development contribution mechanisms are reviewed libraries should be an allowable item. This would also support funding for libraries in high growth areas.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

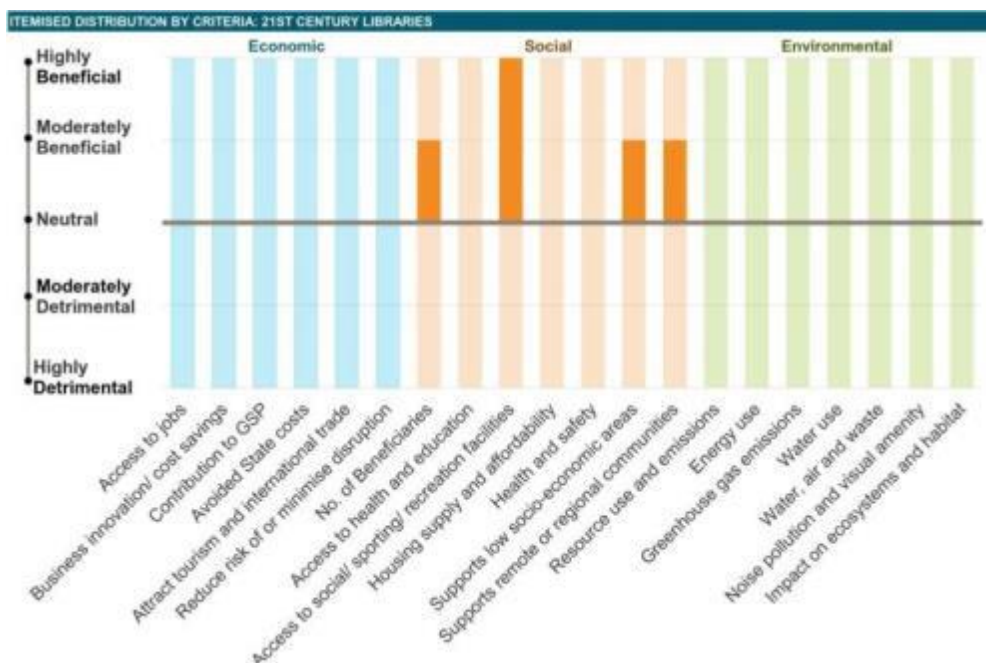
How does this option perform under different scenarios?

Supercity	Neutral	
Westside Story	Neutral	
Regional Cities	Neutral	
Accelerated Climate Change /Mitigation	Neutral	
Prolonged/ Severe Economic Downturn	+	Unemployed people disconnected from work and formal learning
Biosecurity Threat	Neutral	

How does this option work with others?

In some instances, municipal libraries can be integrated with schools and this would relate to schools as community facilities (SCF). Some libraries may need to be rationalised or refurbished to better meet community needs (CSR).

What are the economic, social and environmental impacts of this option?



Commentary:

There is some evidence that suggests that for every \$1 invested in public libraries there is a community benefit of \$3.56 (SGS 2011).

Risks and opportunities

It may not be feasible for all towns to have libraries but reasonable access, either through shared school facilities or within reasonable travel distance, is important. This may even mean a subsidy to ensure rural communities can access libraries, particularly given the role of libraries to provide free access to computers and internet services. In some instances public libraries could be integrated with existing school libraries on school sites.

Libraries also play an important role in addressing the needs of multicultural communities. They provide free services that include a range of collections and programs including English language courses and socialising opportunities (particularly for parents with young children) in ethnically diverse local government areas. They also provide community language collections as well as access to online overseas newspapers in numerous languages.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then we have clarified that this recommendation could be integrated into school sites in some instances. This was in response to submitters who assumed we were recommending libraries should always be integrated onto school sites. We have also emphasised the role libraries play in providing free access to Wi-Fi and digital technology, particularly in rural and disadvantaged communities, to more clearly articulate the benefits.

Additional evidence

Australian Continuous Improvement Group conducted an evaluation of the state government Living Libraries Infrastructure Program. The evaluation found that:

- State grants to councils are up to a maximum of \$750,000
- Around 15 projects were approved each year for the previous year
- 63 projects were approved over four years
- The \$17.2 million living libraries infrastructure program grants contributed to \$180 million worth of projects, divided evenly between metro (\$8.1 million) and regional (\$9.1 million)
- Proportion of project expenditure was greater for regional projects (22 per cent of total project expenditure) than metro projects (6 per cent)
- The increasing costs of buildings means that the maximum grant amount of \$750,000 is diminishing in significance compared to the total cost of a major new library.

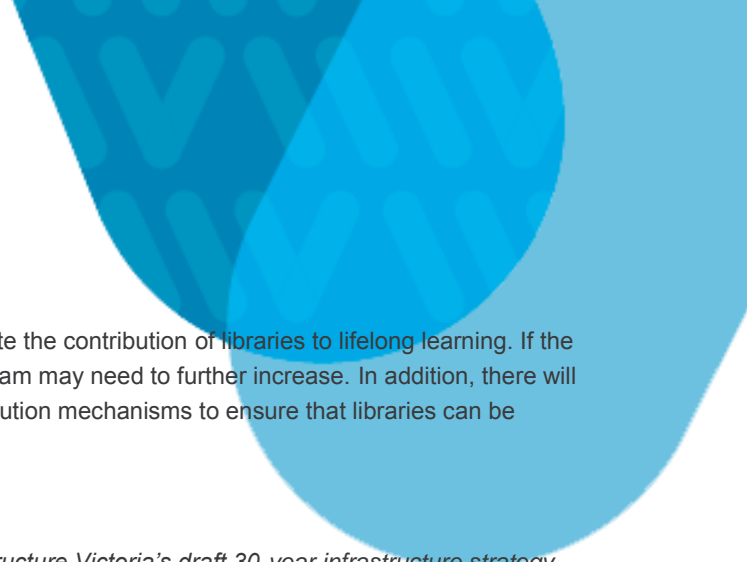
According to economic modelling in *Dollars, Sense and Public Libraries* found:

- Public libraries are primarily funded by local government with state government support
- For every dollar invested in public libraries, the community receives at least 3.6 times as much value in return. In 2007–08, the community benefit was \$681 million against a cost of \$191 million.

For current upgrades and new libraries, the state government currently contributes just six per cent to overall metropolitan project costs and 22 per cent for regional projects.

Next steps

In recognition of the significant role that libraries play to support lifelong learning, our recommendation is for the state should become a more significant co-investor with local government to fund libraries. In the first instance, the state government should review its current grants program to identify the appropriate level of contribution. For example, a 50 per cent increase would allow the capped maximum grant to rise from \$750,000 to \$1.25 million.



The government should set up a monitoring framework to evaluate the contribution of libraries to lifelong learning. If the contribution continues to increase over time, then the grant program may need to further increase. In addition, there will be a need to review existing and proposed and developer contribution mechanisms to ensure that libraries can be included as an allowable item.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Australian Continuous Improvement Group for the Victorian Department of Environment, Land, Water and Planning, *Evaluation of the Living Libraries Infrastructure Program*, 2015.

SGS Economics and Planning, *Dollars, sense and public libraries*, 2011

Landfill waste levy increase

LLI

Option type

Changing behaviour through economic charging

Location

Statewide

Sector

Water and waste

Certainty of evidence

Medium

Direct option cost

\$1 million–\$10 million

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 15: Manage pressures on landfill and waste recovery facilities

Low	Low	Low	Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option would increase the landfill levy charge to reduce the amount of waste sent to landfill. Higher prices for waste disposal can assist to minimise waste generation and increase resource recovery activities.

The landfill levy in Victoria is currently more than 50 per cent lower than the levy in NSW but comparable to the levy in SA and WA. While there is ongoing research and discussion on the appropriate level of a landfill levy, and the exact purpose this levy should serve, it is generally considered that current levies under-represent the true cost of waste disposal. Ideally landfill levies should provide a clear price signal on the cost of disposing waste. This may increase the competitiveness of alternative and more sustainable recycling and waste recovery options.

What is the level of community support?

There was a high level of discussion of this option during consultation. Responses were generally negative. This option was opposed by the metropolitan citizen jury.

What do we think of this option and why?

This option was not recommended in the strategy because under current arrangements the landfill levy does not provide a clear price signal to waste generators and in particular households, and therefore there was little justification to consider an increase to this levy. While we acknowledge there is a need to review pricing signals for waste disposal, this option is framed around increasing the landfill levy and there is limited evidence to support this as an efficient pricing mechanism. Evidence (Productivity Commission, 2006) suggests that setting the right level of the landfill levy is complex with regards to accounting for different locations and waste streams, influencing good operational practice and ensuring net costs are not imposed on the community.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

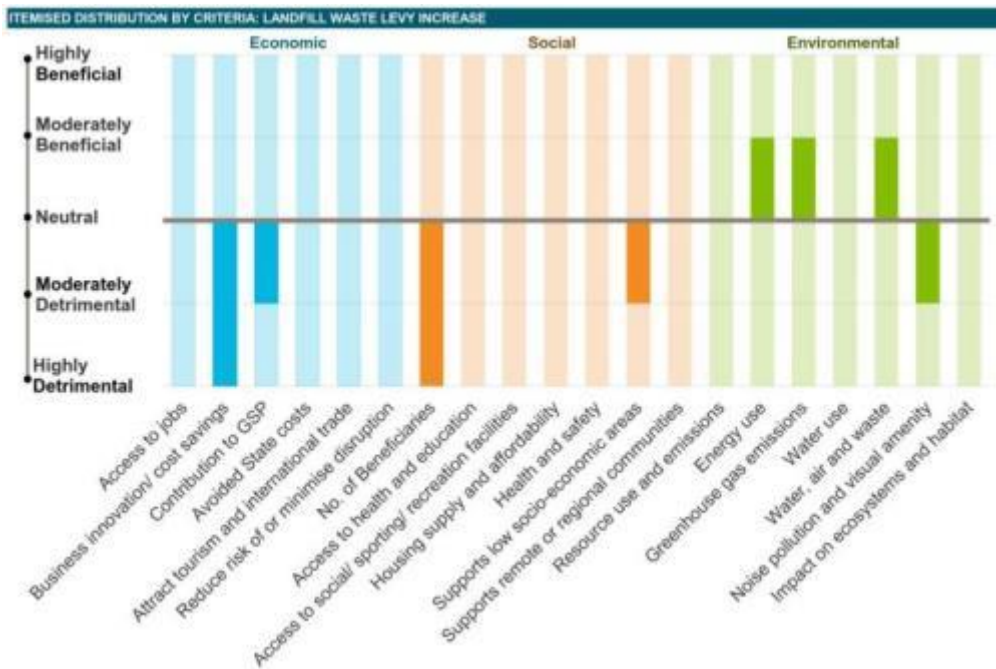
How does this option perform under different scenarios?

Supercity	++	Increased need to minimise waste disposal
Westside Story	++	Increased need to minimise waste disposal
Regional Cities	++	Increased need to minimise waste disposal
Accelerated Climate Change /Mitigation	+	Increased need to minimise waste disposal
Prolonged/ Severe Economic Downturn		Increased likelihood of illegal dumping
Biosecurity Threat		Neutral

How does this option work with others?

This option is an alternative to other waste disposal pricing mechanisms such as household waste disposal fees (HWD).

What are the economic, social and environmental impacts of this option?



Commentary:

The landfill levy increase imposes additional costs on businesses and households, which has negative economic and social impacts, including for low socio-economic index areas.

Risks and opportunities

Targeting of the levy could be challenging. There is a risk that the landfill levy may not be high enough to significantly reduce waste to landfill, or could be so high as to lead to illegal dumping and waste avoidance practises.

If successful, this option could lead to reduced pressure on landfill sites, negate the need for larger landfill sites and lead to growth of competitive waste recycling and recovery industries.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Productivity Commission, *Waste management*, 2006

Sustainability Victoria, *Statewide waste and resource recovery infrastructure plan*, 2015

The Centre for International Economics, *Impacts of the waste levy on recycling*, 2011

Landfill site consolidation LOC

Option type

Better use through refurbishment of existing assets

Location

Statewide

Sector

Water and waste

Certainty of evidence

Low

Evidence base

Deloitte/Aurecon, *Assessment 1: Options analysis report*, 2016

Direct option cost

\$1 billion–\$5 billion

Contribution to meeting the need

Need 15. Manage pressures on landfill and waste recovery facilities – **Low**

What is this option?

This option considers a new strategic direction for the waste management industry through the consolidation of the number of landfills in Victoria. This would mean reducing the number of landfills by decommissioning smaller landfills. Consolidating landfills could lead to efficiency across the network through economies of scale and higher standards of environmental operations.

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option was not recommended in the strategy because there was no clear evidence that additional action was required to consolidate landfill sites. The waste industry is largely privatised and consultation indicated that rationalising of landfill sites is considered as part of business operation processes. Consultation also indicated that there may be different considerations around landfill site consolidation in regional areas. Specifically, impacts on prices and local economies would need consideration in consolidating landfills in regional areas due to the sometimes significant distances between landfill sites in these areas. We will continue to monitor issues regarding landfill consolidation in regional areas.

Local solar energy generation

LSE

Option type

Changing behaviour through licensing
Better use through technological innovations

Location

Statewide

Sector

Energy

Certainty of evidence

Medium

Direct option cost

\$1 billion–\$3 billion

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 18: Transition to low carbon energy supply and use

Low	Low	Low	Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Subsidise the development of additional small-scale, distributed solar PV in both the residential and business sector. This option proposes regulatory changes to encourage the inclusion of solar power generation for all new buildings above a certain size.

This option includes government subsidies for the inclusion of solar panels on existing public buildings and public spaces such as car parks. This option can assist to ensure that projected growth in development also offers a feasible pathway to transition away from reliance on brown coal energy supply.

What is the level of community support?

There was limited to no discussion of this option during public consultation. This option was recommended by the metropolitan citizen jury.

What do we think of this option and why?

This option was not recommended in the strategy because falling costs and increasing customer awareness mean that the market can lead to sufficient uptake of solar technology without government assistance. Uptake of small scale solar has been hugely successful in Australia. This uptake is projected to increase further. The costs of solar technology and battery storage technology have also been falling and may reduce further with innovation. For these reasons, an additional role for state government is not clear. Evidence also suggests that subsidisation of small scale solar uptake is not an economically effective use of government revenue. It is noted that other options that influence the effective uptake of small scale solar without direct subsidies, namely energy efficient development (EED) and small-scale solar regulation (SSE) have been recommended in the strategy (ref. 18.1.3 and 18.2.3).

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

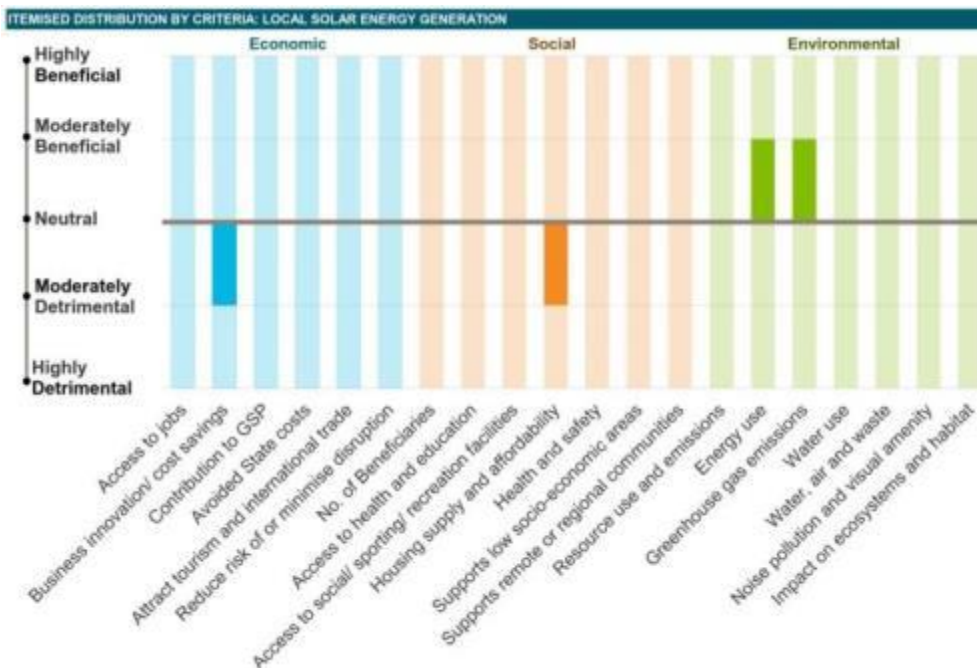
How does this option work with others?

This option would be better enabled by guidance on technically feasible application of small-scale solar (SSE). This option would also be complementary to measures to better allow the market to determine cost effective energy-use efficiency in new buildings.

How does this option perform under different scenarios?

Supercity	++	Increased need for more efficient energy generation to manage peak load
Westside Story	++	Increased need for more efficient energy generation to manage peak load
Regional Cities	+	Increased need for more efficient energy generation to manage peak load
Accelerated Climate Change /Mitigation	++	Acute need to reduce carbon emissions
Prolonged/ Severe Economic Downturn	-	Less demand for energy
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



Commentary:

Depending on the level of subsidisation, this option can increase business costs and reduce housing affordability by requiring the construction of small scale solar generation for new developments.

Risks and opportunities

This option may remove any type of market signal and therefore may result in investments that are not economically effective.

This option could require additional investment in distribution networks to allow for the supply and use of electricity generated locally.

There is potential for solar generation projects to enable the creation of self-sufficient 'off-grid' communities if combined with electricity storage and back-up energy generation options. For regional and remote communities this could be a more cost effective form of electricity supply than reliance on the grid.

Additional notes

Uptake of solar power generation in Victoria has been strong and is expected to grow further with:

- Significant cost reductions in solar panels
- Technological advancements in storage solutions
- Opportunities for households to sell excess power to the grid.

Onsite power generation through solar panels can provide benefits to the broader Victorian community by reducing network costs and mitigating the need for additional sources of generation.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Grattan Institute, *Sundown, sunrise: How Australia can finally get solar power right*, 2015

International Renewable Energy Agency, *The power to change: Solar and wind cost reduction potential to 2025*, 2016

Melbourne Airport bus dedicated road priority

MAB

Option type

Incremental expansion of existing assets

Location

Melbourne central subregion, Melbourne western subregion and Melbourne northern subregion

Melbourne Airport – North West state significant corridor

Sector

Transport

Certainty of evidence

Low

Direct option cost

\$50 million–\$100 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 10: Meet growing demand for access to economic activity in central Melbourne; and

Need 11: Improve access to middle and outer metropolitan major employment centres

Low	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option would provide on-road priority for bus services for the entire journey between Southern Cross Station and Melbourne Airport. This solution would enable bus services to largely bypass freeway congestion and run efficient services every 3-5 minutes during peak times with a reliable 20-25 minute journey time in contrast to the existing trip-time fluctuations. Improved priority is a requirement for bus services to maintain optimal performance and increase its mode share in the face of increased congestion. Changes to the provision of this service would need to be incorporated with the overall Melbourne Airport master plan (further detail in *What is this option? cont'd*).

What is the level of community support?

There was limited to no discussion of this option during public consultation. The metropolitan jury had a mixed view of this option.

What do we think of this option and why?

This option was recommended in the strategy (ref. 10.9.1, 11.4.1) because it provides a low cost solution to improving the travel time and reliability of the airport bus service, delaying the need for a higher cost heavy rail solution. Providing infrastructure support to the current airport shuttle buses makes a low to moderate contribution to needs 10 and 11 over time. By using advanced traffic management (ATM) principles such as ramp metering, the need for dedicated bus lanes on the freeway can be avoided. This will remove the potential negative impacts on other road users by reallocating lanes from general road users to buses noted in the assessment. However, lane allocation on the arterial roads leading to the freeways will still be required, to be supported also by signal priority and intersection changes as appropriate. This option is recommended for delivery over 0-10 years as future developments in automated vehicles may eliminate the need for on-road priority of high capacity vehicles such as buses. However, given current demand on this corridor it is worth proceeding with this option until these technological changes are fully developed.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

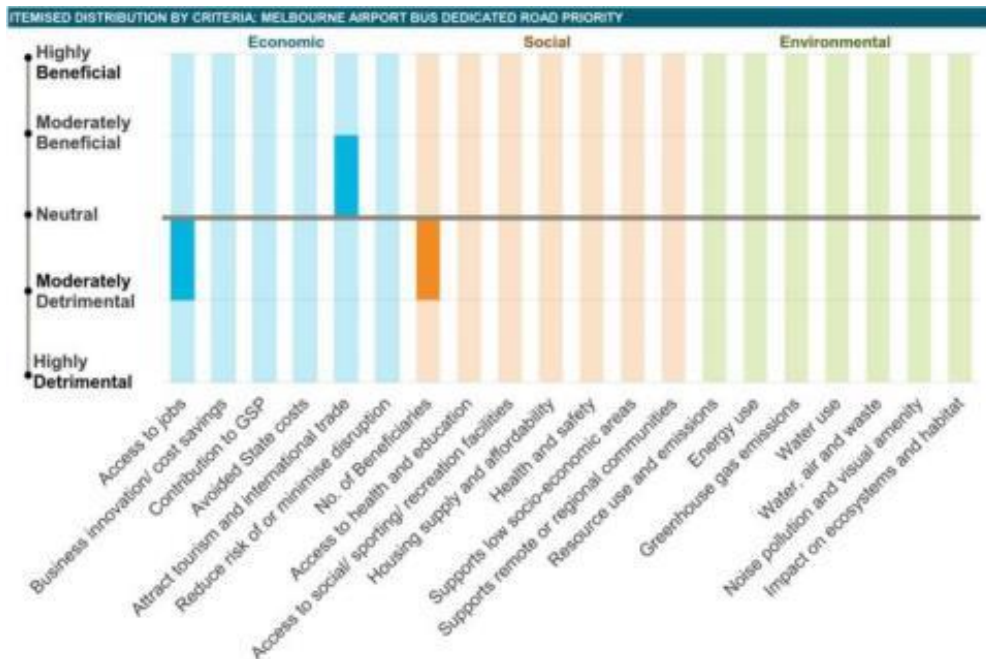
How does this option work with others?

Transport network pricing (TNP) could be considered as an alternative for this option by better managing demand on the Tullamarine Freeway or encouraging higher vehicle occupancies. This option is dependent on advanced traffic management (ATM) and it could also delay the need for Melbourne Airport heavy rail link (MAH). The ability of this option to ease road congestion will be dependent on it being combined with demand management measures such as transport network pricing (TNP).

How does this option perform under different scenarios?

Supercity	++	Supports mode shift to address congestion
Westside Story	+	Supports mode shift to address congestion
Regional Cities	+	Supports mode shift to address congestion
Accelerated Climate Change /Mitigation	+	Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	-	Less demand for travel
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



Commentary:

If a priority lane is included, there is the potential that this option may displace other road users, especially during peak periods, when capacity on the freeway is compromised and so affect access to jobs.

What is this option? (cont'd)

Interventions could include:

- Dedicated bus lanes with priority signalisation to enter and exit Adderley Street.
- Introduction of a bus lane on Footscray Road.
- Introduction of ramp metering with a designated bus bypass lane at the entrances to the Tullamarine Freeway.
- Delineation of a bus lane on the non-managed section of freeway near Melbourne Airport, potentially combined with the emergency stopping lane.
- Expansion of Terminal Drive (inbound to airport) and/or Melrose Drive (outbound from airport) to include dedicated bus lanes, or construction of a new two-way bus-only corridor through the existing car parking area parallel to Terminal Drive.

Infrastructure Australia has recommended multi-modal planning for improving public transport links to Melbourne Airport as a priority initiative. The airport bus will benefit from the range of traffic management infrastructure being delivered with the CityLink Tulla Widening Project.

Risks and opportunities

There is the risk that the prioritisation of buses on arterial roads could require the reallocation of traffic lanes from public use to the exclusive use of the airport bus. Despite the benefits of better reliability and access to the airport, this option could impact on travel times for other motorists if exclusive lanes are used.

This increase in reliability and efficiency between the airport and the city has the opportunity to defer the significant cost of a heavy rail link to the airport. This capital could be used to fund other high priority projects in the state.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then we have clarified that delivery of the recommendation could include better signalling and managed motorway improvements. This reflects the introduction of Managed Motorways on the Tullamarine freeway, the full deployment of which will reduce the need for priority bus lanes.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Melbourne Airport heavy rail line MAH

Option type

New assets

Location

Melbourne central subregion, Melbourne western subregion and Melbourne northern subregion

Melbourne Airport – north west state-significant corridor

Sector

Transport

Certainty of evidence

Medium

Direct option cost

\$3 billion–\$5 billion

Option lead time

5–10 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 10: Meet growing demand for access to economic activity in central Melbourne; and

Need 11: Improve access to middle and outer metropolitan major employment centres

Moderate	Moderate	Significant	Significant
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0-5 yrs

5-10 yrs

10-15 yrs

15-30 yrs

What is this option?

Delivery of a rail link between Melbourne (Tullamarine) Airport and the central city. The rail link is assumed to be via the existing Albion East reservation and services would run via the Melbourne Metro rail tunnel and through to the south-east. The new line would provide direct connectivity to the airport, with passengers able to easily access airport services via no more than one interchange for the vast majority of metropolitan lines. It is estimated that the journey would take 30 minutes between the CBD and the airport at a frequency of 10 minutes. This new link would increase reliability of services for staff and airline passengers to Melbourne Airport and could reduce the impact of congestion on the Tullamarine Freeway.

While the assumption has been made based on previous work that the Albion East alignment would be adopted and that services would operate via Melbourne Metro, there are projected to be significant capacity pressures on this line by 2046, suggesting an alternative network solution may be required.

What is the level of community support?

There was a high level of discussion of this option during consultation. Responses were generally positive. This option was recommended by the regional citizen jury, but the metropolitan jury had mixed views.

What do we think of this option and why?

This option was recommended in the strategy (ref. 10.9.2 and 11.4.2) because it makes a moderate to significant contribution to both need 10 and need 11 and delivers a positive cost-benefit result. However, upgrades to airport buses should be pursued first (ref. 10.9.1 and 11.4.1), as this is a more cost effective solution in the short-term, with delivery of the rail link within 15-30 years. We have not proposed a particular technical solution for this project, but note that existing plans are projected to face capacity challenges over the long term (further detail in *What do we think of this option and why? cont'd*).

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

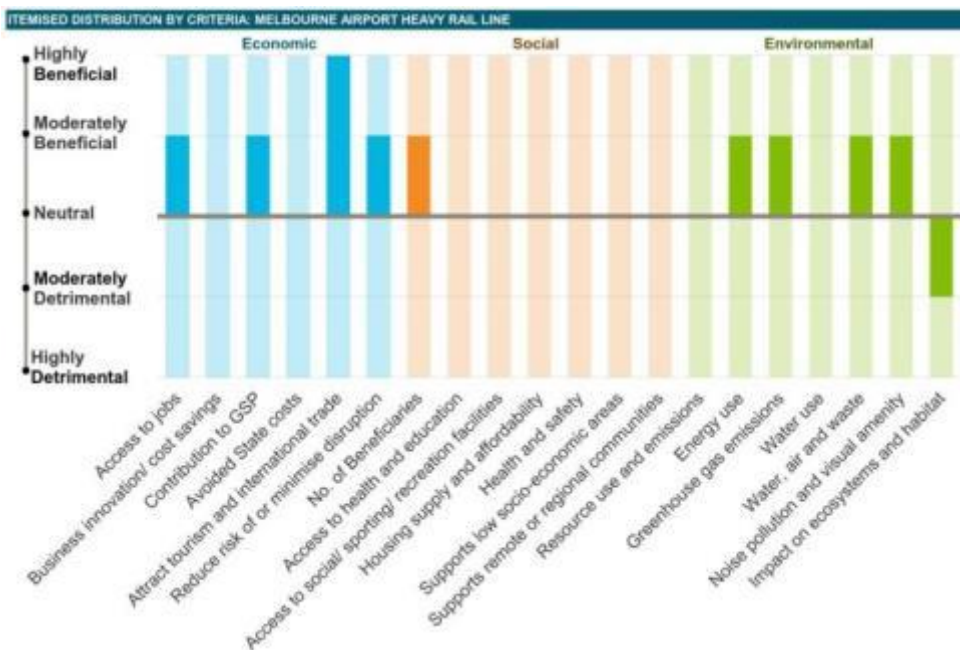
How does this option work with others?

Current plans for this option make it dependent on Melbourne Metro (committed) and potentially supported by high capacity trains - 10 car (HCT2) and it is an alternative for Melbourne Airport bus dedicated road priority (MAB). This option's impact in terms of reduced congestion would be dependent on managing traffic flow on the Tullamarine Freeway (e.g. via transport network pricing (TNP) or advanced traffic management (ATM)).

How does this option perform under different scenarios?

Supercity	++	Supports mode shift to address congestion
Westside Story	+	Supports mode shift to address congestion
Regional Cities	+	Supports mode shift to address congestion
Accelerated Climate Change /Mitigation	+	Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	-	Less demand for mass transit
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



What do we think of this option and why? (cont'd)

Further work is required to reconsider the longer-term metropolitan rail network configuration, but the most important features of an airport rail service are likely to be that it offers a reliable and frequent service to central Melbourne, minimising journey time, and preferably continuing on to the south east – a significant secondary origin and destination for many passengers.

While the existing plans for an Airport Rail Link have provided the basis for our assessment, we have not proposed a particular technical solution for this option, but note that existing plans for the rail link along the Albion East alignment and connecting to the south-east via the Melbourne Metro tunnel are projected to face capacity challenges over the long term, due to growth on the Melton and Sunbury lines which would share tracks with the airport line. A more enduring solution could require a different network configuration, potentially leveraging further capacity upgrades to the Sunshine and Werribee corridors (ref. 10.10.2), or by identifying a different corridor for the airport rail link – whether connected to the existing rail corridor or a separate dedicated link. Consideration could even be given to linking to regional rail corridors. However, caution is warranted in pursuing any options which would be materially higher cost than the current plans.

The further planning and investigation work should also consider the land use outcomes and impacts with the delivery of the airport heavy rail. This could consider the role that additional stations could play in developing housing density, access to employment around Melbourne Airport or connections to existing activity centres such as Essendon Fields. At the highest level, the strategic role of the airport rail as either a standalone shuttle for the benefit of air travellers or as a suburban rail corridor supporting access and employment in middle suburbs will need to be decided. We think its primary role should be for airport access, but options for additional stations should be tested.

The suitability of 10-car trains operating to the airport will also need further consideration. They may not be suitable for this route due to the potential excess capacity when running at a 10 minute frequency. Should the airport service operate via Sunshine and Melbourne Metro, it may be necessary to use 10-car trains in order to deliver a simple, metro style operation on this corridor.

Alternative access to the airport could potentially be provided via a dedicated link.

Risks and opportunities

There are significant risks to scope based on the operating constraints of the network between Albion and the city. The project may need to provide greater capacity in this section which will be a significant increase in the scope of the project. This could include additional tracks between Albion and the CBD, an alternate alignment between the airport and the CBD (connecting to another rail line or dedicated tracks for the full route) or an alternate network configuration, for example taking advantage of the capacity created by Melbourne Metro 2 (MMS) should that project proceed. In addition, until detailed planning is undertaken between the state government, federal government and airport authorities, additional scope risk may be encountered within the airport planning area.

With the large supply of car parking areas at Melbourne Airport, there is a risk that the structure of the pricing and number of services may not attract people to leave their cars at home. This could lower the benefits from this option that involves a significant capital investment.

This option presents the opportunity to re-use a proportion of the existing airport car parking for more productive land uses such as hotels and other development plans to increase the ability to realise Melbourne Airport as a national employment centre.

Funding

Should government choose to pursue this project, it will then need to consider funding options. Below is a range of potential funding mechanisms which could be examined to help fund the project.

Potential funding mechanisms

General government revenue	User charges	Beneficiary charges	Property development	Asset sales
✓	✓	✓	✓	

Major beneficiary contributions from parties who will be significant beneficiaries from the Melbourne Airport heavy rail line could be explored. For example, a major beneficiary contribution from the Melbourne Airport owners could be negotiated, reflecting the direct benefits a new rail link would provide to its business.

Depending on the scope and design of the project, such as whether it includes new train stations that could serve travel other than to the airport, opportunities for other beneficiary charges could be examined if there is a substantial uplift in land values and business activity in the vicinity of the project. A betterment levy could be considered on commercial and/or residential property in defined catchment areas in the vicinity of new train stations. Developer contributions from new developments occurring near a new train station could also be considered. If betterment levies and developer contributions are both considered by government, it should ensure that new charges do not unfairly duplicate each other or any existing charges.

Property development could also be considered, for example, selling or leasing land and air rights surplus to government requirements at new train station sites for commercial, residential or retail development. Property development can assist in putting underutilised government land and space to higher and better uses, creating added value through improved amenity and access to services. There could also be opportunities to sell and/or lease land and air rights at existing train stations for complementary uses such as conference centres, 'downtown check-ins' or hotels.

General government revenue could be considered based upon any broader public benefit such as transport congestion relief and the increased attractiveness of doing business in Victoria. User charges, such as higher than standard public transport fares (especially for express services) for the new airport rail line, could be considered.

Infrastructure Victoria is examining transport network pricing as part of our research program. We think that the primary objective of a transport network pricing regime – where users pay to access and use the transport network – should be to manage demand, rather than to recover costs for infrastructure. We are focusing on examining road pricing regimes in metropolitan Melbourne as a first step towards a comprehensive transport network pricing regime that includes roads and public transport. Careful consideration must be given to the design of the regime to ensure it is efficient, fair and sustainable.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then we have clarified that delivery of this recommendation should occur before the capacity of the bus service is exceeded rather than after, as this was unclear in the draft recommendation.

Scope change

Complementary transport services to provide access to employment throughout the Melbourne Airport precinct will be important even with a rail link, as the preliminary modelling showed a risk that this option could reduce access to employment if accompanied by a withdrawal of bus services.

The identification of the south-east as a substantial catchment, albeit secondary to central Melbourne, is partly driven by the assumption under current plans that services will operate direct across the city to the south-east. However, there is some logic to this market particularly benefiting from a direct service, considering the high density of both knowledge intensive services sector businesses (likely to attract interstate and international travel) and employees (more likely to travel for business). It is therefore preferable that further network planning include consideration of the benefits of such a direct cross-town link.

Transport modelling and economic analysis

Infrastructure Victoria commissioned KPMG, Jacobs and Arup to undertake transport modelling for a number of options being considered for the strategy, including a variety of 'build' and 'non-build' transport options. This allowed major transport projects to be quantitatively assessed alongside several technology, policy and reform options. In addition, economic analysis was undertaken for the 'build' options to estimate a cost benefit ratio, including for this option. The options were modelled individually, mostly on a standalone basis, with a number of options then also tested in various combinations.

This analysis was undertaken on a different basis and produced different results to what is presented throughout the options book, which was prepared by AECOM/PWC with the intention of allowing a mixture of qualitative and quantitative assessment across the full range of options, across all sectors and needs. While on the face of it these two analyses reference similar metrics, different assumptions and methodologies have been applied. In particular, the KPMG/Jacobs/Arup assessment provided purely relative ratings of each option's contribution to the needs, with the ratings scale set by the performance of only the select range of options modelled. This had the result of showing some transport options as making a "high" contribution to Need 18 (transition to lower carbon energy supply and use) simply because they were the highest of the options modelled; however, in Infrastructure Victoria's judgement most transport sector options will make a much lower contribution than energy sector options, as transport comprises a much smaller proportion of total carbon emissions. It provides a useful assessment for sorting the relative contribution of the options modelled, but should not be taken as an absolute assessment. In contrast, the assessments developed in the AECOM/PwC assessment considered the full range of options identified for each need and provided more of an 'absolute' assessment.

With these caveats in mind, however, the results of this alternative analysis are helpful inputs into Infrastructure Victoria's 'global' assessment, and in preparing the strategy we have come to a considered view based on the totality of evidence available to us.

In terms of the KPMG/Jacobs/Arup analysis of this option, the Melbourne Airport heavy rail link was modelled in two ways – as an extension of the Sunbury line and as a direct link between the CBD and the Airport. This modelling found that it had a number of benefits. Because the project connects to Melbourne Metro 1, it would enable passengers to travel by rail directly from the Cranbourne/Pakenham corridor to Melbourne Airport, reducing traffic on both the Tullamarine and Monash Freeways. It would also provide minor relief to crowding for passengers travelling on Melbourne Metro 1 due to the extra services provided on these corridors.

Accessibility metrics generally improve slightly, albeit with a decline in accessibility to the Sunshine NEC. This is due to the reduction in services along the Sunbury corridor associated with the project. It is worth noting that the accessibility measures used to address IV's transport related needs are based on employment. In reality a new rail connected to the airport would provide significant advantages for travellers and people accessing Melbourne Airport for leisure purposes.

In terms of the economic analysis, the cost benefit ratio for the Melbourne Airport heavy rail link was estimated as being between 1.0 and 1.4 without WEBs, and 1.2 - 1.6 including WEBs. This suggests the Melbourne Airport heavy rail link is an economically viable project and worthy of detailed investigation. In particular, there are multiple uncertainties with modelling transport links to the airport which warrant further investigation.

It is worth noting that the modelling assumed that the airport bus will be replaced with the rail service. The analysis found that the increase in demand for passengers accessing the airport using public transport (airport bus or rail) is not that

significant. Consequently, detailed consideration will need to be given to airport bus service planning if Melbourne Airport heavy rail link was pursued.

For more detail, consult the 'Economic appraisal and demand modelling' report to Infrastructure Victoria.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

KPMG/Arup/Jacobs, *Economic appraisal and demand modelling*, 2016

Melbourne Airport, *Melbourne Airport master plan*, 2013

Public Transport Victoria, *Melbourne Airport rail link study*, 2013

Public Transport Victoria, *Network development plan: Metropolitan rail*, 2012



Melbourne Airport metropolitan public transport connections MAM

*Option MAM is addressed in SNE – Smartbus
network extensions and service increases*

Melbourne Airport new road link MAN

Option type

New assets

Location

Melbourne Airport – North West state-significant transport corridor

Sector

Transport

Certainty of evidence

Low

Direct option cost

\$100 million–\$500 million

Evidence base

Deloitte/Aurecon, Assessment 1: *Options analysis report*, 2016

Contribution to meeting the need

Need 13. Improve the efficiency of freight supply chains -
Low

What is this option?

New road connection from the M80 to the west of Melbourne Airport (Tullamarine) connecting to the freight precinct, improving travel times and reliability for road freight vehicles.

What is the level of community support?

There was limited to no discussion of this option during public consultation. The metropolitan jury had a mixed view of this option.

What do we think of this option and why?

This option was not recommended in the strategy because no further evidence has been found that might alter Infrastructure Victoria's earlier assessment that this option performed poorly in terms of cost and contribution. A new road connection from the M80 to the west of Melbourne Airport is unlikely to offer significant travel time and reliability benefits over the existing Airport Drive link, which has the capacity to be expanded to six lanes in the future.

Mobility as a service MAS

Option type

Better use by regulation

Better use through technological innovations

Location

Staewide

Sector

Transport

Certainty of evidence

Low

Direct option cost

\$10 million–\$25 million

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 6: Improve accessibility for people with mobility challenges; and

Need 10: Meet growing demand for access to economic activity in central Melbourne; and

Need 11: Improve access to middle and outer metropolitan major employment centres; and

Need 12: Improve access to jobs and services for people in regional and rural areas

Low	Low	Low	Low
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0-5 yrs

5-10 yrs

10-15 yrs

15-30 yrs

See further assessments in AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

What is this option?

Support market adoption of 'mobility as a service' (i.e. transport services rendering personal car ownership unnecessary) where this encourages higher vehicle occupancy and increased transport options. This would involve regulatory change to remove barriers to the entry of new market players offering mobility services, creating opportunities for organisations in addition to Uber. Particular areas of opportunity include ride hailing, carpooling and the use of mini-buses and coaches providing either on-demand or fixed schedule services (e.g. supported by third-party apps). An example would be the use of 'luxury' coaches offering a higher standard of commuter service aimed at business people.

What is the level of community support?

There was limited discussion of this option during public consultation.

What do we think of this option and why?

This option was recommended in the strategy (ref. 1.3.1, 10.7.1 and 12.2.2) for implementation within five years because removing barriers to the entry of new market players offering innovative transport services can increase travel options and encourage higher vehicle occupancy, easing congestion. Particular areas of opportunity include ride hailing (eventually via driverless vehicles), car-pooling and private mini-buses and coaches providing either on-demand or fixed schedule services through third party applications. In regional areas, the ability to earn a supplementary income and provide much needed local on-demand transport has the potential for widespread community benefit. This option should be undertaken with a review of metropolitan bus contracts to ensure that these new players are not contractually precluded or otherwise disadvantaged from entering the market.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

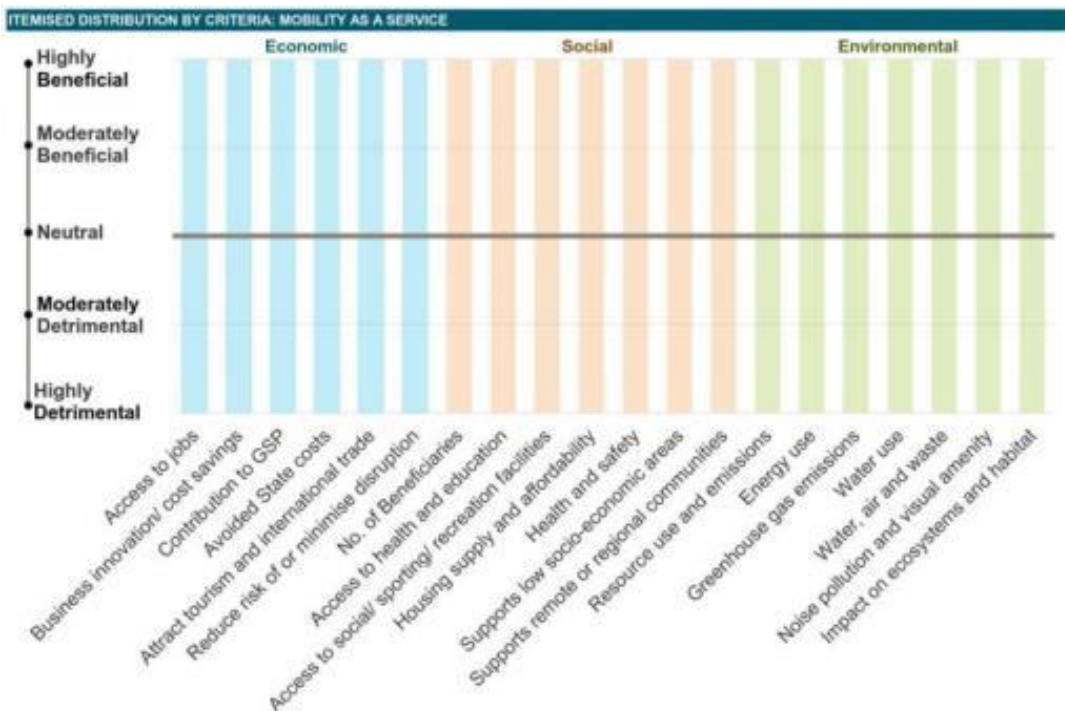
How does this option perform under different scenarios?

Supercity	++	Improved access, more transport choice
Westside Story	+	Improved access, more transport choice
Regional Cities	+	Improved access, more transport choice
Accelerated Climate Change /Mitigation	+	More efficient transport use
Prolonged/ Severe Economic Downturn	-	Less demand for mass transit
Biosecurity Threat	Neutral	

How does this option work with others?

This option is broadly complementary to options whose object (or outcome) is to increase urban density and support multi-modal transport use (including less car ownership and use of private cars).

What are the economic, social and environmental impacts of this option?



Commentary:
No net impacts identified.

Risks and opportunities

Services enabled by this option may not be price competitive with existing public services that attract substantial public funding, and if they rely on the same transport networks, may not be able to offer improved service quality.

This option could help address gaps in public transport connectivity.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Melbourne to Brisbane freight rail line

MBF

Option type

Incremental expansion of existing assets

New assets

Location

Statewide

Sector

Transport

Certainty of evidence

Medium

Direct option cost

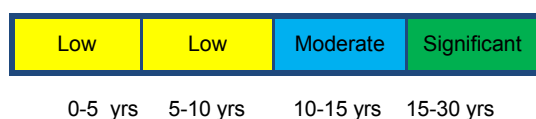
\$100 million–\$250 million

Option lead time

10-15 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 13: Improve the efficiency of freight supply chains



What is this option?

Construction of a high performance and direct interstate freight rail corridor between Melbourne and Brisbane, which would also link south-east Queensland with Perth and Adelaide (via Parkes) as part of a National Distribution Network. The purpose of this option is to create a more efficient, reliable and cost-competitive alternative to road-based freight by bypassing the Sydney metropolitan rail network, significantly reducing travel time. Longer trains and double-stacking containers would bring further efficiencies. The new freight rail line will use the existing interstate rail line in Victoria, but with major upgrades to enable, for example, the carriage of double-stacked trains.

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive. This option was recommended by the regional citizen jury.

What do we think of this option and why?

This option was recommended for further planning in the strategy (ref. 13.5.1) because of the significant boost it will bring to freight rail operations on the north-south corridor between Melbourne and Brisbane, and need for the Victorian government to work with the Commonwealth Government and the ARTC to maximise the benefits of the Inland Rail Project for the state. This option was assessed as making a significant contribution to more efficient freight supply chains, however, we note that the business case identified a cost benefit ratio of 1.02 (7 per cent discount rate). Significant benefits include the reduction in transit time, double stacked container operation and benefits that accrue from an increased rail mode share. Further investigation is required to define the final scope and project design for the Victorian section of the line. Infrastructure Australia has identified this option as a priority project.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

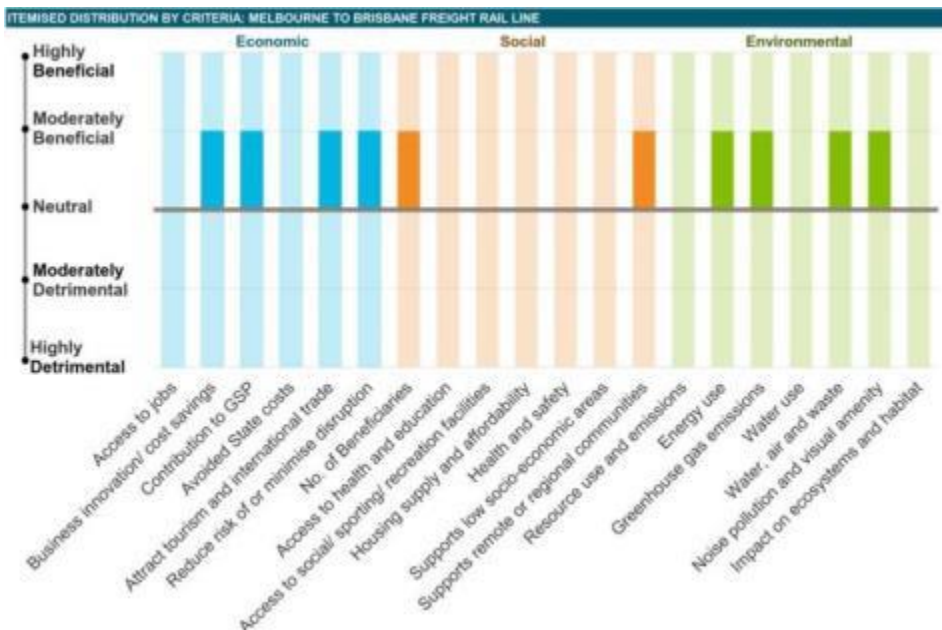
How does this option work with others?

This option would be more effective if implemented in conjunction with land use planning for freight precincts (FLP). It is also highly likely be dependent on the development of the Western Interstate Freight Terminal (WIF) at Truganina as there are capacity and access issues with the existing Dynon freight terminal, including an inability to accommodate double-stacking.

How does this option perform under different scenarios?

Supercity	Neutral	
Westside Story	Neutral	
Regional Cities	Neutral	
Accelerated Climate Change /Mitigation	+	Less carbon intensive freight transport
Prolonged/ Severe Economic Downturn	-	Less demand for heavy freight
Biosecurity Threat	Neutral	
Bay West	++	Enhances supply chains, close to Bay West
Hastings	+	Enhances supply chains, but not as close to Hastings

What are the economic, social and environmental impacts of this option?



Risks and opportunities

There is a risk that the new route and service may still not be competitive with road transport. If the project does not deliver substantial cost and time savings, the benefits from shifting freight from road to rail may not be achieved. Another key risk is that the demand projections for the National Distribution Network (NDN) may not be realised, resulting in a poor return on investment for this option. There is also a risk that it will shift the pattern of movement on the NDN away from Victoria.

With the development of the inland freight route, there is an opportunity to free up capacity on other parts of the national rail freight network for additional short haul and passenger services. This could further reduce the demand on truck haulage and the associated vehicle emissions.

Additional notes

Changes to recommendations from the draft strategy

This option was not recommended in the draft strategy. Since then we have included a new recommendation in response to stakeholder feedback and new evidence for further planning work within 0-5 years for delivery of the Inland Rail project, working with ARTC and the Commonwealth. This highlighted to us the importance of making a recommendation to ensure that the state gains the maximum benefit from the delivery of this project.

Timing

Our recommendation anticipates project completion in 10-15 years. In this, we have been guided by both Infrastructure Australia's Infrastructure Priority List (23 November 2016) which identifies the need for the project as being longer term (understood to mean 10-15 years) and the ARTC business case which sets out a 10-year project delivery program. Prior to staging of the works being confirmed, however, there is some risk that interdependent projects such as the Western Interstate Freight Terminal (WIF) may need to be in place earlier.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Australian Rail Track Corporation, *Inland Rail Programme Business Case*, 2015

Australian Rail Track Corporation, *Melbourne–Brisbane inland rail alignment study*, 2010

Metropolitan bus network reform

MBN

Option type

Better use through contractual processes
Incremental expansion of existing assets

Location

Melbourne

Sector

Transport

Certainty of evidence

Medium

Direct option cost

\$1 million–\$10 million

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 1: Address infrastructure demands in areas with high population growth; and

Need 10: Meet growing demand for access to economic activity in central Melbourne

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

Need 11: Improve access to middle and outer metropolitan major employment centres

Significant	Significant	Significant	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Substantial restructure of the existing metropolitan bus network, building on the approach taken in the City of Brimbank in 2013. This would include a ‘clean slate’ review of the network to introduce a hierarchy of routes, focus on directness of services, reduction in services where they are underutilised, removal of duplication of routes, better use of existing school buses, and harmonisation of timetables with the rail network. It could involve an increase in funding, but may be able to achieve substantial benefits even with negligible change in bus funding levels. Although the goal of this reform would be to restructure the entire metropolitan bus network, it could potentially be introduced in stages based on geographic sub-areas. Early stages of this reform could potentially entail adjustments to the local network surrounding Werribee (which has a largely self-contained bus service structure with limited connections northeast of Williams Landing Station), the network east of Dandenong (which has few through-connections across the Cranbourne Line), and the mostly self-contained bus network surrounding Frankston.

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive.

What do we think of this option and why?

This option was recommended in the strategy (ref. 10.4.5, 11.3.4) because, as Melbourne’s future growth increases travel demand and worsens congestion, we will need to make better use of existing assets in addressing Victoria’s transport needs. A comprehensive overhaul of bus contracts, and, consequently, of the metropolitan bus network, encompassing both route changes and service levels, will play a critical role in building an efficient, multi-modal transport system that can better address people’s transport current and future transport needs, with planning work to be undertaken as soon as possible. While these changes could be implemented with minimal investment, they would also complement the improvements proposed in our other bus recommendations (further detail in *What do we think of this option and why? cont’d*).

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

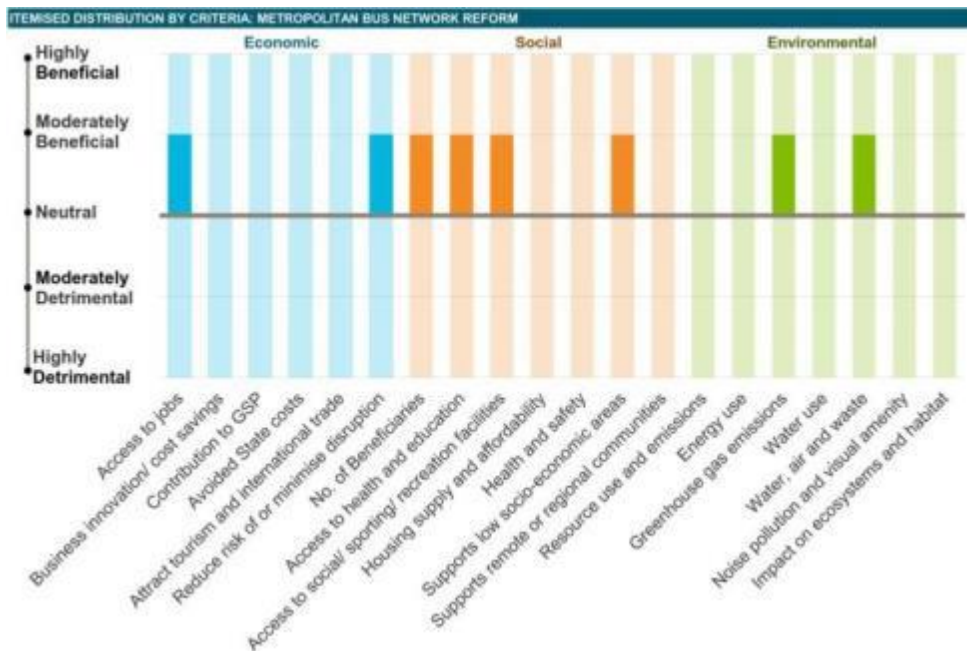
How does this option work with others?

This option complements the bus services expansion options such as SmartBus network expansion (SNE) and growth area bus service expansion (LBS).

How does this option perform under different scenarios?

Supercity	++	More efficient use of transport capacity
Westside Story	++	More efficient use of transport capacity
Regional Cities	++	More efficient use of transport capacity in Melbourne
Accelerated Climate Change /Mitigation	+	Supports a shift to a more energy efficient mode
Prolonged/ Severe Economic Downturn	+	More affordable transport options
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



What do we think of this option and why? (cont'd)

This reform, by improving service frequencies and introducing more direct routes, will encourage mode shift to public transport and thereby alleviate pressure on the broader road network. This has been assessed as making a moderate contribution to accessing the central city and a significant contribution to accessing major employment centres. This option has been recommended for implementation within 0-10 years.

Risks and opportunities

There is a risk that some bus patrons will not receive the same level of service as they did previously, especially in areas of low patronage or population. This could negatively impact elderly passengers or those with impaired mobility.

There is an opportunity to increase the number of services using the same number of buses, in doing so allowing frequencies to be increased and waiting times to be cut. More efficient and frequent services could provide reduced travel times and improved service reliability, thereby increasing bus patronage and mode share which has the potential to reduce congestion and the carbon intensity of transport.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then the timing of this recommendation has changed from 0-5 years to 0-10 years given the complexity and scale of reforming the bus network, including that some improvements may be dependent on change to bus contracts. However, we have reaffirmed the importance of early planning and delivery of as many network improvements as early as possible, ahead of contract reform.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Loader, C., *Bringing better buses to Brimbank: Implementing bus network reform in Melbourne*, 2015

Mental health & alcohol and other drug (AOD) acute and community facilities

MHA

Option type

New assets

Location

Statewide

Sector

Health and human services

Certainty of evidence

Low

Direct option cost

\$1 billion–\$3 billion

Option lead time

5-10 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 3: Respond to increasing pressures on health infrastructure, particularly due to ageing

Moderate	Significant	Significant	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

Need 8: Address increasing demand on the justice system

Low	Low	Low	Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Expand the provision of appropriate facilities to support an increased number of patients suffering from mental health and/or alcohol and other drug (AOD) dependency. The option covers a number of infrastructure initiatives including an increase in:

- Dedicated acute and sub-acute hospital beds across the state.
- Emergency department facilities adapted to better meet the need of mental health and AOD patients presenting at these locations.
- Community-based beds across the State for transitional and long-term support.
- Facilities for the delivery of community-based support services.

(Further detail in *What is this option? cont'd*).

What is the level of community support?

There was limited discussion of this option during public consultation. An earlier version of this option Aged care and mental health residential care investment (ACM) generated a moderate level of discussion of this option, and responses were generally positive. Both citizen juries made recommendations in support of ACM.

What do we think of this option and why?

This option was recommended in the strategy (ref. 3.3.2), noting that government should firstly define the strategic approach to service delivery and then align infrastructure planning according. We consider that an increased investment in the order of \$1-3 billion will be required for mental health services and alcohol and other drug services facilities over the next 30 years, based on the current model of service delivery. A move towards new models of community based care in the future could significantly alter the service model, however, requiring a less intensive infrastructure response in the longer term.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

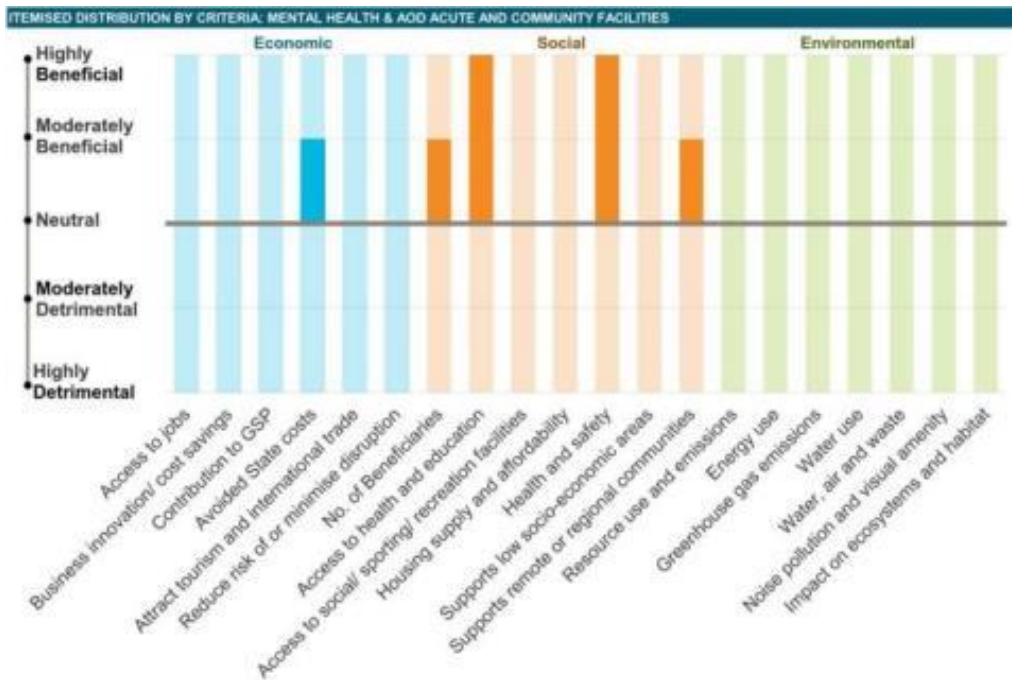
How does this option work with others?

This option is enabled by Health infrastructure coordinated planning (HIC), which will provide an overarching strategy for development of new facilities.

How does this option perform under different scenarios?

Supercity	+	Reflecting population growth
Westside Story	+	Reflecting population growth
Regional Cities	+	Reflecting population growth
Accelerated Climate Change /Mitigation	+	Reflecting increased levels of community stress
Prolonged/ Severe Economic Downturn	+	Reflecting increased levels of community stress
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



Commentary:

This option is expected to improve access to health care through expansion in the capacity of both acute and community based health services. Due to the scale of the option and the prevalence of mental illness in the community this is considered likely to be highly beneficial for access to health and regional and remote communities, given that they have been targeted as an underserved area.

What is this option? (cont'd)

The treatment approach and facility requirements of mental health services and AOD services are quite different. They have been grouped together in this option, however, as they share a common ground in that they consist of a variety of facilities ranging from acute hospital bed-based services through to outpatient community services. Both sectors have to balance the requirement of investing in admitted versus community based support services and allocate their resources accordingly.

Facility growth and development would be matched initially to targeted areas where the greatest demand exists. Over the next 0-10 years this is expected to predominantly be in growth areas in the outer north-west and south-east of Melbourne and the regional areas of Traralgon, Shepparton and Geelong. AOD bed-based services are delivered on a statewide basis and so access to service is more important than physical location, particularly in rural and regional areas.

Risks and opportunities

The success of this option will depend on a gradual and continual release of expanded facilities. These types of health services require a relatively high staff-to-patient ratio, with the workforce requiring specialist skills. The availability of appropriately trained mental health workers to support expanded facilities is limited and therefore restricts how quickly services can be expanded.

The National Disability Insurance Scheme needs to be monitored to understand the impact on service delivery in this sector of the health service.

Funding

Should government choose to pursue this program, it will then need to consider funding options.

Potential funding mechanisms

General government revenue	User charges	Beneficiary charges	Property development	Asset sales
✓				

General government revenue will continue to be a major source of funding for programs like mental health and AOD acute and community facilities as achieving and improving social objectives and outcomes benefits the broader community.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then we have clarified that integrated facilities should include 'complementary' services. This responds to stakeholder feedback about the potential detrimental effects of co-location with some justice services.

Next steps

In August 2016, following the release of *All things considered*, the State Government outlined their intent and approach to developing a statewide system design, service and infrastructure plan for Victoria's health system by publishing the *Statewide system design, service and infrastructure plan for Victoria's health system: discussion paper*. This paper outlines the scope of the plan and the approach to completing it by July 2017. The plan will be supported by a series of

major service stream and locality plans including a clinical mental health system plan for which the *Victoria's clinical mental health system plan: discussion paper* was also issued in August 2016.

The clinical mental health discussion paper notes that historic approaches for estimating demand for bed based service have been replaced with a new approach that will better identify service demand and care packages across the sector in inpatient and community based service environments.

The *Statewide system design, service and infrastructure plan for Victoria's health system: discussion paper* does not make a reference to AOD services. The sector is understood however to be reviewing service requirements and looking in the future to new therapeutic day treatment and rehabilitation models which treat patients more comprehensively outside of bed-based services.

Once this first step of developing the system design, service and infrastructure plan has been completed and the strategic approach to service delivery has been determined, then a detailed infrastructure response can be developed.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Victorian Department of Health and Human Services, *Victoria's clinical mental health system plan: discussion paper*, 2016

Victorian Department of Health and Human Services, *Statewide system design, service and infrastructure plan for Victoria's health system, Stakeholder discussion paper*, 2016

Multi-modal interchange improvements

MII

Option type

Incremental expansion of existing assets

Location

Statewide

Sector

Transport

Certainty of evidence

Low

Direct option cost

\$750 million–\$1 billion

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 6: Improve accessibility for people with mobility challenges

Low	Low	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

Need 10: Meet growing demand for access to economic activity in central Melbourne; and

Need 11: Improve access to middle and outer metropolitan major employment centres

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Improve the physical layout of transport interchanges to facilitate better multi-modal trip-making. This option is designed to provide the physical infrastructure to support more attractive multi-modal journeys and a more efficient and higher quality alternative to private vehicle transport. Works could include the redesign of bus interchanges at train stations, relocation of tram and bus stops and removing unnecessary impediments for users to transfer from one service to another quickly and safely. It requires the incorporation of the user perspective into infrastructure design. By leveraging better use of the existing network, it is possible to support more general travel, not just journey to work trips (further detail in *What is this option? cont'd*).

What is the level of community support?

There was limited to no discussion of this option during public consultation. This option was recommended by the metropolitan citizen jury.

What do we think of this option and why?

This option was recommended in part in the strategy (ref. 6.1.2, 10.4.3 and 11.3.2). Specifically, we recommended that a transparent prioritisation process be developed for upgrading transport interchanges beyond current commitments. This framework should focus on identifying upgrades that facilitate faster and easier passenger transfers, including for people with mobility challenges, and supporting a multi-modal network. Priority interchanges for upgrade are expected to include those which serve the Monash, Dandenong and Latrobe national employment clusters and the Box Hill and Broadmeadows metropolitan activity centres. The location of further upgrades could also include regional as well as metropolitan interchanges. Many transport interchanges have been developed in an ad-hoc manner over time and are not designed to assist passengers to complete their journeys. Providing fast, attractive and accessible interchanges between different transport modes encourages public transport (PT) usage and facilitates safer and more enjoyable PT journeys.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	Relates to key point/option for discussion
Regional Growth Plans	Contributes to implementing policy

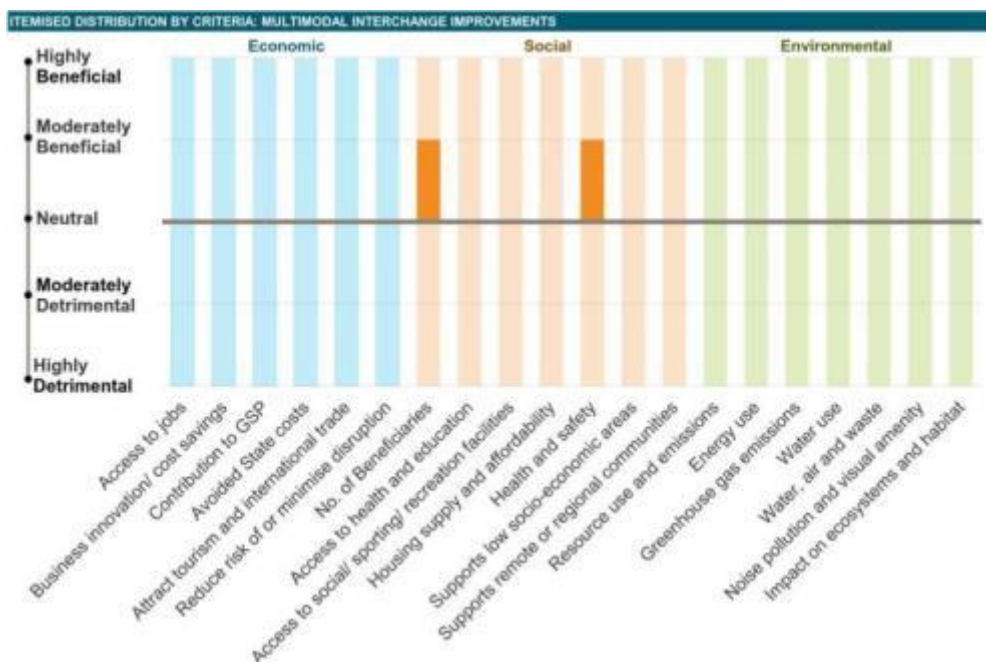
How does this option perform under different scenarios?

Supercity	++	More efficient use of transport capacity
Westside Story	+	More efficient use of transport capacity
Regional Cities	+	More efficient use of transport capacity
Accelerated Climate Change /Mitigation	+	Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	+	More affordable transport options
Biosecurity Threat	Neutral	

How does this option work with others?

This option will improve train station access for all users when delivered together with Metropolitan rail station interchange upgrades (MRI). Combined with Real time public transport information (TNI), this option will encourage greater confidence in taking multi-modal journeys.

What are the economic, social and environmental impacts of this option?



What is this option? (cont'd)

This option increases the ability of people to make safer, faster and more enjoyable public transport journeys to access jobs and services across the city.

Some examples of areas with good transport connections and infrastructure which could be improved include:

- North Richmond Station - Victoria Parade tram corridor (lack of amenities)
- Box Hill Station - 109 tram and multiple buses (lack of cohesion between services; limited information for riders)
- Keon Park Station - 902 SmartBus (offset bus stops)
- Caulfield Station - 900 SmartBus, route 3 tram (offset tram stop)
- Burwood East - 75 tram - 703 SmartBus (offset bus stops)

Risks and opportunities

The upgrade of interchanges will vary greatly in cost and complexity working around active road and rail corridors, however, it is assumed these risks will be managed during the planning phase.

Opportunities for this option include the ability to activate previously underutilised spaces around transport corridors.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then we have clarified that this recommendation could also be applicable to key regional stations feeding into Melbourne.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Public Transport Victoria, *Network development plan: Metropolitan rail*, 2012

Justice delivery in regional areas MJC

*Option MJC is in addressed in CMD – Courts
maintenance and optimised use and JDG – Justice
delivery in areas of growth*

Metropolitan level crossing removal completion

MLC

Option type

Better use through refurbishment of existing assets

Location

Melbourne

Sector

Transport

Certainty of evidence

High

Direct option cost

>\$10 billion

Option lead time

10–15 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 10: Meet growing demand for access to economic activity in central Melbourne; and

Need 11: Improve access to middle and outer metropolitan major employment centres; and

Need 19: Improve the resilience of critical infrastructure

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Remove the remaining approximately 130 level crossings on the metropolitan train network after the current program of 50 removals. This option considers further level crossing removals beyond those currently funded in forward estimates. This includes the potential to refine the selection of level crossings to be removed in the latter part of the existing program alongside consideration of the remaining 130 level crossings (further detail in *What is this option? cont'd*).

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive.

What do we think of this option and why?

This option was recommended in part in the strategy (ref. 11.3.3) because of the need to remove points of conflict between rail and road users that can reduce localised road congestion, allow for increased rail services and improve the reliability of the overall transport network. However, in recognition of recent and current commitments to level crossing removals, we have assumed some level of continued delivery will occur over time as a business as usual activity (subject to business cases).

Our recommendation is therefore targeted at a more strategic level in calling for the development of a process to transparently identify and prioritise level crossings removals. The removal of level crossings provides a moderate contribution to needs 10, 11 and 19 across all time periods. Improvements to the prioritisation of level crossings removals should build upon the previous analysis prepared by VicRoads and be delivered within 0-5 years to ensure the highest priority locations are targeted first. Removal of all level crossings in the metropolitan electrified network may not be viable, even in the long term (further detail in *What do we think of this option and why? cont'd*).

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

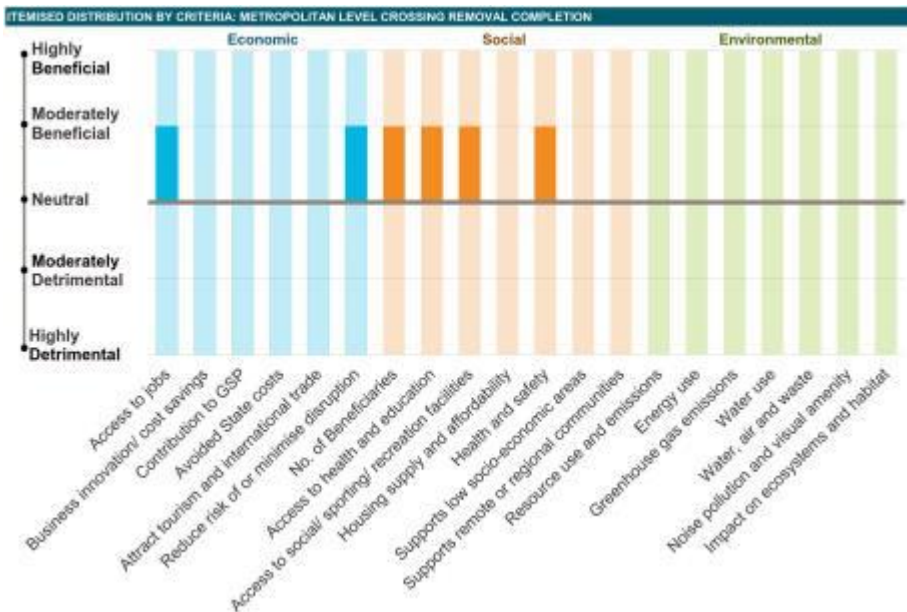
How does this option perform under different scenarios?

Supercity	++	Reduces delay, improves network performance
Westside Story	+	Reduces delay, improves network performance
Regional Cities	+	Reduces delay, improves network performance
Accelerated Climate Change /Mitigation	+	Supports smoother traffic flows, mode shift to public transport
Prolonged/ Severe Economic Downturn	-	Less demand for travel
Biosecurity Threat	Neutral	

How does this option work with others?

This option would be complementary to arterial road network employment centre enhancements (ARN) and a wide range of options which would increase the number of rail services operating on existing lines.

What are the economic, social and environmental impacts of this option?



What is this option? (cont'd)

Removal of the level crossings provides safety benefits to road and footpath users. It also enables additional services to be added to the network without increasing traffic congestion (through longer delay periods with boom gates down at level crossings). Further, it increases the reliability of the system by removing the potential for conflicts and delays at level crossings. Level crossing removal provides better movement around the suburban road network and affords additional access to employment and services in the central city and greater metropolitan area.

Priorities should be based on a range of criteria including the strategic level-crossing prioritisation framework developed by VicRoads in 2014, which analysed all remaining level crossings based on:

- Strategic fit: Alignment with the road network and proximity to activity centres and employment clusters
- Economic and environmental implications: Level of potential environmental and transport economic benefits
- Safety: Potential to reduce the risk of death or injury

Additional corridor-wide strategic factors should also be considered, including operational considerations, the remaining number of level crossings, the nature of the remaining crossings, and the nature of the land uses and design context in each corridor. The closure of some roads should also be considered as an option for level crossing removal where practicable.

On the basis of the VicRoads criteria, many of the highest-priority level crossings are already included within the current government 50 level crossing removals project (i.e. are under construction or in the planning/design stages). However, some are not addressed by the current program and would be key candidates for future prioritisation, such as Glen Huntly Road which (when combined with adjacent Neerim Road which is classified by VicRoads as a moderate priority) could complete an entirely traffic-separated run on the Frankston Line from Caulfield Station to Wickham Road.

Further crossing removals should occur on a sectional basis to optimise both the delivery and effectiveness of these projects, with opportunities considered on a corridor-by-corridor basis.

Sunshine-Dandenong Line:

This is the group that forms the Melbourne Metro corridor; removal of the remaining 25 level crossings should be prioritised between Watergardens in the north-west and Pakenham in the south-east which have the highest projected future train frequencies. Calder Park Drive which separates Watergardens Station from the train stabling yard should be considered as a priority.

Frankston Loop Line:

As a high-volume standalone corridor per the PTV post-Melbourne Metro service plan, the 43 kilometre Frankston Line has the potential to benefit significantly from the removal of its remaining 19 level crossings. Although all the high-priority level crossings identified by VicRoads for this corridor (with the exception of Glen Huntly Road which includes a tram-train level crossing) are part of the 50 level crossing removals currently underway, there are several medium-priority crossings between Caulfield Station and Balcombe Road which could be elevated in status to fill the gaps in an otherwise crossings-free portion of the corridor.

Northern Loop Line (Craigieburn and Upfield):

These two corridors are programmed to operate together as the Northern Loop Line following the implementation of Melbourne Metro, serving high-growth areas and programmed for new high-capacity rolling stock presumably to be equipped with high-capacity signalling capabilities. However, while there are only about six level crossings remaining on the Craigieburn Line, there are about 20 remaining crossings on the dense street network that characterises the Upfield Line (none of which have been classified by VicRoads as a medium or high priority). Although full separation of both components of the Northern Loop Line may therefore be identified as a low priority due to the scope of works vis-à-vis the likely benefits, the Craigieburn portion in itself represents an opportunity to complete the higher-growth half of the line and address three of VicRoads' remaining medium-priority crossings in the process.

Burnley Loop Line (Alamein, Belgrave, Lilydale):

The advantage of this group is that it has fewer than 10 level crossings remaining. However, these comprise only one high and one medium-priority crossing and one tram-train level crossing (Riversdale Road). Since this corridor does not serve high-growth areas (and is therefore unlikely to experience significantly degraded conditions in the future) it should be considered a lower priority unless there are significant changes in residential development.

Glen Waverley Line:

The advantage of this line is that it has only five level crossings remaining, two of which (Madden Grove and Glenferrie Road) are classified as high-priority according to the VicRoads criteria. However, it does not serve a high-growth area (and therefore is not likely to see significant deterioration of conditions) and should be considered a moderate priority.

Cross-City Line (Werribee to Sandringham):

Forming the Cross-City Line following implementation of Melbourne Metro, the Werribee-to-Sandringham corridor serves several high-growth areas (particularly on the western leg near Werribee) but still has more than 20 level crossings remaining along its length. This service can be considered a moderate priority for crossings removal, with a higher priority on the western Werribee segment due to its six VicRoads-prioritised crossings (1 high and 5 'lower') as well as its strategic importance to/through the high-growth western suburbs.

Clifton Hill Loop Line (South Morang/Mernda and Hurstbridge):

Although serving some high-growth areas and forming part of the future Melbourne Metro 2 corridor, the high number of remaining level crossings on the Clifton Hill Group (approximately 38, only three of which are listed by VicRoads as medium to lower-priority) and its relatively new, non-high capacity signalling-fitted rolling stock would make this a lower priority for nearer-term level-crossings removal

What do we think of this option and why? (cont'd)

Consideration will also be given in future Infrastructure Victoria strategy updates for the removal of level crossings on the non-electrified freight and regional rail networks. Further investigation is required to identify the crossings on these networks that would provide benefits to freight movements and road safety.

Risks and opportunities

There are risks from undertaking construction in an existing operational rail corridor that would need to be managed during the option delivery phase.

Opportunities to package up level crossing removals should be considered in order to achieve economies of scale and maximise benefits to the rail network. Once priority locations are identified, land use integration opportunities should be a central consideration.

Funding

Should government choose to pursue this program, it will then need to consider funding options. Below is a range of potential funding mechanisms which could be examined to help fund the program.

Potential funding mechanisms

General government revenue	User charges	Beneficiary charges	Property development	Asset sales
✓	✓		✓	

General government revenue is likely to be a major source of funding for metropolitan level crossing removal completion (MLC) as the benefits are usually widely distributed such as improving public safety and increasing capacity and time savings on the transport network. Victoria could explore opportunities to seek federal government contributions for

projects such as MLC. The federal government has previously provided funding for similar projects, such as the level crossing removal at Main Road in St Albans.

Property development should also be considered, for example, selling or leasing land and air rights surplus to government requirements at train station sites for commercial, residential or retail development. Property development can assist in putting underutilised government land and space to higher and better uses, creating added value through improved amenity and access to services. Sites at recent level crossing removals at Gardiner and Ormond train stations have been prepared and reserved for property development.

Existing user charges (public transport fares) should continue to be charged but are only expected to cover a portion of ongoing operating costs.

Infrastructure Victoria is examining transport network pricing as part of our research program. We think that the primary objective of a transport network pricing regime – where users pay to access and use the transport network – should be to manage demand, rather than to recover costs for infrastructure. We are focusing on examining road pricing regimes in metropolitan Melbourne as a first step towards a comprehensive transport network pricing regime that includes roads and public transport. Careful consideration must be given to the design of the regime to ensure it is efficient, fair and sustainable.

Additional notes

Where a level crossing is not a priority for road congestion or additional rail services, there may be still a range of measures that could increase the safety of the crossing for all users. A number of new intelligent transport systems (ITS) such as in-vehicle and road-side warning and protection systems are being developed that can increase safety without the significant cost of a level crossing removal.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

VicRoads, *Strategic framework for the prioritisation of level crossings in metropolitan Melbourne*, 2014

Melbourne Metro 2 MMS

Option type

New assets

Location

Melbourne central subregion

Sector

Transport

Certainty of evidence

Low

Direct option cost

>\$10 billion

Option lead time

5-10 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 10: Meet growing demand for access to economic activity in central Melbourne

Significant	Significant	Significant	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Construct a heavy rail connection between Clifton Hill and the CBD through to Fisherman's Bend and Newport via two new rail tunnels. The works will separate the high growth South Morang – Southern Cross Line from the Clifton Hill group. This will provide flow on capacity benefits to the Werribee Line and will allow for future extensions/additions to the Clifton Hill group (such as the Doncaster and Wollert rail extensions). This tunnel forms the major component of the network upgrade during Stage 3 of the PTV *Network Development Plan – Metropolitan Rail*, December 2012. The new link could provide the opportunity for additional stations in the inner north and urban renewal precincts such as Fisherman's Bend. The construction of this link contributes to amenity and the attractiveness for businesses and people to relocate to the redevelopment areas. Furthermore, it will add capacity for people to access employment and social activities in the central city.

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive.

What do we think of this option and why?

This option was recommended for further investigation in the strategy (ref. 10.10.2) within 0-5 years as one possible solution for expanding capacity on the Sunshine, Werribee and Mernda corridors. It would make a significant contribution to need 10, due to the capacity uplift it provides and the new stations it offers, particularly to support Fishermans Bend. However, it comes at a very high cost, with a resulting poor preliminary cost benefit ratio. Given the degree of integration in current transport and land use plans, including subsequent projects and precinct development planning which depends on this proposal, the absence of an alternative option which would provide a similar function, it would be rash to remove this proposal from further consideration at this stage. However, further work is needed to identify and assess alternative options, and to refine this one by seeking to reduce the cost and broaden the benefits.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

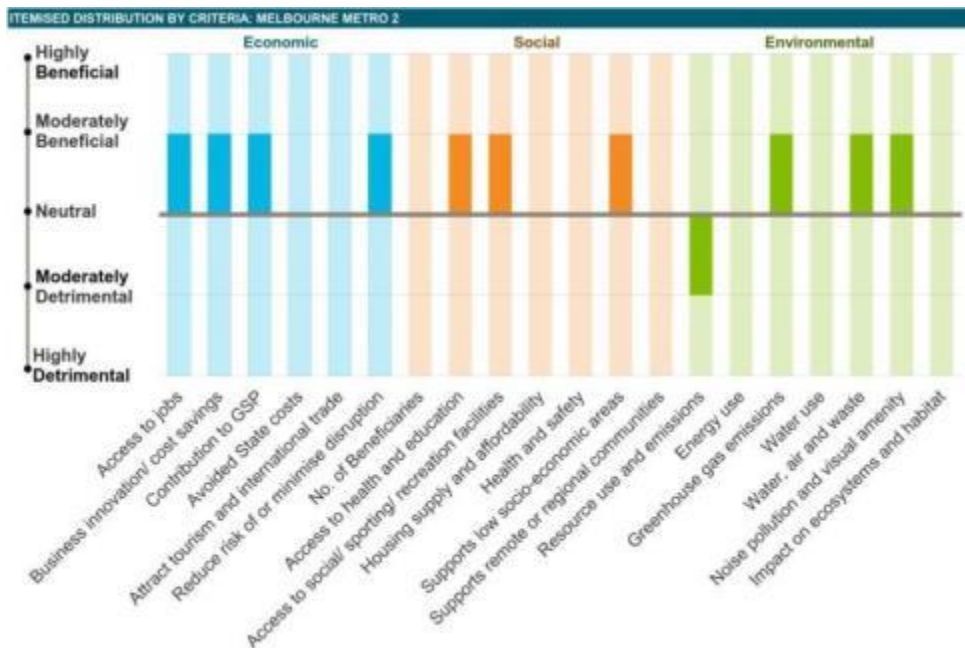
How does this option work with others?

There will be significant benefits where this option is combined with other network enhancements such as high capacity trains (HCT2 and HCT3) and high capacity signalling through rail signals and fleet upgrade (RSF). It will also enable the construction of Wollert rail extension (WRE2) and Doncaster heavy rail line (DHR). This option would complement central city tram network extension (CCT).

How does this option perform under different scenarios?

Supercity	++	Supports mode shift to address congestion
Westside Story	++	Supports mode shift to address congestion
Regional Cities	+	Supports mode shift to address congestion
Accelerated Climate Change /Mitigation	+	Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	-	Less demand for mass transit
Biosecurity Threat	Neutral	
Bay West	+	Reduces impact of congestion on freight traffic
Hastings	+	Reduces impact of congestion on freight traffic

What are the economic, social and environmental impacts of this option?



Risks and opportunities

Large-scale tunnelling projects have risks with managing poor ground conditions, interference with other tunnels and utility services and water seepage. This can lead to project delays and cost overruns.

There is an opportunity with this option to integrate the reconfiguration of the metropolitan train system with the development of urban renewal projects. This would have the benefit of reducing dependence on car transport and could lower congestion in the new development areas.

Funding

Though this option has only been recommended for further planning work in the strategy, should government choose to pursue this project, it will then need to consider funding options. Below is a range of potential funding mechanisms which could be examined to help fund the project. This advice is provided based on the Clifton Hill to Newport tunnel alignment, noting that other alignments require investigation.

Potential funding mechanisms

General government revenue	User charges	Beneficiary charges	Property development	Asset sales
✓	✓	✓	✓	

General government revenue is likely to be a major source of funding for projects like Melbourne Metro 2. This project, if pursued, could provide public benefit with increased capacity across large parts of the metropolitan train network.

Beneficiary charges could be examined if there is a substantial uplift in land values and business activity in the vicinity of new train stations. These include developer contributions, which could be levied on new developments occurring near new train stations in Fishermans Bend and Melbourne's inner north. Some funding could also be raised from betterment levies applied to a defined catchment in the vicinity of new train stations to capture a portion of the additional land and business value created by the new project. If betterment levies and developer contributions are both considered by government, it should ensure that new charges do not unfairly duplicate each other or any existing charges.

Property development could also be considered, for example, selling or leasing land and air rights surplus to government requirements at new train station sites for commercial, residential or retail development. Property development can assist in putting underutilised government land and space to higher and better uses, creating added value through improved amenity and access to services. This has been done before at Melbourne Central train station.

Existing user charges, (public transport fares), should continue to be charged but are only expected to cover a portion of ongoing operating costs.

Infrastructure Victoria is examining transport network pricing as part of our research program. We think that the primary objective of a transport network pricing regime – where users pay to access and use the transport network – should be to manage demand, rather than to recover costs for infrastructure. We are focusing on examining road pricing regimes in metropolitan Melbourne as a first step towards a comprehensive transport network pricing regime that includes roads and public transport. Careful consideration must be given to the design of the regime to ensure it is efficient, fair and sustainable.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then we have clarified that the scope of this recommendation include the development of further network planning following trigger point analysis.

Transport modelling and economic analysis

Infrastructure Victoria commissioned KPMG, Jacobs and Arup to undertake transport modelling for a number of options being considered for the strategy, including a variety of 'build' and 'non-build' transport options. This allowed major transport projects to be quantitatively assessed alongside several technology, policy and reform options. In addition, economic analysis was undertaken for the 'build' options to estimate a cost benefit ratio, including for this option. The options were modelled individually, mostly on a standalone basis, with a number of options then also tested in various combinations.

This analysis was undertaken on a different basis and produced different results to what is presented throughout the options book, which was prepared by AECOM/PWC with the intention of allowing a mixture of qualitative and quantitative assessment across the full range of options, across all sectors and needs. While on the face of it these two analyses reference similar metrics, different assumptions and methodologies have been applied. In particular, the KPMG/Jacobs/Arup assessment identified a scale of contributions to needs which set "high" ratings for each need based on the modelled option which made the highest contribution to that need, and other ratings were identified in order to distinguish between the level of contribution of the options. This had the result of showing most 'build' options as making a low or medium contribution to most needs, because the contribution of the 'non-build' options was so much higher. It also has the result of showing some transport options as making a "high" contribution to Need 18 (transition to lower carbon energy supply and use) where in Infrastructure Victoria's judgement most transport sector options will make a much lower contribution than energy sector options, as transport comprises a much smaller proportion of total carbon emissions.

With these caveats in mind, however, the results of this alternative analysis are helpful inputs into Infrastructure Victoria's 'global' assessment, and in preparing the strategy we have come to a considered view based on the totality of evidence available to us.

In terms of KPMG/Jacobs/Arup analysis of this option, the transport modelling found that in providing direct rail connections across the city, this project would enable passengers to more easily travel between destinations on the rail network and reduce travel times. It would improve access to the CBD for both public transport and car travel, the percentage of population within 45 minutes of the CBD increasing by between 2 and 3 per cent. It would also improve access to a number of NECs, most notably East Werribee (6 per cent increase) and Latrobe (3 per cent increase), which are located at either end of Melbourne Metro 2. It would provide significant congestion relief to the Werribee and South Morang Lines.

Modelling indicates that the project would notably increase rail patronage and reduce car trips across the network, with small decreases in car volumes along the Princes Freeway and the M80. This would result in a slight reduction in carbon emissions, but also improve the efficiency of freight supply chains, with freight spending less time travelling on the road network.

While the benefits of this project are substantial, and it made the greatest contribution to the needs of all the projects assessed through modelling, the costs of construction are also anticipated to be very great (up to double that of Melbourne Metro 1). Consequently, the cost benefit ratio for Melbourne Metro 2 was estimated as ranging only from 0.4 - 0.5 with wider economic benefits (WEBs) and 0.3 - 0.5 without WEBs, a poor result.

For more detail, consult the 'Economic appraisal and demand modelling' report to Infrastructure Victoria.

Next steps

Further investigation is required to determine alternative methods to solve the future growth on the Mernda and Werribee corridors. Investigations should consider protecting station locations and potential tunnel alignment(s) in the Fishermans Bend precinct.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

KPMG/Arup/Jacobs, *Economic appraisal and demand modelling*, 2016

Public Transport Victoria, *Network development plan: Metropolitan rail*, 2012

Mildura passenger rail restoration MPR

Option type

Better use through refurbishment of existing assets

Location

Mallee, Wimmera Southern Mallee and Loddon Campaspe regions

Sector

Transport

Certainty of evidence

High

Direct option cost

\$750 million–\$1 billion

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 10: Meet growing demand for access to economic activity in central Melbourne; and

Need 12: Improve access to jobs and services for people in regional and rural areas

Very Low	Very Low	Very Low	Very Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Restore passenger rail services to north-west Victorian communities between Mildura and Maryborough with connection through to Melbourne. Prior to 1993 passenger rail services linked north-west Victoria and Mildura with Melbourne. Currently only freight services use the tracks beyond Maryborough. The region is serviced by commercial flights between Mildura and Melbourne Airport and combination bus and train links via Swan Hill, Bendigo and Ballarat. The restoration of a passenger rail link provides better accessibility for people with mobility issues and improved connections to Melbourne and the local region for access to jobs and services.

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option was not recommended in the strategy because based on our assessment and the results of a previous feasibility study it provides a very low/negative contribution to meeting the need but at a high cost. Furthermore, the rail service would not be competitive with the convenience of private vehicles or the travel time of flying. Even under our “regional cities” scenario, and despite submissions supporting this option, we believe that alternative solutions will better support the transport need along this corridor. This might include more frequent and direct coach services between Mildura and Melbourne, including connections with existing rail services, that could be considered under regional coach upgrades (RCU) and regional train link upgrades (RTL). In the strategy we have prioritised upgrading and improving the existing passenger rail network, given the sizeable task in doing this and demonstrable catchment, rather than reopening old lines which generally would serve a limited range of trips and have relatively high threshold costs to bring up to passenger operation standards.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

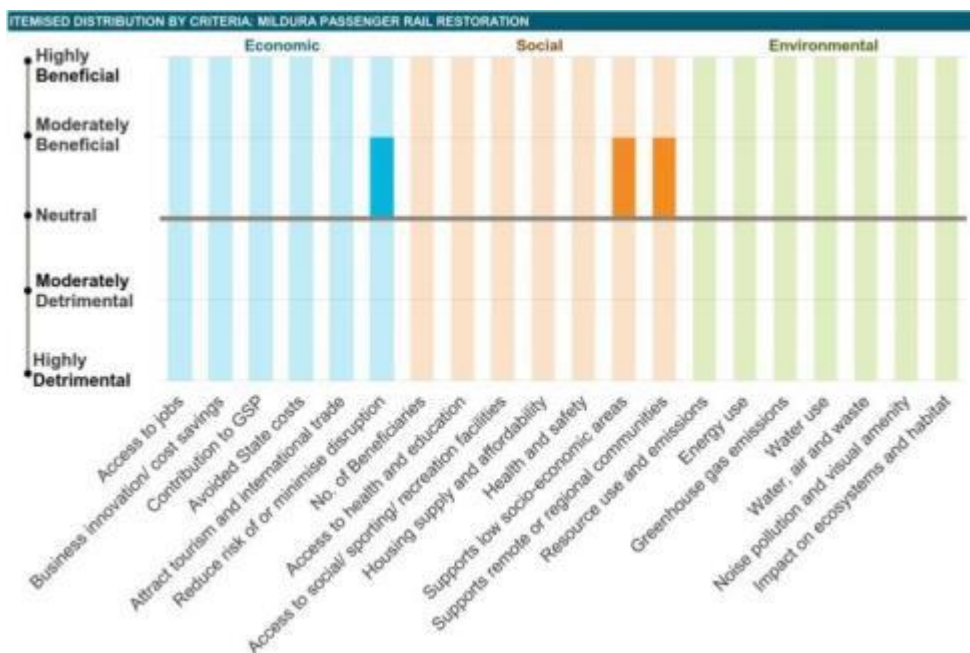
How does this option perform under different scenarios?

Supercity	Neutral	
Westside Story	Neutral	
Regional Cities	+	Improved access
Accelerated Climate Change /Mitigation	Neutral	
Prolonged/ Severe Economic Downturn	-	Less demand for travel
Biosecurity Threat	Neutral	

How does this option work with others?

This option is an alternative to regional coach upgrades (RCU) on this corridor.

What are the economic, social and environmental impacts of this option?



Risks and opportunities

The passenger service may have negative impacts on rail freight operations that use the same line.

There is an opportunity to leverage the Murray Basin Rail Project upgrades to reduce the costs of infrastructure upgrades required for reinstating the passenger service.

While upgrade works delivered as part of Murray Basin Rail Project will reduce the cost of restoring passenger services to Mildura, further significant upgrades beyond the current program to level crossing protection and other infrastructure would still be required. The extent of additional upgrade works would depend on the quality and speed of the service.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Victorian Department of Transport, *Mildura rail feasibility study*, 2010

Mobile police and justice workforce MPW

Option type

Better use through technological innovations
Better use through information

Location

Statewide

Sector

Justice and emergency services
ICT

Certainty of evidence

Low

Direct option cost

\$250 million–\$500 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 2: Address infrastructure challenges in areas with low or negative growth; and

Need 8: Address increasing demand on the justice system; and

Need 12: Improve access to jobs and services for people in regional and rural areas; and

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option seeks to leverage the mobility of the police and broader justice workforce (e.g. community corrections) by implementing a new system to enable non-emergency engagement with police and other justice personnel. In the first instance this would be a call-centre. This has been delivered in other states (such as NSW) and is known as a 'Police Assistance Line'. Beyond the call-centre, there is a need to enable broader digital channels of interaction with the community, leveraging mobile technology and the increasing the availability of mobile applications 'Police Online' (further detail in *What is this option? cont'd*).

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were polarised. The metropolitan jury had a mixed view of this option. As the option has changed considerably, this support related to the previous scope (see *Additional notes* section). Ninety four per cent of people surveyed as part of community research supported the creation of a non-emergency hotline.

What do we think of this option and why?

This option was recommended in the strategy (ref. 2.2.1, 8.2.1 and 12.1.1) because as service delivery moves towards more mobile deployment of resources, public contact with the justice sector needs to evolve too, both improving service delivery and taking pressure off infrastructure such as police stations or 000. A non-emergency call-centre (using the number 131 444 adopted in other states) and supportive technology platforms (Police Online) should be introduced within 0-5 years. Importantly we believe this is a key part of a service delivery change occurring for police, where the standard methods of engagement (visiting a station or calling 000) are being replaced by modern communications and more responsive public engagement. The experience in other Australian and New Zealand jurisdictions has shown that these means of contacting police for non-urgent matters are valued by the communities in which they operate. This engagement is made possible with the current delivery of new mobile devices used in the field.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

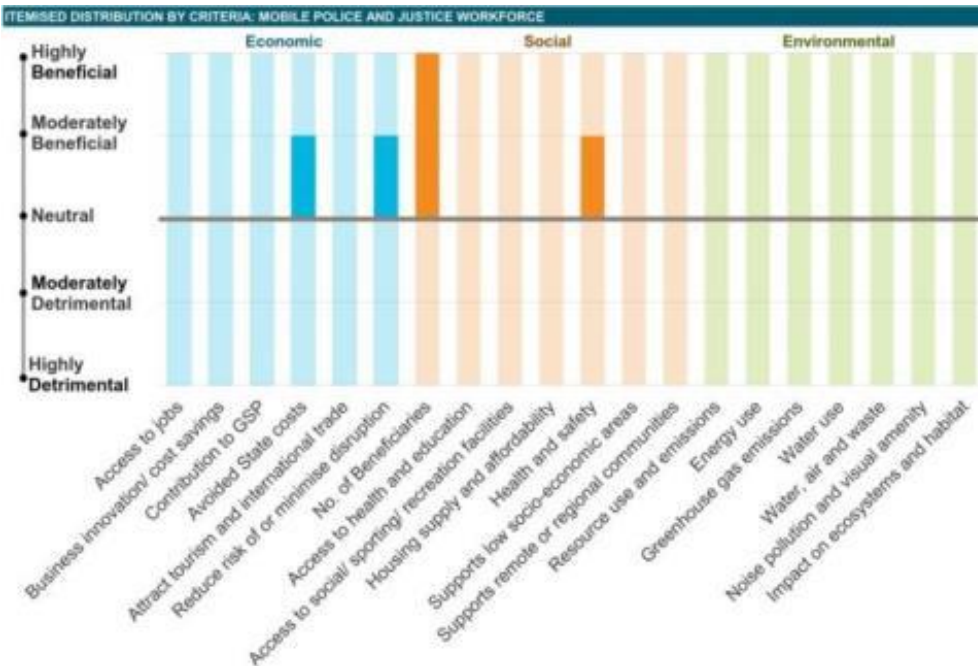
How does this option perform under different scenarios?

Supercity	Neutral	
Westside Story	Neutral	
Regional Cities	+	Improved access for remote communities
Accelerated Climate Change /Mitigation	Neutral	
Prolonged/ Severe Economic Downturn	++	More responsive police & justice workforce
Biosecurity Threat	++	More responsive police & justice workforce

How does this option work with others?

The key complementary relationship for this option is police complexes (PSS). While this option could be delivered without PSS, the benefits of a shift in service delivery model with new channels to the public would be supported by delivering both together. This option also presents an opportunity for integrated service delivery with human services (JCS) by facilitating greater integration of call-centres.

What are the economic, social and environmental impacts of this option?



Commentary:

This option is expected to benefit health and safety by improving access to police services. This is expected to occur directly through centralised points of contact for the community. This option is also expected to promote better use of police resources, which could allow for their more productive use, benefiting health and safety and the resilience of police resources. There is also the potential for avoided state costs.

What is this option? (cont'd)

With appropriate training and controls, these services could feasibly be staffed by non-police personnel and then progressed to police officers as needed. This would have the benefits of lowering the cost of the services, and increasing the number of police officers available for operational duties. In the case of the NSW Police Assistance Line, 200 officers were able to return to operational duties.

Risks and opportunities

There are risks associated with such projects going over time and budget, especially with likely dependencies on core Victoria Police ICT improvements.

The opportunity is to drive increased perceptions of safety in communities with police and justice staff generally more visible and accessible. This option will need to be supported by successful implementation of the supporting technology. There is also an opportunity for linkages to other complementary services to be made, such as legal aid.

Additional notes

Scope change

This scope of this option has changed significantly since version one of the *Draft options book*. Previously the option sought to deliver a mobile police and justice workforce through rolling out ICT and other related infrastructure. However, as part of the 2015-2016 state budget, it was announced that a program to deliver mobility for police was being delivered through a \$272 million program over the next five years. This is part of a broader Blue Connect Program which is focused on maintaining the performance of core information systems and delivering longer-term reforms to ICT systems and processes, including the implementation of technology to support the delivery of a mobile police workforce.

Further work revealed that the benefits of this mobility would not be realised without a shift in the way the public can engage the police and justice workforce. As a result, we refocused this option to focus on one of the most important channels that is missing for police – a non-emergency call centre – which could replace the need for people to attend a police station to seek assistance (when not an emergency) but call a number (which would over time be supported by other technology platforms).

Blue Connect Program

It is understood that the Victoria Policing Information Process and Practice Reform Program (PIPP) has been re-named to BlueConnect Program. This includes work to develop this option, to develop ICT solutions to improve case management and intelligence and deliver current commitments for mobile technology and body worn cameras.

Victoria Police Capability Plan 2016-2025

The recently released Victoria Police Capability Plan 2016-2025 calls for more tailored and responsive services to the community through the use of technology. This option would support that outcome.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

NSW Auditor General, *NSW Police: The police assistance line*, 2003

Victorian Department of Premier and Cabinet, *Budget delivers more police, Targets high-risk offenders to keep Victorians safe*, 2016

Victorian Police, *Victorian police blue paper: A vision for Victoria police in 2025*, 2014

Victoria Police, *Victoria Police Capability Plan 2016-2025: Capability framework*, 2016

Metropolitan rail capacity upgrades

MRC

Option type

Better use through refurbishment of existing assets

Location

Melbourne

Sector

Transport

Certainty of evidence

Low

Direct option cost

\$3 billion–\$5 billion

Option lead time

5–10 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 1: Address infrastructure demands in areas with high population growth; and

Need 10: Meet growing demand for access to economic activity in central Melbourne; and

Need 11: Improve access to middle and outer metropolitan major employment centres

Low	Low	Low	Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Deliver capacity improvements to the metropolitan rail network with projects such as signalling upgrades, track amplifications, greater platform and carriage utilisation and increases to terminus capacity. This option will remove physical and operational constraints to maximise the use of the existing rail network (for specific projects refer to further detail in *What is this option? cont'd*).

What is the level of community support?

There was limited discussion of this option during public consultation.

What do we think of this option and why?

This option was recommended in part in the strategy (ref. 10.4.4) because a number of lower cost upgrades and renewals can make a substantial improvement to the reliability and operation of the metropolitan rail network. However, in recognition of upgrade programs already committed, we have assumed continued delivery will occur over time as a business as usual activity. Our recommendation is therefore targeted at a more strategic level in calling for the development of a process to transparently identify and prioritise network upgrades and enhancements that will ensure that the most effective projects are delivered. The delivery of these minor network upgrades and enhancements provide a low contribution to needs 1, 10 and 11 across all time periods when assessed in isolation. However, we consider the contribution to these needs is much greater when this option is combined with other network enhancements such as rail signals and fleet upgrade (RSF) and metropolitan level crossing removal completion (MLC). Our recommendation requires that the Public Transport Victoria (PTV) *Network Development Plan – Metropolitan Rail* is further developed within 0-5 years to transparently identify and prioritise network upgrades.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

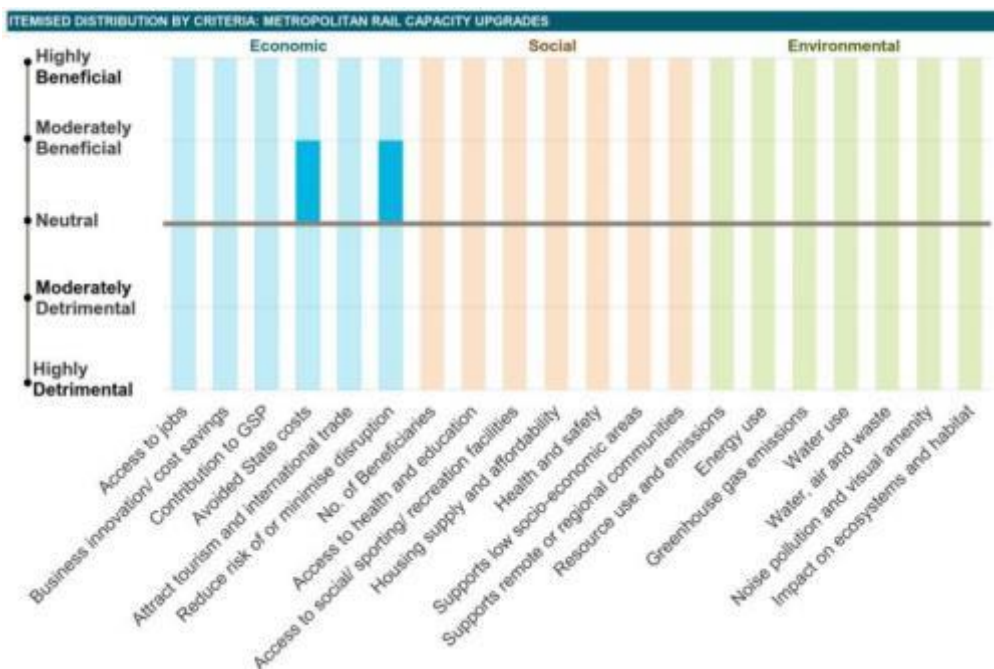
How does this option work with others?

This option works as a complement to High capacity trains - 10 car (HCT2), high capacity trains - 7 car (HCT3), multimodal interchange improvements (MII), metropolitan rail station interchange upgrades (MRI), public transport train timetabling (PTT) and rail signals and fleet upgrade (RSF) in increasing the capacity and efficiency of metropolitan rail operations.

How does this option perform under different scenarios?

Supercity	++	Supports mode shift to address congestion
Westside Story	+	Supports mode shift to address congestion
Regional Cities	+	Supports mode shift to address congestion
Accelerated Climate Change /Mitigation	+	Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	-	Less demand for mass transit
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



Commentary:

This option has the potential to reduce costs to the state by delaying the need for larger, more expensive capacity improvement projects. Many of the projects which will be delivered under this option will also increase the resilience of the rail network through updated power and signalling, as well as reducing the interaction and dependencies between lines.

What is this option? (cont'd)

Scope could include:

- Initiatives that encourage more even use of train platforms when boarding and alighting to boost train capacity such as increasing canopy cover on platforms to encourage passengers to move further down platforms.
- Removing and rearranging seats in train and tram carriages to improve train capacity.
- Modify Burnley junction to fully segregate Glen Waverley services from the Belgrave/Lilydale/Alamein lines.
- Replacement of life-expired signalling systems.
- Track amplifications, for example duplication between Greensborough and Eltham and through the Altona Loop (Network Development Plan).

The increased carrying capacity enables greater numbers of people to access employment and services in peak times.

Risks and opportunities

There are risks from undertaking construction in an existing operational rail corridor that would need to be managed during the option delivery phase. This option may provide opportunities to increase the capacity of the rail network through smaller, less disruptive interventions than large scale projects.

Funding

Should government choose to pursue this program, it will then need to consider funding options. Below is a range of potential funding mechanisms which could be examined to help fund the program.

Potential funding mechanisms

General government revenue	User charges	Beneficiary charges	Property development	Asset sales
✓	✓	✓		

General government revenue is likely to be the major funding source for programs like metropolitan rail capacity upgrades as the benefits of the program are shared by users across the metropolitan rail network. The capacity upgrades would provide some relief to congested road networks across Melbourne.

Beneficiary charges could also be considered if there is a substantial uplift in land values and business activity in the vicinity of each project. A betterment levy could be considered on commercial and/or residential property in defined catchment areas for projects such as the duplication of the Dandenong and Cranbourne corridor if the increase in services and decrease in travel time substantially increases land values.

Existing user charges (public transport fares) should continue to be charged but are only expected to cover a portion of ongoing operating costs.

Infrastructure Victoria is examining transport network pricing as part of our research program. We think that the primary objective of a transport network pricing regime – where users pay to access and use the transport network – should be to manage demand, rather than to recover costs for infrastructure. We are focusing on examining road pricing regimes in metropolitan Melbourne as a first step towards a comprehensive transport network pricing regime that includes roads and public transport. Careful consideration must be given to the design of the regime to ensure it is efficient, fair and sustainable.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Public Transport Victoria, *Network development plan: Metropolitan rail*, 2012

Melton rail electrification MRE1

Option type

Incremental expansion of existing assets

Location

Melbourne western subregion

Melbourne – Ballarat state-significant transport corridor

Sector

Transport

Certainty of evidence

Medium

Direct option cost

\$500 million–\$750 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 1: Address infrastructure demands in areas with high population growth

Moderate	Significant	Significant	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

Need 10: Meet growing demand for access to economic activity in central Melbourne; and

Need 11: Improve access to middle and outer metropolitan major employment centres

Moderate	Moderate	Moderate	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Extension of the electrified suburban rail network from Sunshine to Melton, including the quadruplication of tracks between Sunshine and Deer Park. The works will also include the removal of three level crossings on the Ballarat line between Sunshine and Deer Park West, with potential additional level crossings beyond this station and a new station at Toolern. There will also need to be an additional rail flyover at Sunshine Road. This option will provide additional capacity on the Ballarat line and increase the frequency of services to the greater Melton growth area. It will also support improved reliability and capacity on the Bendigo and Geelong lines. This will allow more people from Melton and other regional areas to access jobs and services in the centre of the city and at the Sunshine National Employment Cluster (NEC). This project is recommended by Infrastructure Australia as a priority initiative. This option will also require upgrades to parking and the road network around existing stations.

What is the level of community support?

There was a high level of discussion of this option during consultation. Responses were generally positive. Both citizen juries made recommendations in support of this option.

What do we think of this option and why?

This option was recommended in the strategy (ref. 1.3.6, 10.8.3) because it upgrades a section of the regional rail network that is currently under substantial pressure from metropolitan growth, delivering improved services and reduced crowding for both metropolitan and regional passengers. The existing service, with lower capacity regional trains, is projected to be dwarfed by demand growth from the western growth corridor. While it can't occur prior to Melbourne Metro, this option is needed around the same time or shortly after completion of that project (within 10-15 years), contributing primarily to need 1, but also contributing to needs 10 and 11 by improving access to Sunshine and the future centre at Toolern. This option complements the introduction of 10 car trains (ref. 10.5.2) and in combination both options have a very strong cost benefit ratio.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Consistent

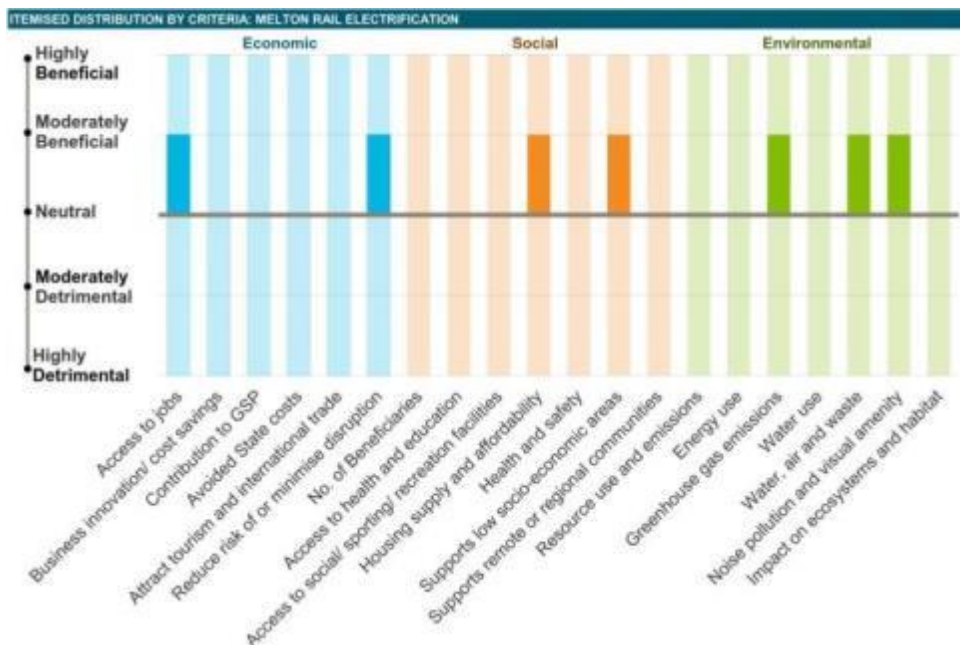
How does this option perform under different scenarios?

Supercity	++	Supports mode shift to address congestion
Westside Story	++	Supports mode shift to address congestion
Regional Cities	+	Supports mode shift to address congestion
Accelerated Climate Change /Mitigation	+	Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	-	Less demand for mass transit
Biosecurity Threat	Neutral	

How does this option work with others?

This option is complemented by High capacity trains - 10 car (HCT2). The ability of this option to reduce road congestion would be dependent on managing demand (e.g. through TNP).

What are the economic, social and environmental impacts of this option?



Risks and opportunities

There are risks from undertaking construction in an existing operational rail corridor that would need to be managed during the option delivery phase.

There is an opportunity to remove a number of level crossings with the electrification of the rail line to Melton. This increases the safety for road and rail users by the elimination of potential conflict points at level crossings.

Additional notes

The Melbourne Metro Business Case shows how the economic results of that project are enhanced by the inclusion of Melton Rail Electrification (MRE1) and High capacity trains - 10 car (HCT2). By considering the business case economic assessment, incremental economic results for these two options together can be identified.

Key economic results for MRE1 and HCT2 (at a 7 per cent p.a. discount rate) are as follows, with ranges reflecting figures with and without Wider Economic Benefits (WEBs):

- Present value of benefits: \$4.5-6.4 billion
- Present value of costs: \$1.4 billion
- Net Present Value: \$3.1-5 billion
- Cost Benefit Ratio: 3.2-4.6

Further investigation is required to determine the sequence of new growth area stations along this corridor. There may be an opportunity for delivering additional stations prior to electrification.

In the development of the final scope, the costs and benefits of extending the electrification to Bacchus Marsh should be considered.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Public Transport Victoria, *Network development plan: Metropolitan rail*, 2012

Victorian Department of Economic Development, Jobs, Transport and Resources, *Melbourne Metro business case*, 2016

Metropolitan rail station interchange upgrades

MRI

Option type

Better use through refurbishment of existing assets

Location

Melbourne

Sector

Transport

Certainty of evidence

Low

Direct option cost

\$5 billion–\$10 billion

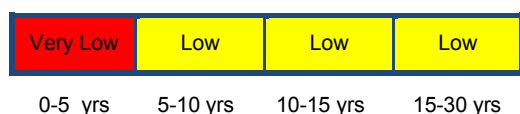
Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 10: Meet growing demand for access to economic activity in central Melbourne; and

Need 11: Improve access to middle and outer metropolitan major employment centres



What is this option?

Upgrade rail stations that experience current and future high passenger volumes and interchanges on the metropolitan network. With the growth in patronage and major changes to the structure and operation of the rail network, rail interchange hubs will shift to reflect new travel patterns. This will require upgrades to the station infrastructure to manage the increased demand. This option will enable rail stations to manage the growth in passenger volumes and changes to the network. As a result, people will be better able to access the central city and employment centres for jobs and services. Some high priority stations could include Flinders Street, Southern Cross, Flagstaff, Melbourne Central, Parliament, Richmond, South Yarra and Caulfield stations (further detail in *What is this option? cont'd*).

What is the level of community support?

There was limited discussion of this option during public consultation.

What do we think of this option and why?

This option was recommended in part in the strategy (ref. 10.4.6) because many of Melbourne's inner-city stations are struggling with the increasing number of passenger interchanges. It is recommended in a scaled-down form as it is not feasible to upgrade all major interchange stations at once and further investigation is required. The delivery of upgrades to major rail station interchanges has been assessed as providing a very low to low contribution to needs 10 and 11 over time when assessed in isolation. However, we consider the contribution to these needs to be much greater when combined with other network enhancements such as Rail signals and fleet upgrade (RSF), Metropolitan level crossing removal completion (MLC) and High capacity trains - 7 car (HCT3). The importance of improving interchanges is intuitive, but further evidence and investigation is required to identify the highest priority stations and the required treatments. Prioritisation and scoping of the required works is particularly important for the large scale and complex upgrades in the central city.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	Relates to key point/option for discussion
Regional Growth Plans	N/A

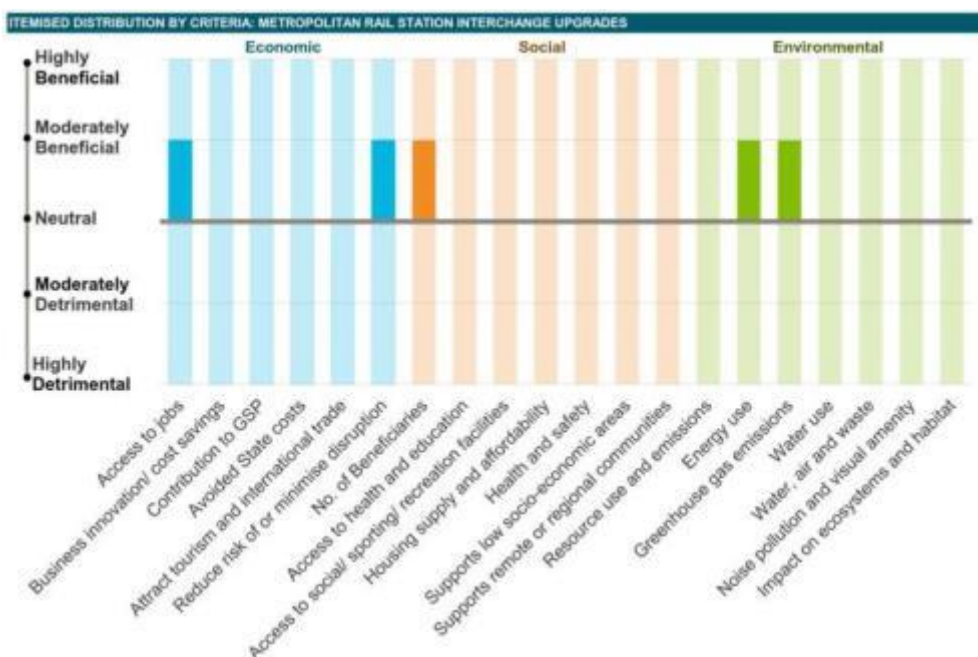
How does this option perform under different scenarios?

Supercity	++	Supports mode shift to address congestion
Westside Story	+	Supports mode shift to address congestion
Regional Cities	+	Supports mode shift to address congestion
Accelerated Climate Change /Mitigation	+	Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	-	Less demand for mass transit
Biosecurity Threat	Neutral	

How does this option work with others?

This option will improve train station access for all users when delivered together with Multi-modal interchange improvements (MII). Combined with Real time public transport information (TNI), this option will encourage greater confidence in taking multi-modal journeys.

What are the economic, social and environmental impacts of this option?



What is this option? (cont'd)

Upgrades could include Disability Discrimination Act (DDA)-compliant access, platform lengthening, additional access points, greater passenger amenity and improved concourse access. DDA compliant access should be prioritised across all major interchange stations, and all proposed upgrades of any type should make provisions for DDA compliance. Platform lengthening should be prioritised at stations projected to accommodate a mixture of 6-car, 7-car and (in conjunction with the Melbourne Metro 1 project) 10-car trains.

Additional access points should be constructed where possible both into/out of the stations (taking advantage of myki-accessed automated entry gates and readers) and across their platforms. With the projected increase in passenger volumes across the network, the existing tunnels and bridges that link various platforms within each station will become severely stressed with pedestrian congestion as any new train services are added.

Passenger amenity and improved concourse access should be highly prioritised at all major interchange stations, as these features impact the satisfaction of public transport customers. In particular the amenities and spaces within the concourses (including basic real-time information, clear wayfinding, and supporting features such as cafes, newsstands and ad hoc public spaces) represent the interface of the public transport network with the surrounding community, and should be enhanced wherever possible with emphasis on the network's busiest interchange stations.

Footscray and North Melbourne stations also experience high passenger volumes and interchanges. However, with recent station re-builds, these stations are not considered to be high priorities for upgrade.

Risks and opportunities

This option would require construction on an active rail corridor at stations with large numbers of people, however these risks are assumed to be managed during the planning phase.

By upgrading interchange stations, this may allow more efficient use of the public transport network and reduce congestion on connecting services.

Funding


Should government choose to pursue this program, it will then need to consider funding options. Below is a range of potential funding mechanisms which could be examined to help fund the program.

Potential funding mechanisms

General government revenue	User charges	Beneficiary charges	Property development	Asset sales
✓	✓		✓	

General government revenue is likely to continue to be a major source of funding for programs like metropolitan rail station interchange upgrades, as the benefits are shared by public transport users from across Victoria who use these interchanges.

Property development could also be considered, for example, selling or leasing land and air rights surplus to government requirements at train station sites for commercial, residential or retail development. In particular, opportunities at Richmond, South Yarra and Caulfield train stations could be investigated as part of any upgrade. Property development can assist in putting underutilised government land and space to higher and better uses, creating added value through improved amenity and access to services. This has been done before at Glen Waverley Station, where \$1.8 million in proceeds from the sale of a development site was reinvested in upgrading the station and station precinct.



Existing user charges (public transport fares) should continue to be charged but are only expected to cover a portion of ongoing operating costs.

Infrastructure Victoria is examining transport network pricing as part of our research program. We think that the primary objective of a transport network pricing regime – where users pay to access and use the transport network – should be to manage demand, rather than to recover costs for infrastructure. We are focusing on examining road pricing regimes in metropolitan Melbourne as a first step towards a comprehensive transport network pricing regime that includes roads and public transport. Careful consideration must be given to the design of the regime to ensure it is efficient, fair and sustainable.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then we have clarified the recommendation is inclusive of central city stations such as Southern Cross.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Public Transport Victoria, *Network development plan: Metropolitan rail*, 2012

Victorian Department of Economic Development, Jobs, Transport and Resources, *Melbourne Metro business case*, 2016

Employment centre mass transit network MTN

Option type

New assets

Location

Melbourne

Sector

Transport

Certainty of evidence

Low

Direct option cost

\$1 billion–\$3 billion

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 11: Improve access to middle and outer metropolitan major employment centres

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Deliver a mass transit public transport system tailored for each employment centre (with mode, frequency and design based on employment and population growth) that complements the existing heavy rail system them (further detail in *What is this option? cont'd*).

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive. This option was recommended by the regional citizen jury.

What do we think of this option and why?

This option was recommended in the strategy (ref. 11.5.4) for delivery over 15 years because improving public transport access has a key role to play in supporting the development of major employment centres. Our assessment is that the Monash, Latrobe and Sunshine National Employment Clusters (NECs) should be early priorities given their existing scale and potential for growth in the short-term. The option will also facilitate the growth of metropolitan activity centres like Box Hill and Footscray.

While improved bus services in particular are likely to play a significant role across these centres, the specific nature of the transport solution needed for each centre will be dependent on their particular circumstances. In the additional notes section we provide further detail on what these particular solutions for each major employment centre could look like.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

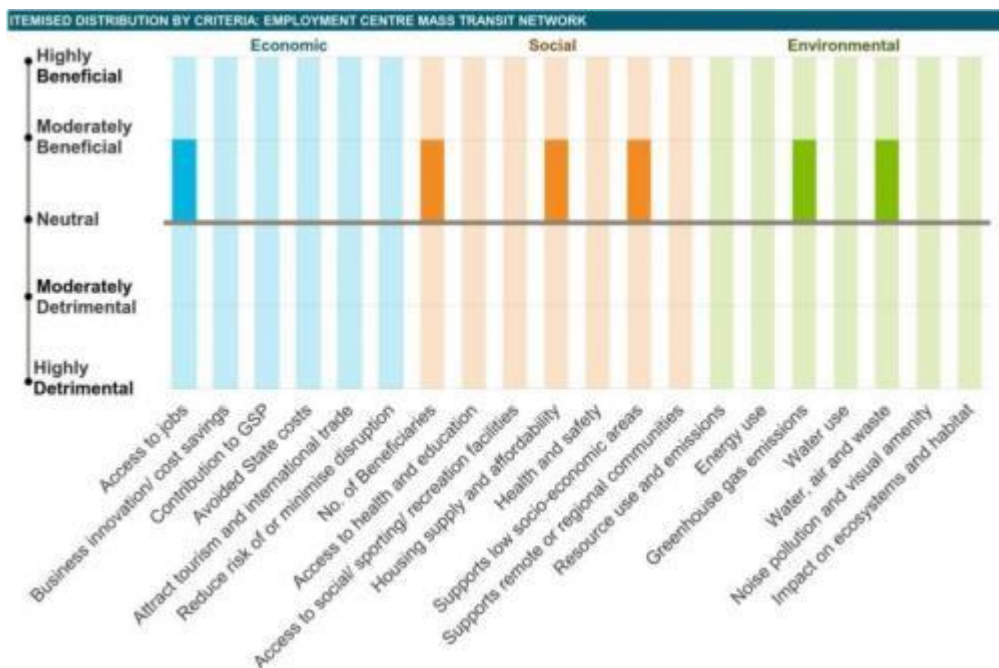
How does this option perform under different scenarios?

Supercity	++	Supports mode shift to address congestion
Westside Story	+	Supports mode shift to address congestion
Regional Cities	+	Supports mode shift to address congestion
Accelerated Climate Change /Mitigation	+	Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	-	Less demand for mass transit
Biosecurity Threat	Neutral	

How does this option work with others?

This option can be complemented by Road space allocation changes (RSA). This option could also be partnered with Employment outside central city incentivisation (EOC), which may potentially encourage greater agglomeration of employment centres in middle and outer areas that would warrant mass transit.

What are the economic, social and environmental impacts of this option?



What is this option? (cont'd)

Potential examples could include:

- Monash: Light rail or Bus Rapid Transit (BRT) along North/Wellington Road connecting the Sandringham, Frankston, Dandenong and (potentially) Belgrave heavy rail lines, and north-south links between Monash and other existing trunk lines (strengths: availability of road space, proximity to the major destination of Monash University; challenges: low-rise dispersed development character)
- Dandenong South: Light rail or BRT connecting the Frankston, and Dandenong and Belgrave heavy rail lines (strengths: availability of road space; challenges: low-rise development character)
- Latrobe: BRT connecting the South Morang, Hurstbridge, and Upfield and Craigieburn heavy rail lines (strengths: availability of road space; challenges: low-rise dispersed development that is not necessarily conducive to pedestrian activity, e.g. warehouses and other large structures)
- Sunshine: BRT connecting the Werribee, Sunbury and Craigieburn heavy rail lines (strengths: proximity to rail lines/stations, high growth potential; challenges: dispersal of employment clusters)
- East Werribee: BRT connecting the Werribee, RRL, and Sunbury and Craigieburn heavy rail lines (strengths: lineal distribution of development, proximity to rail lines/stations; challenges: wide spacing between structures, lack of pedestrian provisions off Old Geelong Road).
- Parkville: Improve east-west service provision (especially highly accessible connections to the hospital from the Victoria Parade tram corridor). Melbourne Airport: BRT connecting Sunbury, Craigieburn and Upfield heavy rail lines (strengths: good freeway access; challenges dispersal of employment outside of the terminal).

The delivery should be staggered to account for the relative stage of development of individual centres.

Risks and opportunities

There is a risk that the new services may not be supported without sufficient promotional coverage. Providing new transport links with very low passenger numbers takes services away from other locations that may have a greater need.

An opportunity exists to coordinate new bus and tram networks with train timetabling changes. This coordination would support more efficient journeys for passengers from their home to their destination.

Funding

Should government choose to pursue this program, it will then need to consider funding options. Below is a range of potential funding mechanisms which could be examined to help fund the program.

Potential funding mechanisms

General government revenue	User charges	Beneficiary charges	Property development	Asset sales
✓	✓	✓	✓	

General government revenue is likely to be a major funding source for programs like employment centre mass transit network, particularly where it provides a public and economic benefit with increased capacity across large parts of the metropolitan public transport network.

Beneficiary charges could also be considered if there is a substantial uplift in land values through increased access to transport and travel time savings. A betterment levy could be considered on commercial and/or residential properties in a defined catchment where there is a significant increase in property values in the vicinity of new major public transport

nodes. Developer contributions from new development occurring near new major public transport nodes could also be considered.

Property development could also be considered, for example, selling or leasing land and air rights surplus to government requirements at new major public transport nodes for commercial, residential or retail development. Property development can assist in putting underutilised government land and space to higher and better uses, creating added value through improved amenity and access to services. This has been done before at Melbourne Central and Southern Cross train stations.

Existing user charges (public transport fares) should continue to be charged but are only expected to cover a portion of ongoing operating costs.

Infrastructure Victoria is examining transport network pricing as part of our research program. We think that the primary objective of a transport network pricing regime – where users pay to access and use the transport network – should be to manage demand, rather than to recover costs for infrastructure. We are focusing on examining road pricing regimes in metropolitan Melbourne as a first step towards a comprehensive transport network pricing regime that includes roads and public transport. Careful consideration must be given to the design of the regime to ensure it is efficient, fair and sustainable.

Additional notes

Next steps

Consideration will need to be given to the capacity of the road network and road space allocation for buses for the proposed new bus rapid transit routes.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Stanley, J and Brain, P, *Investing in Melbourne's National Employment Clusters*, 2016

Victorian Department of Environment, Land, Water and Planning, *Plan Melbourne refresh discussion paper*, 2015

New port NCP

Option type

New assets

Location

Melbourne southern or western subregion

Sector

Transport

Certainty of evidence

Low

Direct option cost

>\$10 billion

Option lead time

10-15 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 13: Improve the efficiency of freight supply chains

Low	Low	Moderate	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

Need 19: Improve the resilience of critical infrastructure

Moderate	Moderate	Moderate	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Construction of a new port to complement the Port of Melbourne and meet international demand for commercial shipping of containers and cargo to and from Victoria. This includes securing land, sea and transport access corridors to any site.

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive. Both citizen juries made recommendations in support of this option.

What do we think of this option and why?

The strategy does not include a recommendation related to the timing or location of a new port (even though this was an option considered during consultation), as government has specifically asked Infrastructure Victoria to provide advice on these matters by May 2017.

The decision to actually proceed with a second container port is unlikely to be required for some time, and it will be important for government to understand the triggers and lead-times associated with developing a second port. Keeping options open for longer can incur some costs, but there are also big costs, and many risks, associated with making the decision prematurely. Making a decision on incomplete information risks getting the decision wrong, which would have significant negative consequences for the economy, environment and society.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

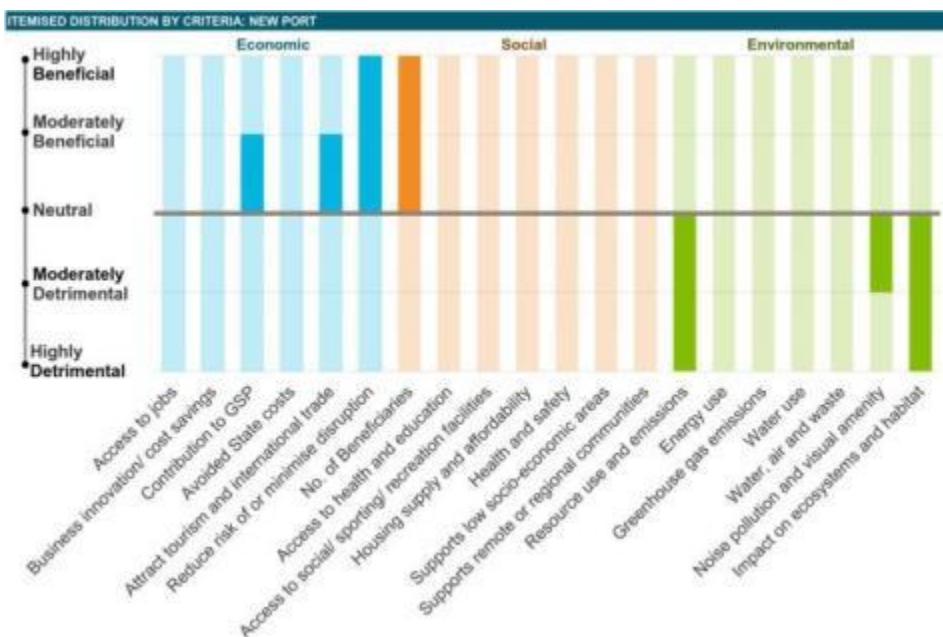
How does this option work with others?

Ports are an important component of freight supply chains, and a new port will interact with other aspects of the supply chain, such as land side transport infrastructure (e.g. road and rail), intermodal terminals and distribution centres, and, depending on the port location, increasing the role and importance of some of these assets and reducing that of others. The location of a new port is also likely to have significant land use, and particularly city-shaping, impacts.

How does this option perform under different scenarios?

Supercity	+	Addresses increased freight demand
Westside Story	+	Addresses increased freight demand
Regional Cities	+	Addresses increased freight demand
Accelerated Climate Change /Mitigation	Neutral	
Prolonged/ Severe Economic Downturn	Neutral	
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?





Risks and opportunities

There is uncertainty regarding the timing of when a new container port would be required, and its optimal location. Securing Victoria's long-term port capacity and ensuring it is available when required is important for the continued growth of Victoria's economy.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

New or expanded forensic mental health facility

NEF

Option type

Incremental expansion of existing assets

New assets

Location

Statewide

Sector

Health and human services

Justice and emergency services

Certainty of evidence

Low

Direct option cost

\$750 million–\$1 billion

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 3: Respond to increasing pressures on health infrastructure, particularly due to ageing

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

Need 8: Address increasing demand on the justice system

Significant	Significant	Significant	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

New or expanded secure forensic mental health facilities are proposed, to respond to the immediate shortfall in supply of places and provide for an increase in demand to service the growing prison population over a 30-year period. Secure forensic mental health facilities in Victoria are currently provided at one facility, the Thomas Embling Hospital, which was opened in 2000. The hospital currently houses 116 patients and has been funded to increase its capacity to 124 patients. The facility accommodates people with a mental illness who are judged unfit to be tried under the *Crimes (Mental Impairment and Unfitness to be Tried) Act 1997* and prisoners from the justice system that require specialised or involuntary mental health treatment. It is proposed to expand the existing facility or provide new facilities to meet demand and address the needs of different patient cohorts (further detail in *What is this option? cont'd*).

What is the level of community support?

There was limited discussion of this option during public consultation.

What do we think of this option and why?

This option was recommended in the strategy (ref. 3.3.1 and 8.3.3) because there is a current shortfall in forensic mental health facilities in Victoria. The Commonwealth Senate select committee on mental health report in 2006 noted that when the Thomas Embling facility opened in 2000, it was designed to support a forecast peak prison population of 2,500 prisoners, far less than the existing prison population of 6,219 at June 2015. The state has provided an increased number of mental health services within the prison system since this time; however it is neither clinically appropriate nor legal for the Thomas Embling Hospital patient cohort to be treated within a prison. In 2014, the Victorian Auditor-General found significant growth (over 50 per cent) over five years of the number of male prisoners with a psychiatric condition requiring treatment. While important planning work needs to occur as a first step, new or expanded facilities are recommended for delivery within 5-10 years.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

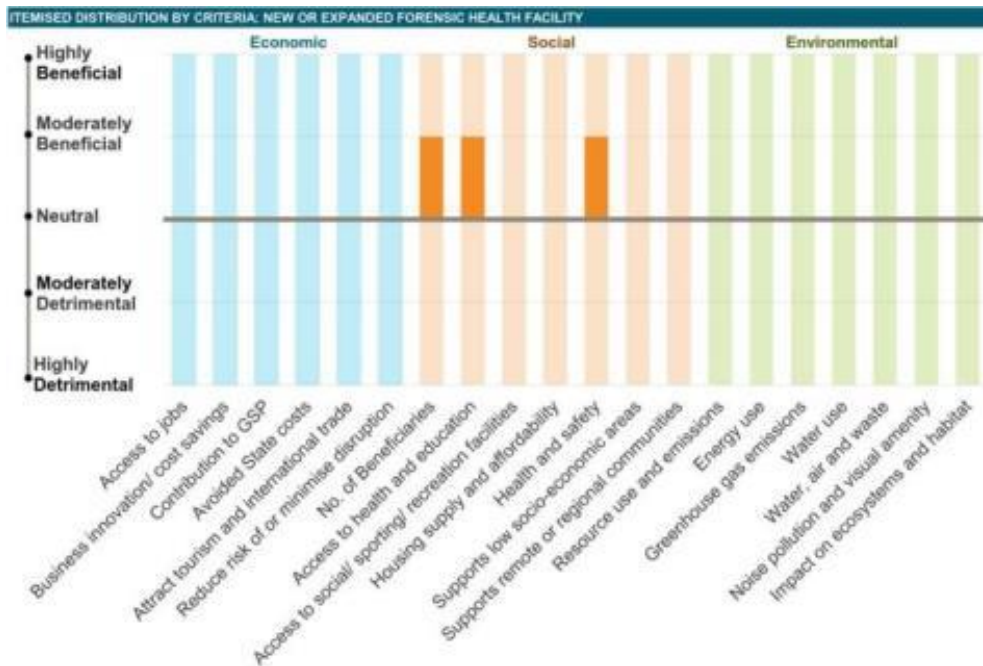
How does this option perform under different scenarios?

Supercity	+	Reflecting population growth
Westside Story	+	Reflecting population growth
Regional Cities	+	Reflecting population growth
Accelerated Climate Change /Mitigation	+	Reflecting increased levels of community stress
Prolonged/ Severe Economic Downturn	+	Reflecting increased levels of community stress
Biosecurity Threat	Neutral	

How does this option work with others?

This option is likely to take pressure of prison populations (NMP and NWP) and therefore could defer demand for new prisons.

What are the economic, social and environmental impacts of this option?



Commentary:

This option has strong benefits for access to health for a small but extremely high needs sub-set of the Victorian community. Increasing capacity for appropriate care of high needs patients is likely to relieve pressure on other mental health services and on justice services.

What is this option? (cont'd)

The shortfall of secure forensic health beds in Victoria is further evidenced by the wait times experienced by patients requiring access to existing beds. The Victorian Auditor-General (2014) noted that there are significant wait times for prisoners to be transferred to the hospital for involuntary treatment which cannot be provided in prisons. The average time prisoners in the Acute Assessment Unit at the Melbourne Assessment Prison are waiting to be admitted for compulsory treatment has increased from 5.3 days in 2009-10 to 22.2 days in 2013-14. The report also noted that in June 2014, over 50 per cent of patients in the Acute Assessment Unit at the Melbourne Assessment Prison were waiting for admission to Thomas Embling Hospital.

Thomas Embling hospital provides involuntary treatment of prisoners with mental illness, as under mental health legislation Victorian prisons are not able to undertake such treatment. The legislation contained in the mental health act has been put in place to provide a separation of custodial and treatment requirements.

The cost included in this option allows for the construction and maintenance of the facilities, but not for the health services that would be operated from them.

Risks and opportunities

In addition to just providing additional beds to meet increased demand, consideration could also be given to providing additional new services to improve patient outcomes, through addressing the needs of different patient cohorts and levels of security. Cohorts to be considered include women, youth, the aged and forensic patients within the community.

This option could be implemented as part of wider policy reform and coordination of services to support Victorians experiencing mental illness outside of the justice system, with the aim of reducing growth in demand for forensic health services.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then we have refined the recommendation to highlight the importance of cohort planning and security considerations in response to stakeholder feedback.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Commonwealth of Australia, *A national approach to mental health: From crisis to community, first report*, 2006

Forensicare, *Forensicare: Strategic plan 2015–2017*, 2015

Victorian Auditor-General, *Mental health strategies for the justice system*, 2014

North East Link NEL

Option type

New assets

Location

Melbourne north–south orbital state-significant transport corridor

Sector

Transport

Certainty of evidence

Medium

Direct option cost

\$5 billion–\$10 billion

Option lead time

5–10 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 11: Improve access to middle and outer metropolitan major employment centres

Low	Low	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

Need 13: Improve the efficiency of freight supply chains

Moderate	Moderate	Significant	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Construction of the North-East motorway Link between the eastern freeway and the M80 to improve outer north-south links for road freight movement and improve travel time and reliability. Multiple possible corridors have been identified, and tunnelling could be required.

What is the level of community support?

There was a high level of discussion of this option during consultation. Responses were generally positive. This option was recommended by the regional citizen jury, but the metropolitan jury had mixed views.

What do we think of this option and why?

This option was recommended in the strategy (ref. 11.5.6 and 13.5.2) for implementation in 10-15 years because it will make a significant contribution to improving freight flows (Need 13) and a moderate contribution to accessing middle and outer metropolitan employment centres. Transport modelling has shown that connecting the M80 and Eastlink to form a more complete ring road in Melbourne can provide a relatively good level of relief to the road network across all regions, as well as improving freight reliability and travel times. The North East Link provides improved access through some of the most congested parts of the road network, including to the CBD, and potentially, depending on the alignment, to the Latrobe National Employment Cluster. Evidence supports proceeding in the medium term, largely supporting existing land uses.

The value of this link in extending the M80 ring road could also increase once automated vehicles are deployed (ACT, DFV), in that it could enable faster and more reliable travel times for a greater number of vehicles on this orbital corridor (further detail in *What do we think of this option and why? cont'd*).

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

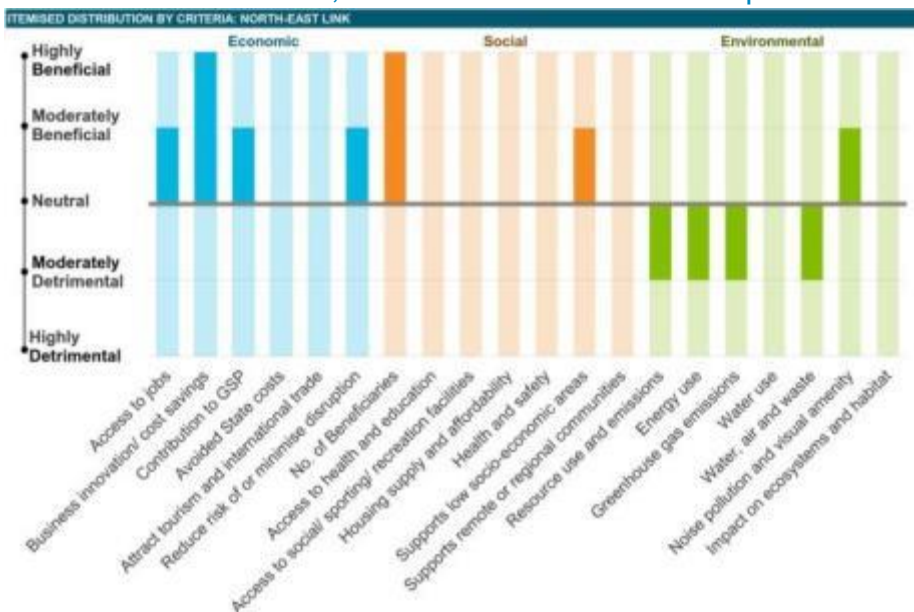
How does this option work with others?

This option could be complemented with transport network pricing (TNP) and advanced traffic management (ATM) to manage any potential induced travel impacts, or those options could be an alternative to this one. Other options which could be potential alternatives include the Eastern Freeway to CityLink Connection and driverless vehicles. This option could have a range of other relationships, including with a second port.

How does this option perform under different scenarios?

Supercity	++	Increases access, reduces localised congestion
Westside Story	+	Improves cross-city travel from more complete ring road
Regional Cities	+	Increases access, reduces localised congestion
Accelerated Climate Change /Mitigation	Potentially negative	Particularly if demand not managed
Prolonged/ Severe Economic Downturn	-	Less demand for heavy freight
Biosecurity Threat	Neutral	
Bay West	+	Additional freeways assist in freight movement
Hastings	++	Significant enhancement of access for exporters to Hastings

What are the economic, social and environmental impacts of this option?



What do we think of this option and why? (cont'd)

This option provides the opportunity to attract trucks to the freeway standard road and away from local roads. This could be further enhanced through the use of truck curfews after the option is delivered, which could improve community amenity.

This option could enable increased truck mass limits and therefore productivity improvements for freight connecting between the logistics and warehouse precincts in the north of Melbourne with the south-eastern suburbs of Melbourne and to the Hume Highway.

This option would connect the less developed north of Melbourne with the more developed south-eastern areas with freeway-standard connection. This could enable improvement of community, employment and economic outcomes.

In terms of the scale of impact, NEL will provide freeway-standard connection for more than 100,000 vehicles per day indicating it has the potential to be one of the most significant single new infrastructure investments.

The use of automated vehicles (ACT, DFV) could further enhance the benefits of this option, as this could enable faster and more reliable travel times for a greater number of vehicles on this orbital corridor.

To maximise the long-term value of this option it could also be complemented with advanced traffic management (ATM) and transport network pricing (TNP).

Risks and opportunities

There are risks with establishing this new link through built up areas and parklands that may require land acquisition and potential new tunnels. This can lead to project delays and cost overruns.

Construction of this new road link provides the opportunity to extend the managed motorway system. This can reduce congestion and improve travel times.

Funding

Should government choose to pursue this project, it will then need to consider funding options. Below is a range of potential funding mechanisms which could be examined to help fund the project.

Potential funding mechanisms

General government revenue	User charges	Beneficiary charges	Property development	Asset sales
✓	✓	✓		

Funding for projects like North East Link (NEL) should include user charges as those who use it will be direct beneficiaries of the new asset. These user charges could be applied as part of a broader transport network pricing regime, or ahead of such a reform, tolls could be charged. Contracting terms for any new tolls should consider favouring flexibility to allow for a transition to an integrated transport network pricing regime.

Infrastructure Victoria is examining transport network pricing as part of our research program. We think that the primary objective of a transport network pricing regime – where users pay to access and use the transport network – should be to manage demand, rather than to recover costs for infrastructure. We are focusing on examining road pricing regimes in metropolitan Melbourne as a first step towards a comprehensive transport network pricing regime that includes roads and public transport. Careful consideration must be given to the design of the regime to ensure it is efficient, fair and sustainable.

Investing in major road links such as NEL can also have a significant impact on land values in the vicinity of the project arising from improved transport accessibility and travel time savings. This means residents and commercial land holders

benefit from the new road whether or not they use it. Charging betterment levies to capture a portion of the benefits that accrue to these indirect beneficiaries could occur following investigations to clarify whether those indirect beneficiaries in established areas experience significant uplift in land value.

Beneficiary charges seek to capture indirect benefits, while user charges seek to capture direct benefits by aligning the cost of infrastructure with those that use it. If betterment levies and user charges are both considered by government, it should ensure that new charges do not unfairly duplicate each other or any existing charges.

General government revenue may still be needed to contribute to funding based on the broader community and economic benefits delivered by the project.

Additional notes

Transport modelling and economic analysis

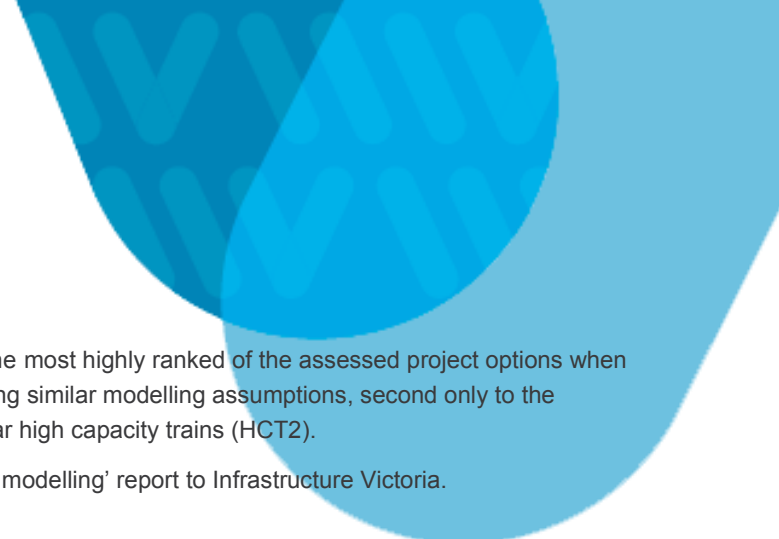
Infrastructure Victoria commissioned KPMG, Jacobs and Arup to undertake transport modelling for a number of options being considered for the strategy, including a variety of 'build' and 'non-build' transport options. This allowed major transport projects to be quantitatively assessed alongside several technology, policy and reform options. In addition, economic analysis was undertaken for the 'build' options to estimate a cost benefit ratio, including for this option. The options were modelled individually, mostly on a standalone basis, with a number of options then also tested in various combinations.

This analysis was undertaken on a different basis and produced different results to what is presented throughout the options book, which was prepared by AECOM/PWC with the intention of allowing a mixture of qualitative and quantitative assessment across the full range of options, across all sectors and needs. While on the face of it these two analyses reference similar metrics, different assumptions and methodologies have been applied. In particular, the KPMG/Jacobs/Arup assessment provided purely relative ratings of each option's contribution to the needs, with the ratings scale set by the performance of only the select range of options modelled. This had the result of showing some transport options as making a "high" contribution to Need 18 (transition to lower carbon energy supply and use) simply because they were the highest of the options modelled; however, in Infrastructure Victoria's judgement most transport sector options will make a much lower contribution than energy sector options, as transport comprises a much smaller proportion of total carbon emissions. It provides a useful assessment for sorting the relative contribution of the options modelled, but should not be taken as an absolute assessment. In contrast, the assessments developed in the AECOM/PwC assessment considered the full range of options identified for each need and provided more of an 'absolute' assessment.

With these caveats in mind, however, the results of this alternative analysis are helpful inputs into Infrastructure Victoria's 'global' assessment, and in preparing the strategy we have come to a considered view based on the totality of evidence available to us.

In terms of the KPMG/Jacobs/Arup analysis of this option, transport modelling indicates that the North East Link is projected to provide a relatively good level of relief to the road network across all regions and improve travel times to the CBD. The modelling reveals the impact of connecting the M80 and Eastlink to form a more complete ring road in Melbourne. It increases traffic on both the Metropolitan Ring Road and Eastlink, as one would expect, but also reduces traffic on the Tullamarine freeway and CityLink, as well as on a number of arterial roads in the north. While it does also result in a small increase in car trips and a reduction in public transport trips across the network, the modelling indicates that the total time spent travelling on the road network reduces with the project.

The preliminary cost benefit ratio for North East Link ranges from 1.4 - 2.1 without wider economic benefits (WEBs), and 2.2 - 3.1 when WEBs are included. Even where upper bound costs are used, WEBs are not included and complementary upgrades to the Eastern Freeway and M80 are excluded, the preliminary cost benefit result is 1.2. While this analysis is preliminary and not to a business case level of assessment, it suggests the North East Link is an economically viable



project and worthy of detailed economic assessment. It was the most highly ranked of the assessed project options when WEBS were included, and in terms of analysis undertaken using similar modelling assumptions, second only to the combined result of Melton rail electrification (MRE1) and 10 car high capacity trains (HCT2).

For more detail, consult the 'Economic appraisal and demand modelling' report to Infrastructure Victoria.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

KPMG/Arup/Jacobs, *Economic appraisal and demand modelling*, 2016



Northern metropolitan corridor health service expansion NHE

*Option NHE is addressed in HIM - Health service
modernisation and expansion*

New or expanded men's prison NMP

Option type

New assets

Location

Statewide

Sector

Justice and emergency services

Certainty of evidence

Medium

Direct option cost

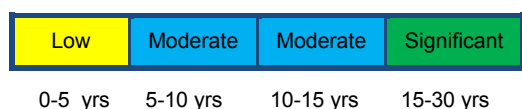
\$1 billion–\$3 billion

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 8: Address increasing demand on the justice system



What is this option?

This option would deliver new capacity for male prisoners through the construction of a new men's prison or the expansion of an existing men's prison. This would seek to accommodate the increased demand on the prison system.

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option was recommended in part in the strategy (ref. 8.3.1) because we believe that while Ravenhall (when opened in 2017) will provide capacity into the short to medium term, there is good reason to plan for uncertainty by choosing a site for a future prison. The growth in unsentenced prisoners in the system has recently been raised as an issue by the Sentencing Advisory Council. This is putting additional pressure on capacity. We also understand there is considerable complexity in siting a new prison – with transport access for employees and visitors two important aspects. We will monitor the prison population for future Infrastructure Victoria strategy updates in light of the government's ability to influence prisoner numbers through policy and service delivery changes (including through implementation of integrated justice and human services option JCS).

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

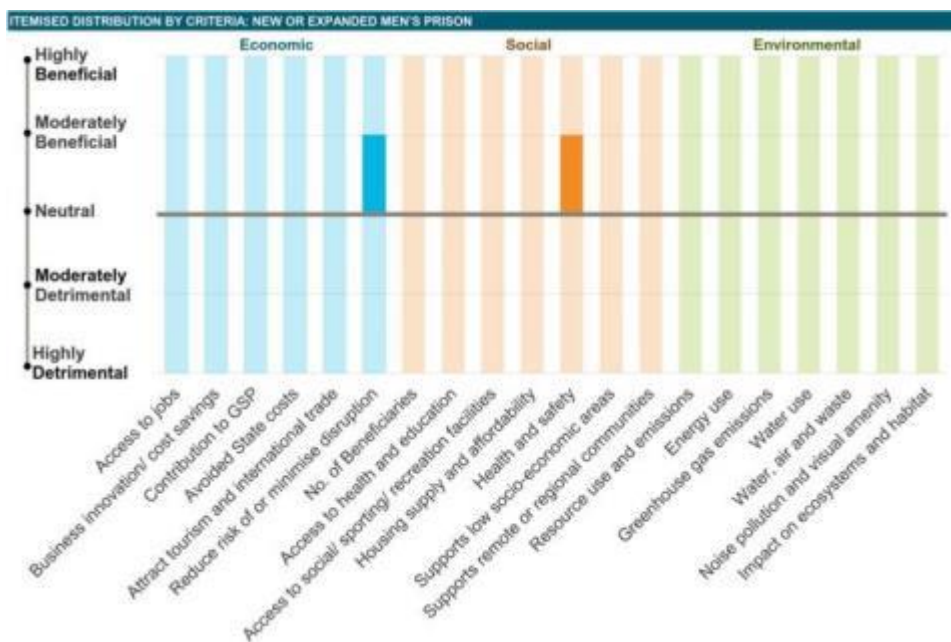
How does this option work with others?

The options which seek to drive greater preventative focus on justice services by integrating with human services (JCS) and more proactive and responsive policing (MPW) operating out of modern integrated facilities (PSS) could defer the need for this option.

How does this option perform under different scenarios?

Supercity	+	Increased demand for justice services
Westside Story	+	Increased demand for justice services
Regional Cities	+	Increased demand for justice services
Accelerated Climate Change /Mitigation	Neutral	
Prolonged/ Severe Economic Downturn	+	Increased demand for justice services
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



Risks and opportunities

There is a risk that with any additional capacity (before it is required) to accommodate prisoners, the focus of the justice system will shift to incarceration of offenders rather than their rehabilitation.

However, with the development of a new prison comes the opportunity to implement new rehabilitation strategies to reduce prisoner recidivism.

Additional notes

Changes to recommendations from the draft strategy

This option was not recommended in the draft strategy. Since then we have included a new recommendation on planning for future prisons. While we don't anticipate this will be an issue over the short to medium term; government policy and legislative choices, including the provision of additional police resources, change year to year and contribute significantly to prison demand. Given the difficulty of siting for future prisons, we have included this recommendation to help manage this uncertainty.

Youth justice

In planning future sites for custodial facilities, consideration should also be given to the condition of, and demand for, youth justice custodial facilities. The 2010 Victorian Ombudsman's *Investigation into Conditions at the Melbourne Youth Justice Precinct* found that the design and location of the Parkville Youth Justice Precinct was inappropriate for a custodial facility which houses vulnerable children. The Ombudsman was of the view the only practical way to address the conditions at the precinct in the longer term was to develop a new facility at another site. The Ombudsman's recommendations were accepted by the Department, which undertook to develop options that can be considered by Government to address issues relating to the suitability and capacity of the existing youth justice centres. The Parkville and Malmsbury Youth Justice Precinct currently remain Victoria's youth justice custodial facilities. The Commission for Children and Young People is currently undertaking an inquiry which will consider issues including the suitability of current youth justice custodial infrastructure. We will monitor the condition and demand for youth justice custodial facilities in future strategies in light of ongoing reviews.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Australian Bureau of Statistics, *Prisoners in Australia, 2015*, catalogue number 4517.0

Minister for Corrections, *Work begins on Victoria's newest prison*, 2015

Sentencing Advisory Council, *Victoria's Prison Population 2005 to 2016*, 2016

Victorian Department of Justice and Regulation, *Corrections, prisons and parole*, 2016

Victorian Department of Justice and Regulation, *Criminal justice system forecasting model*, 2016

Victorian Department of Justice and Regulation, *The Project: Ravenhall prison project*, 2016

Victorian Ombudsman, *Investigation into the rehabilitation and reintegration of prisoners in Victoria Discussion Paper*, 2014

Victorian Ombudsman, *Whistleblowers Protection Act 2001 Investigation into conditions at the Melbourne Youth Justice Precinct*, 2010

National park access management NPA

Option type

Better use through information

Location

Statewide

Sector

Science, agriculture and environment

Certainty of evidence

Low

Evidence base

Not determined

Direct option cost

Not determined

Contribution to meeting the need

Likely to contribute to:

Need 16. Help preserve natural environments and minimise biodiversity loss

What is this option?

This option considers using non-price related mechanisms to manage access to national parks in areas experiencing or likely to experience environmental pressures. Limiting access will allow for environmental recovery and assist to minimise biodiversity impacts where this is occurring. Examples may be partial access to park areas or use of ballot systems during peak visitor periods.

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option was not recommended in the strategy because this is a tool already deployed by park managers to manage access. This option was explored to consider the non-pricing tools to manage access to parks, particularly in areas of vulnerability. Non-price related approaches can also lead to more positive community engagement on alternative ways of managing park areas for the longer term, and help to build awareness of environmental needs.

Nuclear plant construction NPC

Option type

New assets

Location

Statewide

Sector

Energy

Certainty of evidence

Medium

Direct option cost

\$5 billion–\$10 billion

Option lead time

5–10 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 18: Transition to low carbon energy supply and use

Significant	Significant	Significant	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Adoption of nuclear technology for energy supply in Victoria. This would provide a near zero emissions technology. Adopting nuclear power could supplement majority of the state's brown coal power generation. Large capital investments, robust and comprehensive planning and prolonged government and public consultation would however be required. Extensive risk mitigation efforts would be required to implement nuclear technology. Nuclear power plants are currently being used in some countries. There are many positive examples of the technology being used without incident, but there have also been some very high profile disasters. The use of nuclear power is currently prohibited under Australian law.

What is the level of community support?

The public are wary of the risks related to radiation and radioactive waste. This option was opposed by the metropolitan citizen jury.

What do we think of this option and why?

This option was not recommended in the strategy because recent studies indicate that large-scale nuclear technology may not be cost effective in the Australian context and may require prohibitive lead times. Nuclear power can provide significant amounts of low emissions energy including baseload. Recent in-depth assessment of this technology for application in South Australia however indicates that the lead times required to implement this technology, and its cost effectiveness, are major hindrances. Adoption of nuclear power draws strong reactions, mostly negative, from the community with legitimate concerns about safety and security. This option was not recommended because over the 30-year time-frame it did not seem practical. We recognise however that technological change, particularly in the development of smaller-scale nuclear facilities, may lead to revision of the feasibility of this option in the medium to long term. In that case significant effort may still be required to develop community consensus.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Not consistent	Strategy supports low emission energy
Plan Melbourne refresh 2015	Not consistent	Strategy supports low emission energy
Regional Growth Plans	Not consistent	Strategy supports low emission energy

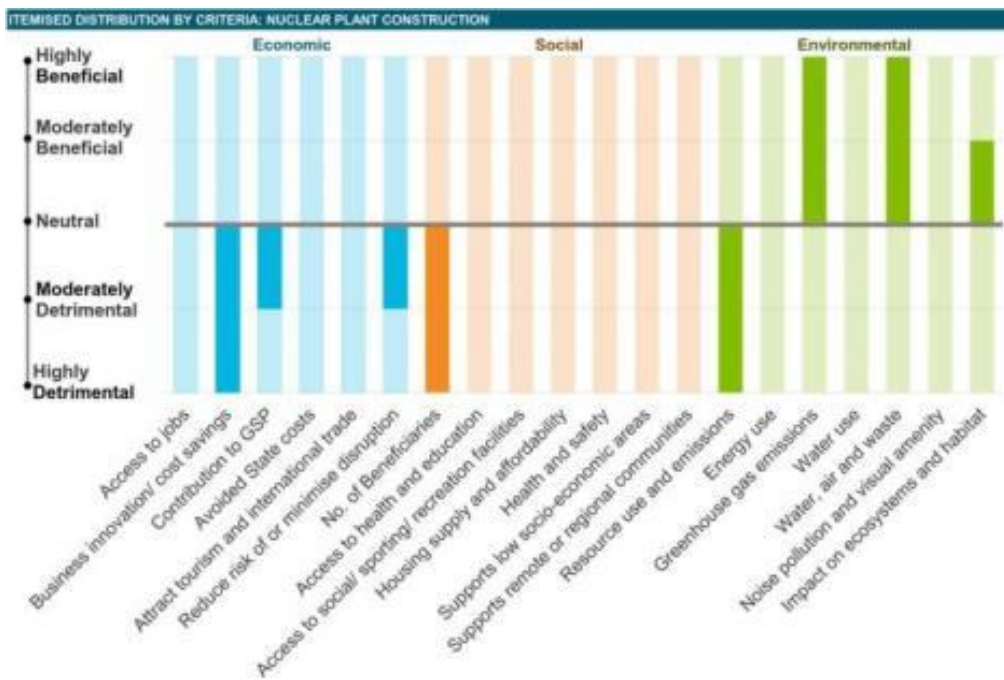
How does this option work with others?

No key relationships have been identified.

How does this option perform under different scenarios?

Supercity	++	Increased need for more reliable baseload supply
Westside Story	++	Increased need for more reliable baseload supply
Regional Cities	+	Increased need for more reliable baseload supply
Accelerated Climate Change /Mitigation	++	increased need to reduce carbon emissions
Prolonged/ Severe Economic Downturn	-	Less demand for energy
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



Commentary:

Modelling to support the 2016 South Australian Royal Commission Report into the Nuclear Fuel Cycle identified that large or small scale nuclear power plants could have adverse economic impacts, due to lack of commercial viability. This option is likely to be detrimental to business costs, household electricity costs, and gross state product.

Risks and opportunities

The 2016 South Australian Nuclear Fuel Cycle Royal Commission Report found that:

- Under current electricity market rules it would not be economically viable to develop a nuclear power plant in South Australia beyond 2030.
- Under a strong carbon price scenario a nuclear power plant in South Australia remained economically unviable.
- The amount of time that could be required to develop national community support, achieve legislative change, plan and build nuclear facilities could limit the impact over the 30-year timeframe considered.
- The development of competing low carbon technologies will determine the need for use of nuclear power to transition to low carbon energy and use.

There have also been three major accidents involving nuclear power stations and the release of radioactive waste – Three Mile Island (1979), Chernobyl (1986) and Fukushima Daiichi (2011). In the case of Fukushima Daiichi and Chernobyl the accidents resulted in significant ongoing contamination of surrounding areas.

While generating energy from nuclear technology is complex, safety risks can however be managed and nuclear power plants can be used to provide a continuous, or baseload, low emissions energy supply source.

Additional notes

Justification for major departures from land use plans

This option is not consistent with state planning policies that favour renewable energy supply. However, it was assessed because it offers low emissions energy generation and is relevant to meeting the need to transition to a low carbon energy supply (need 18).

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

South Australian Government, *Nuclear fuel cycle royal commission report*, 2016

United States Energy Information Administration, *Levelized cost and levelized avoided cost of new generation resources in the annual energy outlook*, 2015

Park pricing and expenditure regime

NPP1

Option type

Better use through public service delivery and approval processes

Better use through economic charging

Better use through funding agreements

Location

Statewide

Sector

Science, agriculture and environment

Cultural, civic, sporting, recreation and tourism

Certainty of evidence

Medium

Direct option cost

\$10 million–\$25 million

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 16: Help preserve natural environments and minimise biodiversity loss; and

Need 17: Improve the health of waterways and coastal areas

Low	Low	Low	Low
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0-5 yrs

5-10 yrs

10-15 yrs

15-30 yrs

What is this option?

This option focuses on delivering a pricing and expenditure regime for the management of parks across Victoria, state forests and other protected areas as well as (where possible) urban parks across Victoria. This regime would consider the value derived from the parks to determine the balance between upgrades and maintenance funded by government with revenue from park fees, levies or other means. This would assist in prioritising new parks, the maintenance of assets which are in need of repair and would also serve to set prices to manage visitor demand in areas experiencing environmental pressures. It would also provide a framework to assess outcomes from investment. This work would draw from recent studies to understand the value derived from the parks.

What is the level of community support?

There was limited to no discussion of this specific option during consultation. Users have previously reported frustration at a user pays approach to national parks.

What do we think of this option and why?

This option was recommended in the strategy (ref. 16.1.1) because we believe there is a real opportunity to develop a strong evidence base for the funding of parks across Victoria. It is clear that the provision of consistent and ongoing investment can be challenging in the face of competing expectations. In the past, environmental benefits and intrinsic values may not have been enough to make a case for investment in national parks, state forests or other protected areas. Recent work on the avoided costs to the state and the ecosystem benefits of the natural environment provides a framework to develop principles to determine clear outcomes for expenditure in this area. This work has application for parks in urban settings, where ecosystem benefits are equally important. The first step would be to account for all assets and understanding the benefits that are provided on a park-by-park basis to inform assessment of cost effective management actions underpinned by appropriate pricing, funding and expenditure. We recommend that a review of the operation and scope of the Melbourne Metropolitan Parks Charge would be an important part of this.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

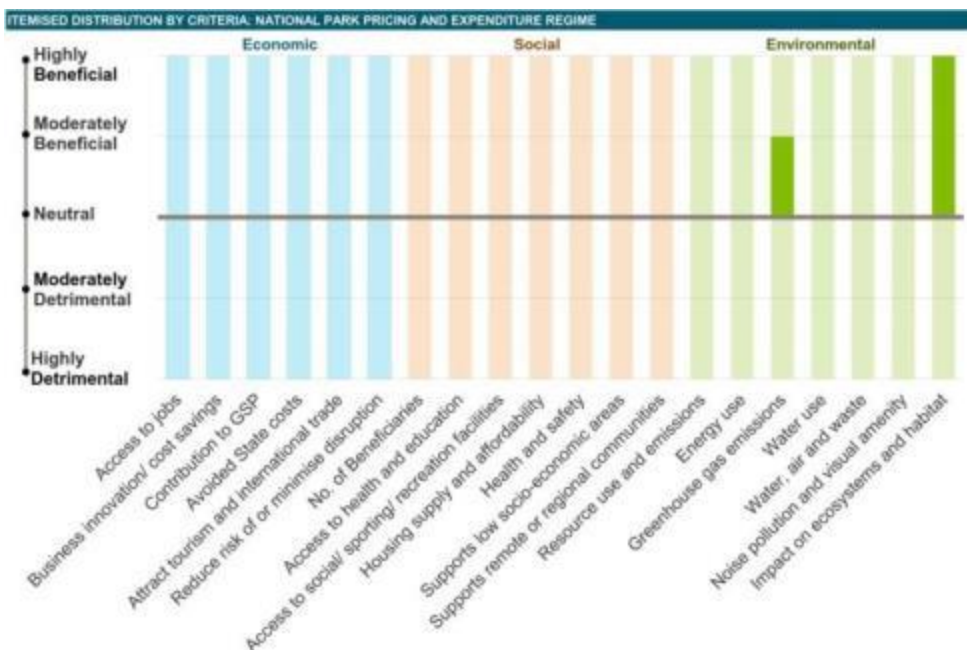
How does this option perform under different scenarios?

Supercity	+	Better able to accommodate demand
Westside Story	+	Better able to accommodate demand
Regional Cities	+	Better able to accommodate demand
Accelerated Climate Change /Mitigation	+	Promotes improves mitigation
Prolonged/ Severe Economic Downturn	Neutral	
Biosecurity Threat	+	Depends on ecosystem impact

How does this option work with others?

This option and national park asset planning (NPP2) are complementary as they both provide a fundamental funding and accountability framework. Together these options also enable greater consideration of engaging private bodies to perform conservation work (NPP2).

What are the economic, social and environmental impacts of this option?



Risks and opportunities

The ability to raise access fees would need careful thought, as it risks negative social impacts. Access to parks improves the general wellbeing of communities. If user fees were to rise as part of this option, illegal access to national parks and protected areas could increase, causing more damage to the environment.

The opportunity with this option is to enable predictable funding of maintenance for parks and the protection of natural environments. This will also enable a clearer sense of the outcomes that are anticipated from investment, as well as the costs that are avoided from the investment.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then we have updated the recommendation to signal that the regime should apply across all land management activities and have softened the reference to environmental economic accounting to be clear that it won't always be possible to ensure funding/revenue reflects all ecosystem values. We also received evidence that the operation of the Parks Charge could be improved and therefore we have highlighted this as a next step.

Change to option title

Since the draft strategy we have changed the name of this option to better align with the intent that the funding which underpins land management spans urban parks and other protected parks, like State Forests. This was missed in the naming of the option, but had been reflected correctly in the recommendation title.

Next steps

One of the areas for review is the Melbourne Metropolitan Parks Charge which has been included on the annual water, sewerage and drainage bills for residential and commercial properties since 1958. It raises around \$150 million per year. Funds raised go to Parks Victoria, Zoos Victoria, the Royal Botanic Gardens and the Shrine of Remembrance for the development, management and maintenance of metropolitan parks, gardens, trails, waterways, and zoos.

One area for review is the operation of the fund. The legally defined spend and collection boundaries do not entirely align, nor do they capture the entirety of the expanded urban growth boundary. This could mean new suburbs miss out on a funding stream for park development. Another consideration is whether there should be greater transparency in the use of this funding. In addition, consideration could be given to whether the scope of the charge could apply across Victoria more broadly.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Victorian Department of Environment, Land, Water and Planning, *Protecting Victoria's environment – Biodiversity 2036*, 2016

Victorian Department of Environment, Land, Water and Planning and Parks Victoria, *Valuing Victoria's Parks*, 2015

National park private management NPP2

Option type

Better use through contractual processes

Location

Statewide

Sector

Science, agriculture and environment

Cultural, civic, sporting, recreation and tourism

Certainty of evidence

Medium

Direct option cost

\$500 million–\$750 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 16: Help preserve natural environments and minimise biodiversity loss

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option would provide financial incentives to conservation groups and the private sector, including not-for-profit conservation organisations, in a concessional/contractor type arrangement to ensure that beneficial environmental outcomes are achieved in national parks, state forests or other protected areas. This would require the establishment of measurable performance targets, for example, improved numbers of an endangered species. This model was envisaged by Tim Flannery (in considering the Australian Wildlife Conservancy) to include public-private relationships where conservation groups or other private bodies could compete for funding to improve biodiversity outcomes.

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally negative. Landcare was notable in its support. 52 per cent of people surveyed as part of community research were supportive of private or community organisations managing national parks on the basis that it improved environmental outcomes or the quality of the amenities.

What do we think of this option and why?

This option was recommended in the strategy (ref. 16.2.2) because this option has the potential to substantially reduce further loss in Victoria's biodiversity. We know the government has established partnerships with groups like Landcare managing some significant projects with a strong volunteer base. However, we think this should be driven with greater purpose by encouraging conservation groups and the private sector to bid for longer-term projects, particularly where a specific target (like improved numbers of an endangered species) is sought. If appropriate, contractual arrangements would need to be implemented, including the requirement to quantify existing levels of biodiversity and report on progress over time, with clear targets.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

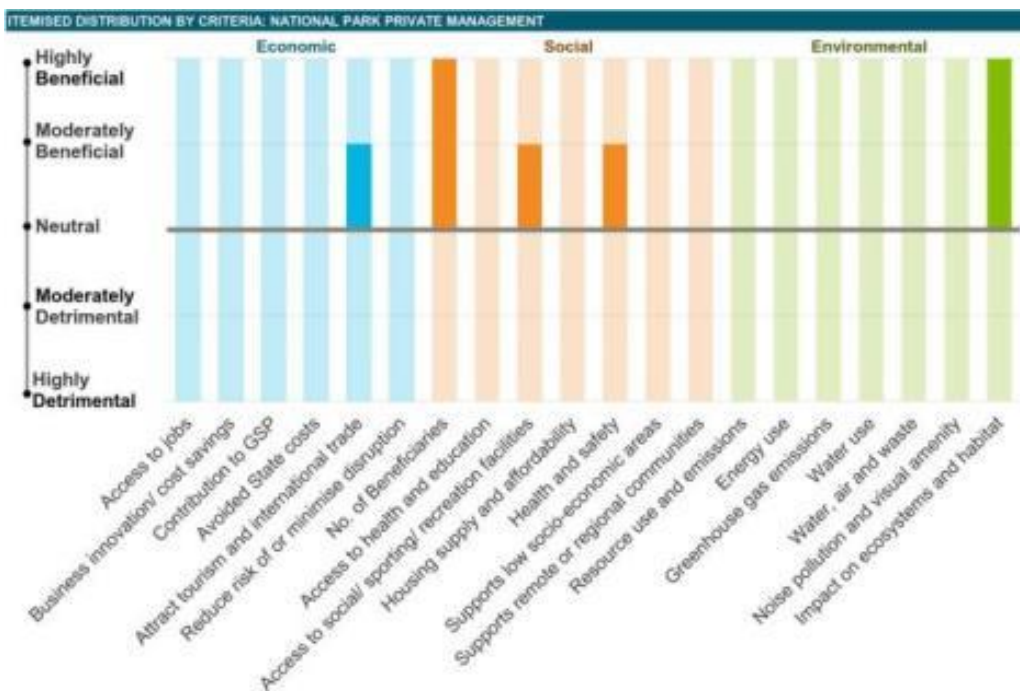
How does this option perform under different scenarios?

Supercity	Neutral	
Westside Story	Neutral	
Regional Cities	Neutral	
Accelerated Climate Change /Mitigation	++	Leverages innovation to address pressure on biodiversity
Prolonged/ Severe Economic Downturn	Neutral	
Biosecurity Threat	+	Depends on ecosystem impact

How does this option work with others?

This option is complementary, and in some ways enabled, by a better framework for the funding (NPP1) and governance (NPP3) of national parks, state forests and other protected areas. This option could also provide new governance approaches for the development and management of new habitat corridors (HCL).

What are the economic, social and environmental impacts of this option?



Commentary:

If private managers are able to improve the quality of services and facilities offered by parks without increasing access fees, this option may improve health and safety.

Risks and opportunities

The risk with this option is that public perceptions of privatisation would affect implementation, and even dampen market interest from conservation businesses. As national parks, state forests and other protected areas are managed for multiple outcomes (such as management of bushfire for public safety), any arrangement would need to take into account the full suite of management issues.

The opportunities include the ability for innovation to drive biodiversity outcomes, which could lead to research and innovation opportunities and export of knowledge.

Additional notes

Case study: Australian Wildlife Conservancy

The Australian Wildlife Conservancy (AWC) is Australia's largest private owner of land for conservation with over 3.25 million hectares across the Kimberley, Cape York, Lake Eyre and the Top End. AWC has adopted a new model for conservation by establishing sanctuaries by acquiring land and through partnerships with landholders and using a strong scientific base to undertake land management including feral animal control and fire management. It has delivered strong results across its estate, and boasts a strong scientific workforce with minimal administrative costs in comparison to its operational budget.

Case study: Western Sydney Parklands Trust

Western Sydney Parklands Trust is an innovative approach to the progressive expansion and ongoing management of bushland corridor in Western Sydney. Currently, the Trust is managing 1000 hectares of bush and aims to double this to 2000 hectares by adding 33 hectares annually. This program is called 'Bringing Back the Bush'. Importantly, the approach brings the community along by facilitating and managing community volunteer, schools and corporate groups to expand, manage and maintain edge habitats near popular recreational areas. In addition, the Trust is partnering with education and training institutions and NGOs to deliver training and transition to work for unemployed and special needs groups via social procurement contracts.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Flannery, T, *After the future: Australia's new extinction crisis*, 2012

National park asset planning NPP3

Option type

Better use through coordination processes

Location

Statewide

Sector

Science, agriculture and environment

Cultural, civic, sporting, recreation and tourism

Certainty of evidence

Medium

Direct option cost

\$10 million–\$25 million

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 16: Help preserve natural environments and minimise biodiversity

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Land managers, like Parks Victoria, need to be able to better forward plan to support investment in the parks under their jurisdiction. This option would put in place a strong accountability framework whereby the government (through the Department of Environment, Land, Water and Planning) would purchase services from the land manager against a clear framework, and whereby the park manager would be held accountable for the outcomes. As part of this, the land manager would be required to forward plan for investment and undertake the type of asset management that is required of comparable government bodies managing public assets. This would result in a more strategic view of these assets - whole-of-lifecycle asset planning for national parks, state forests and other protected areas - to preserve natural environments and minimise biodiversity loss.

What is the level of community support?

There was limited discussion of this option during public consultation.

What do we think of this option and why?

This option was recommended in the strategy (ref. 16.2.1) because clarifications of accountabilities between the Department of Environment, Land, Water and Planning and Parks Victoria could improve asset management of its urban and regional parks, making a moderate contribution to need 16. Typically a separation between policy and service delivery is best practice for public infrastructure; the asset manager needs to be able to cost the efforts that will be required to deliver the outcome sought by policy. This accountability framework is important to complement a new pricing, funding and expenditure model (NPP1). Clarified accountabilities would enable the land manager to forward plan for investment and be better placed to undertake asset management of these critical public assets against set standards. This could provide a strong benefit for tourism and support greater visitation.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

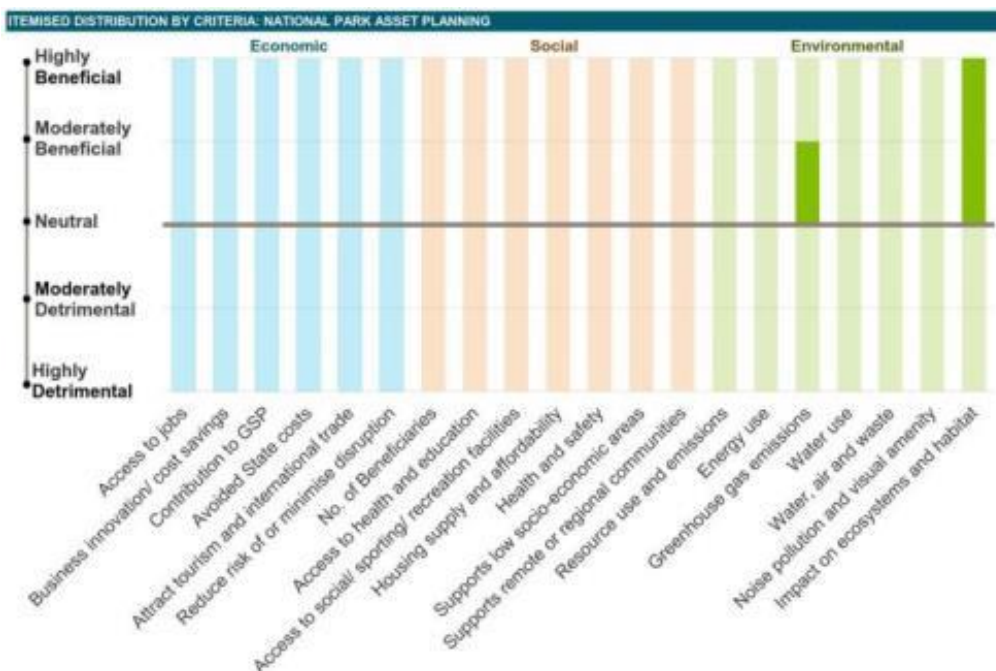
How does this option perform under different scenarios?

Supercity	Neutral	
Westside Story	Neutral	
Regional Cities	Neutral	
Accelerated Climate Change /Mitigation	++	Enables better planning to respond to climate challenges
Prolonged/ Severe Economic Downturn	Neutral	
Biosecurity Threat	+	Depends on ecosystem impact

How does this option work with others?

This option, a pricing and funding regime (NPP1) and national park asset planning (NPP2) are complementary as they both provide a fundamental funding and accountability framework. Together these options also enable greater consideration of engaging private bodies to perform conservation work (NPP2).

What are the economic, social and environmental impacts of this option?



Risks and opportunities

There is a risk that the land managers will not have the resources and internal capability to fulfil the role.

There is an opportunity for better management of bushfire risk through identifying asset risk and contingency plans.

Additional notes

Strengthening Parks Victoria Project

Parks Victoria has recently engaged the community as part of its Strengthening Parks Victoria Project as part of its 20th anniversary. This feedback will inform the development of a report to the Minister for Energy, Environment and Climate Change on changes to its operating model. There is an opportunity for this option to be addressed through this process.

Current governance model

Parks Victoria operates in a complex legislative environment. The *Parks Victoria Act 1998* is supplemented with authority to operate from agreements with the Secretary of DELWP and delegations made under five separate land category Acts and the *Conservation Forests and Lands Act*. Parks Victoria also has responsibilities as a port manager under the *Port Management Act*, numerous appointments as 'waterway manager' under the *Marine Safety Act*, and through its lease with Melbourne Water it is responsible for managing recreation areas and assets in metropolitan reserve parks.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Parks Victoria, *Strengthening Parks Victoria – Discussion paper*, 2016

Victorian Department of Environment, Land, Water and Planning, *Protecting Victoria's environment – Biodiversity 2036*, 2016

New underground metro rail system NUM

Option type

New assets

Location

Melbourne

Sector

Transport

Certainty of evidence

Low

Direct option cost

>\$10 billion

Option lead time

10-15 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 10: Meet growing demand for access to economic activity in central Melbourne

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

A complementary metro-style subway system within a five km radius of Flinders Street station akin to those in London or New York. This option also includes the provision of new links to development areas that are currently not serviced, such as Fishermans Bend and E-Gate.

This subway system will provide links to currently under-served areas. It will also complement the existing heavy rail network to increase the connectivity of the network and the mobility of the population. This will result in an increase in the supply of public transport for journeys into the central city.

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option was not recommended because no further evidence has been found that might alter Infrastructure Victoria's earlier assessment that this option performed poorly in terms of cost and contribution, with the cost of this option being very high. We think that there are other, better value alternatives to improve urban mobility, including improvements to bus and tram services, better integrating existing public transport networks, and the potential future opportunities for flexible, on-demand transport offered by driverless vehicles.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

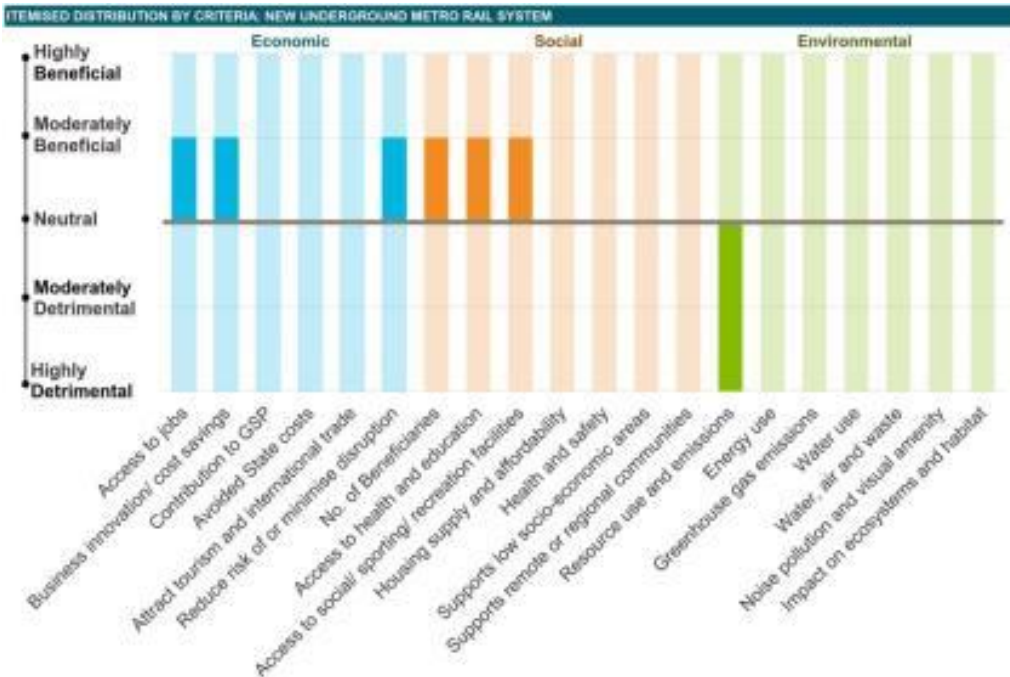
How does this option work with others?

This option could complement Melbourne Metro 2 (MMS).

How does this option perform under different scenarios?

Supercity	++	Supports mode shift to address congestion
Westside Story	+	Supports mode shift to address congestion
Regional Cities	+	Supports mode shift to address congestion
Accelerated Climate Change /Mitigation	+	Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	-	Less demand for mass transit
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?





Risks and opportunities

The strategic rationale for this option is relatively weak at this point in time due to the prevalence of the tram network which services the inner-suburbs well.

There are opportunities to strategically connect stations and services with the existing rail network linking to areas across metropolitan Melbourne.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

New or expanded women’s prison NWP

Option type

New assets

Location

Statewide

Sector

Justice and emergency services

Certainty of evidence

Medium

Direct option cost

\$1 billion–\$3 billion

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 8: Address increasing demand on the justice system

Moderate	Moderate	Significant	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option would deliver new capacity for female prisoners through the construction of a new women’s prison or the expansion of an existing women’s prison. This would seek to accommodate the increased demand on the prison system.

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option was recommended in part in the strategy (ref. 8.3.1) because we believe that while expansion of the Dame Phyllis Frost Centre to meet demand in the short-term, that there is good reason to plan for uncertainty by choosing a site for a future prison. The growth in unsentenced prisoners in the system has recently been raised as an issue by the Sentencing Advisory Council. This is putting additional pressure on capacity, though this is less for women’s prisons, it still adds considerable uncertainty. We also understand there is considerable complexity in siting a new prison – with transport access for employees and visitors two important aspects. We will monitor the prison population for future Infrastructure Victoria strategy updates in light of the government’s ability to influence prisoner numbers through policy and service delivery changes (including through implementation of integrated justice and human services JCS).

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

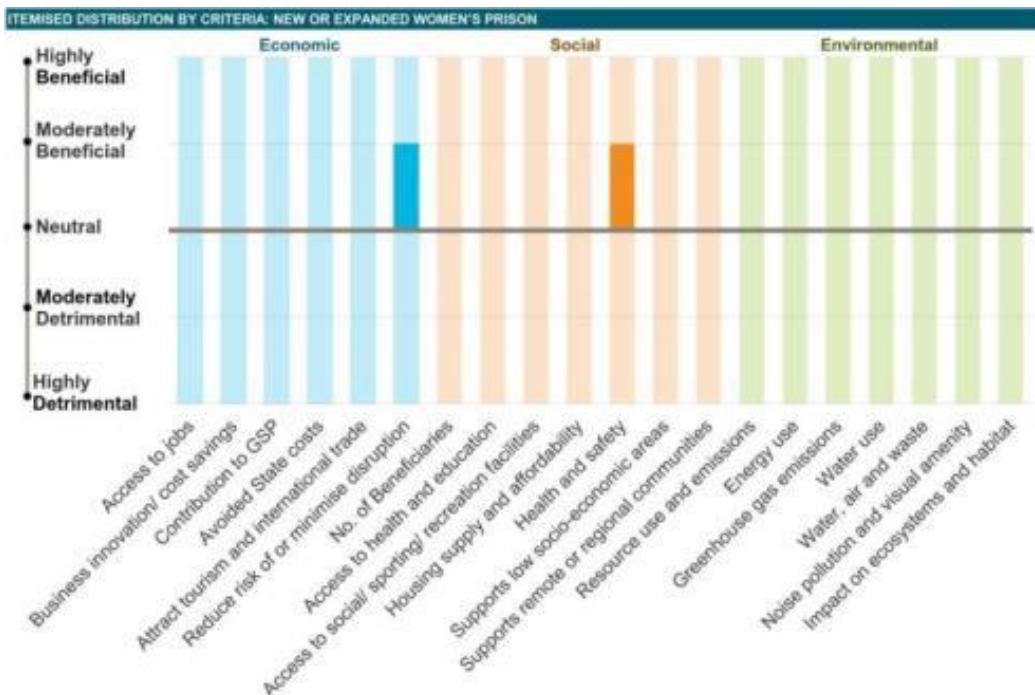
How does this option perform under different scenarios?

Supercity	+	Increased demand for justice services
Westside Story	+	Increased demand for justice services
Regional Cities	+	Increased demand for justice services
Accelerated Climate Change /Mitigation	Neutral	
Prolonged/ Severe Economic Downturn	+	Increased demand for justice services
Biosecurity Threat	Neutral	

How does this option work with others?

The options which seek to drive greater preventative focus on justice services by integrating with human services (JCS) and more proactive and responsive policing (MPW) operating out of modern integrated facilities (PSS) could defer the need for this option.

What are the economic, social and environmental impacts of this option?



Risks and opportunities

There is a risk that with any additional capacity (before it is required) to accommodate prisoners, the focus of the justice system will shift to incarceration of offenders rather than their rehabilitation.

However, with the development of a new prison comes the opportunity to assign a prison that would enable provision of new rehabilitation strategies to reduce prisoner recidivism.

Additional notes

Changes to recommendations from the draft strategy

This option was not recommended in the draft strategy. Since then we have included a new recommendation on planning for future prisons. While we don't anticipate this will be an issue over the short to medium term; government policy and legislative choices, including the provision of additional police resources, change year to year and contribute significantly to prison demand. Given the difficulty of siting for future prisons, we have included this recommendation to help manage this uncertainty.

Youth justice

In planning future sites for custodial facilities, consideration should also be given to the condition of, and demand for, youth justice custodial facilities. The 2010 Victorian Ombudsman's *Investigation into Conditions at the Melbourne Youth Justice Precinct* found that the design and location of the Parkville Youth Justice Precinct was inappropriate for a custodial facility which houses vulnerable children. The Ombudsman was of the view the only practical way to address the conditions at the precinct in the longer term was to develop a new facility at another site. The Ombudsman's recommendations were accepted by the Department, which undertook to develop options that can be considered by Government to address issues relating to the suitability and capacity of the existing youth justice centres. The Parkville and Malmsbury Youth Justice Precinct currently remain Victoria's youth justice custodial facilities. The Commission for Children and Young People is currently undertaking an inquiry which will consider issues including the suitability of current youth justice custodial infrastructure. We will monitor the condition and demand for youth justice custodial facilities in future strategies in light of ongoing reviews.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Australian Bureau of Statistics, *Prisoners in Australia, 2015*, catalogue number 4517.0

Minister for Corrections, *Work begins on Victoria's newest prison*, 2015

Sentencing Advisory Council, *Victoria's Prison Population 2005 to 2016*, 2016

Victorian Department of Justice and Regulation, *Corrections, prisons and parole*, 2016

Victorian Department of Justice and Regulation, *Criminal justice system forecasting model*, 2016

Victorian Department of Justice and Regulation, *The Project: Ravenhall prison project*, 2016

Victorian Ombudsman, *Investigation into the rehabilitation and reintegration of prisoners in Victoria Discussion Paper*, 2014

Victorian Ombudsman, *Whistleblowers Protection Act 2001 Investigation into conditions at the Melbourne Youth Justice Precinct*, 2010

On-farm water efficiency

OFU

Option type

Incremental expansion of existing assets

Location

Regional and rural Victoria

Sector

Water and waste

Certainty of evidence

Medium

Direct option cost

\$250 million–\$500 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 14: Manage threats to water security, particularly in regional and rural areas

Low	Low	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

Need 17: Improve the health of waterways and coastal areas

Low	Low	Low	Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Government investment in water use efficiency on farms. Additional investment to improve water efficiency at the farm level. It is proposed that the scheme is based on the model used for the 'Farm Water Program' in Northern Victoria and extended to other areas to complement irrigation delivery efficiency projects.

The scope of on-farm programs may need to be assessed on a case by case basis around the principle of fully realising the benefits of irrigation modernisation. Where farm water use is efficient, less water is wasted and more water is made available for other uses including the environment (further detail in *What is this option? cont'd*).

What is the level of community support?

There was limited discussion of this option during public consultation. This may be as it was not recommended in the draft strategy.

What do we think of this option and why?

This option was not recommended in the strategy because we have not identified a clear role for government. This option has merit in that it minimises wastage of water resources and in doing so can generate water savings. A number of farm water program projects are currently being administered by the Goulburn-Broken catchment management authority. As at May 2016, 524 projects had been developed with 68.8 billion litres of water saved (GBCMA 2016) and evidence suggests there is scope for further water savings on farms in Northern Victoria for example. With improvements to the water market (recommendation 14.1.2) and implementation of a new water pricing process by the Essential Services Commission, we consider that a pricing signal is the best mechanism to trigger water use efficiency on farms. The effectiveness of pricing will however be monitored with room to re-investigate this option.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

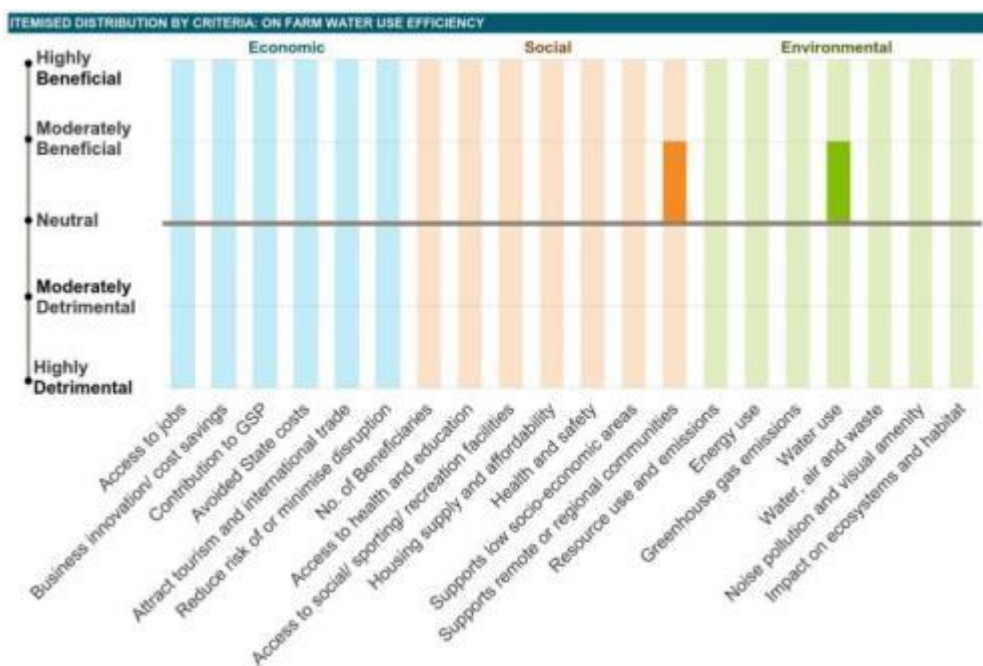
How does this option work with others?

Implementing this option means that the benefits of investments in increasing irrigation water delivery efficiency can be maximised (WDE).

How does this option perform under different scenarios?

Supercity	+	Heightened need to conserve water resources
Westside Story	+	Heightened need to conserve water resources
Regional Cities	++	Heightened need to conserve water resources
Accelerated Climate Change /Mitigation	++	Acute need to conserve water resources
Prolonged/ Severe Economic Downturn	+	Economic incentive to increase farm productivity
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



What is this option? (cont'd)

Following major investment in irrigation system upgrades in northern Victoria and in the Murray-Darling Basin to increase water delivery efficiency, initiatives to improve water efficiency at the farm level have been developed. For example, joint funding from commonwealth and state governments, catchment management authorities and industry groups is being used to deliver the 'Farm Water Program' in northern Victoria. This program achieves water savings by improving on-farm irrigation systems. Initiatives such as this allow the full benefits of irrigation modernisation to be realised. As more irrigation modernisation projects are completed around the state, there may be benefit in extending on-farm irrigation efficiency initiatives.

Risks and opportunities

Water savings generated from implementing this option could be used for a range of purposes including returning water to the environment. There is an opportunity for this option to drive further innovation in farming practices by focusing on efficiency and productivity at the farm level.

Additional notes

Initiatives to improve irrigation on-farms can generate long-term water savings. For example the Farm Water Program in Northern Victoria involves wide ranging improvements to on-farm irrigation systems including laser grading, drainage reuse, irrigation scheduling and plastic lined channels. The Farm Water Program is administered by the Goulburn Broken Catchment Management Authority on behalf of a consortium that includes irrigators, state and federal governments, water business and catchment management authorities. There may be scope to extend initiatives such as this in the future. For example, it is roughly estimated that 70,000 - 100,000 hectares of farm land may be suitable for irrigation modernisation works and that this could realise around 80 GL of water savings.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Victorian Department of Environment, Land, Water and Planning, *Victorian farm modernisation project*, 2016

Farm Water, *Farm Water Program fact sheet*, 2016

Online liveability infrastructure platform OLI

Option type

Changing behaviour through information

Location

Statewide

Sector

Transport

Health and Human Services

Cultural, civic, sport, recreation and tourism

Certainty of evidence

Medium

Evidence base

Deloitte/Aurecon, *Assessment 1: Options analysis report*, 2016

Direct option cost

<\$100 million

Contribution to meeting the need

Need 1. Address infrastructure demands in areas with high population growth – **Negative/very low**

Need 4. Enable physical activity and participation – **Low**

Need 5. Provide spaces where communities can come together – **Low**

What is this option?

This option would seek to improve the accessibility and ease of use for information regarding infrastructure and services that support physical activity and participation, as well as the use of public spaces. The intention is that the availability of this information will increase the use of those services.

This would be achieved through the delivery of an online platform that provides residents and visitors to Victoria with a listing of recreational spaces, libraries, social infrastructure and health facilities. Information such as cycle paths, walkways and organised sport events would be provided. The platform would link with appropriate websites, (such as for public transport) to identify mode and journey options which support active living and participation in the community.

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option was not recommended in the strategy because we think that increasing access to public space can be better addressed through community and public space utilisation deregulation (CSU). We assessed that it would make a low to very low/negative contribution to needs 1, 4 and 5.

Outer metro arterial roads OMA

Option type

Incremental expansion of existing assets

New assets

Location

Melbourne

Sector

Transport

Certainty of evidence

Medium

Direct option cost

\$1 billion–\$3 billion

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 11: Improve access to middle and outer metropolitan major employment centres

Significant	Significant	Significant	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

Need 13: Improve the efficiency of freight supply chains

Moderate	Moderate	Significant	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Upgrade seriously congested roads in outer metropolitan areas (including new road links, widening and duplication of existing roads, grade separations, connections to motorways, provision of bus lanes, etc.) to improve safety and local access for people and goods. Emphasis would be placed on providing an adequate, base-level network in the growth areas, including the building of a grid-like network in the outer west.

This option would be additional to and follow on from the recently announced five-year Outer Suburban Arterial Roads (OSARs) program.

What is the level of community support?

There was a moderate level of discussion of the recommendation, Outer metropolitan arterial roads which includes this option. Responses were generally positive.

What do we think of this option and why?

This option was recommended in the strategy (ref. 1.3.5, 11.5.5) because arterial roads are essential infrastructure used by many forms of transport, but upgrades often lag behind the growth of new suburbs. This results in acute bottlenecks and increased and unreliable travel times both for private motorists and on-road public transport users. This is a problem particularly in outer areas where there are often more limited transport choices than in more established areas of Melbourne. This option should be delivered over the next 5-15 years, following the completion of the OSARs program. Other options recommended by Infrastructure Victoria have the potential to minimise the risks that arterial road upgrades in these areas will merely induce demand (and thereby undermine their benefits), such as road space allocation to public transport (RSA), improvements to local bus services (LBS) and SmartBus services (SNE), and transport network pricing (TNP).

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

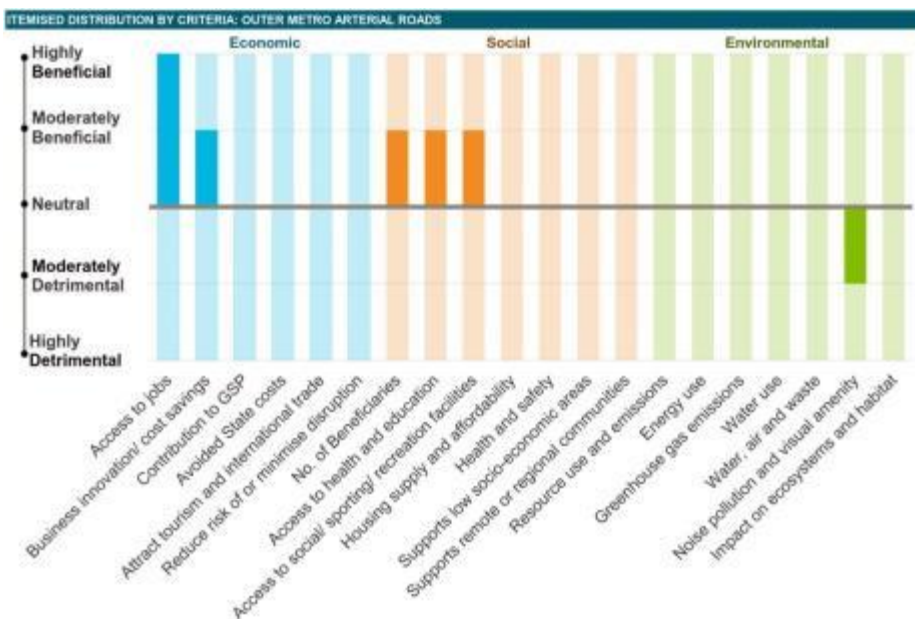
How does this option perform under different scenarios?

Supercity	++	Addresses heightened risk of congestion
Westside Story	+	Addresses heightened risk of congestion
Regional Cities	+	Addresses heightened risk of congestion
Accelerated Climate Change /Mitigation	+	Enables smoother traffic flows, if demand managed
Prolonged/ Severe Economic Downturn	-	Less demand for travel
Biosecurity Threat	Neutral	Heightened need for lower contagion risk mobility

How does this option work with others?

To address the risk of induced travel demand, this option would be usefully complemented with road space allocation (RSA) and transport network pricing (TNP). It should also be complemented with public transport options such as Smartbus expansions (SNE), Growth area buses (LBS) and road space allocation (RSA), as well as growth area local buses (LBS) and SmartBus expansion (GNE).

What are the economic, social and environmental impacts of this option?



Risks and opportunities

There may be a risk of traffic delays during construction. The upgrades to the road network will also need to consider any potential impacts to the local environment.

There may be an opportunity to align this option with other outer metropolitan road developments.

Funding

Should government choose to pursue this program, it will then need to consider funding options. Below is a range of potential funding mechanisms which could be examined to help fund the program.

Potential funding mechanisms

General government revenue	User charges	Beneficiary charges	Property development	Asset sales
✓	✓	✓		

General government revenue is likely to continue to be a major source of funding for programs like outer metro arterial roads, particularly where it provides a public and economic benefit by increasing mobility and accessibility in many parts of outer metropolitan Melbourne.

Beneficiary charges could also be considered if there is a substantial uplift in land values and business activity in the vicinity of the new roads. These include developer contributions, which could be levied on new developments occurring in the vicinity of the new roads. This already occurs for arterial roads in greenfield areas, where developer contributions provide financial contributions or works/land-in-kind and should continue to do so.

User charges applied as part of a transport network pricing regime to manage demand could also be a potential source of funds for outer metro arterial roads.

Infrastructure Victoria is examining transport network pricing as part of our research program. We think that the primary objective of a transport network pricing regime – where users pay to access and use the transport network – should be to manage demand, rather than to recover costs for infrastructure. We are focusing on examining road pricing regimes in metropolitan Melbourne as a first step towards a comprehensive transport network pricing regime that includes roads and public transport. Careful consideration must be given to the design of the regime to ensure it is efficient, fair and sustainable. If developer contributions and user charges are both considered by government, it should ensure that new charges do not unfairly duplicate each other or any existing charges.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Outer Metropolitan Ring Road OMR

Option type

New assets

Location

Melbourne western subregion

Melbourne north state significant transport corridor

Melbourne western state significant transport corridor

Melbourne east–west orbital state significant transport corridor

Sector

Transport

Certainty of evidence

Medium

Direct option cost

>\$10 billion

Option lead time

5–10 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 11: Improve access to middle and outer metropolitan major employment centres

Low	Low	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

Need 13: Improve the efficiency of freight supply chains

Moderate	Moderate	Significant	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Construction of the outer metropolitan ring road to improve cross-Melbourne freight vehicle access and connections to the north and east from key freight precincts in the west. This option will also improve access to employment in north and western metropolitan Melbourne.

What is the level of community support?

There was a high level of discussion of this option during consultation. Responses were generally positive. The metropolitan citizen jury had a mixed view of this option.

What do we think of this option and why?

This option was recommended in the strategy (ref. 11.5.7 and 13.5.3) because our modelling and economic analysis showed it to be a relatively high performing project that will improve freight travel times and ease congestion in northern and western regions of Melbourne by diverting traffic from a number of other motorways and arterial roads. The option is recommended for staged implementation within 15-30 years.

The resulting redistribution of traffic would enhance access to major employment centres in the west and north, including the East Werribee, Sunshine and Latrobe National Employment Corridors (NECs), Melbourne Airport, the Epping and Broadmeadows Metropolitan Activity Centres (MACs). It will also improve the capacity of the freight network.

However, we think the introduction of this link needs careful management and land use integration to reap the greatest benefits and avoid the potential for it to drive less efficient, dispersed land use patterns. For this reason we recommended that the completion of this ring road should occur in the later part of this period, although its delivery could also be staged. Triggers for project commencement (and staging) should be identified so as to minimise unintended land use implications.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

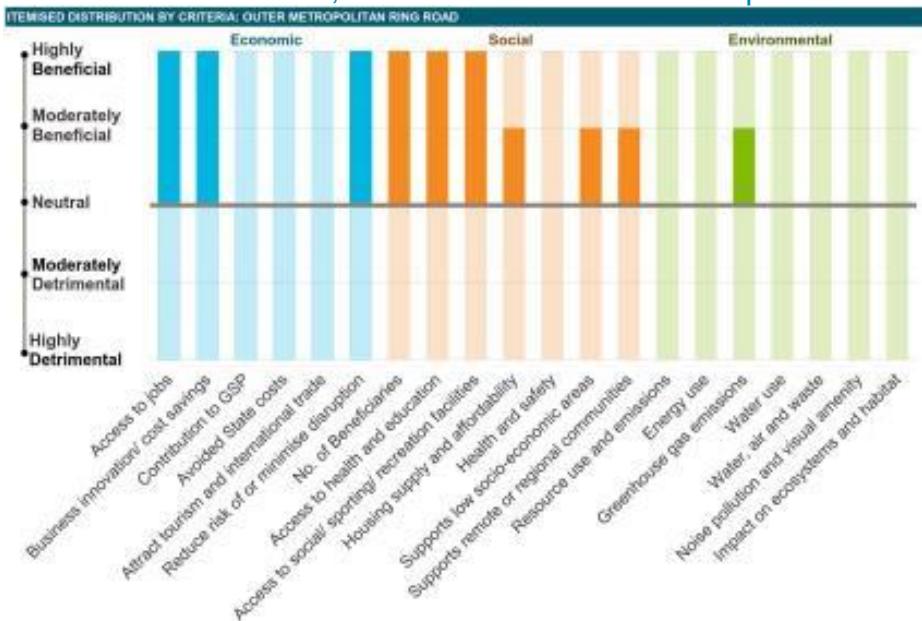
How does this option work with others?

This option is one of various road projects which are enablers of the high productivity freight network (HPF), including through supporting a Western Interstate Freight Terminal (WIF). The performance of this road would likely be enhanced by combining it with advanced traffic management (ATM), driverless freight vehicles (DFV) and transport network pricing (TNP). Some of these could also improve the existing network, deferring the need for this option. Further assessment of the relationship with a new port is required.

How does this option perform under different scenarios?

Supercity	++	Addresses heightened risk of congestion
Westside Story	+	Addresses heightened risk of congestion
Regional Cities	+	Addresses heightened risk of congestion
Accelerated Climate Change /Mitigation	+	Risk of induced travel and dispersed land use
Prolonged/ Severe Economic Downturn	-	Less demand for travel, heavy freight
Biosecurity Threat	Neutral	Heightened need for lower contagion risk mobility
Bay West	++	Significant enhancement of access for regions to Bay West
Hastings	+	Additional freeways assist in freight movement

What are the economic, social and environmental impacts of this option?



Commentary:

Despite an increase in vehicle travel across the network, the OMR is expected to decrease carbon emissions by 2 per cent as a result of congestion relief.

Risks and opportunities

There is a risk that this option, passing through greenfield development areas, could lead to less efficient urban form. For example, one of the ways in which induced travel can occur is through people changing their residence to take advantage of new transport connectivity but in the process living further away from jobs and services. This could be mitigated through both transport network pricing (TNP) and maintaining strong land use controls to avoid residential growth outside the urban growth boundary.

There is a risk that the construction of the new orbital freeway could make it harder for some people to access their existing jobs and services, due to the severance effect of the corridor, and the project could have negative impact on surrounding ecosystems and habitats.

There is an opportunity to change land uses surrounding the proposed road alignment to maximise the benefits it would offer for industrial and logistics sectors. This could in turn assist in the ongoing shift of heavy industry out of inner Melbourne, supporting urban renewal.

With the development of the OMR, there is an opportunity to extend the standard gauge freight network within the proposed road reservation. This will assist with the growing freight movement between established logistics hubs and interstate destinations. However, this is not in the scope which has been assessed.

Funding

Should government choose to pursue this project, it will then need to consider funding options. Below is a range of potential funding mechanisms which could be examined to help fund the project.

Potential funding mechanisms

General government revenue	User charges	Beneficiary charges	Property development	Asset sales
✓	✓	✓	✓	

Funding for projects like Outer Metropolitan Ring Road (OMR) should include user charges, as those who use it will be direct beneficiaries of the new asset. These user charges could be applied as part of a broader transport network pricing regime, or ahead of such a reform, tolls could be charged. Contracting terms for any new tolls should consider favouring flexibility to allow for a transition to an integrated transport network pricing regime.

Infrastructure Victoria is examining transport network pricing as part of our research program. We think that the primary objective of a transport network pricing regime – where users pay to access and use the transport network – should be to manage demand, rather than to recover costs for infrastructure. We are focusing on examining road pricing regimes in metropolitan Melbourne as a first step towards a comprehensive transport network pricing regime that includes roads and public transport. Careful consideration must be given to the design of the regime to ensure it is efficient, fair and sustainable.

Beneficiary charges could also be considered if there is a substantial uplift in land values and business activity in the vicinity of the new project. These include developer contributions, which could be levied on new developments occurring near the new infrastructure. Developer contributions could be considered as part of any rezoning that facilitates land uses complementary to the new road.

Investing in major road links such as OMR can also have a significant impact on land values in the vicinity of the project from improved transport accessibility and travel time savings. This means residents and commercial land holders benefit from the new road whether or not they use it. Charging betterment levies to capture a portion of the benefits that accrue to these indirect beneficiaries could occur following investigations to clarify whether those indirect beneficiaries in established areas experience significant uplift in land value.

Major beneficiary contributions could be negotiated with potential major beneficiaries of the new road. Potential major beneficiaries could include freight and industrial businesses or major land owners.

Beneficiary charges seek to capture indirect benefits, while user charges seek to capture direct benefits by aligning the cost of infrastructure with those that use it. If betterment levies and user charges are both considered by government, it should ensure that new charges do not unfairly duplicate each other or any existing charges.

Property development could also be considered following the construction of the OMR. Following the construction of the new freeway, any unused land could be sold or leased for property development, if it is considered surplus to government requirements. Property development can assist in putting underutilised government land and space to higher and better uses, creating added value through improved amenity and access to services. Opportunities could include petrol stations, service centres, or other businesses wishing to locate near a freeway.

General government revenue may still be needed to contribute to funding based on the broader community and economic benefits delivered by the project.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then we have added additional information on next steps, given uncertainties on potential timing of commencement and staging and concerns about the project driving urban sprawl.


Transport modelling and economic analysis

Infrastructure Victoria commissioned KPMG, Jacobs and Arup to undertake transport modelling for a number of options being considered for the strategy, including a variety of 'build' and 'non-build' transport options. This allowed major transport projects to be quantitatively assessed alongside several technology, policy and reform options. In addition, economic analysis was undertaken for the 'build' options to estimate a cost benefit ratio, including for this option. The options were modelled individually, mostly on a standalone basis, with a number of options then also tested in various combinations.

This analysis was undertaken on a different basis and produced different results to what is presented throughout the options book, which was prepared by AECOM/PWC with the intention of allowing a mixture of qualitative and quantitative assessment across the full range of options, across all sectors and needs. While on the face of it these two analyses reference similar metrics, different assumptions and methodologies have been applied. In particular, the KPMG/Jacobs/Arup assessment provided purely relative ratings of each option's contribution to the needs, with the ratings scale set by the performance of only the select range of options modelled. This had the result of showing some transport options as making a "high" contribution to Need 18 (transition to lower carbon energy supply and use) simply because they were the highest of the options modelled; however, in Infrastructure Victoria's judgement most transport sector options will make a much lower contribution than energy sector options, as transport comprises a much smaller proportion of total carbon emissions. It provides a useful assessment for sorting the relative contribution of the options modelled, but should not be taken as an absolute assessment. In contrast, the assessments developed in the AECOM/PwC assessment considered the full range of options identified for each need and provided more of an 'absolute' assessment.

With these caveats in mind, however, the results of this alternative analysis are helpful inputs into Infrastructure Victoria's 'global' assessment, and in preparing the strategy we have come to a considered view based on the totality of evidence available to us.

In terms of the KPMG/Jacobs/Arup analysis of this option, the modelling showed that the Outer Metropolitan Ring Road is expected to improve metropolitan-wide accessibility to employment, education and inner city jobs. Modelling indicates



that the project would also improve accessibility to a number of employment centres, most notably Melbourne Airport, Sunshine and East Werribee. It would provide congestion relief to the western and northern regions, in particular, by diverting traffic from the Western Ring Road, the Calder, Princes and Hume Freeways, and well as from arterial roads. On the downside, traffic increases are likely on the Western Freeway and Sunbury Road. A relatively large increase in vehicle kilometres travelled and a large reduction in vehicle hours travelled at a network-wide level indicates materially improved accessibility.

The preliminary cost benefit ratio for OMR ranges from 1.4 - 2.1 without WEBs, and 1.6 - 2.3 when WEBs are included. Even where upper bound costs are used and WEBs are not included, the preliminary cost benefit ratio result is 1.4. While this analysis is preliminary and not to a business case level of assessment, it suggests the OMR is an economically viable project and worthy of detailed economic assessment. It was, along with the North East link, the most highly ranked of the assessed project options when WEBs were excluded, and in terms of analysis undertaken using similar modelling assumptions, second only to the combined result of Melton rail electrification (MRE1) and 10 car high capacity trains (HCT2).

In terms of its contribution to the needs, the project addresses the Need to improve the efficiency of freight supply chains, as freight will travel less in heavy congestion and the travelled by freight in congested traffic will improve by almost 10 per cent. Despite notable increases in vehicle travel across the network, the Outer Metropolitan Ring Road is expected to reduce carbon emissions by almost 2 per cent as a result of the congestion relief it provides although we note land use change towards less efficient development patterns was not assessed in the modelling

For more detail, consult the '*Economic appraisal and demand modelling*' report to Infrastructure Victoria.

Next Steps

As a first step, there needs to be further consideration of staging and integrated land use planning, including defining trigger points for project commencement. Further project development should consider the opportunity to deliver the OMR in stages, whether they be geographic stages (e.g. different sections of the alignment) and/or stages in the standard of facility provided (e.g. starting with an arterial road standard, upgradeable to freeway standard).

Other notes

OMR has been planned with curves of a radius that would enable the operation of high speed trains, and would provide a suitable corridor through the growth areas of Kalkallo and Mickleham for such a rail link.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

KPMG/Arup/Jacobs, *Economic appraisal and demand modelling*, 2016

Organic waste to energy OWE

Option OWE is addressed in EGW – Energy generation from waste

Organic waste management

OWM

Option type

Changing behaviour through subsidies

Better use through information

Location

Statewide

Sector

Water and waste

Certainty of evidence

High

Direct option cost

\$1 million–\$10 million

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 1: Address infrastructure demands in areas with high population growth; and

Need 18: Transition to low carbon energy supply and use

Very Low	Very Low	Very Low	Very Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

Need 15: Manage pressures on landfill and waste recovery facilities

Low	Low	Low	Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option seeks to develop and implement measures to manage organic waste closer to the point of generation. This includes organic waste recovery measures and re-use of organic waste for other beneficial purposes. Organic waste currently has some of the lowest rates of waste recovery in Victoria with only three per cent of food waste being recovered in 2011-12 for example. As organic waste decomposes at landfill sites it contributes greenhouse gas emissions and leachates into the water table. This option involves measures to reduce the amount of organic waste sent to landfill by promoting measures such as organic composting at the household level or organic waste to energy opportunities.

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive. This option was recommended by the metropolitan citizen jury.

What do we think of this option and why?

This option was recommended in part in the strategy. Specifically, acceleration of actions identified in the *Victorian organics resource recovery strategy* (2016) was recommended (ref. 15.1.2). This is because there is significant scope to improve management of organic waste and including increasing resource recovery. Prioritising planning for organic waste management in the short-term will enable implementation of actions in the short to medium term to address current and growing organic waste volumes being generated and sent to landfill. This includes organic waste from the residential, commercial and industrial sectors. Waste from the commercial and industrial sector includes timber, woody waste and liquid organic waste from manufacturing processes. The *Victorian organics resource recovery strategy* recognises the need to align recovery actions with end markets for recycled organic products.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

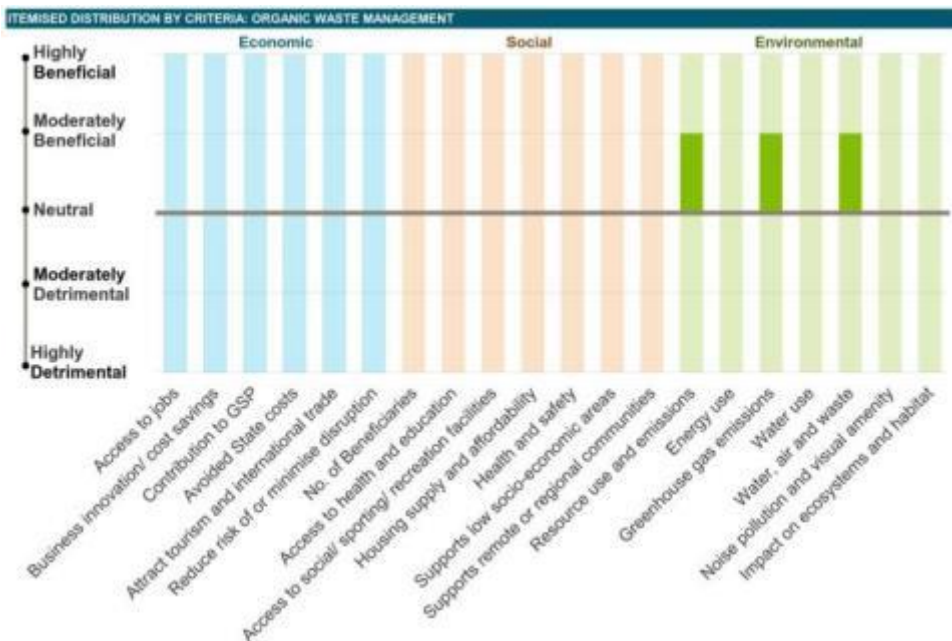
How does this option work with others?

This option complements waste to energy initiatives (EGW) for example through opportunities to generate biogas.

How does this option perform under different scenarios?

Supercity	++	Increased need to manage waste streams
Westside Story	++	Increased need to manage waste streams
Regional Cities	+	Increased need to manage waste streams
Accelerated Climate Change /Mitigation	+	Increased need to reduce carbon emissions
Prolonged/ Severe Economic Downturn	-	Less waste generated
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



Risks and opportunities

This option may not significantly reduce waste volumes in a timely manner with regards to deferring further investment in waste management and landfill infrastructure. The health and safety aspects of managing organic waste will require particular attention in policy design and implementation.

There is a risk of over-relying on advanced technological processes and large scale solutions to increase the recovery of organic waste at the expense of simpler solutions that can be implemented quicker. A multi-faceted approach that considers opportunities for both small-scale localised facilities and larger scale solutions should be considered.

There is also a risk that the market for organic products may not develop sufficiently quickly to see increased diversion rates from landfill in the short term.

There is potential to combine the aims of this option with community infrastructure (e.g. composting and community gardens) for broader beneficial outcomes.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Sustainability Victoria, *Victorian organics resource recovery strategy*, 2015

Preventative health care awareness PHC

Option type

Changing behaviour through technological innovations
Changing behaviour through information
Changing behaviour through regulation

Location

Statewide

Sector

Health and human services

Certainty of evidence

Medium

Direct option cost

\$100 million–\$500 million

Contribution to meeting the need

Need 3. Respond to increasing pressures on health infrastructure, particularly due to ageing – **Moderate**

What is this option?

Preventing people from needing to receive health services is critical in creating a more sustainable health care system, particularly given the forecast major impact of chronic disease ahead. This option proposes to invest in technology that supports preventative health, for example remote health monitoring and self-monitoring equipment. The implementation of this option aims to improve the number of people living healthy lifestyles, to in turn reduce the number of people needing to access the health system.

Increased access to information will enable consumer-directed care and allow patients to more proactively manage their own health issues. This will in turn reduce the number of people needing to access the health system. This option is a combination of policy and/or regulatory change and capital works through investment in ICT.

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive. This option was opposed by the regional citizen jury.

What do we think of this option and why?

This option is not recommended in the strategy because Infrastructure Victoria has determined that the option is beyond the scope of an infrastructure strategy. Although these programs may have downstream effects on the use of infrastructure, we do not have sufficient evidence to draw the link between infrastructure planning and this intervention. The option has been assessed as making a moderate contribution to need 3 and so it may be a policy worth considering as part of a broader health policy focus.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

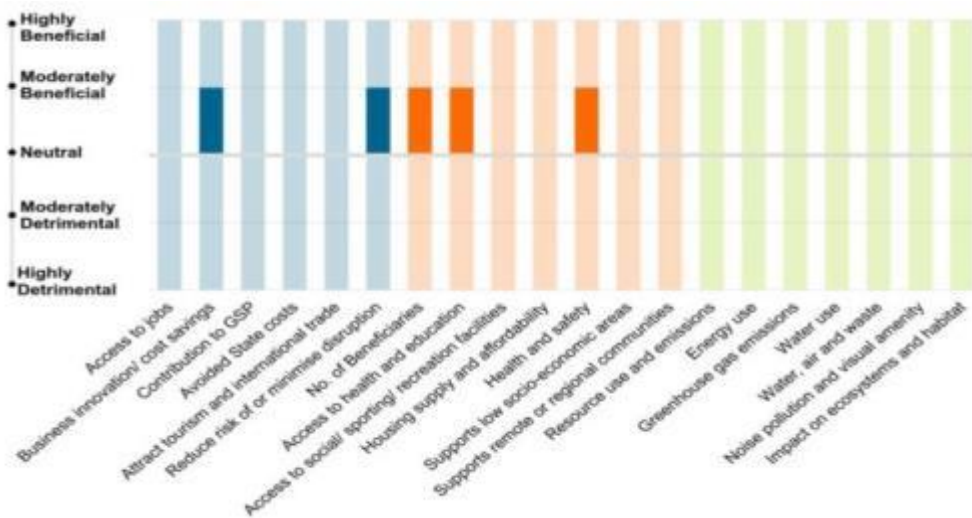
How does this option perform under different scenarios?

Supercity	Neutral	
Westside Story	Neutral	
Regional Cities	Neutral	
Accelerated Climate Change /Mitigation	Neutral	
Prolonged/ Severe Economic Downturn	+	Need to address increased health issues associated with lower household incomes
Biosecurity Threat	+	Increased need for preventative measures

How does this option work with others?

A complementary option is health education programs (HEP) which focuses on educating the younger generation to encourage physical activity, which is another type of intervention that could be employed to prevent health problems.

What are the economic, social and environmental impacts of this option?





Risks and opportunities

As with any technology related project, there are significant risks associated with the implementation of this option. Technology projects involve doing things differently and do not always have a previous application to learn from. Government will therefore have to balance the extent to which they lead or lag the private sector in taking up these initiatives to achieve value for money.

Evidence base

AECOM/PwC, *Assessment 2: Economic, social and environmental assessments and option relationship mapping*, 2016

Deloitte/Aurecon, *Assessment 1: Options analysis report*, 2016

Public high rise estate regeneration PHG

Option PHG is addressed in SHA – Public housing asset management and SHS3 – Social housing stock transfer model

Public high rise housing estate renovation PHR

*Option PHR is addressed in SHA – Public housing
asset management*

Port of Melbourne container terminal expansion PMC

Option type

Incremental expansion of existing assets

Location

Melbourne central subregion

Sector

Transport

Certainty of evidence

Medium

Direct option cost

\$750 million–\$1 billion

Option lead time

5–10 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 13: Improve the efficiency of freight supply chains

Low	Low	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Expanding the capacity of the Port of Melbourne through a range of measures, including the extension of berths, the use of Webb Dock exclusively for containers, relocating the car import/export trade, landside investment and technology improvements at both Webb and Swanson Docks.

This is in addition to the current port expansion project.

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were polarised. The metropolitan citizen jury were open to this option, noting existing work underway for the development of the new port option (MCP).

What do we think of this option and why?

The strategy does not include a recommendation related to container expansion at the Port of Melbourne (even though this was an option considered during consultation), as this is within scope of the advice on the timing and locations of a new port that government has specifically asked Infrastructure Victoria to provide by May 2017.

However, it should be noted that the most efficient way of accommodating growing container volumes in Victoria is to increase the capacity of the Port of Melbourne whenever this should be needed, and to the extent that this is feasible.

Improvements in port productivity are anticipated to have positive impacts on businesses involved in international trade. By increasing the productivity of the supply chain, this option is also likely to positively affect general business costs and economic growth.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

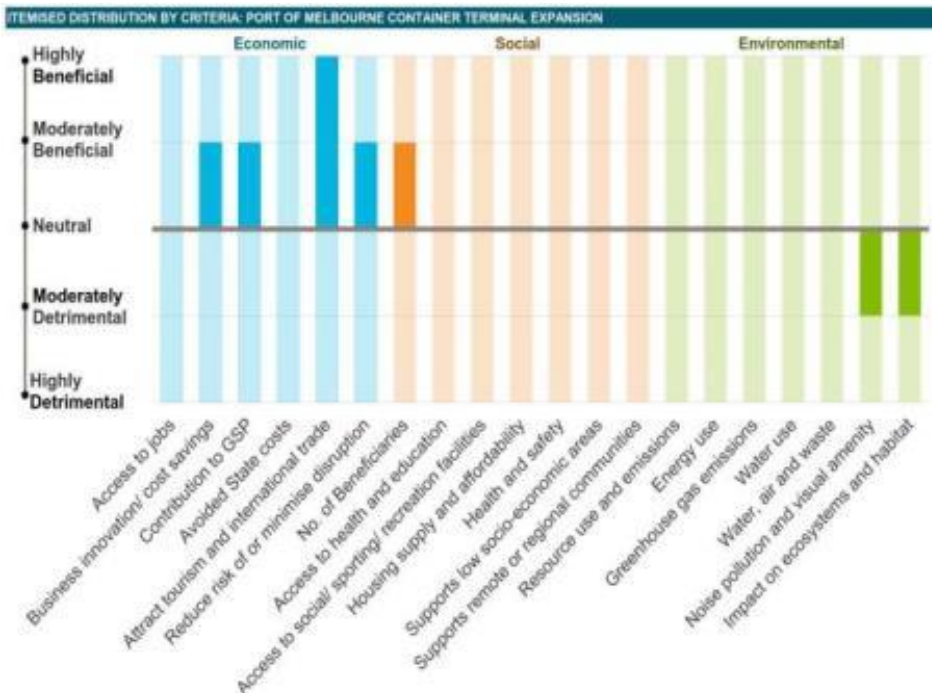
How does this option work with others?

As this option would use Webb Dock exclusively for containers, it may work well with rail access at Webb Dock (WDF) as well as land use planning of the freight precinct (FPL) to ensure coordination of freight task. This option would work well with the Port of Melbourne rail shuttle (PMM), as it would help to maintain freight movements in the face of increasing road congestion around the port precinct.

How does this option perform under different scenarios?

Supercity	++	Addresses increased freight demand
Westside Story	+	Addresses increased freight demand
Regional Cities	+	Addresses increased freight demand
Accelerated Climate Change /Mitigation	Neutral	
Prolonged/ Severe Economic Downturn	-	Less demand for heavy freight
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?





Risks and opportunities

Expansion of the container capacity at the Port of Melbourne may attract larger vessels to the port, which may potentially increase safety risks, and the risks of disruption. Conversely, there may be limits to the size of ships that can access the port, due to the constraints of the Port Philip Bay heads access, or the West Gate Bridge.

This option would also support growing demand for economic activity in central Melbourne.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Port of Melbourne rail shuttle PMM

Option type

Incremental expansion of existing assets

Location

Melbourne central subregion

Sector

Transport

Certainty of evidence

High

Direct option cost

\$50 million–\$100 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 13: Improve the efficiency of freight supply chains

Moderate	Moderate	Significant	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option would implement a port-rail shuttle to move international containers from the Port of Melbourne to hubs across the Melbourne metropolitan area, improving freight movement efficiency and reducing the number of road vehicles servicing the port.

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive.

What do we think of this option and why?

This option was recommended in the strategy (ref.13.3.1) because an alternative access to Swanston Dock is required in order to obtain the greatest use out of the existing port facilities and to manage growing truck movements around the port. With the lease of the port now finalised, we believe that the government can now work with the new owner in delivering this important freight infrastructure.

The rail shuttle has real merit as it could not only reduce transport costs, but it could also shield freight movements from growing congestion around the port, making a moderate to significant impact on freight efficiency over time. However, we also think that in finalising the plans for this option, consideration should also be given to the viability of any new technologies that could present a potentially more effective solution.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

How does this option work with others?

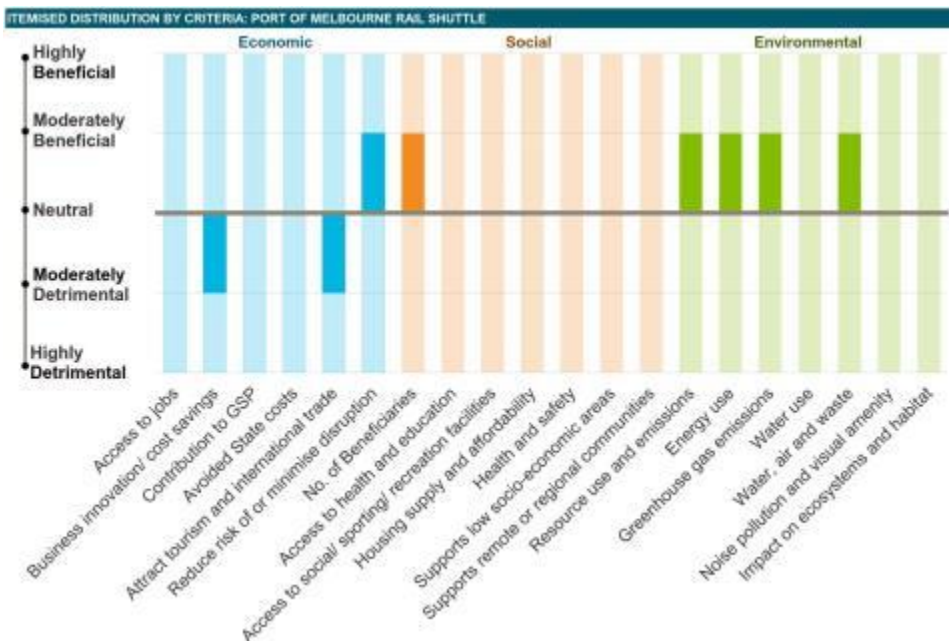
The completion of land use planning (FPL) and the Webb Dock freight rail (WDF) would lead to greater efficiency improvements in the freight supply chain from this option due to the increased volume of freight to transport from the port and the more effective placement of infrastructure required for this option that would become evident after land use planning.

A combination of road pricing (TNP) and driverless freight vehicles (DFV) could also be a potential future alternative to this option.

How does this option perform under different scenarios?

Supercity	++	Reduces conflicts between freight and road traffic
Westside Story	++	Reduces conflicts between freight and road traffic
Regional Cities	+	Reduces conflicts between freight and road traffic
Accelerated Climate Change /Mitigation	+	Facilitates more carbon efficient rail freight
Prolonged/ Severe Economic Downturn	-	Less demand for heavy freight
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



Risks and opportunities

A metropolitan rail container shuttle would require access to the passenger rail network, in particular, to the high growth Dandenong Line. There is the potential that this option would increase congestion and extend travel times for passenger trains on the network.

This option has the potential to reduce noise pollution related to truck movements around the port. It may also contribute to improved environmental outcomes, given the reduced number of heavy vehicles on the road.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. However, we did recommend that the government prepare a port rail access policy to assist in assessing the port operator's proposals and enable timely delivery of the best-value infrastructure. That draft recommendation has been updated and a new recommendation for the Port rail shuttle has been included based on new evidence and stakeholder feedback that it should be changed from planning to delivery of the shuttle. The same level of detail is not currently available for Webb Dock rail access and it remains as a part of the recommendation to plan for rail access as a longer-term proposition.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Jacobs for Department of Economic Development, Jobs, Transport and Resources, *Port Rail Shuttle project - supply chain analysis*, 20 February 2015

Department of Transport, Planning and Local Infrastructure, *Metropolitan Intermodal System, Project Development Report*, 30 September 2013

Police complexes PSS

Option type

New assets

Location

Statewide

Sector

Justice and emergency services

Certainty of evidence

Medium

Direct option cost

\$750 million–\$1 billion

Option lead time

5–10 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 1: Address infrastructure demands in areas with high population growth; and

Need 2: Address infrastructure challenges in areas with low or negative growth

Low	Moderate	Moderate	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

Need 8: Address increasing demand on the justice system

Low	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option would implement a move to larger police ‘complexes’ supporting police ‘service points’ within local communities. This is known, in general terms, as a ‘hub and spoke’ model, which would be progressively delivered over time. This would be a service delivery shift resulting in consolidation of an undetermined number of police stations over time, particularly where operating costs are high and use is low. This would drive significant change in the ability of police to respond to demand by optimising police assets (further detail in *What is this option? cont’d*).

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive. This option was opposed by the metropolitan citizen jury. 64 per cent of people surveyed as part of community research were in favour of having more police patrolling the streets and a police station further from where they live.

What do we think of this option and why?

This option was recommended in the strategy (ref. 8.1.3) because a shift to a more effective service delivery model for police (including through a non-emergency call centre and online capability provided by recommendation 2.2.1, 8.2.1 and 12.1.1) requires a change in assets and their distribution. Further planning work would be required to determine the appropriate service catchments for these new facilities and the optimum number of complexes. It is unlikely that rural or remote stations would be appropriate for closure. The roll out of these complexes should be staged by first focussing on areas with a service need (such as growth areas), the replacement or consolidation of stations that are coming to the end of their service life and the consolidation of facilities in areas where there are more local stations than necessary to provide efficient and responsive policing services, unless they are suitable for repurposing as complexes (further detail in *What do we think of this option and why? cont’d*).

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

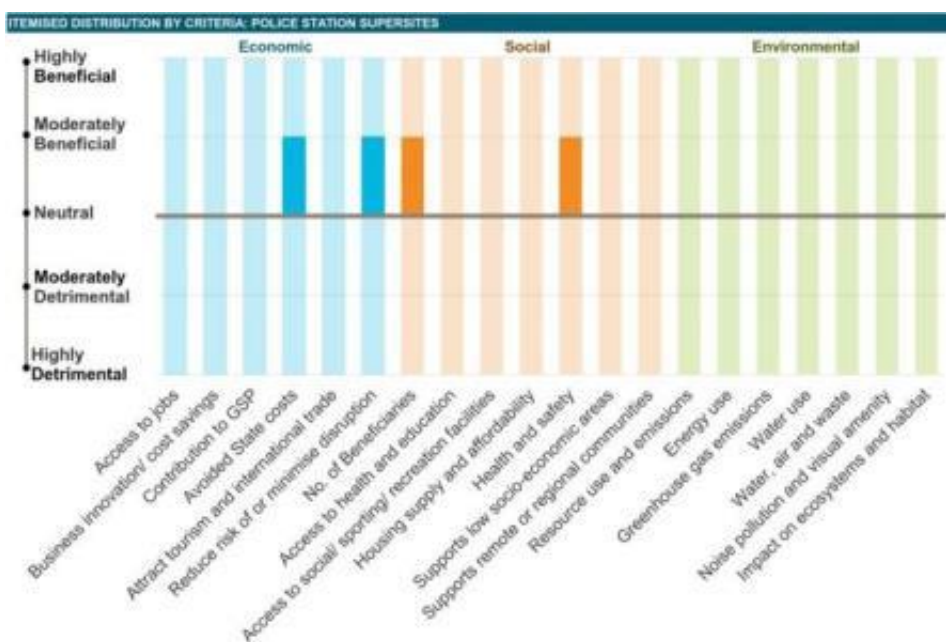
How does this option perform under different scenarios?

Supercity	+	Improves efficiency and response effectiveness
Westside Story	+	Improves efficiency and response effectiveness
Regional Cities	++	Improves efficiency and response effectiveness
Accelerated Climate Change /Mitigation	Neutral	
Prolonged/ Severe Economic Downturn	+	Increased demand for justice services
Biosecurity Threat	Neutral	

How does this option work with others?

This option is one half of a service delivery change for police – and therefore has a dependency on changes which deliver a more mobile, responsive police force supported by new channels of communication to the public (MPW). This option is also complementary with justice and human services integrated planning and delivery (JCS), as it would provide opportunities for new integrated co-located facilities.

What are the economic, social and environmental impacts of this option?



Commentary:

This option is expected to benefit health and safety by improving access to police. This is expected to occur by achieving greater separation of operational and administrative tasks; which would allow more time for police officers to spend on operational matters and unsworn police staff to perform administrative functions where appropriate. This would benefit health and safety and the resilience of police resources. There is also the potential for avoided state costs.

What is this option? (cont'd)

Though detailed planning work needs to be done, we have based our assumption on the delivery of 24 complexes across Victoria. This can be understood as:

- Three complexes in each of the five Melbourne metropolitan subregions
- Two in the Geelong region
- One in each of the seven Victorian regional areas.

We don't think this is necessarily the right number, but it is a good starting point.

These police complexes (the 'hubs') would be supported by service points (the 'spokes') that could include shopfronts in commercial or business districts, or be co-located with other public services for reporting non-urgent matters, accessing information or reporting on bail. In some remote areas, the existing station is best suited to this task but in other areas it would be assumed over time that existing police stations, that usually have a 30-year life before needing replacement, would be replaced by a regionally positioned super-site supported by a workforce of mobile police.

Other training and forensic facilities could be considered to support these complexes to create efficiencies.

What do we think of this option and why? (cont'd)

This staging needs to be underpinned by strong community engagement to ensure the community understand the benefits of the approach, and how it will improve service delivery. These complexes have a great opportunity to be delivered in many instances as integrated facilities with other justice and human services for a greater focus on crime prevention (JCS). The contribution to meeting needs 1, 2 and 8 will grow over time, becoming significant in 15 years for high growth and low growth areas.

Risks and opportunities

If the delivery of this hub and spoke network is piecemeal, then investment decisions could be delayed and/or ad hoc.

This option will need to be supported by successful implementation of the supporting upgrades to technology. A hub and spoke model could support increased police efficiency.

Funding

Should government choose to pursue this program, it will then need to consider funding options. Below is a range of potential funding mechanisms which could be examined to help fund the program.

Potential funding mechanisms

General government revenue	User charges	Beneficiary charges	Property development	Asset sales
✓			✓	✓

General government revenue will likely continue to be a major source of funding for programs like police complexes as the benefits from such investment are usually widely distributed across the community.

Property development could also be considered, including commercially leasing parts of premises within or around the public infrastructure, such as cafés or shops, or leasing to complementary businesses. Property development can assist in putting underutilised government land and space to higher and better uses, creating added value through improved amenity and access to services.

Additionally, any police sites that are no longer fit-for-purpose and surplus to government requirements should be sold which can provide a one-off funding boost. This could help fund new facilities and allow sites to be available for higher and better uses.

Additional notes

Changes to recommendations and option name from the draft strategy

This option was recommended in the draft strategy. Since then the scope of this recommendation has been changed to be less prescriptive about the type of network most appropriate to this recommendation. The recommendation also sets out a more graduated sequence for the roll-out. The term 'police station supersites' has been changed to police complexes as well in response to stakeholder feedback that supersites refers to a specific model.

Next steps

Considerable engagement with government and community would be required in planning the roll-out. It will be important that Victoria Police work with the local community to understand the benefits of this approach, including putting more police into frontline service delivery that would otherwise be required to remain in police stations.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Canadian Police College, *Discussion paper series: Change and innovation in Canadian policing – Tiered Policing: An Alternative Model of Police Service Delivery*, 2014

Royal Commission into Family Violence, *Summary and Recommendations*, 2016

Victorian Department of Premier and Cabinet, *Budget delivers more police, Targets high-risk offenders to keep Victorians safe*, 2016

Victoria Police, *Victorian police blue paper: A vision for Victoria police in 2025*, 2014

Victoria Police, *Victoria Police Capability Plan 2016-2025: Capability framework*, 2016

Public transport alternative use of taxis or hire cars

PTA

Option type

Better use through coordination processes

Better use through contractual processes

Location

Statewide

Sector

Transport

Certainty of evidence

Medium

Direct option cost

\$10 million–\$25 million

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 2: Address infrastructure challenges in areas with low or negative growth; and

Need 12: Improve access to jobs and services for people in regional and rural areas

Significant	Significant	Significant	Significant
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0-5 yrs 5-10 yrs 10-15 yrs 15-30 yrs

Need 6: Improve accessibility for people with mobility challenges

Moderate	Moderate	Moderate	Moderate
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0-5 yrs 5-10 yrs 10-15 yrs 15-30 yrs

What is this option?

Change bus and taxi/hire car regulations to encourage alternative transport services, particularly in rural and regional areas. This option will realise initiatives to integrate local community transport and taxis with route bus services to expand access opportunities. Two recent examples include the FlexiRide service operating in Yarrowonga that utilises taxis in place of bus services and a trial of community transport (ConnectU) that was held in Warrnambool. These initiatives incorporate both more accessible and more flexible delivery of transport services. Elements of this option have been trialled in regional centres; however, it can apply in outer suburbs and rural areas. Through changes in regulation and delegation of local governance this option would open up the ability for the private sector to provide innovative, flexible transport solutions to Victorians facing isolation due to disability, location or income. This will help foster greater social inclusion in areas with poor transport services (further detail in *What is this option? cont'd*).

What is the level of community support?

There was a high level of discussion of this option during consultation. Responses were generally positive. This option was recommended by the metropolitan citizen jury.

What do we think of this option and why?

This option was recommended in the strategy (ref. 2.1.3, 6.2.1 and 12.2.6) for delivery within 10 years, as trials have shown that demand-responsive transport can improve transport access and provide a cost effective alternative to conventional public transport services, particularly in lower density areas (including the regions). The provision of such services can also reduce community reliance on private vehicle travel and the need for household car ownership. This initiative may require ongoing subsidies and regulation changes and should build on the recent trials of such services in Yarrowonga and Warrnambool.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

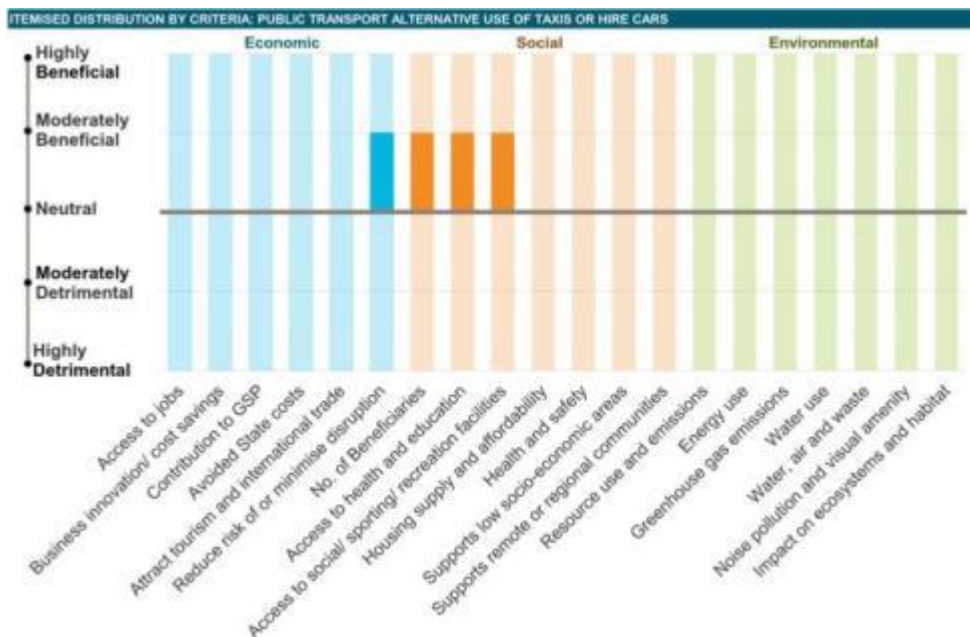
How does this option perform under different scenarios?

Supercity	+	More efficient use of transport capacity
Westside Story	+	More efficient use of transport capacity
Regional Cities	+	More efficient use of transport capacity
Accelerated Climate Change /Mitigation	+	Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	+	More affordable transport options
Biosecurity Threat	Neutral	

How does this option work with others?

This option complements public transport accessibility (PTV) in that it can provide accessible community transport. This option is particularly relevant for smaller regional centres as alternative to regional bus upgrades (RBU). Mobility as a service (MAS) will have a role in completing PTA and may replace it in future.

What are the economic, social and environmental impacts of this option?



What is this option? (cont'd)

Areas best suited to this type of service include population clusters that are connected with Melbourne and the wider region by regional buses or trains but that have limited means of local circulation, such as Camperdown, Romsey, Seville, Bacchus Marsh or Yarrum.

Risks and opportunities

There is a risk with this option that a number of regulatory and legal changes will need to be made to use taxi or hire cars as a replacement for traditional public transport route services that could lead to implementation delays. However, trials are underway to understand these regulatory and legal changes.

There may be an opportunity to redeploy low use buses to higher demand areas through the use of taxi or hire cars on existing routes. This would save investment in additional buses and drivers for regional areas.

Additional notes

Next steps

The first steps will be to refine the proposed service changes based on the evaluation of recent trials to identify high priority locations for implementation.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Public Transport Victoria, *New PTV FlexiRide service for Yarrowonga and Mulwala*, 2013

Public transport network resilience

PTN

Option type

Better use through refurbishment of existing assets
 Incremental expansion of existing assets
 New assets

Location

Statewide

Sector

Transport

Certainty of evidence

Low

Direct option cost

\$500 million–\$750 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 19: Improve the resilience of critical infrastructure

Significant	Significant	Significant	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Upgrades, refurbishment and new infrastructure assets to increase the resilience of the public transport network, particularly heavy rail. During intense weather events the public transport network struggles to maintain services through flooding of underground spaces, trees falling over lines, buckled tracks in hot weather and other events. Relatively small shocks to the system can lead to network-wide failures. This option aims to build resilience in the entire network that will enable it to absorb shocks and continue operation during extreme weather events (further detail in *What is this option? cont'd*).

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive.

What do we think of this option and why?

This option was recommended in part in the strategy (ref. 19.1.3) because many aspects of Victoria's public transport network are susceptible to weather events that delay or cancel services, disrupting people's journeys and reducing their confidence to use public transport. In fact there are many contributors to service disruptions, and we think an all hazards approach is appropriate. However, this option was recommended in a scaled-down form, focusing first on the further work required to identify and prioritise the types of interventions such as additional substations, upgrades to drainage and removal of vegetation and identifying high priority locations. This option was assessed as providing a significant contribution to Need 19 across all time periods and scores well on the economic and social indicators. While it has been identified as a relatively modest cost, careful planning is required to develop the program scope.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	Relates to key point/option for discussion
Regional Growth Plans	Contributes to implementing policy

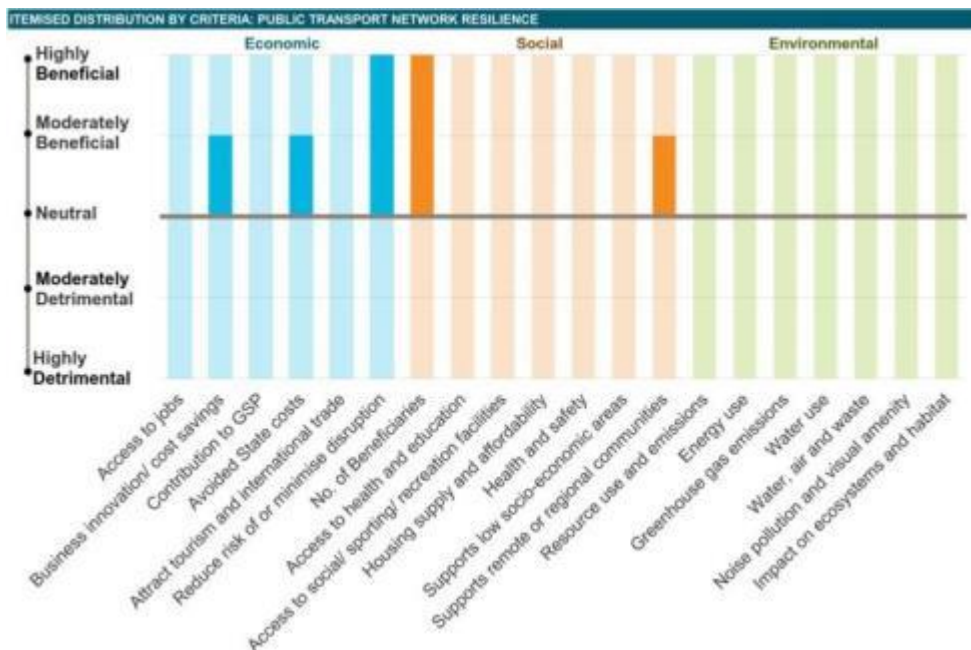
How does this option perform under different scenarios?

Supercity	++	Addresses heightened impact of disruptions
Westside Story	+	Addresses heightened impact of disruptions
Regional Cities	+	Addresses heightened impact of disruptions
Accelerated Climate Change /Mitigation	++	Addresses heightened risk of disruptions
Prolonged/ Severe Economic Downturn		Neutral
Biosecurity Threat		Neutral

How does this option work with others?

This option complements works undertaken with Metropolitan rail capacity upgrades (MRC) and Regional rail capacity upgrades (RRC) to improve the resilience of the rail network.

What are the economic, social and environmental impacts of this option?



What is this option? (cont'd)

Specific areas of flooding concern are Windsor railway station and the corner of Kerferd Road and Canterbury Road in Middle Park (route 12 tram). The greater provision of turnbacks and back-up power substations will allow rail services to be more agile in their response to disruptions. Although a larger intervention beyond the scope of these small upgrade packages, modernised signalling will reduce the reliance on copper wiring which is subject to damage and theft and also boost overall capacity on the rail network.

Risks and opportunities

There are risks from undertaking construction in existing operational transport corridors that would need to be managed during the option delivery phase.

Increased resilience will enhance the attractiveness of public transport and maintain transport routes for emergency services.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Public transport train timetabling

PTT

Option type

Better use through coordination processes

Location

Melbourne

Sector

Transport

Certainty of evidence

Medium

Direct option cost

\$1 million–\$10 million

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 10: Meet growing demand for access to economic activity in central Melbourne

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

Need 11: Improve access to middle and outer metropolitan major employment centres

Low	Low	Low	Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Deliver timetable changes across the train system to realise all available capacity by reconfiguring peak period services to better meet patronage demand. This option would increase services on the lines to Melbourne's north and west, some of the most crowded in the network. To make these changes it would be necessary to remove a number of services from the City Loop that would then run direct to Flinders Street Station at peak times. For example, base case scenarios for the *Melbourne Metro Concept of Operations* (Draft, June 2013), a report which sets out the capability of the network after the Regional Rail Link Project completion, show all peak period Frankston Line services operating direct to Flinders Street and continuing on to Southern Cross Station to connect to the Werribee Line. This would be a temporary change, with Frankston services returning to the City Loop following completion of the Melbourne Metro by 2026. This report also shows approximately eight additional trains per hour from north and west Melbourne could be added.

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive. Both citizen juries made recommendations in support of this option.

What do we think of this option and why?

This option was recommended in the strategy (ref. 10.4.2) because it completes service improvements provided for by the Regional Rail Link, making a moderate contribution to Need 10 on the back of capital investment which has already been made. Timetable changes will allow for the maximum number of services to be provided on some of Melbourne's busiest lines, enabled by and in keeping with the planned benefits of this investment. Every timetable change, however, inconveniences some customers and in this instance we expect some people using the Frankston line will need to start interchanging who previously didn't. On balance, however, this is an essential change to address crowding on the lines that service the rapidly growing north and west.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

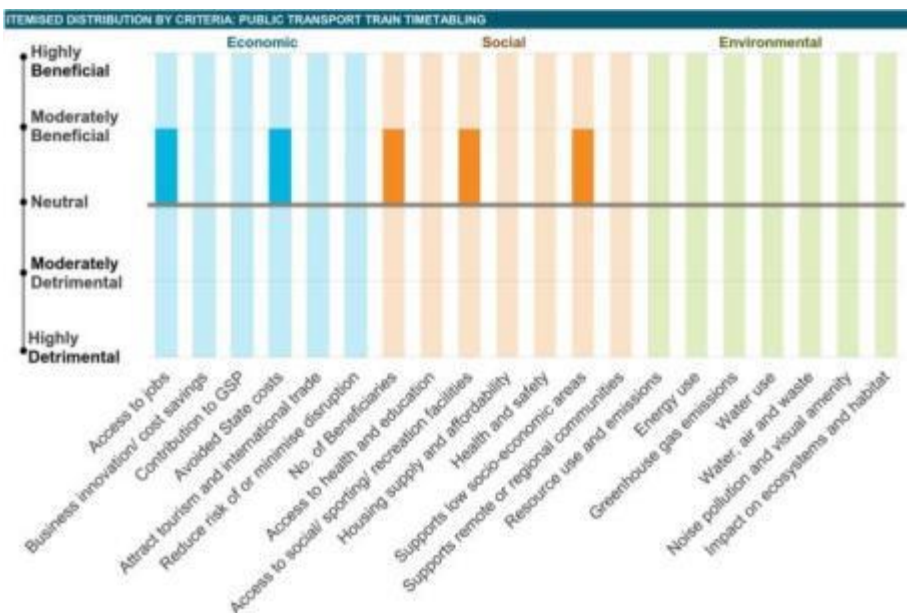
How does this option work with others?

This option is not dependent on any others as it is about fully utilising infrastructure which is already in place. It would be complemented by coordination with timetabling and service routes of buses and trams where they connect with train services through options such as metropolitan bus network reform (MBN) to ensure maximum connectivity between the different modes.

How does this option perform under different scenarios?

Supercity	++	Supports mode shift to address congestion
Westside Story	+	Supports mode shift to address congestion
Regional Cities	+	Supports mode shift to address congestion
Accelerated Climate Change /Mitigation	+	Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	-	Less demand for mass transit
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



Risks and opportunities

With changes to City Loop access for some passengers, there is a risk that this option may lose community support despite passengers from other areas enjoying additional services.

With a new train timetable, there is an opportunity to change tram and bus timetables to achieve a greater level of connection between different transport modes. Buses and trams that are scheduled to meet train departures can create smoother and faster journeys for passengers from their homes to their destinations.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Public Transport Victoria, *Melbourne Metro concept of operations: Draft document version 8*, 2013

Public Transport Victoria, *Metropolitan train timetables*, 2016

Public transport accessibility

PTV

Option type

Better use through refurbishment of existing assets

Location

Statewide

Sector

Transport

Certainty of evidence

Low

Direct option cost

\$750 million–\$1 billion

Option lead time

>15 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 6: Improve accessibility for people with mobility challenges

Moderate	Moderate	Moderate	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Upgrade public transport assets across all modes (trains, trams, buses) to provide accessibility for all Victorians. The *Victorian State Disability Plan 2013-2016* identifies making transport infrastructure more accessible as a key priority and is considered here as a separate project based on the size of the investment required. There have been ongoing programs in place to meet legal requirements for accessible public transport. However, this option includes the accelerated full roll-out of required upgrades across all assets, vehicles and transport modes to provide full journey accessibility. It also includes upgrading information displays and platform facilities to suit all abilities. *Disability Standards for Accessible Public Transport 2002* (DSAPT—DDA 1992) specifies the targets of accessibility over time for all modes, with the goal that all buses be fully accessible by 2022 and trains/trams by 2032 (consistent with the expected retirement of non-compliant rolling stock). It also specifies that 90 per cent of all tram, train and bus stops should be compliant with their respective standards by the end of 2017 (further detail in *What is this option? cont'd*).

What is the level of community support?

There was a high level of discussion of this option during consultation. Responses were generally positive. Both citizen juries made recommendations in support of this option.

What do we think of this option and why?

This option was recommended in the strategy (ref. 6.1.3) because we think that access to infrastructure will enhance social inclusion, due to the ease with which people can travel from place to place to access employment and services. The option makes a moderate contribution to meeting need 6 in the short-term which becomes significant in the longer term. While government must meet the requirements of the *Disability and Discrimination Act 1992*, we have taken this to be base case (further detail in *What do we think of this option and why? cont'd*).

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	Relates to key point/option for discussion
Regional Growth Plans	Contributes to implementing policy

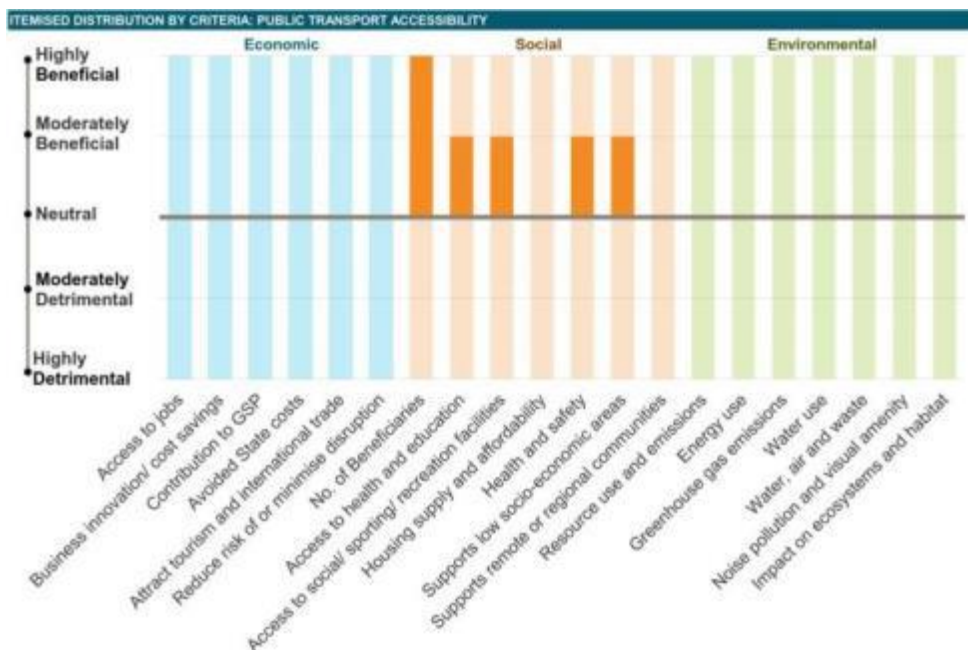
How does this option work with others?

In some locations other transport upgrade options will substitute the need for this option, for example multi-modal interchange improvements (MII) and metropolitan rail station interchange upgrades (MRI). Other options that complement this option include options for new rolling stock, for example high capacity trains– 10 car (HCT2).

How does this option perform under different scenarios?

Supercity	+	Increase demand for accessible transport
Westside Story	+	Increase demand for accessible transport
Regional Cities	+	Increase demand for accessible transport
Accelerated Climate Change /Mitigation	+	Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	+	Increases range of affordable transport options
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



What is this option? (cont'd)

This program should work toward the full realisation of DSAPT through the following actions:

- Regional buses: Require wheelchair lifts on all new coaches as rolling stock is replaced.
- Local buses: Continue to improve bus stops with tactile surface indicators and passenger information displays (PIDs) including audible timetables. Complete the fully low-floor fleet (with PIDs on-board) as rolling stock is replaced.
- Metropolitan and regional rail: Continue to improve accessibility at stations through better ramps, more sheltered areas, hearing loops, accessible toilets and assistance call buttons etc. Outfit both existing and new rolling stock with allocated spaces, hearing loops and assistance buttons. Ensure the legislated platform gap is achieved at all stations for all vehicles or apply other solutions such as a dynamic ramp on all rolling stock for use at non-compliant stations.
- Tram: Continue to acquire low-floor trams as the fleet is expanded and continue to rebuild/renew tram stops to an accessible standard.

What do we think of this option and why? (cont'd)

We propose an acceleration of current upgrade programs focused on low cost and high benefit upgrades so that all public transport users have greater access as soon as possible. The government should particularly consider prioritising access and integration improvements at key destinations, such as hospitals. Cost efficiencies may be achieved through combining this option with other recommended transport upgrades such as Multi-modal interchange improvements (MII) and Metropolitan rail station interchange upgrades (MRI).

Risks and opportunities

Despite the upgrades to the platforms and stops, the surrounding roads and footpaths may still prevent people from accessing public transport. Without upgrades by other infrastructure owners there is a risk that, people may still not be able to access their public transport needs.

There is an opportunity with the upgrades of stations for disability access to deliver general station amenity upgrades such as additional lighting, landscaping and repainting. In addition to providing better access to all transport users, the amenity works could encourage greater use of public transport.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then we have clarified that this recommendation is focused on acceleration of retrofitting assets. This responds to stakeholder misinterpretation that full DDA compliance would be achieved in 0-5 years.

Scope change

The previous cost estimate for this option was higher as it included the procurement of new rolling stock that has since been removed from the scope of this option. The removal of rolling stock from the scope was to focus this option on upgrading the existing fixed transport infrastructure and retrofitting existing rolling stock that can be done and accelerated now without the long lead time for rolling stock procurement. New rolling stock is covered by options High capacity trains – 10 car (HCT2), High capacity trains – 7 car (HCT3), High capacity trams (HCT4) and Regional rolling stock expansion (RRS).

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Victorian Department of Transport, Planning and Local Infrastructure, *Accessible public transport in Victoria action plan 2013-2017*, 2013

Regional bus upgrades

RBU

Option type

Incremental expansion of existing assets

Location

Regional and rural Victoria

Sector

Transport

Certainty of evidence

Low

Direct option cost

\$500 million–\$750 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 2: Address infrastructure challenges in areas with low or negative growth

Low	Low	Low	Low
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0-5 yrs 5-10 yrs 10-15 yrs 15-30 yrs

Need 12: Improve access to jobs and services for people in regional and rural areas

Moderate	Moderate	Moderate	Moderate
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0-5 yrs 5-10 yrs 10-15 yrs 15-30 yrs

What is this option?

Deliver new and expanded bus networks throughout regional Victorian cities and towns, including Geelong-Bellarine, Bendigo, Latrobe Valley, Grampians, Ballarat and Shepparton, with a focus on the provision of adequate capacity and connections in growth areas. Improving regional city bus services will increase personal mobility, resulting in improved access to jobs and services in regional cities and Melbourne. It will also help increase social inclusion through the delivery of improved transport services. Regional bus upgrades should focus on the achievement of both spatial and frequency standards to provide a reliable public transport option for all Victorians. Geelong-Bellarine and Bendigo have recently developed new network plans to guide public transport investment, with Bendigo citing a 400-600 metre maximum walking distance to bus stops as a preferred target. Examples of areas for system redevelopment are Ballarat and Wodonga due to their high growth rates and/or existing limitations of services.

What is the level of community support?

There was limited to no discussion of this option during consultation. Both citizen juries made recommendations in support of this option.

What do we think of this option and why?

This option was recommended in the strategy (ref. 12.2.7) because additional bus services within regional cities increases personal mobility, provides access to jobs and services and increases social inclusion. Additional bus services focused on increasing capacity and coverage in growth areas of regional cities were assessed as providing a moderate contribution to need 12 with very strong social benefits. For a moderate upfront cost, additional bus services provide a flexible and cost-effective means to deliver transport solutions in regional cities. This option was recommended for delivery over the next 10 years building on recent changes to the Bendigo bus network (further detail in *What do we think of this option and why? cont'd*).

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	Consistent
Regional Growth Plans	Contributes to implementing policy

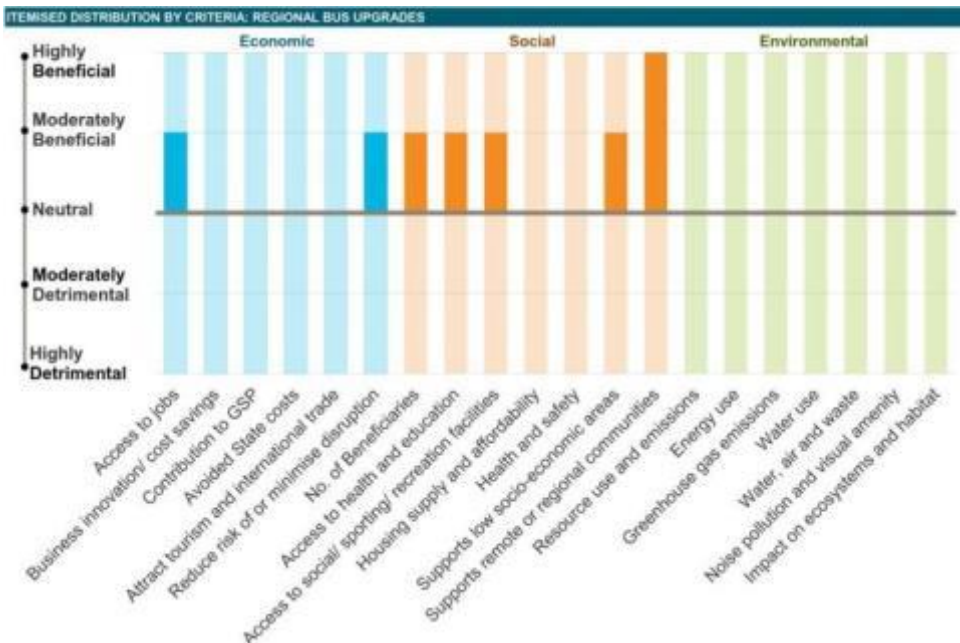
How does this option perform under different scenarios?

Supercity	Neutral	
Westside Story	Neutral	
Regional Cities	+	Improves access
Accelerated Climate Change /Mitigation	+	Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	+	Provides a safety net for access in regional areas
Biosecurity Threat	Neutral	

How does this option work with others?

This complements access, platform and vehicle improvements through multi-modal interchange improvements (MII) and public transport accessibility (PTV). This option is similar to public transport alternative use of taxis or hire cars (PTA) and therefore they should not be implemented in the same location. This option also complements regional coach upgrades (RCU) by connecting local bus services in regional cities with inter-town coach services.

What are the economic, social and environmental impacts of this option?



What do we think of this option and why? (cont'd)

This option will need to be reviewed over time as alternative transport options emerge and driverless technology develops.

Risks and opportunities

There is a risk that the new services may not be supported without sufficient promotional coverage. Providing new transport links with very low passenger numbers may take services away from other locations that could have a greater need.

There is an opportunity with the bus upgrades to deliver amenity upgrades such as additional lighting, landscaping and repainting at bus stops. In addition to providing better bus services, the amenity works could encourage greater use of public transport.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Victorian Department of Economic Development, Jobs, Transport and Resources, *Connecting regional Victoria: Victoria's regional network development plan*, 2016

Relocatable community infrastructure

RCI

Option type

New assets

Location

Statewide

Sector

Cultural, civic, sporting, recreation and tourism

Education and Training

Certainty of evidence

Medium

Direct option cost

\$25 million–\$50 million

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 1: Address infrastructure demands in areas with high population growth; and

Need 5: Provide public spaces where communities can come together

Significant	Significant	Significant	Significant
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0-5 yrs 5-10 yrs 10-15 yrs 15-30 yrs

Need 12: Improve access to jobs and services for people in regional and rural areas

Low	Low	Low	Low
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0-5 yrs 5-10 yrs 10-15 yrs 15-30 yrs

Need 19: Improve the resilience of critical infrastructure

Moderate	Moderate	Moderate	Moderate
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0-5 yrs 5-10 yrs 10-15 yrs 15-30 yrs

What is this option?

For areas experiencing high levels of population growth there can be a significant lag between the time that new residents arrive in areas experiencing high growth and the delivery of basic community infrastructure. This option proposes the use of relocatable or interim buildings as a solution to address immediate community needs before permanent facilities can be funded and constructed. The facilities could be used for services such as early years' services, community meeting spaces and health consulting rooms. The state would support local government and community organisations to deliver the facilities through a grants program that would be tied to criteria based on service need and infrastructure gaps. Areas experiencing rapid change or that have been impacted by disasters (e.g. bushfires) would be prioritised.

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive.

What do we think of this option and why?

This option was recommended in the strategy (ref. 1.4.3, 5.4.1 and 19.2.3) because relocatable buildings can be high quality, affordable, sustainable and provide a rapid response to meet changing community needs. The relocatable buildings would need to be flexibly designed to meet the regulatory and service requirements of the services that will use them. We have costed the buildings at about \$1 million each at a size of 240m² as this would be a sufficient size to run a kindergarten program. There are around 20 local government areas in the top quintile of population growth (absolute and percentage). We allowed in our estimates that up to 30 relocatable buildings may need to be funded. Moreover, temporary or interim facilities should be able to be included as allowable items for funding through developer contributions mechanisms. We think this program may be required for approximately 10 years. After that time, the program should be reviewed. There may be sufficient permanent infrastructure after that time to manage ongoing population growth.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Consistent

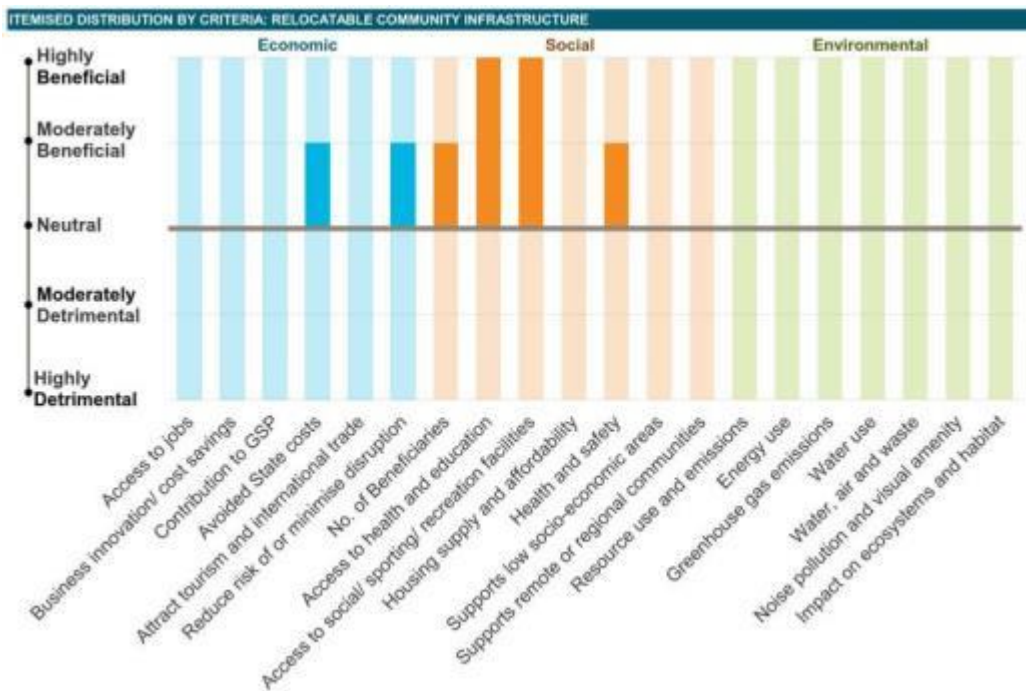
How does this option perform under different scenarios?

Supercity	+	Enables rapid response to high levels of growth
Westside Story	+	Enables rapid response to high levels of growth
Regional Cities	+	Enables rapid response to high levels of growth
Accelerated Climate Change /Mitigation	+	Supports emergency response to natural disasters
Prolonged/ Severe Economic Downturn	Neutral	
Biosecurity Threat	+	Supports emergency response to natural disasters

How does this option work with others?

This option can assist with meeting early community needs. It would allow time to understand community needs before future community facilities are built in greenfield areas and urban renewal areas. It does not substitute the need for permanent new facilities such as schools as community facilities (SCF).

What are the economic, social and environmental impacts of this option?



Commentary:

There is a significant community benefit when communities can have early access to essential community services such as kindergartens.

Risks and opportunities

Appropriate planning should be undertaken to ensure interim facilities do not replace the need for permanent infrastructure. Community expectations need to be managed; it is important that communities understand the facilities are temporary and that they will be removed once there is no longer a need. A further consideration would be to ensure additional temporary community infrastructure is coupled with adequate outdoor space, for example a temporary kindergarten would require outdoor play areas.

Temporary infrastructure can be commissioned immediately to provide access to essential services for many communities. Access to libraries, kindergartens and sport facilities, for instance, will take pressure off existing transport services if residents can access these services within their own suburb. This would be particularly beneficial in areas that are more isolated and don't have access to facilities in neighbouring areas. This option also has a multi-use benefit in that it allows the infrastructure to be moved to other locations within a local government area or even to another region once it is no longer needed. Portable buildings could also be built for multiple purposes. Regions that are projected to grow less rapidly may suffer from an oversupply of older infrastructure and so areas experiencing rapid growth and change should be prioritised.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then we have refined the recommendation to replace 'pop up' with 'interim'. This responds to stakeholder feedback that 'pop-up' suggests it can appear overnight, whereas there is still a need to do some pre planning to make sure the facility is appropriately located, and can meet community need. Stakeholders suggested 'interim' facilities would be a more appropriate technical term that should be an allowable item for development contributions.

Next steps

- Some local governments such as the City of Whittlesea have already begun using relocatable infrastructure for two purposes, where permanent infrastructure was destroyed after bushfires and in new areas experiencing rapid growth. This option should build on this experience.
- A state government administered grants fund would need to be established.
- Review existing and proposed developer contribution mechanisms to allow for temporary or interim community infrastructure to be an allowable item.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Residential and commercial property densification RCP

Option RCP is addressed in STO - Strategic transit-oriented centres and corridors.

Regional coach upgrades RCU

Option type

Incremental expansion of existing assets

Location

Regional and rural Victoria

Sector

Transport

Certainty of evidence

Medium

Direct option cost

\$500 million–\$750 million

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 2: Address infrastructure challenges in areas with low or negative growth; and

Need 12: Improve access to jobs and services for people in regional and rural areas

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Deliver additional coach services to increase the frequency of public transport and provide new links between rural communities and regional centres and cities to increase access to jobs, education, health care and other services. Priority corridors for regional coach services should include those areas that do not have direct rail connections and/or exhibit high demand on existing coach routes, e.g. the arc of major regional centres connecting Geelong, Ballarat, Bendigo and Shepparton, as well as high-demand growth corridors such as Heathcote-Melbourne. Upgrades should also include connections between regional/rural towns that are not currently connected to each other via a scheduled public transport service despite their proximity and potential for increased interaction (such as Ararat and St Arnaud-Donald).

What is the level of community support?

There was limited discussion of this option during public consultation.

What do we think of this option and why?

This option was recommended in the strategy (ref. 2.1.2 and 12.2.8) because additional coach services between regional towns and cities provide a vital service to access jobs, services and recreational activities across rural and regional Victoria. The delivery of additional coach services provides a moderate contribution to needs 2 and 12 and would deliver very strong social benefits. For a low upfront cost, additional coach services provide a flexible means to deliver transport solutions in rural and regional areas. This option does not provide for a coach service to every town but is designed to provide basic coverage across the state and link into the regional rail network (further detail in *What do we think of this option and why? cont'd*).

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy Rail connections from Geelong to Ballarat and Bendigo are identified in the G21 RGP. Our option is consistent with the policy aim to improve Geelong's connection to the broader region

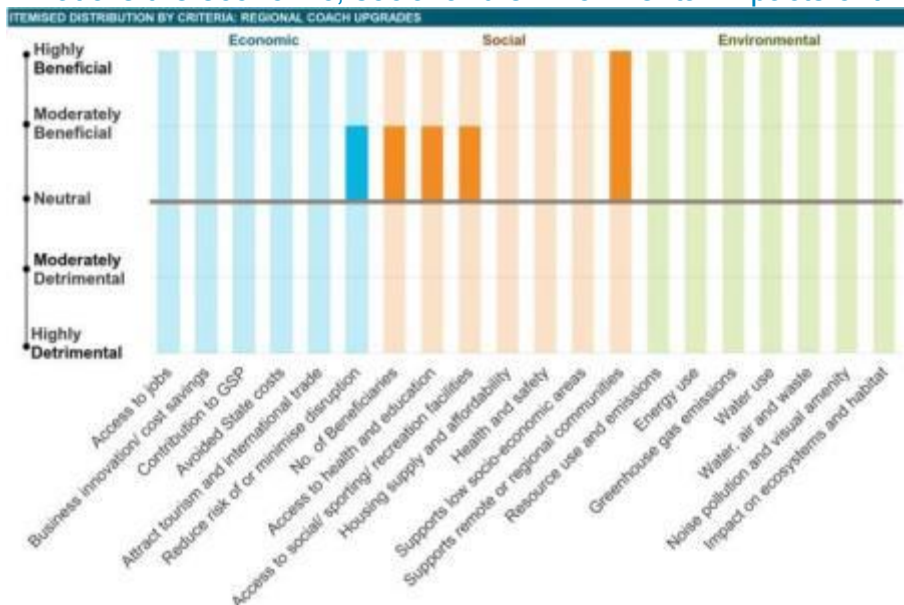
How does this option perform under different scenarios?

Supercity	Neutral	
Westside Story	Neutral	
Regional Cities	+	Improves access
Accelerated Climate Change /Mitigation	+	Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	+	Provides a safety net for access in regional areas
Biosecurity Threat	Neutral	

How does this option work with others?

Increasing coaches between regional cities and rural townships complements access, platform and vehicle improvements through multi-modal interchange improvements (MII) and public transport accessibility (PTV). This option also complements regional bus upgrades (RBU) in connecting inter-town coach services with local bus services in regional cities. This option provides an alternative lower cost solution to Bendigo-Ballarat-Geelong rail revival (BBG) for transport between these three regional centres.

What are the economic, social and environmental impacts of this option?



What do we think of this option and why? (cont'd)

This option was recommended for delivery over the next 10 years building on priorities in the Regional Network Development Plan to transparently identify locations for new or expanded coach services. This option will need to be reviewed over time as alternative transport options emerge and driverless technology develops.

Risks and opportunities


There is a risk that the new services may not be supported without sufficient promotional coverage. Providing new transport links with very low passenger numbers may take services away from other locations that could have a greater need.

There is the opportunity to have better local public transport connections in regional centres, to help supplement the inter-town coach services.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Victorian Department of Economic Development, Jobs, Transport and Resources, *Connecting regional Victoria: Victoria's regional network development plan*, 2016



Integrated shared use community and recreation facilities RFC

*Option RFC is addressed in CSM - Cultural and sport
major infrastructure investment framework*

Riparian fence investment RFI

Option type

Incremental expansion of existing assets

Location

Regional and rural Victoria

Sector

Science, agriculture and environment

Water and waste

Certainty of evidence

Medium

Direct option cost

\$100 million–\$250 million

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 16: Help preserve natural environments and minimise biodiversity loss; and

Need 17: Improve the health of waterways and coastal areas

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option focuses on investment in riparian fences to prevent stock access into rivers and limit the associated damage caused by erosion, defecation, vegetation damage and sedimentation.

Riparian damage from unrestricted livestock access impacts catchment health and water quality. This has consequences for biodiversity given the importance of waterway health to species flourishing, providing habitats for wildlife, shade to maintain water temperatures, and roots to control erosion. Riparian zones are also natural wildlife corridors, for example playing a valuable role in assisting migration of endangered species. This option would require a policy or planning mechanism to ensure sensitive waterways are fenced off, banks are re-established and other management mechanisms are employed.

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive. Both citizen juries made recommendations in support of this option.

What do we think of this option and why?

This option was recommended in part in the strategy (ref. 17.1.2) because protecting riparian areas will assist to maintain the health of river and stream banks as well as minimising water quality impacts. Specifically, we recommended expanding the program of fencing of riparian areas in priority waterways while allowing for uptake of alternative solutions such as virtual fencing. The *Regional riparian action plan* (2015) identifies that more work is required to accelerate improvements to riparian land. Currently 23 per cent of this land is in excellent or good condition, 43 per cent in moderate condition and 32 per cent in poor or very poor condition. The recommendation focuses delivery of riparian management solutions to priority waterways over a specified time period.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

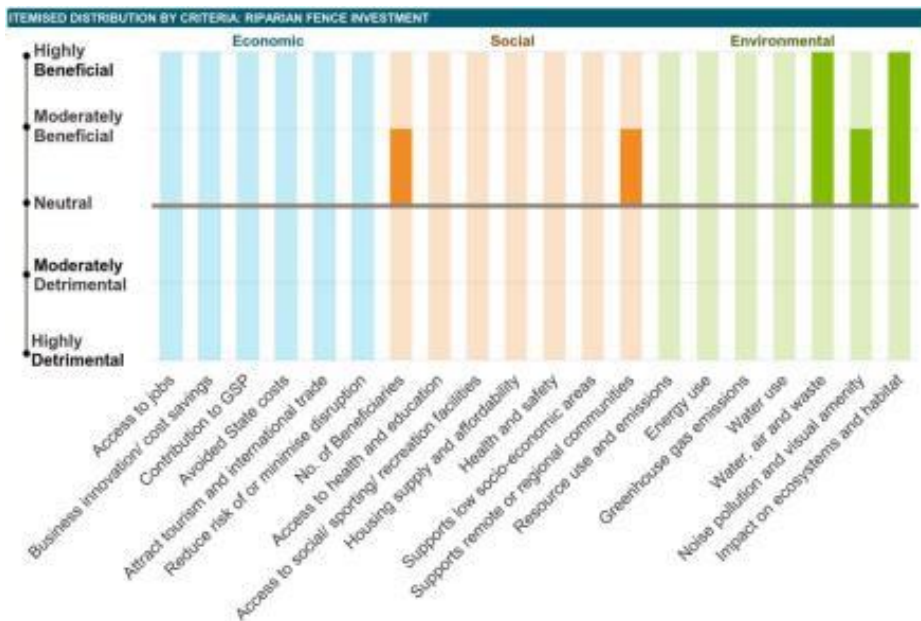
How does this option perform under different scenarios?

Supercity	+	Likely growth in livestock industry to feed larger population
Westside Story	+	Likely growth in livestock industry to feed larger population
Regional Cities	++	Likely growth in livestock industry to feed larger population
Accelerated Climate Change /Mitigation	+	Minimises stress to waterway health
Prolonged/ Severe Economic Downturn	-	Less demand for livestock
Biosecurity Threat	Neutral	

How does this option work with others?

This option can enable the implementation of the habitat corridor link (HCL) option if installation of fencing is aligned with potential habitat corridors.

What are the economic, social and environmental impacts of this option?



Risks and opportunities

A risk of this option is that investments are poorly targeted or not considered in a broader context, for example in flood-prone areas where a different approach may be needed.

This option presents an opportunity to protect natural wildlife corridors, playing a valuable role in assisting migration of endangered species to safe habitats and protecting endangered flora.

Improved health of waterways would assist in maintaining high water quality and improving amenity values in some areas leading to community benefits and tourism.

Additional notes

While riparian fencing means construction of fencing for land near waterways, additional work is typically required such as weed management, revegetation and erosion control. Included in the costs of this option are basic weeding and watering of vegetation costs. Site specific consideration may determine that costs in addition to this are required.

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then we have expanded the scope of this recommendation to highlight removal of the regulatory barriers to fenceless farming technologies in response to stakeholder feedback that this is one of the primary obstacles to market uptake.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Victorian Department of Environment, Land, Water and Planning, *Our catchments our communities: Integrated catchment management in Victoria, 2016-19*, 2016

Victorian Department of Environment, Land, Water and Planning, *Regional riparian action plan: Working in partnership to improve riparian land in regional Victoria*, 2015

Victorian Department of Environment, Land, Water and Planning, *Riparian fencing in flood-prone areas guidelines*, 2015

Residential facilities for people with disabilities

RFP

Option type

Better use through refurbishment of existing assets

Incremental expansion of existing assets

New assets

Location

Statewide

Sector

Health and human services

Certainty of evidence

Medium

Evidence base

Deloitte/Aurecon, *Assessment 1: Options analysis report*, 2016

Direct option cost

\$1 billion–\$5 billion

Contribution to meeting the need

Need 6. Improve accessibility for people with mobility challenges – **Low**

What is this option?

This option proposes the expansion of infrastructure for people with disabilities, including residential care facilities and accessible individual housing. Expansion is proposed through provision of new purpose-built facilities.

Aged care residential facilities are often being used to provide residential care for persons with a disability. Aged care facilities do not however, provide the correct setting, particularly for younger patients with a disability.

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option is not recommended in the strategy because home modifications will be covered by the NDIS. In circumstances where housing is required, then this will be social housing which is covered by social housing stock expansion (SHE) rather than specialist housing for people with disabilities.

Rowville heavy rail line

RHR

Option type

New assets

Location

Melbourne eastern subregion

Sector

Transport

Certainty of evidence

Medium

Direct option cost

\$5 billion–\$10 billion

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 10: Meet growing demand for access to economic activity in central Melbourne; and

Need 11: Improve access to middle and outer metropolitan major employment centres

Low	Low	Moderate	Moderate
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0-5 yrs

5-10 yrs

10-15 yrs

15-30 yrs

What is this option?

A new heavy rail line to Rowville connected at Huntingdale Station running east along the central median of North Road and Wellington Road to Stud Road, then turning north to terminate at Stud Park. The works include the construction of four stations at Monash University, Mulgrave, Waverley Park and Rowville. This option provides a better service for people to access employment opportunities around the Monash National Employment Cluster (NEC) and jobs and services in the central city. A rail extension to Rowville is identified in the PTV *Network Development Plan – Metropolitan Rail*, December 2012 for delivery in Stage 3. A feasibility study has also been completed which identified that prior to this project occurring there is a need to remove level crossings on the Dandenong corridor (committed) and introduce extended trains (e.g. 10 car trains – option HCT2) operating via a new Melbourne Metro tunnel (committed).

What is the level of community support?

There was a high level of discussion of this option during consultation. Responses were generally positive. This option was opposed by the metropolitan citizen jury.

What do we think of this option and why?

This option was not recommended in the strategy because a more comprehensive service could be provided at a lower cost by developing a mass transit network focused around the Monash NEC (ref. 11.4.4). While there would be benefits in linking the Monash University precinct and Rowville directly to central Melbourne without interchange, the poor preliminary cost benefit ratio demonstrates that these are outweighed by the costs. East of Monash, the remainder of the corridor that this option is proposed to service is relatively low density and experiencing low levels of growth. Either the proposed mass transit network or continued upgrades to the SmartBus network (SNE and LBS) could adequately support the Rowville corridor over the long term. Even though this option has general community support, the evidence does not support its inclusion in the strategy.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

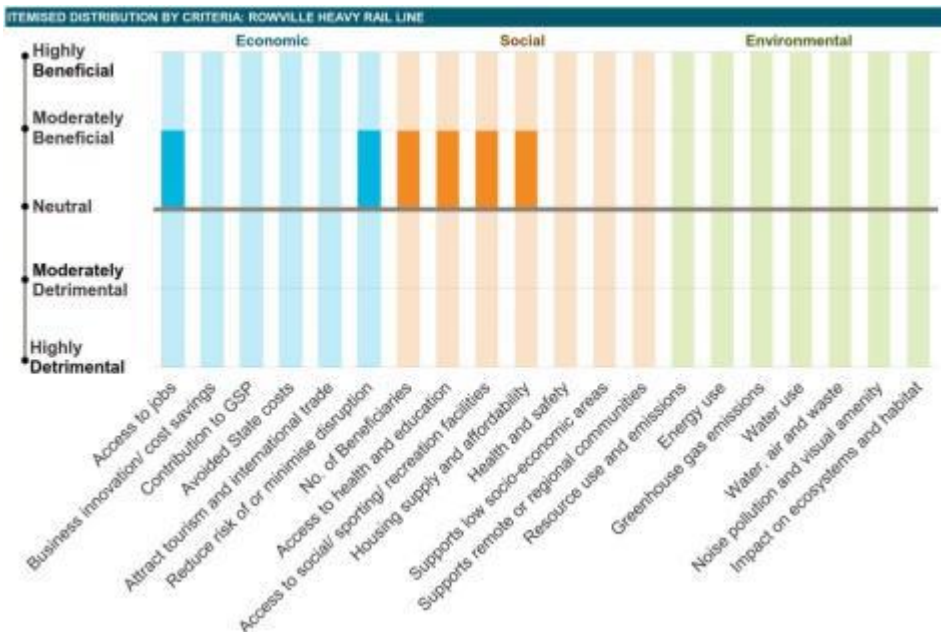
How does this option perform under different scenarios?

Supercity	++	Supports mode shift to address congestion
Westside Story	Neutral	
Regional Cities	+	Supports mode shift to address congestion in Melbourne
Accelerated Climate Change /Mitigation	+	Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	-	Less demand for mass transit
Biosecurity Threat	Neutral	

How does this option work with others?

This option is dependent on high capacity trains - 10 car (HCT2). The ability of this option to reduce road congestion would be dependent on managing demand (e.g. through TNP).

What are the economic, social and environmental impacts of this option?



Risks and opportunities

There are risks to be managed during delivery of the project including unknown ground conditions during tunnelling and impacts to rail and utility services during construction.

There is an opportunity to increase the land use density along the new rail corridor and provide a high capacity transport connection to the Monash National Employment Cluster (NEC).

Additional notes

Transport modelling and economic analysis

Infrastructure Victoria commissioned KPMG, Jacobs and Arup to undertake transport modelling for a number of options being considered for the strategy, including a variety of 'build' and 'non-build' transport options. This allowed major transport projects to be quantitatively assessed alongside several technology, policy and reform options. In addition, economic analysis was undertaken for the 'build' options to estimate a cost benefit ratio, including for this option. The options were modelled individually, mostly on a standalone basis, with a number of options then also tested in various combinations.

This analysis was undertaken on a different basis and produced different results to what is presented in the options book, which was prepared by AECOM/PwC with the intention of allowing a mixture of qualitative and quantitative assessment across the full range of options, across all sectors and needs. While on the face of it these two analyses reference similar metrics, different assumptions and methodologies have been applied. In particular, the KPMG/Jacobs/Arup assessment provided purely relative ratings of each option's contribution to the needs, with the ratings scale set by the performance of only the select range of options modelled. This had the result of showing some transport options as making a "high" contribution to Need 18 (transition to lower carbon energy supply and use) simply because they were the highest of the options modelled; however, in Infrastructure Victoria's judgement most transport sector options will make a much lower contribution than energy sector options, as transport comprises a much smaller proportion of total carbon emissions. It provides a useful assessment for sorting the relative contribution of the options modelled, but should not be taken as an absolute assessment. In contrast, the assessments developed in the AECOM/PwC assessment considered the full range of options identified for each need and provided more of an 'absolute' assessment.

With these caveats in mind, however, the results of this alternative analysis are helpful inputs into Infrastructure Victoria's 'global' assessment, and in preparing the strategy we have come to a considered view based on the totality of evidence available to us.

In terms of KPMG/Jacobs/Arup analysis of this option, transport modelling indicates that Rowville heavy rail line is projected to slightly improve metropolitan wide accessibility to employment, health, education (2 per cent) and inner city jobs (increase of 3 per cent). Due to the project's connection to Monash University, it is expected to improve access to the Monash NEC, with accessibility to the Monash NEC increasing by almost 3 per cent. As such, the project would cause a small increase in rail patronage and reduction in car travel. However, the project would have minimal impacts on levels of congestion on the network or crowding across the rail network.

Modelling indicates that the project will also have negligible impacts on freight and carbon dioxide emissions.

While the Rowville heavy rail line provides material benefits, they are outweighed by the large capital costs. Consequently, the preliminary cost benefit ratio for the Rowville heavy rail line ranges only from 0.3 - 0.5 with and without the inclusion of Wider Economic Benefits, which is a poor result.

For more detail, consult the 'Economic appraisal and demand modelling' report to Infrastructure Victoria.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

KPMG/Arup/Jacobs, *Economic appraisal and demand modelling*, 2016

Public Transport Victoria, *Network development plan: Metropolitan rail*, 2012

Public Transport Victoria, *Rowville rail study stage 1*, 2012

Public Transport Victoria, *Rowville rail study stage 2*, 2014

Regional highway upgrades RHU

Option type

Incremental expansion of existing assets

Location

Regional and rural Victoria

Sector

Transport

Certainty of evidence

Medium

Direct option cost

>\$10 billion

Option lead time

5–10 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 2: Address infrastructure challenges in areas with low or negative growth; and

Need 12: Improve access to jobs and services for people in regional and rural areas

Moderate	Moderate	Moderate	Moderate
----------	----------	----------	----------

0-5 yrs 5-10 yrs 10-15 yrs 15-30 yrs

Need 13: Improve the efficiency of freight supply chains

Significant	Significant	Significant	Significant
-------------	-------------	-------------	-------------

0-5 yrs 5-10 yrs 10-15 yrs 15-30 yrs

What is this option?

A program of priority works to improve the level of service for commercial vehicles, and to improve safety and capacity for all road users. Proposed projects include the duplication of the Western Highway from Ararat to Stawell (or, elsewhere, road widenings with centre safety barriers), upgrade of the Princes Highway East from Nar Nar Goon to Bunyip, bypasses of Shepparton, Ararat, Bendigo and Beaufort, upgraded river crossings at Swan Hill, Echuca and Yarrawonga, and upgrades to improve traffic flow such as overtaking lanes. Included in this option also are upgrades to local roads which are currently, or are anticipated to be, carrying significant freight traffic (such as transporting mineral sands in north-west Victoria and forestry products in the Green Triangle).

What is the level of community support?

There was a high level of discussion of the recommendation Regional highways, which includes this option. Responses were generally positive. This option was recommended by the regional citizen jury.

What do we think of this option and why?

This option was recommended in part in the strategy (ref. 2.1.1, 12.2.5 and 13.4.1). Specifically, we recommended that within five years a transparent framework be developed for the prioritisation, at a statewide level, of upgrades to regional highways that incorporates both strategic criteria and regional priority assessments. Such a framework could help ensure maximum return on public investment, and that a strategic approach is maintained in the prioritising of road investments across the state. High priority projects will improve the level of service for commercial vehicles and improve safety and capacity for all road users. This could include duplications (for example, on the Western Highway from Ararat to Stawell), road widening with centre safety barriers (for example, on the Goulburn Valley Highway), town bypasses (for example, Shepparton and Traralgon), upgraded river crossings (for example, at Swan Hill), and upgrades to improve traffic flow such as overtaking lanes. Further development of this option is needed to consider the specific priorities across the state.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

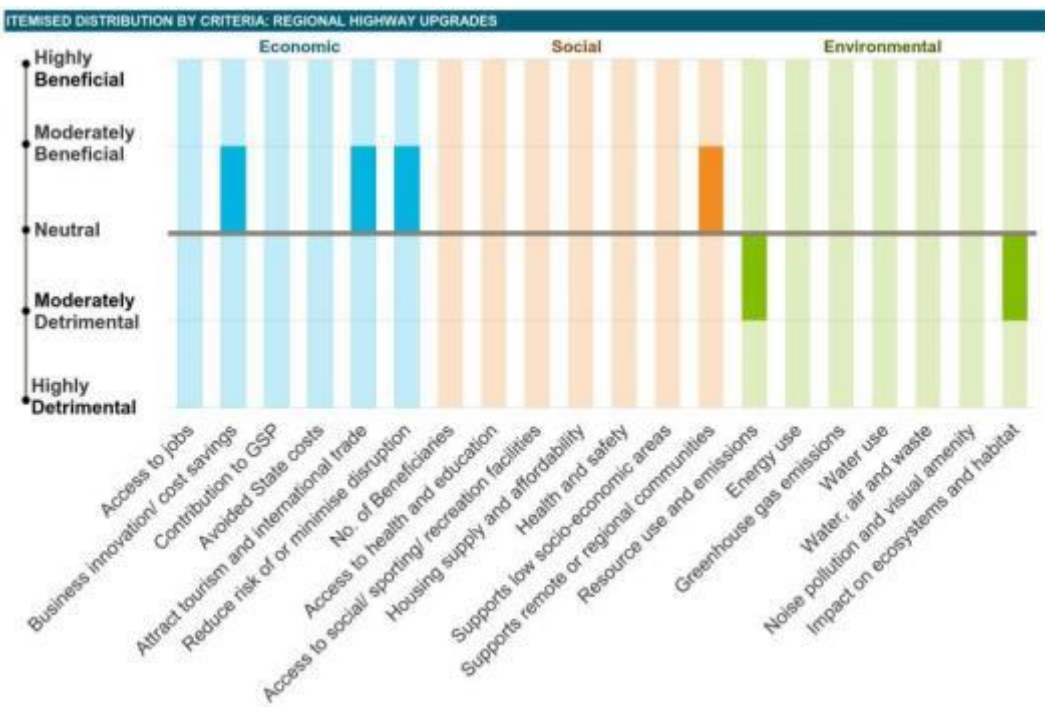
How does this option perform under different scenarios?

Supercity	Neutral	
Westside Story	Neutral	
Regional Cities	+	Addresses heightened risk of congestion
Accelerated Climate Change /Mitigation	Neutral	
Prolonged/ Severe Economic Downturn	-	Less demand for travel, heavy freight
Biosecurity Threat	Neutral	

How does this option work with others?

To maximise the value of this option for freight efficiency, it could be coupled with driverless freight vehicles (DFV). To maximise its value in terms of access to jobs, it could be complemented with automated car technology (ACT). It should be undertaken in coordination with regional road upgrades (RRU) and road asset management reform (RMF).

What are the economic, social and environmental impacts of this option?



Risks and opportunities

As this option would impact existing road corridors, there is a risk during the construction phase of traffic/freight disruption and delays. This would not be a risk during the planning phase.

There may be an opportunity to undertake planned road maintenance at the same time as the upgrades, to reduce overall costs.

This option would also support addressing road infrastructure challenges in high and low growth regional and rural areas. Highway upgrades would also support greater efficiency in the freight network inter- and intra-state.

Funding

Should government choose to pursue this program, it will then need to consider funding options. Below is a range of potential funding mechanisms which could be examined to help fund the program.

Potential funding mechanisms

General government revenue	User charges	Beneficiary charges	Property development	Asset sales
✓	✓			

General government revenue is likely to continue to be a major source of funding for programs like regional highway upgrades, particularly where there are wider community benefits from the investment, such as improved safety.

Additionally, existing heavy vehicle user charges could contribute funding for regional highway upgrades. Reforms to existing heavy vehicle user charges are needed so that charges are commensurate with the impact by those users. We recognise that this is underway through a national reform process.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then we have clarified the wording of this recommendation to highlight the important role of local knowledge to enable identification of candidates for upgrades and the need to focus on how this information is being translated into a prioritisation of highway projects at a statewide level.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Road asset management reform

RMF

Option type

Better use through coordination processes

Location

Statewide

Sector

Transport

Certainty of evidence

Medium

Direct option cost

\$10 million–\$25 million

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 10: Meet growing demand for access to economic activity in central Melbourne; and

Need 11: Improve access to middle and outer metropolitan major employment centres

Low	Low	Low	Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

Need 12: Improve access to jobs and services for people in regional and rural areas

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Despite a number of changes to the road maintenance regime underway in Victoria, this option considers reform to the State's road asset management regime (further detail in *What is this option? cont'd*).

What is the level of community support?

There was limited discussion of this option during public consultation.

What do we think of this option and why?

The option was recommended in part in the strategy (ref. 10.6.1, 11.3.1 and 12.2.1) because we believe that part of the challenge for road maintenance is ensuring that there is clear and appropriate allocation of roads between local government and the state government. Where local governments report issues with maintenance, there is some evidence that these roads are being used for purposes which may make them arterial roads, and hence should be managed by VicRoads. Similarly, there is evidence that the state government holds roads that serve a local function, and which may be surplus to needs. Clarifying these accountabilities, as part of a broader performance-based asset management framework would help ensure that government can spend its money more wisely on roads that are priorities. This only has a low to moderate contribution in meeting several needs, because in isolation, this will not provide improved outcomes without funding.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

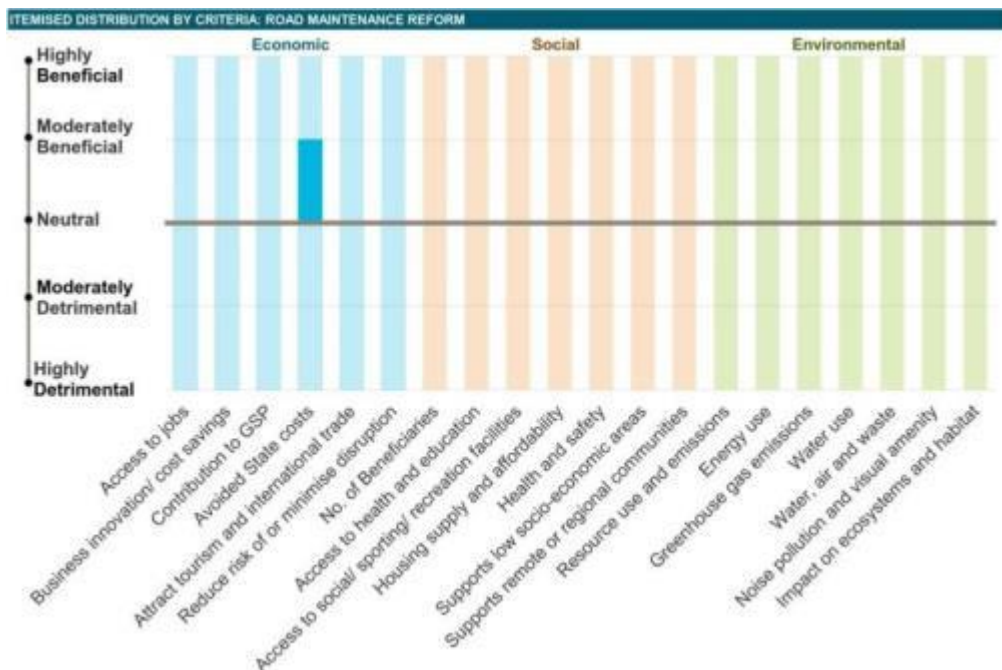
How does this option work with others?

This option is complementary to options that relate to road maintenance improvements – regional road upgrades (RRU) and regional highway upgrades (RHU).

How does this option perform under different scenarios?

Supercity	+	More efficient use of transport capacity
Westside Story	Neutral	
Regional Cities	Neutral	
Accelerated Climate Change /Mitigation	++	Heightened risk of road surface deterioration
Prolonged/ Severe Economic Downturn	-	Less wear from lower demand for travel, heavy freight
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



What is this option? (cont'd)

Reforms could include:

- Overhauling the prescriptive approach to maintenance by applying a performance-based framework which prioritises high productivity users and considers some roads surplus to requirements.
- Reviewing the allocation of road responsibility between the state and local government, consistent with the purpose and use of the road.
- Reviewing legislation to ensure that shared paths have clearly articulated maintenance accountabilities.
- Establishing collaborative road maintenance strategies between the state and local councils to bundle road maintenance programs.
- Looking at opportunities in metropolitan Melbourne to link to public transport (e.g. tram track) maintenance.
- Continuing to pursue the alliance procurement model (e.g. VicRoads and Fulton Hogan formed a maintenance alliance to improve regional roads for South Western and Eastern Victoria).

Risks and opportunities

There are risks that this initiative could result in perceived 'cost shifting' from the state to local governments, and result in overall reduced investment in road maintenance.

This option provides an opportunity to identify and utilise economies of scale in road maintenance, such as through alliances with road maintenance specialists, and through better coordination of routine road maintenance with other road changes (e.g. tram or intersection upgrades).

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Infrastructure Partnerships Australia, *Road maintenance: Options for reform*, 2011

Regional metro rail service RMR

Option type

Incremental expansion of existing assets

Location

Regional and rural Victoria

Bendigo, Ballarat, Geelong and Latrobe regional cities

Sector

Transport

Certainty of evidence

Medium

Direct option cost

\$100 million–\$250 million

Option lead time

5–10 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 12: Improve access to jobs and services for people in regional and rural areas

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Provision of intra-city 'metro rail' services in regional cities. This option would provide for additional rolling stock, signalling upgrades, station upgrades and supporting staff for introducing new timetabled services. Examples of this 'metro rail' service could include between Waurin Ponds and Corio, Kangaroo Flat and Epsom/Eaglehawk and Moe and Traralgon.

These services will increase access to jobs, education, health care and other services for people living in regional centres.

What is the level of community support?

There was limited discussion of this option during public consultation. This may be as it was not recommended in the draft strategy.

What do we think of this option and why?

This option was not recommended in the strategy because the likely demand for intra-city services can be more cost effectively met by other modes of transport such as buses or in the future by more flexible mobility solutions. In addition, more transport opportunities can be obtained by running additional 'through' services between regional areas and Melbourne rather than short shuttles within regional cities. Providing shuttle services was found to make a moderate contribution to meeting need 12 over all time periods. Although this is not a high cost solution we do not think it provides the optimal solution for transporting people within a regional city. The transport needs of residents in Bendigo, Geelong and Latrobe City are best provided for with a combination of additional local bus services under Regional bus upgrades (RBU) for local trips and additional rail services under Regional train link upgrades (RTL) for longer journeys to Melbourne and other regional towns. No economic, social and environmental impact assessment was undertaken.

Risks and opportunities

There is a risk with this option that the convenience of rail travel purely within regional cities when compared to private vehicle travel will not be great enough to generate substantial demand for the rail options that are between 10 and 30 kilometres in length.

There is an opportunity to integrate the proposed train timetables with existing bus networks and improve active transport links and facilities. There is also an opportunity to change land use and encourage greater densities around stations in line with sustainable development principles. There is a strong link between increased densities and increased active transport.

Additional notes

Several stakeholders have advocated for an extended metro rail shuttle service between Drouin and Sale. This extended service potentially has merit due to the many larger population centres all connected to the rail line within this region. Further investigation is required to understand the origin and destinations of users along this corridor and the viability of a shuttle service.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Public Transport Victoria, *Bendigo metro rail recommendations report*, 2015

Recycled material usage in building construction

RMU

Option type

Changing behaviour through safety and environmental standards

Location

Statewide

Sector

Water and waste

Certainty of evidence

High

Direct option cost

\$1 million–\$10 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 15: Manage pressures on landfill and waste recovery facilities

Low	Low	Low	Low
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0-5 yrs 5-10 yrs 10-15 yrs 15-30 yrs

What is this option?

This option reviews public sector procurement processes to remove barriers to allowing recycled materials that meet technical specifications to compete in the building and construction market.

There are a number of successful initiatives that increase the re-use of materials such as concrete, brick, glass and rubber in building and construction activities. To allow the market to fully incorporate these products, further clarification of technical specifications and procurement processes is required to ensure that barriers to greater uptake of recyclable materials are not created. This would further complement existing sustainable building assessment initiatives such as the Green Star rating program and incentivise further innovation in waste recovery.

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive. Both citizen juries made recommendations in support of this option.

What do we think of this option and why?

This option was recommended in the strategy (ref. 15.1.1) because at a relatively low cost it assists to ensure that the public sector component of the market for building and construction recycled products operates sustainably and efficiently. In comparison to other waste streams, materials such as tyres, metals, concrete and glass have some of the highest rates of recovery in Victoria. This is a low cost option that removes artificial barriers (whether procurement policies or procurement practices) limiting further use of materials such as these and other recycled materials that meet technical specifications for building and construction activities.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

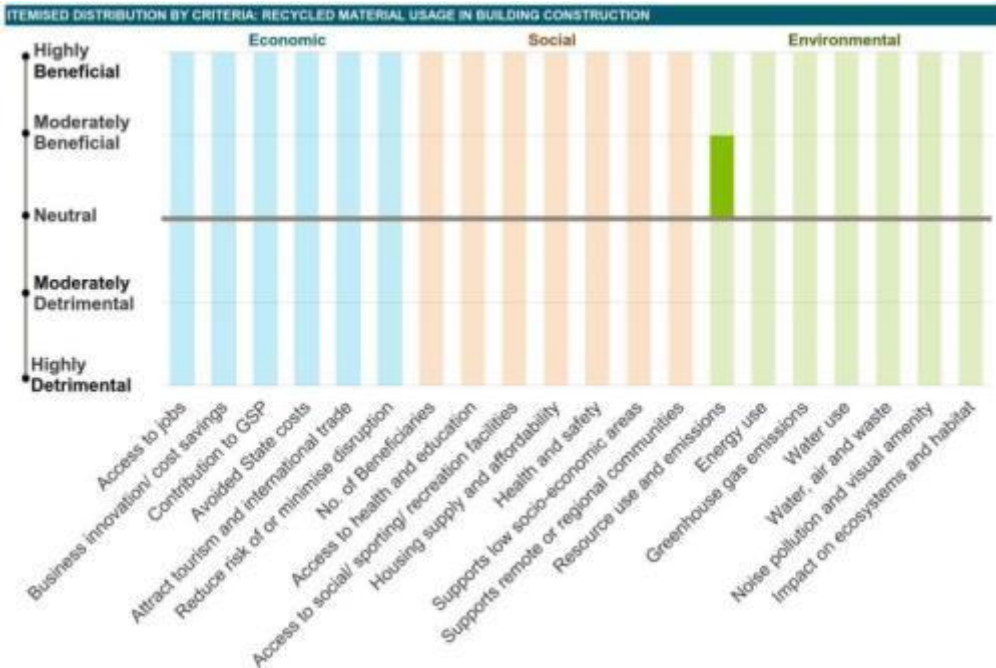
How does this option perform under different scenarios?

Supercity	++	Increased demand for construction materials
Westside Story	++	Increased demand for construction materials
Regional Cities	++	Increased demand for construction materials
Accelerated Climate Change /Mitigation	Neutral	
Prolonged/ Severe Economic Downturn	Neutral	
Biosecurity Threat	Neutral	

How does this option work with others?

No key relationships have been identified.

What are the economic, social and environmental impacts of this option?



Risks and opportunities

There is a risk that the cost of building and construction may increase where additional effort is required to utilise recycled materials without compromising quality.

There is potential for this option to encourage further innovation and additional environmentally sustainable measures. The use of recycled materials to construct road bases provides an example in a different industry of where recycling materials is already taking place efficiently.

Additional notes

Recycled materials suitable for use in construction

The *Victorian market development strategy for recovered resources* recognises the need for sustainable markets for recovered materials and discusses the role of government in a market based system, for example through product procurement. Materials and products singled out for attention in the document are organics (including timber), rubber (tyres), e-waste, flexible plastics, glass fines and concrete and bricks. A range of projects examining product specifications for recycled materials suitable for use in construction are also being investigated by Sustainability Victoria.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Sustainability Victoria, *Market summary – recycled brick, stone and concrete*, 2014

Sustainability Victoria, *Recycled products in pavement construction: A business case for councils to use local recycled products in pavement construction*, 2015

Sustainability Victoria, *Statewide waste and resource recovery infrastructure plan 2015–2044*, 2015

Sustainability Victoria, *Victorian market development strategy for recovered resources*, 2016

Regional rail capacity upgrades RRC

Option type

Better use through refurbishment of existing assets

Location

Regional and rural Victoria

Sector

Transport

Certainty of evidence

Low

Direct option cost

\$5 billion–\$10 billion

Option lead time

5–10 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 10: Meet growing demand for access to economic activity in central Melbourne; and

Need 12: Improve access to jobs and services for people in regional and rural areas

Low	Low	Low	Low
-----	-----	-----	-----

0-5 yrs 5-10 yrs 10-15 yrs 15-30 yrs

What is this option?

Deliver capacity upgrades to the regional rail network with projects such as signalling upgrades, track amplifications, asset upgrades and increases to station capacity. This option will remove physical and operational constraints to maximise the use of the existing regional rail network (further detail in *What is this option? cont'd*).

What is the level of community support?

There was limited discussion of this option during public consultation.

What do we think of this option and why?

This option was recommended in part in the strategy (ref. 12.2.4) because a number of lower cost upgrades and renewals can make a substantial improvement to the reliability and operation of the regional rail network. However, in recognition of upgrade programs already committed, we have assumed continued delivery will occur over time as a business as usual activity. Our recommendation is therefore targeted at a more strategic level in calling for the development of a process to transparently identify and prioritise network upgrades and enhancements that will ensure that the most effective projects are delivered.

The delivery of these minor network upgrades and enhancements has been assessed as providing a low contribution to Needs 10 and 11 across all time periods in isolation. However, we consider the contribution to these needs is much greater when this option is combined with other network enhancements such as Regional rolling stock expansion (RRS) and Regional train link upgrades (RTL). Our recommendation requires that the Regional Network Development Plan is further developed within 0-5 years to transparently identify and prioritise network upgrades.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Consistent

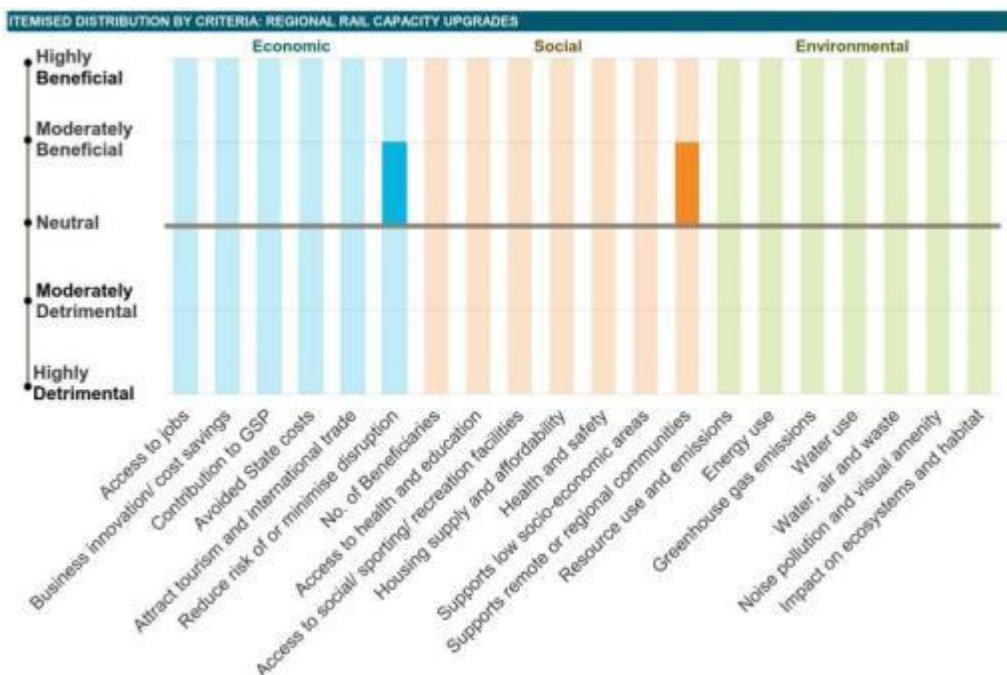
How does this option perform under different scenarios?

Supercity	Neutral
Westside Story	Neutral
Regional Cities	++ Improves access
Accelerated Climate Change /Mitigation	+ Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	- Less demand for travel
Biosecurity Threat	Neutral

How does this option work with others?

This option enables regional train link upgrades (RTL) and regional metro rail service (RMR) by improving the resilience and capacity of the regional rail network.

What are the economic, social and environmental impacts of this option?



What is this option? (cont'd)

Some general examples of projects around the network could include:

- Upgrading sections with track amplification and crossing loops to support additional services and reliability.
- Reconstructing large scale ageing support infrastructure such as long span bridges.
- Adding platforms to existing stations.

These projects will allow for a better rail service to be run on all lines, with projects across the network enabling a greater number of people in regional areas to access employment and services.

A number of proposed projects and future priorities aimed at upgrading capacity for the five regional lines include:

- Ballarat Line: Investigating the need for extra stations near Ballarat and addition track duplications and the construction of crossing loops west of Melton (beyond current commitments).
- Geelong Line: Building another platform at South Geelong, Marshall and Waurn Ponds stations and duplicating tracks between Geelong and Waurn Ponds. Provision of additional passing loops beyond Waurn Ponds.
- Bendigo Line: Upgrading tracks to allow for higher speed trains (up to 160km/h) and increasing track capacity between Kyneton and Bendigo stations.
- Seymour Line: Decreasing travel times between Seymour and Melbourne by upgrading track and signalling which will allow for higher speed trains. Allowing more train services to Shepparton by providing extra passing loops, tracks, train stabling and signalling upgrades.
- Traralgon Line: Providing extra passing loops and track duplication between Bunyip and Longwarry to facilitate more services, upgrading signalling to allow more trains through Sale, station upgrades for a second platform and reconstructing the aged Avon River Bridge at Stratford.

These upgrades need to be prioritised and driven by service planning on these lines. This includes the further planning, investigation and assessment criteria development recommended in option Regional train link upgrades (RTL).

Risks and opportunities

There are risks from undertaking construction in an existing operational rail corridor that would need to be managed during the option delivery phase.

This option may provide opportunities to increase the capacity of the rail network through smaller, less disruptive interventions than large scale projects.

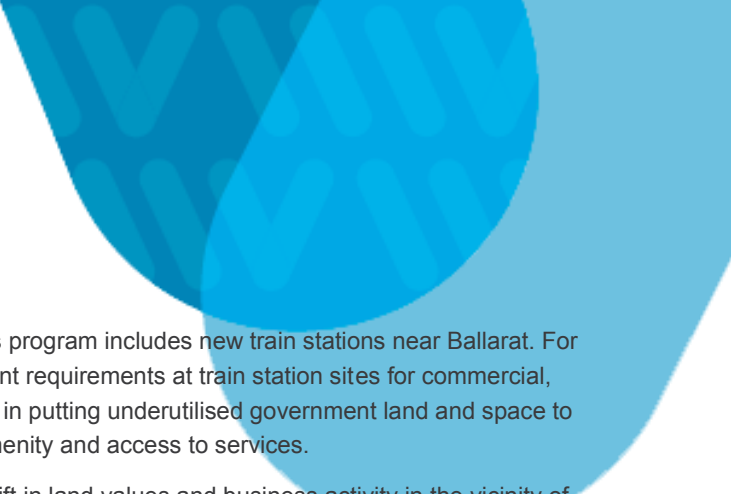
Funding

Though this option has only been recommended in part in the strategy, should government choose to pursue this program, it will then need to consider funding options. Below is a range of potential funding mechanisms which could be examined to help fund the program.

Potential funding mechanisms

General government revenue	User charges	Beneficiary charges	Property development	Asset sales
✓	✓	✓	✓	

General government revenue is likely to continue to be a major source of funding for programs like regional rail capacity upgrades, as the benefits of the program are shared by many Victorians and could provide some relief to related road networks, which are congested.



Property development could also be considered if the scope of this program includes new train stations near Ballarat. For example, selling or leasing land and air rights surplus to government requirements at train station sites for commercial, residential or retail development. Property development can assist in putting underutilised government land and space to higher and better uses, creating added value through improved amenity and access to services.

Beneficiary charges could be examined if there is a substantial uplift in land values and business activity in the vicinity of new train stations. These include developer contributions, which could be levied on new developments occurring near new train stations. Betterment levies could also be applied to land in a defined catchment near new train stations to capture a portion of the additional land and business value created by the new project. If developer contributions and betterment levies are both considered by government, it should ensure that new charges do not unfairly duplicate each other or any existing charges.

Existing user charges (public transport fares) should continue to be charged but are only expected to cover a portion of ongoing operating costs.

Infrastructure Victoria is examining transport network pricing as part of our research program. We think that the primary objective of a transport network pricing regime – where users pay to access and use the transport network – should be to manage demand, rather than to recover costs for infrastructure. We are focusing on examining road pricing regimes in metropolitan Melbourne as a first step towards a comprehensive transport network pricing regime that includes roads and public transport. Careful consideration must be given to the design of the regime to ensure it is efficient, fair and sustainable.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Victorian Department of Economic Development, Jobs, Transport and Resources, *Connecting regional Victoria: Victoria's regional network development plan*, 2016

Regional rail eastern corridor dedicated rail track RRE1

Option type

Incremental expansion of existing assets

Location

Gippsland region, west Gippsland state-significant transport corridor

Melbourne central subregion, Melbourne eastern subregion, Melbourne southern subregion and Melbourne south-eastern state-significant transport corridor

Sector

Transport

Certainty of evidence

Low

Direct option cost

\$1 billion–\$3 billion

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 10: Meet growing demand for access to economic activity in central Melbourne; and

Need 13: Improve the efficiency of freight supply chains

Very Low	Very Low	Low	Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

Need 12: Improve access to jobs and services for people in regional and rural areas

Very Low	Very Low	Very Low	Very Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Build dedicated regional rail tracks on the south-east corridor to separate regional (passenger and freight) from metropolitan trains. Assuming this additional track pair would follow the Dandenong corridor, this would mean new tracks from Pakenham to South Yarra and from Flinders Street to Southern Cross. The project would remove conflicts between regional train services and slower metropolitan services. This will increase capacity and reliability of both the regional and metropolitan networks to encourage mode shift from cars. It will also allow for a modest increase in the number of train services accessing the central city, alleviating crowding on the Dandenong Line.

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive. This option was opposed by the regional citizen jury.

What do we think of this option and why?

This option was recommended for further investigation in the strategy as part of broader planning for this corridor (ref. 12.3.3 and 13.5.5) because there is potential that additional capacity could be required for freight and regional services either in the latter part of the 15-30-year period or beyond, and solutions are potentially complex and high cost. Trigger points for a major uplift in capacity need to be identified, because at present the demand drivers for such an upgrade are not clear and could be linked to other investments, for example if Hastings were identified as the preferred future port location. The full range of solutions should be considered, not only new tracks as proposed in this option but also all options to better use existing infrastructure first (e.g. through operational changes), or make more modest enhancements (e.g. expanding the electrified network). From this analysis a long-term plan for the Cranbourne, Pakenham and Gippsland lines should be developed.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

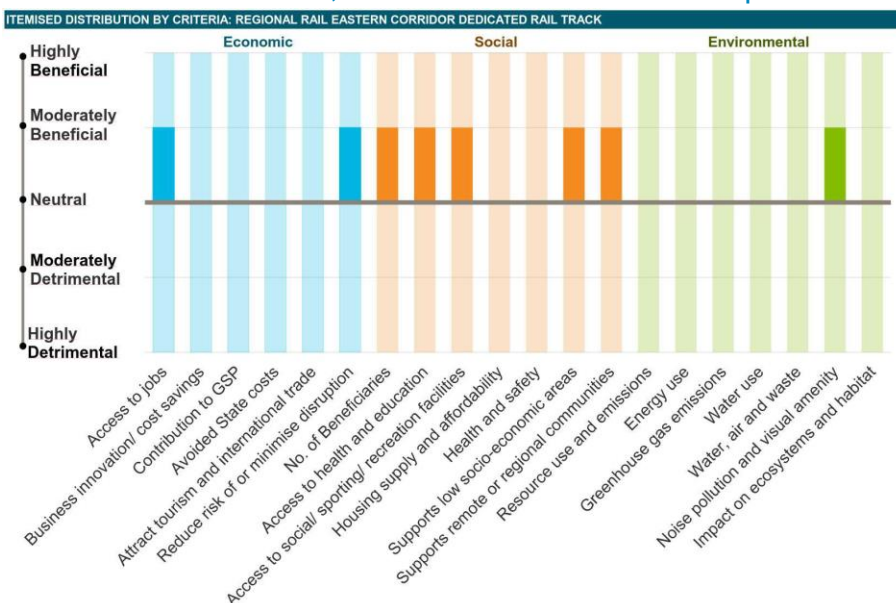
How does this option perform under different scenarios?

Supercity	++	Supports mode shift to address congestion
Westside Story	Neutral	
Regional Cities	+	Supports mode shift to address congestion
Accelerated Climate Change /Mitigation	+	Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	-	Less demand for mass transit
Biosecurity Threat	Neutral	
Bay West	+	Enhances connection to the south east
Hastings	++	Enhances connection to state rail network

How does this option work with others?

This option is an alternative to and would eliminate the need for the Gippsland-Pakenham rail shuttle (GPR) as Gippsland services would have use of the additional tracks to the city. There is a substantial interdependency with the new port (NCP) with RRE1 being a key enabler for the Hastings location.

What are the economic, social and environmental impacts of this option?



Risks and opportunities

There are risks from undertaking construction in an existing operational rail corridor that would need to be managed during the delivery phase.

There is an opportunity with the current Caulfield-Dandenong rail upgrade and level crossing removals to construct supporting infrastructure for an eastern corridor dedicated track. This would save future costs of constructing an additional track in the existing corridor.

Funding

Though this option has only been recommended for further investigation in the strategy, should government choose to pursue this project, it will then need to consider funding options. Below is a range of potential funding mechanisms which could be examined to help fund the project.

Potential funding mechanisms

General government revenue	User charges	Beneficiary charges	Property development	Asset sales
✓	✓	✓	✓	

General government revenue is likely to be a major source of funding for projects like regional rail eastern corridor dedicated track (RRE1), particularly where the benefits are widely distributed across the community. Victoria could explore opportunities to seek federal government contributions for projects such as RRE1. For example, the Regional Rail Link project received funding from both the federal and state governments.

Property development could also be considered, for example, selling or leasing land and air rights surplus to government requirements at new train station sites for commercial, residential or retail development. Property development can assist in putting underutilised government land and space to higher and better uses, creating added value through improved amenity and access to services.

In addition, beneficiary charges could be considered if the scope of the project includes new train stations and there is a substantial uplift in land values and business activity in the vicinity of any new train stations. New beneficiary charges could include developer contributions and betterment levies on commercial and/or residential property. For example, a betterment levy was used to raise funding for the City Loop. If developer charges and betterment levies are both considered by government, it should ensure that new charges do not unfairly duplicate each other or any existing charges.

Existing user charges (public transport fares) should continue to be charged but are only expected to cover a portion of ongoing operating costs. Should there be additional capacity for rail freight, changes to user charges would be accounted for within the existing pricing structure set by the responsible regulator.

Infrastructure Victoria is examining transport network pricing as part of our research program. We think that the primary objective of a transport network pricing regime – where users pay to access and use the transport network – should be to manage demand, rather than to recover costs for infrastructure. We are focusing on examining road pricing regimes in metropolitan Melbourne as a first step towards a comprehensive transport network pricing regime that includes roads and public transport. Careful consideration must be given to the design of the regime to ensure it is efficient, fair and sustainable.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then we have clarified that the scope of this recommendation include the development of a long-term plan for Cranbourne, Pakenham and Gippsland lines following the trigger point analysis.

Project scope

Subject to further assessment, this option could well sit in a higher cost range than indicated, particularly if tunnelling is required. We note work undertaken by the Rail Futures Institute, which identified the potential for works which would sit well beyond the suggested cost range including:

- Tunnelling between Springvale and Caulfield, potentially via Monash and Chadstone
- Tunnelling between Caulfield and the Melbourne Metro tunnels in the vicinity of South Yarra or Domain
- Expansion of the viaduct along the Yarra River between Flinders Street and Southern Cross stations

Note that the introduction of 10 car trains is expected to address projected growth in metropolitan passenger rail demand over the next 30-years, although this option could offer opportunities for service improvements, such as additional express services and improved reliability.

Consideration for standard or dual gauge access along this corridor will need to be considered in a future scenario where the Port of Hastings may be developed.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Victorian Department of Transport, Economic Development, Transport, Jobs and Resources, *Melbourne Metro business case*, 2016

Rail Futures Institute, *Intercity*, 2016

Regional rail electrification

RRE2

Option type

Incremental expansion of existing assets

Location

Statewide

Melbourne – Bendigo state-significant transport corridor

Melbourne – Ballarat state-significant transport corridor

Melbourne – Geelong state-significant transport corridor

Sector

Transport

Certainty of evidence

Low

Direct option cost

\$5 billion–\$10 billion

Option lead time

5–10 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 10: Meet growing demand for access to economic activity in central Melbourne; and

Need 12: Improve access to jobs and services for people in regional and rural areas

Moderate	Significant	Significant	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Electrification of passenger rail services to Geelong (Sunshine to Waurn Ponds), Ballarat (Sunshine to Wendouree) and Bendigo (Sunbury to Epsom and Eaglehawk) to increase line capacity and reliability. This will attract greater mode shift from cars and may encourage more commuting from regional centres. The main benefits of electrification are cost efficiency, better rolling stock, reduced carbon emissions and reduction in travel times, particularly on corridors with closely spaced (or large numbers of) stations due to the sharper acceleration/ deceleration profiles of the lighter electric rolling stock (further detail in *What is this option? cont'd*).

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option was not recommended in the strategy. It was not recommended because we do not think that the full electrification of the Bendigo, Ballarat and Geelong lines is required for capacity or cost efficiency purposes within the timeframe of this strategy. This option makes a moderate to significant contribution to meeting needs 10 and 12, however, this contribution is achieved with a very high capital cost. At this stage only the Geelong line out of these three rail corridors has a strong case for electrification. This has been recommended separately in Geelong rail electrification (GRE). As the state's population grows and land use changes occur over time, partial electrification of other regional rail lines will be considered in future Infrastructure Victoria strategy updates.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

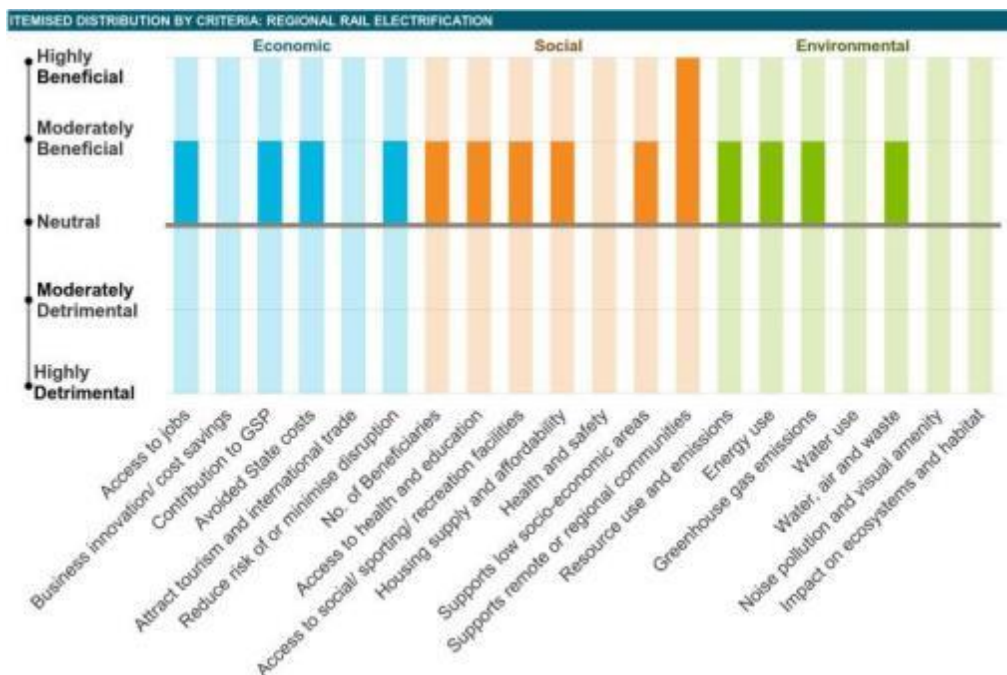
How does this option perform under different scenarios?

Supercity	+	Supports mode shift to address congestion
Westside Story	+	Supports mode shift to address congestion
Regional Cities	++	Supports mode shift to address congestion
Accelerated Climate Change /Mitigation	+	Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	-	Less demand for mass transit
Biosecurity Threat	Neutral	

How does this option work with others?

This option includes Geelong rail electrification (GRE) within its scope. This option would be dependent upon the delivery of new rolling stock in either regional rolling stock expansion (RRS) or high capacity trains – 7/10 car (HCT3/2).

What are the economic, social and environmental impacts of this option?



What is this option? (cont'd)

Priorities for regional rail electrification should focus on the corridors with steady patronage and a large number of stations within a commutable distance to Melbourne, particularly the Geelong corridor. This could be followed by electrification of the Ballarat and/or Bendigo corridors pending the introduction of new or improved stations to serve emerging growth areas and/or continued increase in demand along these routes.

This will assist in connecting people living in regional areas with jobs and services in the central city, and support the viability of reverse commuting to growing regional employment centres.

Risks and opportunities

There are risks from undertaking construction in an existing operational rail corridor that would need to be managed during the delivery phase.

With faster and more frequent regional rail services, there is opportunity for greater regional development along the rail corridors.

Additional notes

Although the Beveridge intermodal freight terminal (BIF) was not recommended for delivery in the final strategy, it should be one of the high priority locations for precinct structure planning and potential land reservation under this option. This facility may be required to support freight operations in the longer term.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Victorian Department of Economic Development, Jobs, Transport and Resources, *Connecting regional Victoria: Victoria's regional network development plan*, 2016

Regional rail gauge standardisation

RRG

Option type

Better use through refurbishment of existing assets

Location

Regional and rural Victoria

Sector

Transport

Certainty of evidence

Medium

Direct option cost

\$1 billion–\$3 billion

Option lead time

5–10 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 12: Improve access to jobs and services for people in regional and rural areas

Very Low	Very Low	Very Low	Very Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

Need 13: Improve the efficiency of freight supply chains

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Convert the remainder of the regional rail network across Victoria, including the passenger network from broad gauge to standard gauge. This will enable a wider range of rolling stock to operate on the Victorian network and interoperability with the broader national network. It will also save rolling stock conversions to broad gauge. The standardisation will provide new freight corridors for standard gauge operations to link with a greater number of port facilities. This will reduce freight costs, increase efficiency and create greater competition between the ports. Of the remaining broad gauge network in Victoria, the next area of focus after the Murray Basin Rail Project could be the Hume/Goulburn areas, including the lines through Seymour, Shepparton and Tocumwal. This would create benefits for the substantial fresh produce industry.

What is the level of community support?

There was a moderate level of discussion of the recommendation Regional rail gauge standardisation, which includes this option. This option was recommended by metropolitan citizen jury.

What do we think of this option and why?

This option was recommended in part in the strategy (ref. 13.4.2) because of the need to improve the efficiency and competitiveness of freight rail. It was recommended in a scaled-down form in recognition of the need for further work to determine the final extent and priorities. Standardisation in the north east of the state has been prioritised to complete conversion of all freight-only rail lines in the state to standard gauge. Standardisation of the regional rail network has been assessed as providing a moderate contribution to need 13 and a very low contribution to need 12. This recognises the value of this option in contributing to freight and indicates the importance of planning carefully for passenger rail services when undertaking standardisation to ensure negative effects are avoided. This option was recommended for delivery within 5–10 years to complete works in the north east following the completion of standardisation works being delivered by the Murray Basin Rail Project.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

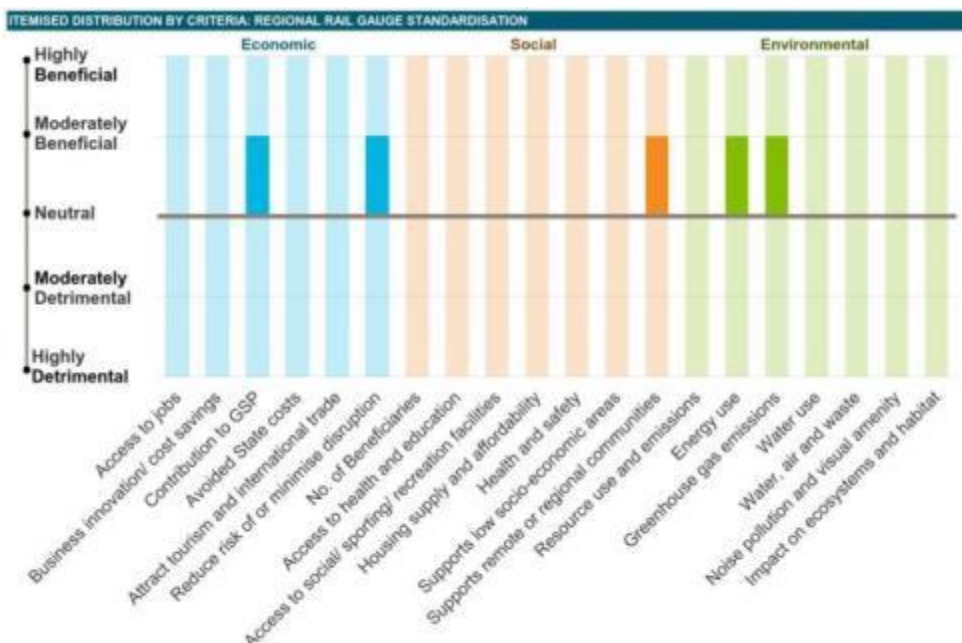
How does this option work with others?

No key relations with other options have been identified.

How does this option perform under different scenarios?

Supercity	Neutral	
Westside Story	Neutral	
Regional Cities	Neutral	
Accelerated Climate Change /Mitigation	-	Less demand for mass movement of bulk freight
Prolonged/ Severe Economic Downturn	-	Less demand for mass movement of bulk freight
Biosecurity Threat	Neutral	
Bay West	+	Enhances rail supply chains
Hastings	+	Enhances rail supply chains

What are the economic, social and environmental impacts of this option?



Commentary:

The majority of benefits from this option will be economic benefits from the reduced regional freight cost. With this will also come environmental benefits from removing trucks from the freeways leading in to Melbourne and a reduction in port-related traffic.

Risks and opportunities

There is a risk around working in an active rail corridor during the construction phase of this option, however, it is assumed these will be managed appropriately. There is also a risk that the standardisation of lines used by freight services could impact on passenger services with issues of stranded rolling stock and train paths into the city on the standard gauge network.

As with the current Murray Basin Rail Project of gauge standardisation works, there is an opportunity to implement axle-load upgrades and other enhancements to increase the potential freight benefits that flow from the standardisation works.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then we have clarified the lines that are proposed for standardisation in northeast Victoria and explained why these are important.

The lines for gauge standardisation in the north east include the Deniliquin-Echuca-Toolamba line and the Tocumwal-Shepparton-Mangalore line that will complete the standardisation of all operational freight-only lines in Victoria. In preparation for these works, a review of the Shepparton to Dookie and Barnes to Moulamein lines will need to be evaluated for standardisation or permanent closure.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Victorian Department of Economic Development, Jobs, Transport and Resources, *Murray Basin Rail Project final business case*, 2015

Victorian Department of Transport, Planning and Local Infrastructure, *Victoria, the freight state: Victorian freight and logistics plan*, 2013

Regional rolling stock expansion

RRS

Option type

Incremental expansion of existing assets

Location

Regional and rural Victoria

Sector

Transport

Certainty of evidence

Low

Direct option cost

\$1 billion–\$3 billion

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 10: Meet growing demand for access to economic activity in central Melbourne; and

Need 12: Improve access to jobs and services for people in regional and rural areas

Moderate	Significant	Significant	Significant
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0-5 yrs 5-10 yrs 10-15 yrs 15-30 yrs

What is this option?

Procure new rolling stock to support additional services on regional lines. This option includes the acquisition of a next generation fleet to allow for retirement of older rolling stock and to support additional rail capacity between regional centres and to the central city, allowing more people to conveniently access jobs and services. Pending the potential for associated corridor enhancements such as electrification, the procurement of new vehicles could also improve journey times or minimise the impact of any new stations. This is due to the sharper acceleration/ deceleration profile of electric vehicles or, to a lesser extent, any new vehicles with an advanced design. All new rolling stock should be specifically developed to best respond to the unique physical characteristics (i.e. grades, spacing of stations) of Victoria’s rail system.

What is the level of community support?

There was limited to no discussion of this option during public consultation. This option was recommended by the regional citizen jury.

What do we think of this option and why?

This option was recommended in part in the strategy (ref. 12.2.3) because it offers a moderate to significant contribution to meeting needs 10 and 12 in its own right and is an essential enabler for regional rail network extensions and capacity expansions – without additional trains, additional services cannot run. However, with an existing rolling stock strategy in place, we have assumed continued purchase of new rolling stock will occur over time as a business as usual activity.

Our recommendation is therefore targeted at a more strategic level in building on the existing work to institute an asset management-based approach to procurement that supports the continuous build of new rolling stock. This is to avoid the small-order, stop-start procurement of recent decades.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

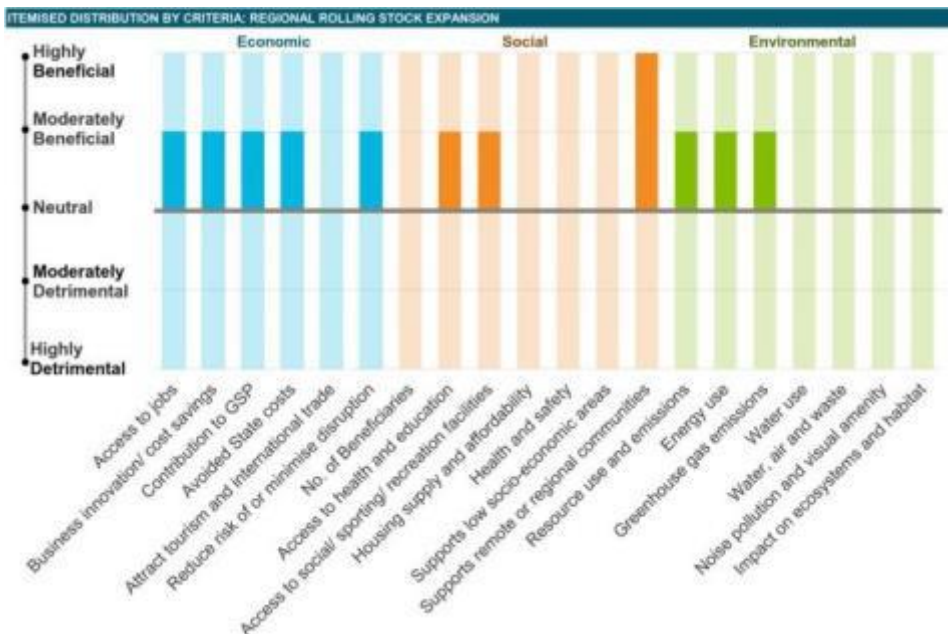
How does this option perform under different scenarios?

Supercity	++	Improves access
Westside Story	+	Improves access
Regional Cities	++	Improves access
Accelerated Climate Change /Mitigation	+	Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	-	Less demand for travel
Biosecurity Threat	Neutral	

How does this option work with others?

This option is a dependency for many of the regional rail options that will require additional rolling stock including Regional train link upgrades (RTL), Geelong rail electrification (GRE), Bendigo-Ballarat-Geelong rail revival (BBG), Torquay rail extension (TRE) and Regional rail electrification (RRE2).

What are the economic, social and environmental impacts of this option?



Risks and opportunities

Based on the long lead times for new rolling stock, there is a risk that delays to the decision on the next generation model will lead to regional rail services being unable to meet the demand in passenger growth and require the ongoing use of ageing rolling stock.

This option provides the opportunity to increase the capacity of the regional rail network and make commuting from peri-urban and regional areas more viable, without additional expensive infrastructure capacity upgrades.

Funding

Should government choose to pursue this program, it will then need to consider funding options. Below is a range of potential funding mechanisms which could be examined to help fund the program.

Potential funding mechanisms

General government revenue	User charges	Beneficiary charges	Property development	Asset sales
✓	✓			

General government revenue is likely to continue to be the major source of funding for programs like regional rolling stock expansion as the benefits of the program are shared by all users of regional lines and could provide some relief to related road networks, which are congested.

Existing user charges (public transport fares) should continue to be charged but are only expected to cover a portion of ongoing operating costs.

Infrastructure Victoria is examining transport network pricing as part of our research program. We think that the primary objective of a transport network pricing regime – where users pay to access and use the transport network – should be to manage demand, rather than to recover costs for infrastructure. We are focusing on examining road pricing regimes in metropolitan Melbourne as a first step towards a comprehensive transport network pricing regime that includes roads and public transport. Careful consideration must be given to the design of the regime to ensure it is efficient, fair and sustainable.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then we have clarified the connection between this recommendation and additional long distance services.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Victorian Department of Economic Development, Jobs, Transport and Resources, *Connecting regional Victoria: Victoria's regional network development plan*, 2016

Victorian Department of Premier and Cabinet, *Rolling stock strategy: Trains, trams, jobs 2015-2026*, 2015

Regional road upgrades RRU

Option type

Incremental expansion of existing assets

Location

Regional

Sector

Transport

Certainty of evidence

Medium

Direct option cost

\$500 million–\$750 million

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 2: Address infrastructure challenges in areas with low or negative growth; and

Need 12: Improve access to jobs and services for people in regional and rural areas; and

Need 13: Improve the efficiency of freight supply chains

Moderate	Moderate	Moderate	Moderate
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0-5 yrs 5-10 yrs 10-15 yrs 15-30 yrs

Need 3: Respond to increasing pressures on health infrastructure, particularly due to ageing

Very Low	Very Low	Very Low	Very Low
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0-5 yrs 5-10 yrs 10-15 yrs 15-30 yrs

What is this option?

A number of smaller scale projects to relieve bottlenecks and improve safety on regional state and local roads. Bottlenecks will be reduced through a range of infrastructure projects such as new and upgraded rest areas and truck turn around areas. Productivity will be improved through more efficient movement of freight.

There is a range of upgrades already committed and therefore treated in the base case. This option goes beyond these.

What is the level of community support?

There was a moderate level of discussion of the recommendation Regional local road maintenance, which includes this option. Responses were generally positive.

What do we think of this option and why?

This option was recommended in a scaled-up form in the strategy (ref. 2.1.4, 12.2.10 and 13.4.4) because it will help address challenges faced by local governments in regional areas in funding road improvements and improve first and last-mile freight movements across the state, as well as improve the condition of regional state roads. It was originally scoped and costed as a 0-5 year program, but has been recommended as a 5-30 year program in the strategy. Substantial funding has already been committed in the short term, including through the Commonwealth's Roads to Recovery program, but we anticipate local road maintenance challenges will persist in coming decades. The first step is the development of a transparent framework for the future distribution of funds to ensure that investment across the state is prioritised on a best-value basis, taking into account input from local government, which are best-placed to identify priorities for investment locally that could improve safety and reduce travel times. This framework, and the quantum of funding allocated, should be informed by the outcomes achieved through current programs and any ongoing funding from other levels of government.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

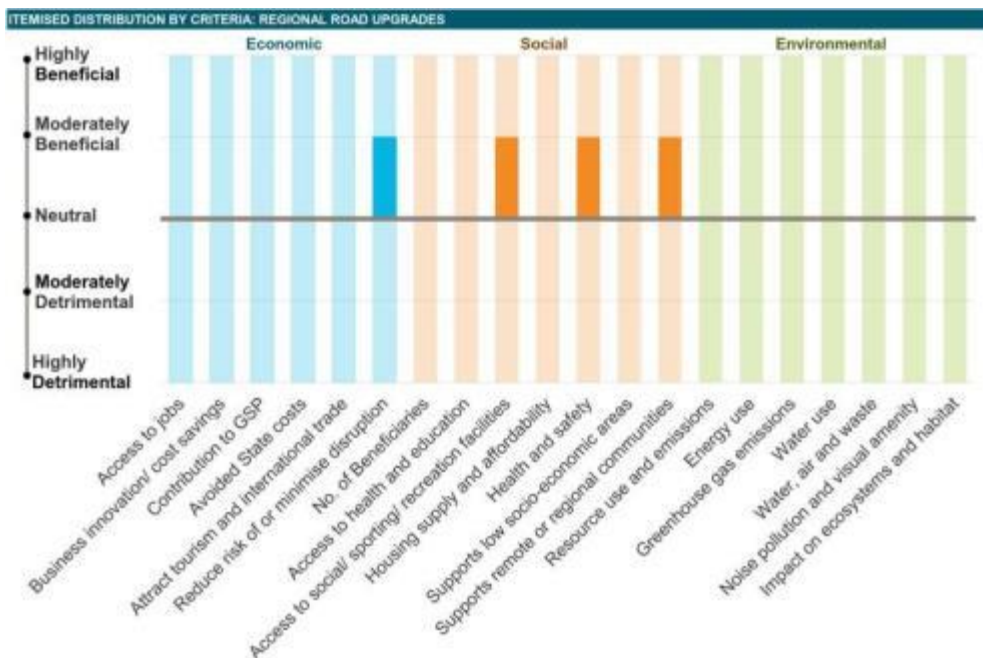
How does this option work with others?

This option is complementary to Regional highway upgrades (RHU) and road asset management reform (RMF).

How does this option perform under different scenarios?

Supercity	Neutral	
Westside Story	Neutral	
Regional Cities	++	Improves traffic flow and safety in regional centres
Accelerated Climate Change /Mitigation	-	Could be counter-productive if induces more travel
Prolonged/ Severe Economic Downturn	-	Less demand for travel
Biosecurity Threat	Neutral	
Bay West	+	Enhances road supply chains
Hastings	+	Enhances road supply chains

What are the economic, social and environmental impacts of this option?



Risks and opportunities

There may be a risk of traffic delays during construction. The upgrades to the road network will also need to consider any potential impacts to the local environment.

There is an opportunity to align this option with regional highway upgrades.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then the title and scope of this recommendation has been expanded to include both state and local roads, in recognition of the maintenance backlog on state roads in regional areas.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Road space allocation changes RSA

Option type

Better use through land use and planning controls

Location

Statewide

Sector

Transport

Certainty of evidence

Medium

Direct option cost

\$750 million–\$1 billion

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 10: Meet growing demand for access to economic activity in central Melbourne; and

Need 11: Improve access to middle and outer metropolitan major employment centres

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Road space priority for public transport and active transport corridors into the central city and suburban employment centres to achieve best and most efficient use of the road network (e.g. separating trams and buses from other traffic), including upgrading some tram routes to light rail standard, and improving facilities for high-patronage bus routes. It includes also where the impact of bottlenecks (e.g. approaching activity centres) could impair the performance of a multimodal network. This will enable greater throughput of passengers on these corridors. This option will also enable the operation of more efficient freight routes and the potential to fully implement network operating plans.

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive; however, only 33 per cent of people surveyed as part of community research were supportive of converting existing road lanes into bus lanes, tramways or bike lanes.

What do we think of this option and why?

This option was recommended in the strategy (ref. 10.6.3 and 11.3.5), as it could play an important role over 0-15 years in improving access to the central city, to middle and outer metropolitan employment centres and to regional centres. A broad suite of approaches is available, from priority lanes to traffic signal priority, and network plans are in place for much of the network, awaiting implementation. As new technologies such as driverless vehicles arrive on the network, this could provide for – and indeed require – more sophisticated forms of road space allocation. This option involves a lot of detailed and sometimes controversial changes to Victorian roads. Accelerating these changes will require substantial resourcing – the technical and community engagement expertise of a major project combined with ongoing urban and transport planning partnerships with local government.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

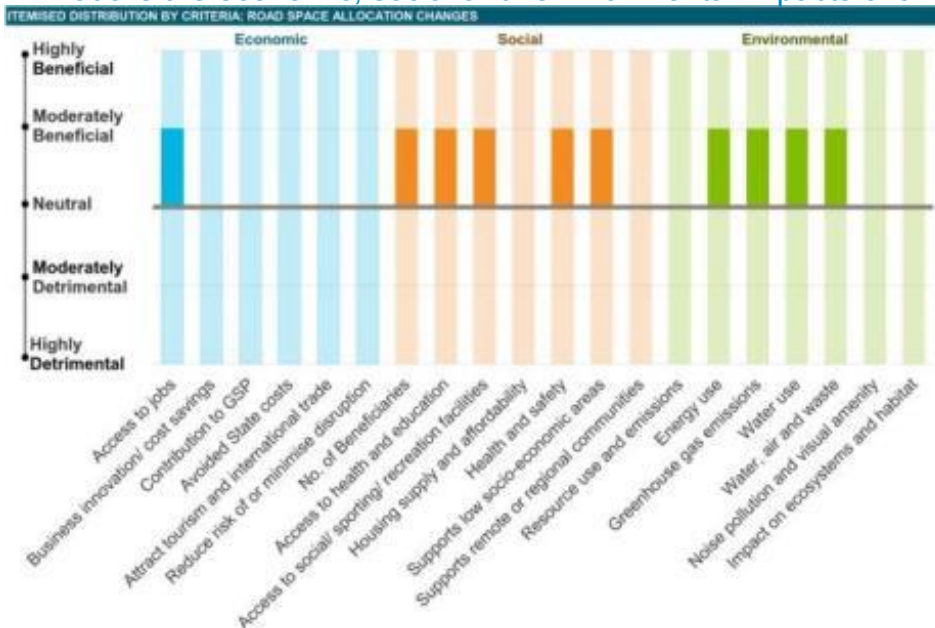
How does this option work with others?

If combined with active lifestyle regulation changes (ALR), larger benefits may be achieved due to space re-allocation being completed as part of an 'active design'. With the completion of expanded walking and cycling networks (BWP2), the space required for cycle path expansions may be incorporated into road space allocation (RSA). This option is also complementary to options focusing on extensions or upgrades to the arterial road network, such as ARN and OMA and to improvements to on-road public transport, such as SNE, CCT and MTN.

How does this option perform under different scenarios?

Supercity	++	Improves transport access, particular to activity centres
Westside Story	+	Improves transport access, particular to activity centres
Regional Cities	+	Improves transport access, particular to activity centres
Accelerated Climate Change /Mitigation	+	Encourages shift to more sustainable modes
Prolonged/ Severe Economic Downturn	+	Facilitates shift to more affordable transport modes
Biosecurity Threat	Neutral	
Bay West	+	Enhances road supply chains
Hastings	+	Enhances road supply chains

What are the economic, social and environmental impacts of this option?



Risks and opportunities

With the removal of road space for private vehicles, there is a risk of a negative response from some sections of the community. The allocation changes may increase travel times and congestion for private vehicles during peak travel times.

Reallocating road space can provide an opportunity to increase urban amenity through streetscape works. This could increase the attractiveness of using local public transport services. A 'Movement and place framework' could assist in balancing urban amenity and transport priorities.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then we have clarified that this recommendation includes both tram and bus corridors, particularly where there are higher frequency bus services or local bottlenecks that could affect running times and broader network performance.

Next steps

Although the reallocation of lanes from general traffic to more specific uses such as public transport priority lanes may result, initially, in increased travel times for some motorists, improving priority for higher capacity modes has the potential to increase the overall productivity of the road network, while also stimulating further mode shift to higher capacity modes.

Given previous controversy, should a substantial and broad change in road space allocation be progressed, a key area for further investigation would be how to better engage key stakeholders such as local government and the community, including considering early planning and discussion about how to manage key trade-offs.

Transport Modelling

Road Space Allocation was modelled by KPMG, Jacobs and Arup in VITM, in a small number of selected corridors in Melbourne. The limited number of corridors where road space allocation to public transport was modelled meant that this option scored negatively across all transport related Needs. The score is also likely a result of the difficulty in using a strategic model for detailed road network assessment.

For more detail, consult the 'Economic appraisal and demand modelling' report to Infrastructure Victoria.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

KPMG/Arup/Jacobs *Economic appraisal and demand modelling*, 2016

Rail signals and fleet upgrade

RSF

Option type

Incremental expansion of existing assets

Location

Melbourne

Sector

Transport

Certainty of evidence

Medium

Direct option cost

\$5 billion–\$10 billion

Option lead time

5–10 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 10: Meet growing demand for access to economic activity in central Melbourne

Moderate	Moderate	Significant	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Upgrade the signalling system across the metropolitan train network to accommodate more trains on existing tracks using new technologies. This option includes the implementation of high capacity signalling (HCS) systems across the network, including upgrades to the rolling stock fleet and communication systems to support in-cabin signalling displays and direct control of the train. Complemented by the purchase of new high capacity trains and associated upgrades (e.g. power upgrades), this will allow more services in peak periods and improve reliability. There are also safety benefits with HCS as it reduces the possibility for human error, and resilience benefits, in that it supports quicker recovery from disruptions. HCS can be implemented on a corridor-by-corridor basis in the order of optimal impact (further detail in *What is this option? cont'd*).

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive. This option was recommended by the metropolitan citizen jury.

What do we think of this option and why?

This option was recommended in a scaled-down form in the strategy (ref. 10.4.7) over 5-30 years because high capacity signalling can enable more train services to operate on existing tracks, reducing overcrowding, but only in instances where the signalling system is a primary network constraint and there is sufficient patronage growth to require capacity expansion. We expect this option could provide strong benefits on the Clifton Hill Line, and potentially others over time. Even where signalling is a primary constraint, a holistic asset management approach should be taken to deployment of high capacity signalling, including considering all upgrades needed to deliver the desired service uplift and performance which may involve upgrades to track, power systems, and deployment of new rolling stock.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

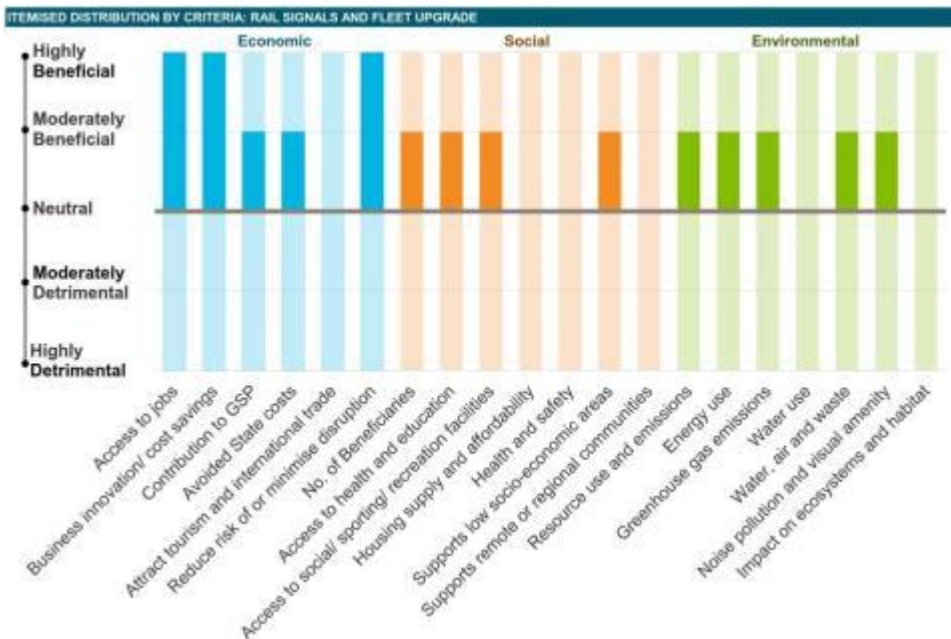
How does this option work with others?

This option is an excellent complement to the purchase of new high capacity trains (HCT2-3) to meet the increased patronage levels. It will also complement extensions of the network, including Wallan rail electrification (WRE1) and Doncaster heavy rail line (DHR).

How does this option perform under different scenarios?

Supercity	++	More efficient use of transport capacity
Westside Story	+	More efficient use of transport capacity
Regional Cities	+	More efficient use of transport capacity
Accelerated Climate Change /Mitigation	+	Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	-	Less demand for mass transit
Biosecurity Threat	Neutral	
Bay West	+	Potentially enhances rail supply chains
Hastings	+	Potentially enhances rail supply chains

What are the economic, social and environmental impacts of this option?



What is this option? (cont'd)

As the Melbourne Metro business case identifies HCS as part of the project, this option would focus on non-Melbourne Metro metropolitan corridors as well as regional trains that overlap with the metropolitan routes:

Clifton Hill Loop Line (South Morang/Mernda and Hurstbridge):

The Clifton Hill group represents the most significant signalling-constrained portion of the metropolitan rail network (specifically the segment from Clifton Hill to/including the City Loop). Given that this line also serves the northern growth area and is being extended to Mernda (further increasing demand) it should be considered as Melbourne's highest priority corridor for signalling upgrades.

Northern Loop Line (Craigieburn and Upfield):

These two corridors are programmed to operate together as the Northern Loop Line following the implementation of Melbourne Metro, serving the northern growth area. As such, this corridor could be identified as a secondary priority for upgrade to HCS, but careful planning would be required to identify the appropriate sequencing with the City Loop reconfiguration option (CLR).

Cross-City Line (Werribee to Sandringham):

Forming the Cross-City Line following implementation of Melbourne Metro, the Werribee-to-Sandringham corridor serves the western growth area. This corridor will receive a boost from Melbourne Metro. However, the western growth area will continue to have an increase in patronage numbers over time. Overall, HCS for this reason is a secondary priority.

Burnley Loop Line (Alamein, Belgrave, Lilydale):

The advantage of this group from an operations perspective is that it has fewer than ten level crossings remaining; however, these lines already have a dedicated express track and do not serve high-growth areas (and are therefore unlikely to experience significantly degraded conditions in the future). It should therefore be considered only a moderate priority for HCS.

Glen Waverley Line:

The advantage of this line is that it has only six level crossings remaining; however, it does not serve a high-growth area (and therefore is not likely to see significant deterioration of conditions) and should be considered a low priority for HCS.

Frankston Line:

As congestion within the Caulfield Loop of the City Loop will decrease as the Dandenong corridor is integrated into Melbourne Metro, post-completion a standalone Frankston Line should be considered a low priority for HCS as long as Melbourne Metro proceeds according to schedule.

Bendigo and Traralgon V/Line services:

As these regional services overlap with the Melbourne Metro corridor along the outer portions of its route, the realisation of the full potential of HCS on Melbourne Metro will be dependent on the regional trains on these corridors also being fitted with HCS technology. (It is presumed the corridors would be HCS-enabled only to Sunshine and Dandenong but that regional trains and drivers would be equipped to use both conventional and HCS signalling).

Risks and opportunities

There is a range of risks with the implementation of high capacity signalling in integrating it with current rolling stock and with the existing legacy signalling and train control systems that could lead to cost increases and delayed roll-outs.

High capacity signalling opens up a range of opportunities to manage the network in different ways, including reconsidering a range of existing operating practices to improve efficiency.

Funding

Should government choose to pursue this program, it will then need to consider funding options. Below is a range of potential funding mechanisms which could be examined to help fund the program.

Potential funding mechanisms

General government revenue	User charges	Beneficiary charges	Property development	Asset sales
✓	✓			

General government revenue is likely to be a major source of funding for programs like rail signals and fleet upgrade as the benefits of the program are shared by all users across the metropolitan rail network.

Existing user charges (public transport fares) should continue to be charged but are only expected to cover a portion of ongoing operating costs.

Infrastructure Victoria is examining transport network pricing as part of our research program. We think that the primary objective of a transport network pricing regime – where users pay to access and use the transport network – should be to manage demand, rather than to recover costs for infrastructure. We are focusing on examining road pricing regimes in metropolitan Melbourne as a first step towards a comprehensive transport network pricing regime that includes roads and public transport. Careful consideration must be given to the design of the regime to ensure it is efficient, fair and sustainable.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then the timing of this recommendation has been brought forward from 10-30 years to 5-30 years. This is to better align with the proposed roll out of new signalling systems as per the Network Development Plan.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Public Transport Victoria, *Network development plan: Metropolitan rail*, 2012

Recycled treated wastewater for non-potable agricultural use

RTA

Option type

Better use through economic charging
 Incremental expansion of existing assets
 New assets

Location

Statewide

Sector

Water and waste

Certainty of evidence

Low

Direct option cost

\$250 million–\$500 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 14: Manage threats to water security, particularly in regional and rural areas; and

Need 17: Improve the health of waterways and coastal areas

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option involves greater use of recycled treated wastewater to meet existing agricultural water demands. This would supplement existing water use and allow greater use of raw water supplies for purposes such as meeting drinking water demands. Agricultural water usage is currently just over 70 per cent of total Victorian water usage. The majority of this water is supplied from catchment water storages. Substituting raw water supplies for agriculture with recycled treated waste water would help to increase water availability for critical purposes, particularly during dry periods. This option will consider the appropriate technology to treat waste water to a quality suitable for farming purposes, infrastructure upgrades to deliver this water to major irrigation areas, and pricing signals to promote uptake.

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive.

What do we think of this option and why?

This option was not recommended in the strategy because there are uncertainties around distributing large volumes of recycled water to supplement existing water usage for agricultural activities. In particular, there is uncertainty around requirements for the agricultural market over a 30-year horizon with regards to suitable locations for agricultural activities and variations in agricultural products. Without adequate planning this option could lead to infrastructure redundancies. There are a number of initiatives successfully utilising recycled water for agriculture at a smaller scale, for example, in peri urban areas. We will continue to monitor the scope of this option to supplement the large volumes of water from storages currently utilised by the agricultural sector.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

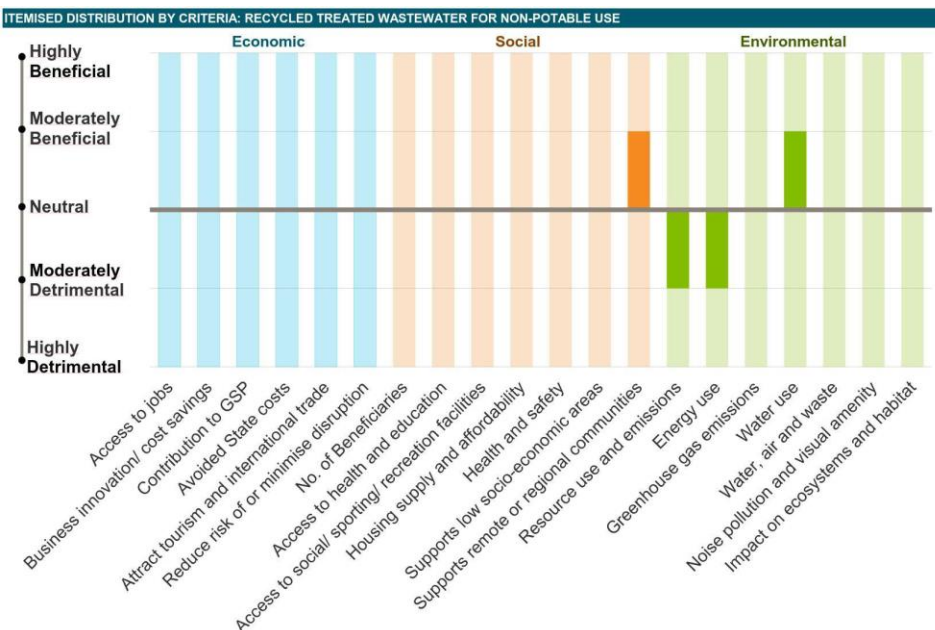
How does this option perform under different scenarios?

Supercity	++	Heightened need to conserve water resources
Westside Story	++	Heightened need to conserve water resources
Regional Cities	+	Heightened need to conserve water resources
Accelerated Climate Change /Mitigation	++	Acute need to conserve water resources
Prolonged/ Severe Economic Downturn	-	Less demand for water
Biosecurity Threat	Neutral	

How does this option work with others?

Where feasible to meet large quantities of existing agricultural demands, this option would utilise a large quantity of wastewater resources reducing availability of this resource for other recycling measures such as recycled wastewater for drinking (RWW).

What are the economic, social and environmental impacts of this option?



Risks and opportunities

There is a risk of infrastructure redundancies where this option is implemented at a large scale while there is uncertainty around changes in agricultural markets over the long term. There is a risk that the quality of water required to sustain a broad range of agricultural activities is higher than anticipated.

There is an opportunity for smaller scale agricultural activities utilising recycled water to drive further innovation and create new irrigation areas.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Boston Consulting Group, *Food and Fibre: Fact Pack*, 2015

Marsden Jacobs and Associates, *Progress against the national target of 30 per cent of Australia's wastewater being recycled by 2015: Report prepared for the Department of Sustainability, Environment, Water, Population and Communities*, 2012

Victorian Department of Environment, Land, Water and Planning, *Water for Victoria: Water plan*, 2016

Recycled treated wastewater for non-potable use

RTH

Option type

Better use through subsidies
 Incremental expansion of existing assets
 New assets

Location

Statewide

Sector

Water and waste

Certainty of evidence

High

Direct option cost

\$10 million–\$25 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 14: Manage threats to water security, particularly in regional and rural areas

Low	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option involves increasing the use of recycled wastewater for non-potable (non-drinking) household use through third-pipe schemes in new and existing estates. A statewide review of current and potential uptake through third-pipe schemes would inform progress in adopting this component of integrated water cycle management. Based on this review, the government can incentivise further uptake where there is potential for significant reduction in demand from mains water supply. This will promote consistency in utilisation of recycled wastewater and assist to address site-specific cost challenges. A suitable incentive may be a targeted grant scheme (further detail in *What is this option? cont'd*).

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive. This option was recommended by the metropolitan citizen jury. 64 per cent of people surveyed as part of community research were supportive of using recycled water for other purposes but not drinking.

What do we think of this option and why?

This option was recommended in the strategy (ref. 14.2.1) because utilisation of recycled water increases resilience to water scarcity and a number of projects delivering recycled water through third pipe schemes are operating successfully. The recommendation focuses on the introduction of a targeted incentive fund to offset the costs of water delivery of a suitable quality to third-pipe schemes. The use of recycled water in new or recently developed estates in particular has been aided by the development of 'third-pipe schemes' which deliver a reticulated recycled water supply. A review to determine areas where implementation of the incentive fund could lead to significant reductions in mains water supply is required. This also presents an opportunity to pair up projects and for example supply sporting and recreational use along with supply to residential areas.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

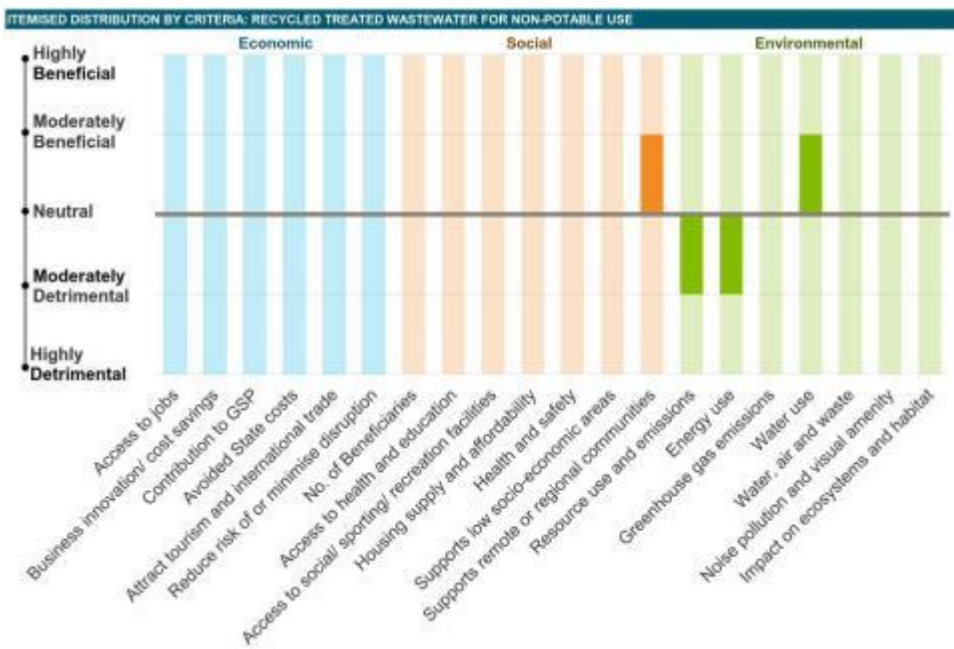
How does this option perform under different scenarios?

Supercity	++	Heightened need to conserve water resources
Westside Story	++	Heightened need to conserve water resources
Regional Cities	+	Heightened need to conserve water resources
Accelerated Climate Change /Mitigation	++	Acute need to conserve water resources
Prolonged/ Severe Economic Downturn	-	Less need to address water security
Biosecurity Threat	Neutral	

How does this option work with others?

If implemented in parallel with stormwater harvesting (SRH) this option has potential to significantly delay the need for major augmentation projects such as additional desalination capacity (WDP or WSA1) or recycled wastewater for drinking (RWW).

What are the economic, social and environmental impacts of this option?



What is this option? (cont'd)

Wastewater treated to a quality suitable for supply through third pipe schemes can be used for watering gardens, toilet flushing, car washing, and irrigation of park areas, sporting ovals and golf courses. A key benefit of this water supply source is that it is not subject to restrictions. A number of water businesses in Victoria currently generate treated wastewater to a quality suitable for supply through third pipe schemes. In areas such as Melbourne and Geelong these schemes are well developed for some greenfield residential sites. This option has potential to further increase use of this resource and to continue to increase local resilience to water scarcity.

Risks and opportunities

Uptake of this option in some rural areas may be limited by significant costs and in some cases lack of reticulated wastewater management systems.

There is potential for cost efficiencies in integrating third-pipe schemes servicing developments within the vicinity of community spaces such as sporting fields.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then the recommendation has been updated to clarify the requirement for this action and the key benefits following release of the Victorian Government's Water plan.

Scope change

Since version one of the *Draft options book* this option was updated to omit the limitation to 'household use' and include the use of this resource for meeting other outdoor watering demands such as sporting and recreational areas.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Marsden Jacobs and Associates, *Progress against the national target of 30 per cent of Australia's wastewater being recycled by 2015: Report prepared for the Department of Sustainability, Environment, Water, Population and Communities*, 2012

Victorian Department of Environment, Land, Water and Planning, *Water for Victoria: Water plan*, 2016

Regional train link upgrades RTL

Option type

Incremental expansion of existing assets

Location

Regional and rural Victoria

Sector

Transport

Certainty of evidence

Medium

Direct option cost

\$750 million–\$1 billion

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 12: Improve access to jobs and services for people in regional and rural areas

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Upgrade existing public transport links between regional centres and surrounding communities. This option will improve high priority links with increased frequency of service, reduced travel times and greater reliability. Examples of this option could include the purchase of additional rolling stock to support rail shuttles at the end of existing lines, increasing the frequency of long-distance services or returning rail services to towns on the freight rail network. These upgrades will increase access to jobs, education, health care and other services for people in rural and regional centres (further detail in *What is this option? cont'd*).

What is the level of community support?

There was limited discussion of this option during public consultation.

What do we think of this option and why?

This option was recommended in part in the strategy (ref. 12.2.9) because of the need to provide an improved rail service within 0-10 years on long distance lines for people to access jobs and services in Melbourne and within their regions. Providing additional rail services in regional areas outside the commuter range makes a moderate contribution to need 12 and a strong contribution to economic and social indicators. The *Regional Network Development Plan* provides a starting point to assess the needs and priorities for additional long distance services. However, we think that further planning and investigation is required to understand the unique service needs of each line across the network and develop a service plan that meets these needs including consideration of weekend demand. The number of services on the Shepparton line should be considered as a high priority considering the population and economic activity in that region (further detail in *What do we think of this option and why? cont'd*).

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

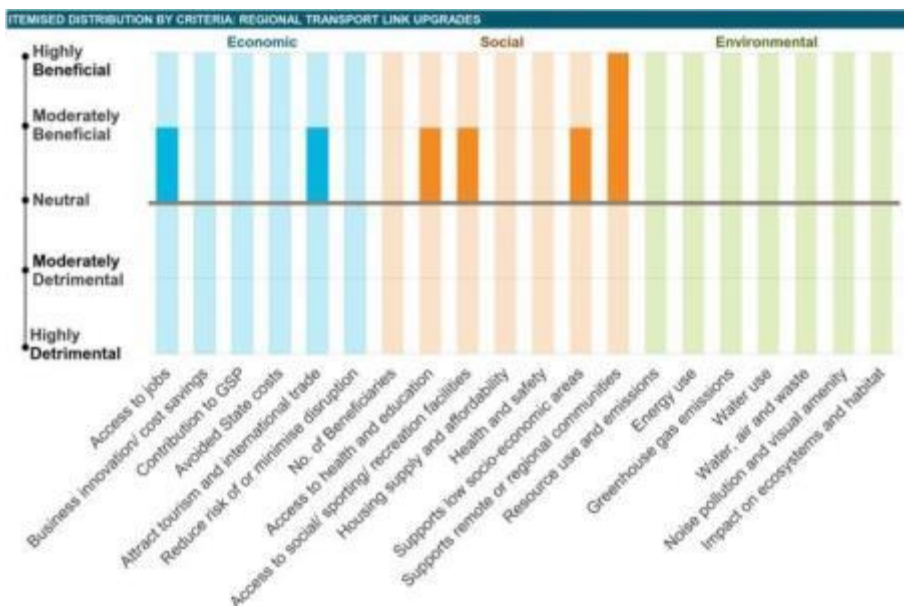
How does this option work with others?

This option is dependent upon the delivery of additional rolling stock under regional rolling stock expansion (RRS) and general infrastructure upgrades under regional rail capacity upgrades (RRC). RTL will act as a complement to regional coach upgrades (RCU) in rural areas.

How does this option perform under different scenarios?

Supercity	+	Supports mode shift to address congestion
Westside Story	Neutral	Supports mode shift to address congestion
Regional Cities	++	Supports mode shift to address congestion
Accelerated Climate Change /Mitigation	+	Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	-	Less demand for travel
Biosecurity Threat	Neutral	
Bay West	+	Potentially enhances regional supply chains
Hastings	+	Potentially enhances regional supply chains

What are the economic, social and environmental impacts of this option?



What is this option? (cont'd)

Rail shuttles: The initiation of rail shuttles would extend the reach (or service hours) of rail services further into regional communities, and enable the matching of capacity with demand along outer portions of the routes by allowing the use of short (1-2-car) trains in outer communities versus the full-length trainsets that travel into Melbourne. This strategy would rely on the design of termini to allow convenient (same-platform/cross-platform) transfers which could presumably be achieved with modest capital outlay given the minimum of platform space required for 1-2-car trains.

A priority/pilot for this type of service (representing the opportunity to increase the number of trains per day) could be the Bendigo-to-Echuca corridor. A potential upgrade in service along this route would be supported by both Echuca-to-Melbourne and Echuca-to-Bendigo demand. The Geelong-to-Warrnambool corridor would similarly represent an opportunity to supplement the existing limited number of through services from Melbourne with shorter Warrnambool-to-Geelong shuttle trains.

Returning rail services: The freight rail network in Victoria connects many towns that were previously served by passenger rail services. Many of these communities have advocated for the return of rail services for their region. Development of assessment criteria is required before the return of passenger rail services to regional cities can be considered.

What do we think of this option and why? (cont'd)

Assessment criteria needs to be developed to consider the return of passenger services to regional cities that are only served by coaches. This criterion is required to ensure a consistent response to future rail studies as they become available. Infrastructure Victoria supports increasing the use of the regional rail network to provide a reliable and efficient transport alternative to private car use for people to access jobs, services and recreational pursuits.

Risks and opportunities

There is a risk that the signalling and other infrastructure may not be able to support the proposed upgrades without significant additional investment.

This option may give the ability to cluster jobs and services in regional centres, due to the increase in transport service quality.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in part in the draft strategy. Since then we have clarified that while this recommendation focuses on 5 services, 5 days per week as set out in the *Regional Network Development Plan*, further planning will be required to understand the appropriate service requirements for each line. We have also highlighted Shepparton as a priority area for investigation, based on evidence of the need for additional services based on economic activity and population.

Rail study

Currently a study is being conducted to assess the cost and feasibility of improving passenger services in the Grampians and Barwon South West Regions. Infrastructure Victoria will assess the outcomes of this study in the preparation of the next 30-year infrastructure strategy.

The recommendation notes the long distance lines of Warrnambool, Bairnsdale, Albury-Wodonga, Echuca, Swan Hill and Shepparton as per the Regional Network Development Plan. This option will also need to assess the needs of the Ararat and Maryborough lines.

Next steps

The next steps for delivering this option and recommendation could include:

- Commence delivery of five services, five days per week on long distance lines
- Develop assessment criteria for the provision of regional passenger rail services in Victoria
- Define the regional cities requiring passenger rail services and what a base level of service should be on an equity basis
- Assess the needs, growth potential and level of service for all long distance lines, to determine the number of services above the base level (this particularly applies to the Shepparton line as a priority)
- Update the *Regional Network Development Plan* with planned service levels for each corridor over the next 15 years.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Victorian Department of Economic Development, Jobs, Transport and Resources, *Connecting regional Victoria: Victoria's Regional Network Development Plan*, 2016

Residential tenancies reform RTR

Option type

Better use through regulation

Location

Statewide

Sector

Health and human services

Certainty of evidence

High

Direct option cost

\$1 million–\$10 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 7. Provide better access to housing for the most vulnerable Victorians

Low	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option proposes reform of the Victorian *Residential Tenancies Act 1997* to provide for improved private rental housing outcomes for low income households, with a key focus on security of tenure. This is not a built infrastructure response, however it has the potential to reduce the requirement to provide additional infrastructure. There are over 270,000 low-income renter households in Victoria, the majority whom are in private rental dwellings. The Act regulates the leasing of properties for residential purposes and the conditions under which leases can be entered and terminated but does not cover leases with a term over five years, enabling leases to be terminated for 'no specified reason' subject to appropriate notice. Tenants are also subject to heavy penalties if they need to exit the lease before the lease expires. Vulnerable and low income households are particularly exposed to rent increase and the lack of long-term tenure security. The government is currently reviewing the Act with the aim of developing reform proposals in 2017.

What is the level of community support?

There was limited discussion of this option during public consultation. This may be as it was not recommended in the draft strategy.

What do we think of this option and why?

This option was not recommended in the strategy as the Victorian government review is currently underway and will report in 2017. We will monitor this in the development of future Infrastructure Victoria strategy updates. This option would not deliver new supply or guarantee affordability for households; however, it could improve the quality of private rental and potentially security of tenure by providing for longer-term lease arrangements. This could assist those households already in more affordable private rental to remain in the local area and maintain access to support networks. It also could provide a more secure housing option for households currently in public housing to transition to when losing the long-term tenure offered by public housing.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	Relates to key point/option for discussion
Regional Growth Plans	N/A

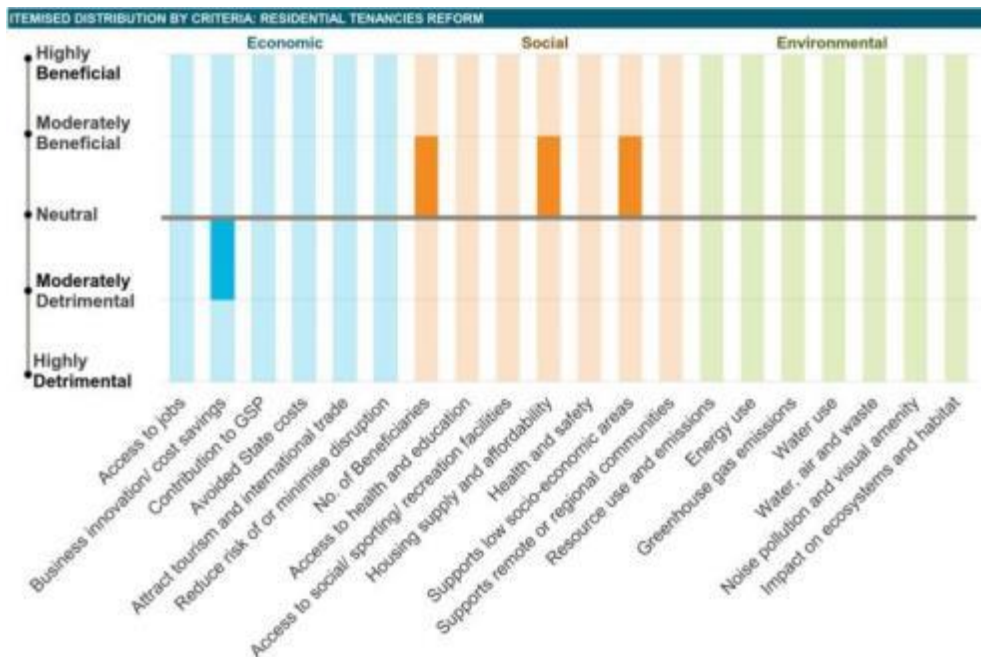
How does this option work with others?

This option is complementary to housing rental assistance and advocacy program extension (HRA) which aims to improve the experience of low income households in the private rental market. This option is not dependent on or a critical enabler for any of the other options.

How does this option perform under different scenarios?

Supercity	+	Reflecting population growth
Westside Story	+	Reflecting population growth
Regional Cities	+	Reflecting population growth
Accelerated Climate Change /Mitigation	++	Increased migration of climate refugees requiring housing
Prolonged/ Severe Economic Downturn	++	Increased number of households suffering housing stress
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



Commentary:

Reforms in favour of tenants would likely support low social-economic index communities, as members of these communities may experience reduced bargaining power. There is a chance that costs to business (i.e. landlords) may increase, due to increased regulation of the private housing supply.

Risks and opportunities

If the reform process is rushed without adequate consultation it may be ineffective or have unintended consequences due to the complexities of the housing market and the vulnerability of some participants. For landlords, the option could present the risk of increased costs, or the inability to increase rents in line with the market. This could disincentivise investment in private housing.

This option does, however, present scope for significant structural reform of tenancies. This option may reduce the need for state and commonwealth government spending in other areas, for example, social housing or other forms of housing support.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Consumer Affairs Victoria, *Rental experiences of tenants, landlords, property managers, and parks residents in Victoria, Final Report*, 2016

River and waterways natural flow regimes RWN

Option RWN is addressed in EWD - Environmental water delivery infrastructure

Recycled treated wastewater for drinking RWW

Option type

Incremental expansion of existing assets

New assets

Location

Statewide

Sector

Water and waste

Certainty of evidence

Medium

Direct option cost

\$5 billion–\$10 billion

Option lead time

10–15 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 14: Manage threats to water security, particularly in regional and rural areas

Moderate	Significant	Significant	Significant
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0-5 yrs 5-10 yrs 10-15 yrs 15-30 yrs

What is this option?

This option would treat wastewater to a quality suitable for drinking to supplement drinking water supplies. This option could include building a new asset or expansion of existing assets. Treating wastewater to drinking quality is costly but has potential to meet the need of managing threats to water security.

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive. This option was recommended by the regional citizen jury. 23 per cent of people surveyed as part of community research would support using recycled water for drinking and other purposes.

What do we think of this option and why?

This option was recommended for further investigation in the strategy (ref. 14.3.1) as a possible technology for future water supply augmentation, alongside a range of other options. This is because this option could provide a significant contribution to increasing water security, although the timing of the need is very uncertain and we have recommended identification of trigger points. Water supply in Victoria has traditionally relied on storages, and this has created risks to supply in extended dry periods. Given projections of a warmer, drier future, technologies that supply water from rainfall independent sources should be considered. Technology improvements will enable wastewater to be treated to potable levels at comparable costs to other rainfall independent technologies. While this option has benefits for environmental sustainability, significant community consultation would be required to build consensus. Other countries facing significant water security challenges (e.g. the United States, Singapore) are implementing or planning to implement schemes to utilise recycled water for drinking purposes.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

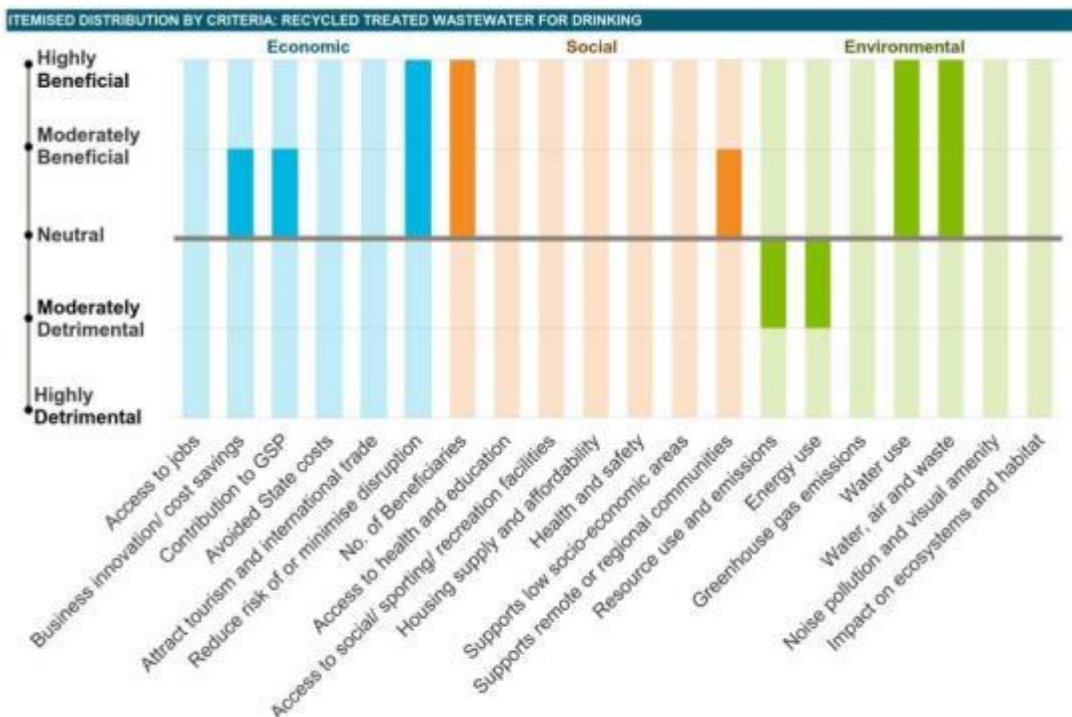
How does this option work with others?

This option could be an alternative to water supply augmentation options such as additional desalination capacity (WDP and WSA1). The need for this option could be significantly delayed by localised water management solutions such as stormwater harvesting (SRH) and recycled water for non-potable use (RTH)

How does this option perform under different scenarios?

Supercity	++	Reflecting population growth
Westside Story	++	Reflecting population growth
Regional Cities	+	Reflecting population growth
Accelerated Climate Change /Mitigation	++	Acute need to conserve available water resources.
Prolonged/ Severe Economic Downturn	+	The need to address water security may lessen but still exist.
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



Commentary:

Treating wastewater to a quality suitable for drinking is an energy intensive process. Utilising recycled water is, however, an environmentally sustainable practise.

Risks and opportunities

Without adequate long-term planning and an integrated approach to water management there is a risk of infrastructure redundancies. Community engagement would be required in considering this option. There is an opportunity for this option to provide a rainfall independent water resource and increase water security.

Funding

Though this option has only been recommended for further planning work as one of a range of possible solutions, should government choose to pursue this project, it will then need to consider funding options.

Potential funding mechanisms

General government revenue	User charges	Beneficiary charges	Property development	Asset sales
	✓			

Water projects like recycled treated wastewater for drinking are typically, and should continue to be, funded through user charges. For example, the cost of the current Wonthaggi desalination plant is being recovered through water charges. There are a large number of identifiable direct beneficiaries and user charges could provide a clear price signal to incentivise users to use water more efficiently by managing or shifting demand.

Like other user charges, government would need to consider balancing competing objectives, such as changing behaviour, managing demand, cost recovery and addressing social and environmental impacts.

Additional notes

Changes to recommendations from the draft strategy


This option was recommended for further investigation in the draft strategy. Since then we have updated the recommendation in light of the release of the Victorian Government's *Water plan* (Oct 2016) and to recognise that the Essential Service Commission's new water pricing approach is being implemented (Oct 2016).

Recycled water for drinking in California

In the United States, the State of California has been considering the role of recycled water in providing water security. Orange County previously led this initiative by treating wastewater to drinking standards, using this water to recharge groundwater supplies, and drawing from these resources to meet drinking water demands. California is however currently in its fifth year of a declared drought, and this has helped to focus the issue of water security. Greater use of recycled water for drinking is being established through the State's regulators who have drafted a report to advise their legislature. The report notes that:

The population of California is projected to increase from 38 million to 50 million by the year 2049. This population increase will have a dramatic impact on the water needs of the State. To address this increased water need, the State will take a variety of actions as outlined in the Governor's California Water Action Plan, first released in 2014 and recently updated in 2016 (CA Natural Resources Agency, 2016). One component of that plan is to increase the use of recycled wastewater. The State Water Board has set a mandate of increasing the use of recycled water by 200,000 acre-foot per year (AFY) by 2020 and an additional 300,000 AFY by 2030. Although the use of recycled water for non-potable uses such as agricultural and landscape irrigation is already well established and has been regulated for decades in California, increasing the use of recycled water as a source of potable water ("potable reuse") is critical for the State to be able to meet this goal.

Community engagement was a key part of considering recycled water for drinking in California, and a representative of the Santa Clara Valley Water District has been quoted as saying that "What we learned from that is with enough information and education you can change people's understanding and perception".



This option highlights recycled water for drinking as a possible technology where major water supply augmentations are being considered in Victoria. As with the experience in California, informed and timely community engagement on any solutions to secure water supplies will be important.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

KQED Science, *How California is learning to love drinking recycled water*, 2016

Infrastructure Partnerships Australia and Water Services Association of Australia, *Doing the important, as well as the urgent: Reforming the urban water sector*, 2015

National Water Commission, *Using recycled water for drinking, Waterlines occasional paper no.2*, 2007

State of California, *Investigation into the feasibility of developing uniform water recycling criteria for direct potable reuse: Report to the Legislature*, 2016

Victorian Department of Environment, Land, Water and Planning, *Managing extreme water shortage in Victoria*, 2016

Affordable housing development incentives

SAH

Option type

Better use through public service delivery and approval processes

Location

Statewide

Sector

Health and human services

Certainty of evidence

Medium

Direct option cost

\$10 million–\$25 million

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 7. Provide better access to housing for the most vulnerable Victorians

Low	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option proposes the introduction of voluntary incentive-based statutory planning mechanisms to increase the supply of affordable housing, in particular affordable private rental dwellings. Mechanisms include:

- Offering development bonuses related to building height, density or floor area ratios
- Reducing building setbacks
- Reducing car parking requirements
- Removing unnecessary planning obstacles to smaller scale infill housing programs such as accessory or ancillary units (e.g. granny flats, secondary suites)
- Fast track planning approval processes.

Individual project assessments will be required to determine the approach without compromising design quality or amenity to the development and the broader community. It is also important that incentives are targeted at the developer, enabling a component of the benefit to be realised through delivery of affordable housing and not inadvertently passed to the landowner in the form of land value uplift.

What is the level of community support?

There was a high level of discussion of the recommendation Affordable housing planning mechanisms, which includes this option. Responses were generally positive. This option was recommended by the metropolitan citizen jury.

What do we think of this option and why?

This option was recommended in the strategy (ref. 7.3.2) because it will increase the supply of affordable housing in suburbs with access to jobs and services, where there is an undersupply of affordable housing in Victoria. The SGS *Rental Affordability Index* (November 2015) provides evidence that affordable rental properties for low income households are only accessible on the outer fringes of urban areas. The option also enables affordable housing to be integrated amongst other housing providing social benefit, rather than creating local concentrations of disadvantage. This option has similar objectives and outcomes to the option affordable housing inclusionary planning controls (AHR), however, it operates on a voluntary rather mandatory basis and is effective in different contexts.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	Consistent
Regional Growth Plans	Contributes to implementing policy

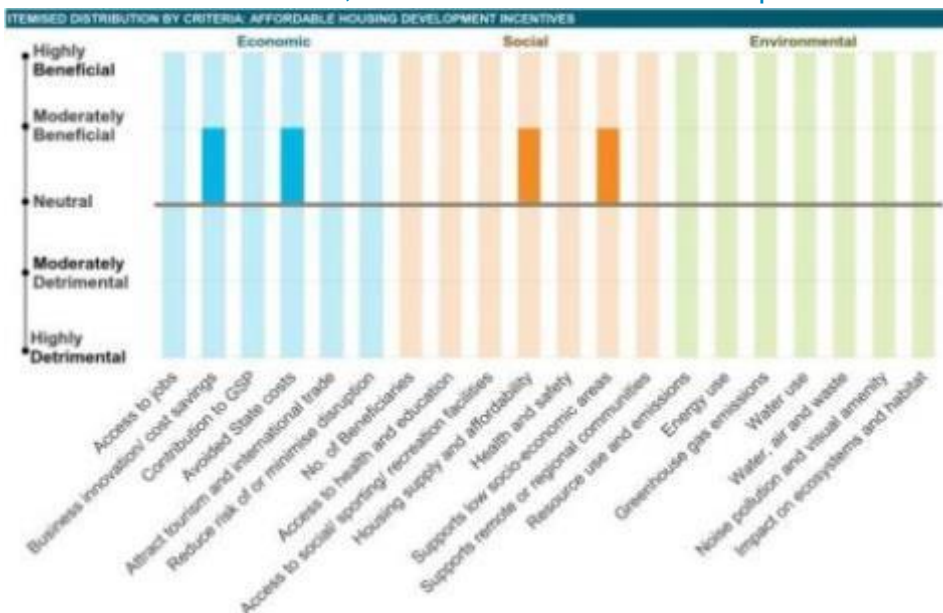
How does this option work with others?

Affordable housing inclusionary planning controls (AHR) aims to achieve the same outcome as this option through mandatory means and is effective in different situations. This option is an enabler to any option proposing the provision of affordable housing assets, including options SHE and TSA. The options for integrated government service and infrastructure planning (SIP), compact urban development (UDC) and strategic transit-oriented centres and corridors (STO) could assist with identifying areas that should be prioritised for additional affordable housing.

How does this option perform under different scenarios?

Supercity	+	Reflecting population growth
Westside Story	+	Reflecting population growth
Regional Cities	+	Reflecting population growth
Accelerated Climate Change /Mitigation	++	Increased migration of climate refugees requiring housing
Prolonged/ Severe Economic Downturn	++	Increased number of households suffering housing stress
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



Commentary:

This option is anticipated to support business innovation and reduced costs by reducing regulatory barriers to encourage development of more affordable housing. Increasing affordable housing is likely to reduce state costs, for example, in the intervention in the housing market, or by creating positive social outcomes.

Risks and opportunities

Concessions offered to developers, such as reduced building setbacks, would need to be applied sensitively to preserve amenity for residents and stakeholders. The issue of reduced car parking is often a contentious development issue. However research has been undertaken (AHURI Final Report No. 211) that displays that affordable housing tenants do in many circumstances have a reduced car parking need, due to the higher than average ratio of aged and disabled tenants.

Additional notes

Next steps

The implementation of this option will require collaboration of state and local government. The system will require a supporting planning framework to be developed, defining the level and extent to which incentives can be applied. Amendment to the state legislation will also be required to provide a definition of affordable housing in the Victorian planning provisions.

Why are incentives required?

Victoria has a shortage of housing available for rent by low income households. In Melbourne there is a particular shortage of rental properties available for low income households in areas with access to transport, jobs and services. Further information providing details of this is provided within the background information on option SCP.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Davison, G., et.al, *Understanding and addressing community opposition to affordable housing development*, 2013

Hulse, K, et al, *Changes in the supply of affordable housing in the private rental sector for lower income households, 2006–11*, AHURI final report no.235, 2014

Hulse, K, et al, *Supply shortages and affordability outcomes in the private rental sector: Short and longer term trends*, AHURI final report no.241. 2015

SGS Economics and Planning, *Revisiting the economics of inclusionary zoning*, 2015

SGS Economics and Planning, *Rental Affordability Index – Release Report* November 2015, 2015

Community health facility access SCC

*Option SCC is addressed in CIM - Community
infrastructure accessibility*

Schools as community facilities

SCF

Option type

New assets
 Incremental expansion of existing assets
 Better use through coordination processes

Location

Statewide

Sector

Education and training
 Cultural, civic, sporting, recreation and tourism

Certainty of evidence

Low

Direct option cost

\$750 million–\$1 billion

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 1: Address infrastructure demands in areas with high population growth; and

Need 2: Address infrastructure challenges in areas with low or negative growth; and

Need 4: Enable physical activity and participation

Significant	Significant	Significant	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

Need 5: Provide public spaces where communities can come together; and

Need 9: Provide access to high-quality education infrastructure to support lifelong learning

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

See further assessments in the AECOM/PwC, *Assessment 3: Technical report*, 2016

What is this option?

This option supports the increased utilisation of school assets by the broader community. This could include the use of school grounds and facilities for outside of school hours programs, early years and organised sports, as well as the integration of spaces to help make schools a relevant place for the whole community. Funding for joint planning would be made available to schools for initial infrastructure investment. An increase in ongoing funding for maintenance and insurance may also be required to cover increased use. Good governance and shared-use agreements will likely be required and a lead broker will also be needed to bring potential partners together well in advance of the design phase for new or upgraded schools. This lead broker could be a representative from the school, local council or state government.

What is the level of community support?

There was a high level of discussion of the recommendation for Schools as community facilities, which includes this option. Responses were generally positive.

What do we think of this option and why?

This option was recommended in part in the strategy (ref. 1.4.7, 2.3.3, 5.3.1 and 9.3.3) because there are a number of efficiency gains and social benefits from leveraging the state's investment in school sites for wider community use. Strong governance and shared use agreements will assist in managing risks and ensuring that the range of regulatory and individual service requirements can all be achieved on one site. State government should identify and provide the necessary additional funding for joint planning and design. Our costings have assumed approximately \$1 million per new or upgraded school. The option was initially costed at transitioning 50 per cent of existing schools as well as all new schools; however, our recommendation scales-down this cost with a stronger focus on new schools. We think that ten new or upgraded schools per year for 25-years (approximately 250 schools) is more realistic. In low growth or declining rural areas it may be appropriate to consolidate a range of existing community facilities into existing school sites.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	Relates to key point/option for discussion
Regional Growth Plans	Contributes to implementing policy

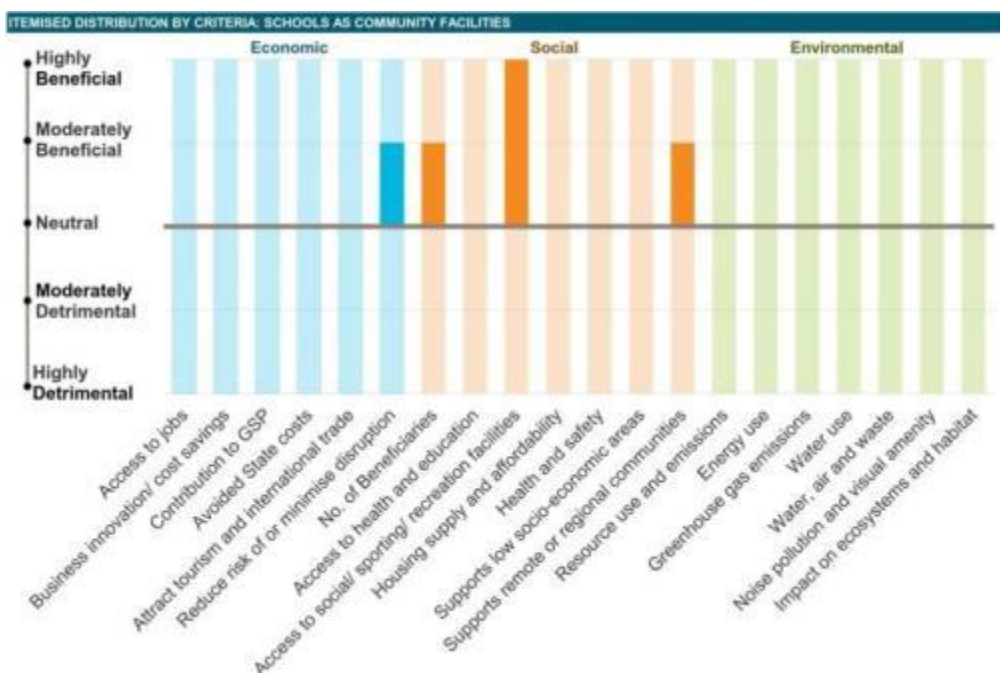
How does this option work with others?

School infrastructure funding certainty (SIF) would enable this option. By publishing the pipeline of planned new schools and upgrades, partners such as councils, would have the time to jointly plan for integrated community facilities on new school sites and schools planned for upgrades. Community shared use agreements (CSS1) enable the shared use of school facilities to occur.

How does this option perform under different scenarios?

Supercity	+	Increased pressure on community facilities
Westside Story	+	Increased pressure on community facilities
Regional Cities	+	Increased pressure on community facilities
Accelerated Climate Change /Mitigation	Neutral	
Prolonged/ Severe Economic Downturn	Neutral	
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



Commentary:

There are a number of efficiencies to be gained through leveraging state school assets to provide wider social benefits and increase access to community facilities

Risks and opportunities

Schools and community partners will need to develop an appropriate governance structure to address impacts on school sites such as security, safety and maintenance issues. Consideration needs to be made to ensure that school principals are not over burdened with managing wider community facilities. There is likely to be an increased role for local government and other partners to assist with managing and programming the shared assets.

A range of community facilities are appropriate for delivery on school sites, including early years' facilities, libraries, arts and sports facilities. As state government is able to land bank future school sites there is an early opportunity to integrate school planning with wider service and community infrastructure planning.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then we have clarified that this recommendation could also include integration with community education providers, in response to feedback from the sector that felt the current wording did not adequately reflect the life-long learning opportunities for these facilities. We have also highlighted that integrated facilities should be designed based on that specific community's needs. In addition, we have clarified that the first step for this recommendation would be to look at governance arrangements, in response to feedback from local governments.

Learnings from previous efforts to share facilities on school sites

Previous efforts to facilitate joint funding of shared community facilities on school sites have been hampered by insufficient lead time for co-investors such as local government and Sport and Recreation Victoria to align funding. This option would be more effective contributor with school infrastructure certainty (SIF). This would provide community and potential co-investors with a five year lead time to undertake joint planning and align funding sources and opportunities. This would also give sufficient time for the preparation of joint use agreements to manage any risks associated with the sharing of facilities.

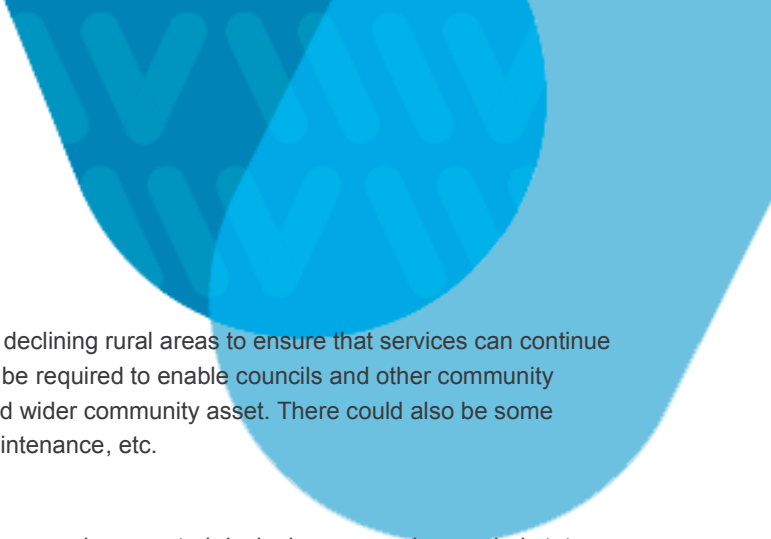
Next steps

- Develop policy frameworks to ensure that all new schools, and schools planned for major upgrades, will be designed to be schools as community facilities.
- Develop guidelines to support joint planning, design and delivery of schools as community facilities.
- Identify schools in rural areas that have capacity to consolidate community facilities onto schools sites, where the sharing of facilities will deliver a wider community benefit.
- This preparatory work can commence immediately with a view to having an ongoing program in place to support schools being delivered within 5 years.

Non-government schools could choose to share community facilities for wider community use such as sharing sports facilities, school ovals or co-locating early years' facilities on their school sites. Appropriate joint use agreements would be required to ensure that where state or local government has made a co-investment for shared community facilities, that these assets are made available in perpetuity or to mutually agreed time horizons.

Changed scope

A number of earlier options such as school facility use for out of hours care (SFU) and schools with low enrolments (SLR) can be addressed through this option. Out of school hours care can be provided on school sites if appropriate spaces are provided. For rural areas, where enrolments are low and where there are underutilised school assets, there could be some efficiencies gained for a range of community facilities to be consolidated onto school sites such as kindergartens, maternal and child health centres and recreation facilities. This would mean that the state, through opening up the school sites for wider community use, would become a larger co-investor in providing essential



community services for rural areas. This would be a support to declining rural areas to ensure that services can continue to be provided to rural communities. Strong governance would be required to enable councils and other community members to have an increased role managing of the school and wider community asset. There could also be some efficiencies gained through sharing recurrent costs such as maintenance, etc.

Community research

Ninety three per cent of people surveyed as part of community research supported designing new and upgraded state schools to include facilities to be available for community use.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

VPA, *Melbourne's open space land data*, 2016

Affordable housing infrastructure plan SCP

Option type

Better use through coordination processes

Location

Statewide

Sector

Health and human services

Certainty of evidence

Medium

Direct option cost

\$1 million–\$10 million

Option lead time

1 – 5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 1: Address infrastructure demands in areas with high population growth; and

Need 2: Address infrastructure challenges in areas with low or negative growth; and

Need 7: Provide better access to housing for the most vulnerable Victorians

Moderate	Moderate	Moderate	Moderate
----------	----------	----------	----------

0-5 yrs 5-10 yrs 10-15 yrs 15-30 yrs

What is this option?

Develop and publish a 30-year statewide plan for affordable housing that responds to forecast population growth, decline and demographic change. The plan would be led by an overarching affordable housing strategy that would outline the full range of interventions to be implemented, in addition to building more affordable housing, to provide access to housing for vulnerable low income households. The detail of the plan would then outline set targets for the location and number of different types of housing to be made available. It would also include a pipeline of supporting funding and land release, with the land being provided by local and state government. The strategy would address short and long-term public housing, community housing and affordable private rental housing (options ARH, CHP, SHE, TSA) and rationalisation of existing housing stock (option SHA). The plan would also provide the basis for the application of inclusionary and incentive planning mechanisms (options AHR and SAH), should they be adopted (further detail in *What is this option? cont'd*).

What is the level of community support?

There was a high level of discussion of the recommendation Affordable housing plan, which includes this option. Responses were generally positive.

What do we think of this option and why?

This option was recommended in the strategy (ref. 7.4.1) because it is required to ensure that an optimal combination of interventions is implemented and the costly solution of supplying new affordable housing dwellings is delivered where it will provide the greatest benefit in areas of high need. Providing a solution to housing affordability for at-risk households is a complex problem involving many social and economic factors. Development of the plan will facilitate better definition of the need and create a holistic, rather than piecemeal response. To attract private sector involvement, the long-term certainty for investment offered by this plan is essential. The plan would also facilitate coordination with commonwealth and local government, key partners in addressing this need.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	Consistent
Regional Growth Plans	Contributes to implementing policy

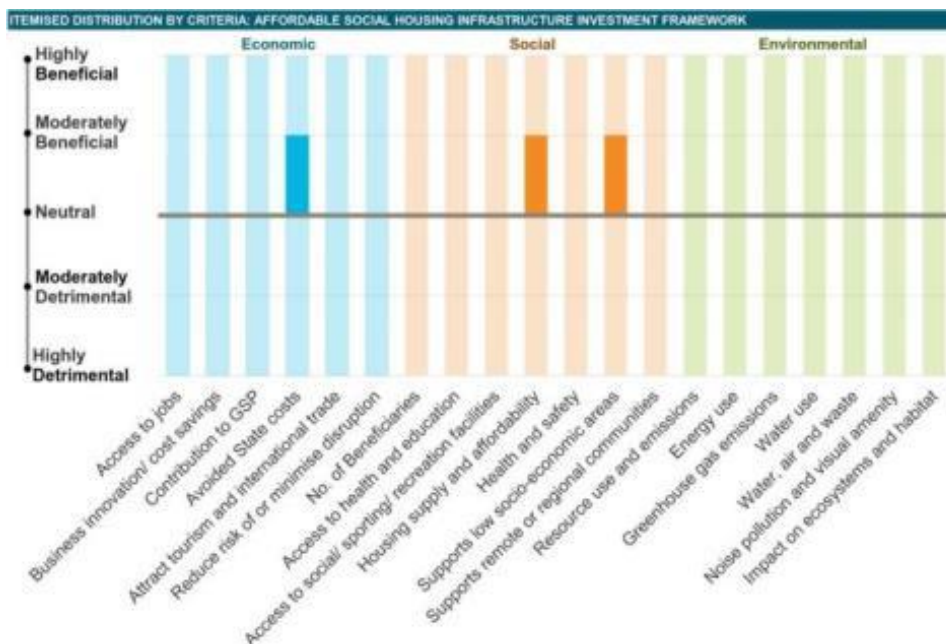
How does this option perform under different scenarios?

Supercity	Neutral	
Westside Story	Neutral	
Regional Cities	Neutral	
Accelerated Climate Change /Mitigation	+	Increased migration of climate refugees requiring housing
Prolonged/ Severe Economic Downturn	+	Increased number of households suffering housing stress
Biosecurity Threat	Neutral	

How does this option work with others?

This option is a critical enabler for all of the other options addressing affordable housing as it provides an overarching plan for the other options to be implemented. Integrated government service and infrastructure planning (SIP) could assist with identifying areas that should be prioritised for additional affordable housing

What are the economic, social and environmental impacts of this option?



Commentary:

This option is likely to result in reduced state costs through better coordination of spending. Broader social benefits are not reflected in the chart as this option is a strategy only and implementation is required to achieve the benefits.

What is this option? (cont'd)

The cost of the option would cover the cost of initially developing the strategy and continuing to refresh the strategy on a regular basis. The cost does not include the funding of items identified in the strategy.

Risks and opportunities

Developing a plan to address the shortage of affordable housing involves the consideration of many complex interrelated factors, most particularly including issues of social equity, welfare and the economics of the broader housing sector. There is not a comprehensive body of knowledge that quantitatively captures the benefits to the entire community of providing affordable housing in a way that can be compared to other infrastructure investments. The absence of this information creates the risk that the actions derived in the plan will not achieve the benefit intended and consequently monitoring of the plan throughout its implementation will be essential.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then we have clarified that this recommendation is applicable across the state.

Background information

The causes of homelessness are many and varied and there is not an overarching study that can comprehensively quantify the cost of homelessness in Australia. Existing research (M. Berry et al, 2003) into the quantitative costs of homelessness and the benefits of reducing its incidence generally identified significant cost savings to government and net gains to the homeless arising from investment in targeted support programs. However, the 2008 commonwealth white paper reported that people who are homeless use hospital emergency services at higher rates than the general population to treat conditions and fix injuries that are made worse by being homeless. It also estimated that the long-term economic cost to the community of not assisting the 50,000 children who pass through specialist homelessness services in Australia each year is close to \$1 billion per annum. Further work is required by government to quantitatively confirm the impact and cost of homelessness to determine the appropriate response.

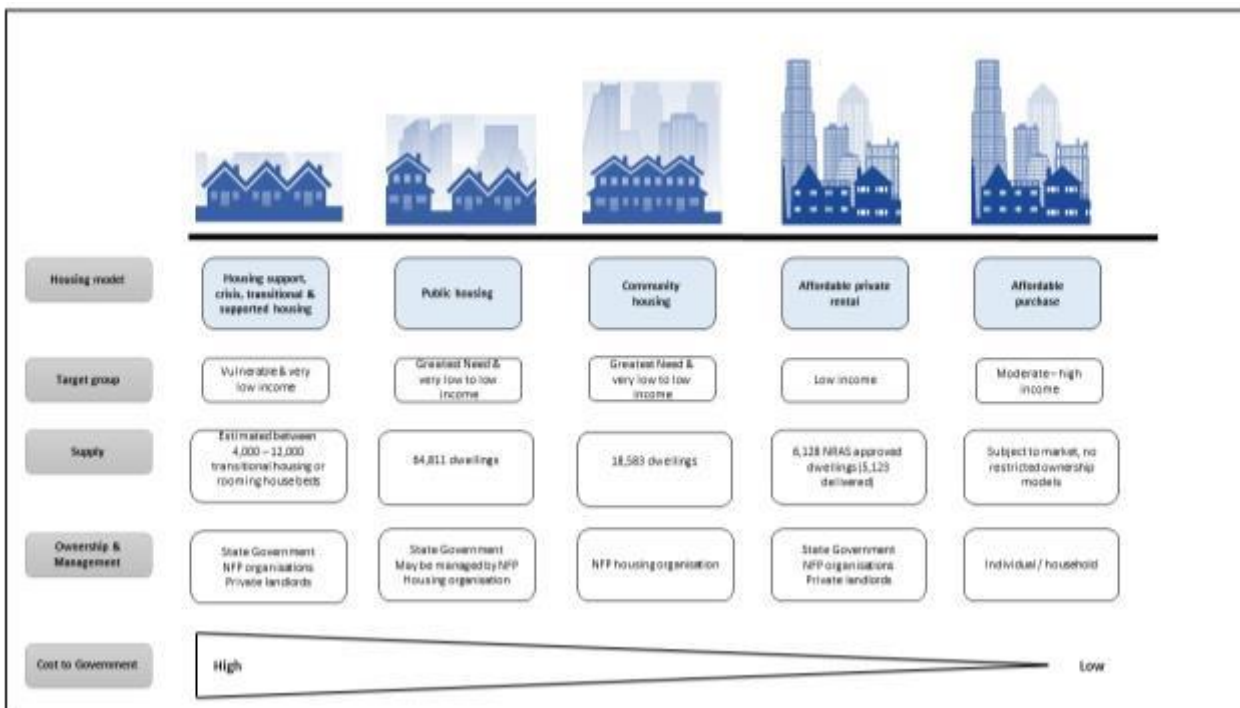
To determine the need for affordable housing, Infrastructure Victoria commissioned a desktop review of existing literature (K. Breen 2016). Based on this analysis, we estimate that there is currently an unmet requirement for access to affordable housing for approximately 75,000 to 100,000 vulnerable low income households in Victoria. Key findings of the report substantiating this are provided below.

- There are over 32,000 households on the public housing list, with over 10,000 of these households requiring priority assistance. The public housing and community housing sectors have recently consolidated their separate waiting lists into one Victorian Housing Register. As this has just taken place, information is only currently available for public housing.
- It is generally defined that if housing costs exceed 30 per cent of a 'low income' household's (households with the lowest 40 per cent of income – Q1 and Q2) gross income, then that household is experiencing 'housing stress'. Using average income figures, a very low income household (households with the lowest 20 per cent of income in Australia – Q1), will have less than \$185/week for a single person household and \$300/week for a family household for all other living expenses if their housing cost is greater than 30 per cent.
- Low income households leasing properties in the community housing and private housing markets may be eligible for financial assistance from the commonwealth government under the Commonwealth Rent Assistance Program (CRA). In 2015, 118,000 CRA recipients in private rental in Victoria were paying more than 30 per cent on housing including approximately:


- a. 38,000 CRA recipients paying more than 50 per cent of income on housing (all income levels).
 - b. 66,000 very-low income (Q1 – lowest 20 per cent income level) recipients paying over 30 per cent income; and
 - c. 22,000 low income (Q2 – second lowest income level) recipients paying over 30 per cent income.
- In addition to the unmet requirement displayed by these statistics, there is also an issue of availability of rental housing in areas that provide access to public transport, jobs and services. The SGS rental affordability index prepared in November 2015 provides evidence that affordability of rental properties for low income households only exists on the outer fringes of urban areas. This shortfall has been created by the market not providing adequately for this sector and higher income earners further compounding the problem by choosing to occupy lower rent properties, reducing access to housing for low income households.

A key component of the plan proposed under this option would be the overarching affordable housing strategy that would outline the full range of supply and demand interventions to be adopted by government, designating the quantum, scope and role of each intervention. The provision of affordable housing is a 'supply side' intervention to address the shortfall in access to affordable housing experienced by low income and at risk households. It is possible through this mechanism to increase the supply of housing and also influence the type and location of housing provided. Government can intervene to directly fund and supply social housing or introduce measures to engage the private sector in the delivery of affordable rental housing. An alternative 'demand side' intervention is for government to provide rental subsidies directly to property owners or to households experiencing housing stress. Subsidies can take many different forms including ongoing rental assistance payments, low cost bond loans, one off payments and short-term financial packages. Rental subsidies can provide a more cost-effective solution, but they rely on the private rental housing market's ability to provide an adequate supply of suitable rental properties and, depending on the scale of intervention, bring the risk of inflating rental costs in the private rental market.

The Affordable Housing Spectrum



Reference: Affordable development outcomes, *Improving access to affordable housing*, 2016



The affordable housing spectrum shown in the diagram above indicates the range of housing solutions in place in Australia to address homelessness, ranging from crisis and transitional housing through to affordable purchase housing. A key component of the solution to moving people out of homelessness is to provide access to a pathway of housing solutions for them to progress through.

The broader issue of the affordability of housing for home owners and moderate to high income renters is not covered under the strategy, as it does not address the 'most vulnerable' households and relates to privately-owned assets. The affordable housing plan proposed in this option will need to consider the full range of housing categories, however, as the availability and accessibility of one category of housing is dependent on factors relating to the full spectrum of housing supply. The housing market is an important component of the Victorian economy. Interventions by government in the provision of affordable housing have the potential to cause disruption to the industry and consequently the impact on the broader housing market must also be considered in the development of the plan.

Currently, Victoria's dedicated affordable housing supply is made up of around 65,000 public dwellings, 18,500 community housing dwellings and 5,500 affordable private rental dwellings. Public housing is a form of long-term subsidised rental housing owned and managed by government, rented to low income households at no more than 25 per cent of total household income and subject to tight eligibility criteria. Community housing, like public housing, is a type of long-term subsidised rental housing. However, it is managed by non-government community housing providers and is for people on low to moderate incomes with a housing need. Many of the community housing properties are owned by the organisation, while some are owned by the Department of Health and Human Services or rented from private landlords with government funding. The community housing organisations are registered and regulated by the state government. Specialist community housing organisations focus on housing particular tenant groups, such as the aged, homeless youth, people living with disabilities, and others. Public housing and community housing are collectively referred to as social housing. Affordable private rental housing is owned by the private sector, and made available at an affordable subsidised rent to households through access and affordability requirements set by government as well as subsidies provided by government – the National Rental Affordability scheme (or NRAS) being a recent Australian example.

The National Disability Insurance Scheme commenced its roll out in Victoria in July 2016. Introduction of the scheme is likely to impact on the demand for affordable rental housing, but exactly how it will do so is unknown. This will need to be monitored closely as the scheme is implemented.

Next Steps

To establish the Affordable housing infrastructure plan, the first step would be to develop an overarching housing strategy, in particular to determine the balance between supply and demand side interventions. This will involve answering the questions such as:

- To what extent can increased subsidies address the requirement and who are they best targeted at?
- To what extent can the provision of affordable housing address the requirement, what cohort should that solution be targeted at and where should it be located?

This process will have to consider both economic and equity factors.

Another important early step will be to determine to what extent and in what way can the private sector be involved to deliver and fund infrastructure solutions. This will require working jointly with the commonwealth government to determine financial mechanisms and local governments to determine statutory planning mechanisms to obtain private sector participation. The commonwealth input on financial matters is required as any state-based strategy will need to reflect the national consequences of taxation, finance, banking and urban policies.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Berry, M. et al, *Counting the cost of homelessness: A systematic review of cost-effectiveness and cost-benefit studies of homelessness*, 2003

Affordable development outcomes, *Improving access to affordable housing*, 2016

Commonwealth of Australia, *The road home: A national approach to reducing homelessness*, 2008

SGS Economics and Planning, *Rental affordability index: Quarter 2 – 2015*, 2015

School campus utilisation SCU1

Option SCU1 is addressed in SRS – Unlocking school resources through technology

Education and medical research precincts linking with the private sector

SEP

Option type

Better use through coordination processes

Location

Statewide

Sector

Education and training

Certainty of evidence

Medium

Direct option cost

\$100 million–\$500 million

Contribution to meeting the need

Need 9. Provide access to high-quality education infrastructure to support lifelong learning – **Low**

What is this option?

Establishment of new precincts that bring sectors together, driven by private sector demand for increased collaboration with the tertiary education and the vocational training sector. This has been demonstrated with the innovation precincts like Carlton Connect or the South East Melbourne Innovation Partnership.

This option would create specialised precincts designed to bring firms, medical and research institutions, technology experts and business service providers together to bolster innovation.

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option was not recommended in the strategy because there is not an obvious and compelling infrastructure role for the state. We recognise that it is important for industry and education providers to have strong linkages and that specialised research-precincts might strengthen these linkages. However, each precinct would be unique and comprise a range of relevant institutions, businesses and other stakeholders. The strategy has not identified specific infrastructure requirements at this precinct level.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

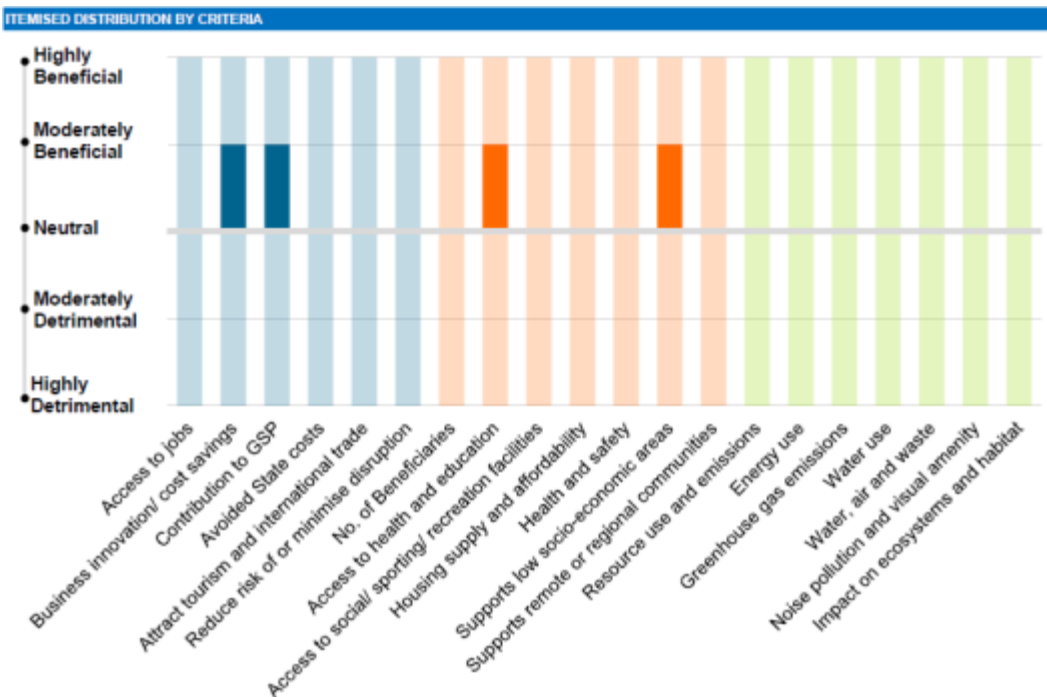
How does this option perform under different scenarios?

Supercity	Neutral
Westside Story	Neutral
Regional Cities	Neutral
Accelerated Climate Change /Mitigation	Neutral
Prolonged/ Severe Economic Downturn	Neutral
Biosecurity Threat	Neutral

How does this option work with others?

No key relations with other options were identified.

What are the economic, social and environmental impacts of this option?



Risks and opportunities

An implementation risk is that the role for government is unclear for this option. In some instances the improved partnerships between industry and education providers can occur even without them being co-located in an identified precinct. There is a need to determine why locating in the same precinct will provide mutual benefit and the potential role for government to assist.

Evidence base

AECOM/PwC, *Assessment 2: Economic, social and environmental assessments and option relationship mapping*, 2016

Deloitte/Aurecon, *Assessment 1: Options analysis report*, 2016

School facility use for out of school hours care SFU

*Option SFU is addressed in SCF – Schools as
community facilities*

Public housing asset management SHA

Option type

Better use through refurbishment of existing assets

Incremental expansion of existing assets

New assets

Location

Statewide

Sector

Health and human services

Certainty of evidence

Medium

Direct option cost

\$5 billion–\$10 billion

Option lead time

1–5 years

Contribution to needs

Need 7: Provide better access to housing for the most vulnerable Victorians

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option proposes to continue to invest in and improve public housing asset management, whilst maintaining the total current number of dwellings. This would involve disposing of obsolete or unsuitable dwellings, holding and refurbishing appropriate dwellings and acquiring new dwellings. More than 30 per cent of existing public housing is over 30-years old and was built to meet the needs of a community that has changed. Consequently, a significant proportion of government owned public housing assets are not fit for purpose and also in poor condition.

Consideration should also be given to the transfer of management and ownership of public housing to the community housing sector as part of the rationalisation, as proposed in social housing stock transfer (SHS3) (further detail in *What is this option? cont'd*).

What is the level of community support?

There was a moderate level of discussion of the recommendation Public housing asset management, which includes this option. Responses were generally positive. This option was recommended by the regional citizen jury.

What do we think of this option and why?

This option was recommended in the strategy (ref. 7.2.1) because the option will replace ageing and poor standard public housing with better quality fit-for-purpose housing. The option has been assessed as moderate, as it does not increase the supply of housing; however, it avoids the housing supply being reduced, when existing housing stock is removed from service and enables housing to be reconfigured to better match tenants' requirements. This option involves spending more than government has in recent years, where the asset management process has not been financed with significant additional capital. The option includes the disposal of obsolete or unsuitable dwellings, however, the direct option cost nominated has not been reduced to account for any funds raised through the disposal, which, if included, could reduce the cost to implement the option.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

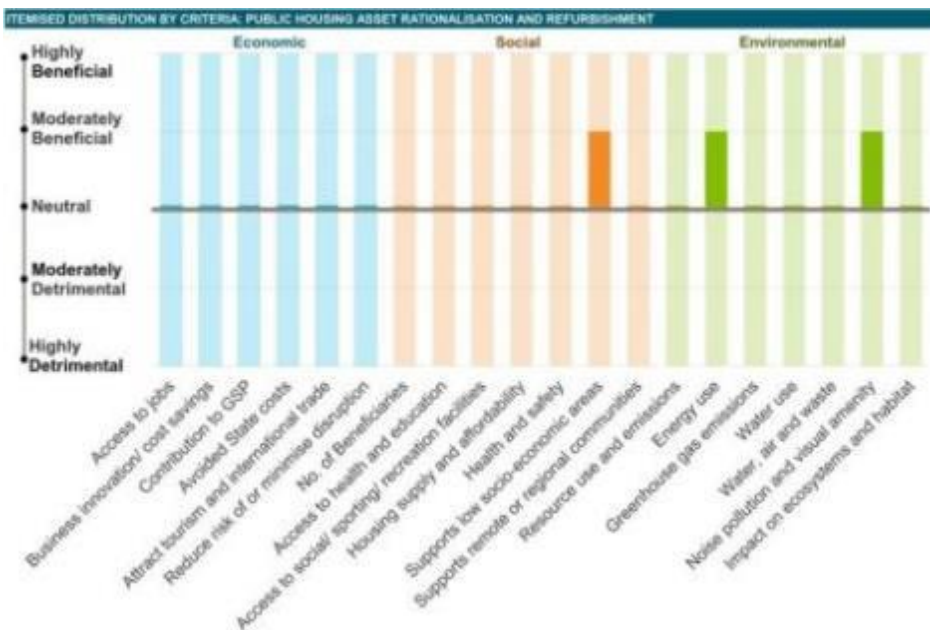
How does this option work with others?

The benefit of this option will only be fully realised if it is provided as part of a pathway of complementary housing solutions, rather than an isolated solution. Developing the affordable housing infrastructure framework (SCP) will be critical to determine the quantum, type and location of housing solutions required. The housing solution options that are complementary include ARH, CHP, HRA, RTR, SHE and TSA. Affordable housing sector planning system amendment (SHS1) and social housing stock transfer option (SHS3) would act as an enabler to this option.

How does this option perform under different scenarios?

Supercity	+	Reflecting population growth
Westside Story	+	Reflecting population growth
Regional Cities	+	Reflecting population growth
Accelerated Climate Change /Mitigation	++	Increased migration of climate refugees requiring housing
Prolonged/ Severe Economic Downturn	++	Increased number of households suffering housing stress
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



Commentary:

In addition to the social benefits, the option is considered likely to have benefits for energy use through upgrades to the existing housing stock. Additionally, this option may have benefits for visual amenity.

What is this option? (cont'd)

Public housing is a form of long-term subsidised rental housing owned and managed by government, rented to low income households at no more than 25 per cent of total household income and is subject to tight eligibility criteria. Currently, Victoria's dedicated public housing supply is made up of around 65,000 dwellings and there is a wait list of over 32,000 households, with over 10,000 of these households requiring priority.

The profile of Victorians seeking public and social housing has changed over time, however, and is now characterised by the following key features:

- A significant proportion of smaller households.
- An increase in elderly, single, economically and socially disadvantaged tenants.
- Homeless people comprise approximately 50 per cent of individuals allocated public housing.
- A lower proportion of working social housing residents.
- Higher numbers of residents with disability, mental health or drug and alcohol issues.
- Fewer people moving from public housing into the private rental housing market.
- Population growth and increasing demand for affordable housing.

In 2012 the Victorian Auditor General (VAGO) undertook an audit and determined that there are:

- 9,596 (14.9 per cent) public housing dwellings are underutilised.
- 3,542 (5.7 per cent) public housing dwellings are overcrowded.
- An estimated 10,000 dwellings at or nearing obsolescence.
- 35,862 (42 per cent) of dwellings are over 30-years old.

Addressing the items raised by VAGO will be a key component of this option, as well as considering the location of existing and future public housing to position it with accessibility to jobs and services. In the design of any new dwellings, consideration should be given to design alternatives that enable cost effective reconfiguration of the dwellings to meet alternative uses in the future.

Risks and opportunities

This option will require tenants to be relocated from their homes permanently or on a temporary basis during construction, as the assets are progressively redeveloped or released. This will provide disruption to an already vulnerable group of the community and will need to be well managed. The option also involves refurbishment of existing assets, which brings some uncertainty to the amount of funds required to implement the option, requiring strong contingency management.

Many existing public housing sites are already relatively dense compared to surrounding neighbourhoods; therefore the capacity to introduce new social or private housing on existing sites may be limited. Reconfiguring the sites for mixed use reduces the spatial concentration of social disadvantage at a neighbourhood level, which has a beneficial social outcome.

Funding

Should government choose to pursue this program, it will then need to consider funding options. Below is a range of potential funding mechanisms which could be examined to help fund the program.

Potential funding mechanisms

General government revenue	User charges	Beneficiary charges	Property development	Asset sales
✓	✓		✓	✓

General government revenue is likely to continue to be a major source of funding for programs like public housing asset management. Selling obsolete stock when land is surplus or the existing housing asset is no longer fit-for-purpose should be pursued, which can help provide a one-off funding boost to government.

Property development could also be considered. Opportunities to sell land or provide development rights could be examined to deliver a combination of social and private housing, with the new social housing stock returned to the state. Other opportunities could also be examined, such as leasing parts of premises within or around the social housing. For example, leasing ground floor premises with a street frontage for commercial purposes such as a supermarket, café or laundromat.

Charging rent is a form of user charge and should continue to be collected; however, we recognise that existing social housing rental payments (including subsidies received such as Commonwealth Rent Assistance payments) are only expected to partially contribute to the cost of social housing.

Additional notes

Changes to recommendations and option name from the draft strategy

This option was recommended in the draft strategy. Since then we have refined the recommendation by removing the term 'rationalisation' from title and description. This was in response to stakeholders misinterpreting it as involving a net reduction to the number of dwellings. We have also highlighted that while the recommendation timeline is 0-30 years a concerted effort will be required in the early part of this period. The reference to stock transfer occurring 'where appropriate' has been removed as stakeholders found it ambiguous.

Next steps

To implement this option an asset management plan is required, covering all assets in the state's public housing stock. The plan would include an assessment of the asset's existing condition and functionality and a costed strategy for the maintenance, redevelopment or release of the asset. The strategy should note the interdependence of activities and a timeline for the work to be implemented. Government have already commenced work on this task, creating an asset intent framework enabling existing dwellings to be classified and assessed and work is being done to classify all existing dwellings. The next steps would be to prepare an implementation plan and business case to secure funding to implement the plan.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Affordable development outcomes, *Improving access to affordable housing*, 2016

Social housing utilising the Defence Housing Australia rental model SHD1

Option type

Better use through contractual processes

Location

Statewide

Sector

Health and human services

Certainty of evidence

Low

Direct option cost

<\$100 million

Contribution to meeting the need

Need 7. Provide better access to housing for the most vulnerable Victorians – **Low**

What is this option?

This option involves the government developing new properties which are then sold to private investors on the basis of being leased back to the government or a community housing provider. The investor would receive a market rent while the properties are then rented to lower income households at a significantly reduced rent. The Australian Defence Housing Australia (DHA) model operates in this way, with the properties leased to defence members and their families. To supply the housing, DHA purchases existing housing stock from the private sector or acts as a developer, building new stock. Investors are provided with a rent guarantee and a significant maintenance service at the end of the lease. Defence personnel operate on an employment system where staff are employed or posted in a given role for a fixed time period in a certain location. At the end of this time period the staff relocate to a new role in a new location. Long-term tenure of rental properties is therefore not required. For the social housing application, however, long-term tenure for tenants is highly desirable.

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option was not recommended in the strategy as it is only a small part of a solution and our recommendations have prioritised other options which we think will be more effective in addressing the need. This model is known to work well for the defence sector in Australia, but it has not been trialled for affordable housing. Research into the model has determined that it could be feasible in the affordable housing sector if a government guarantee was provided and the program was delivered on a large scale. One option for government, should it wish to pursue this option further, is to request that DHA operate a trial, given their expertise and capability. This approach would be permitted under the existing legislation that governs the operation of the organisation.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

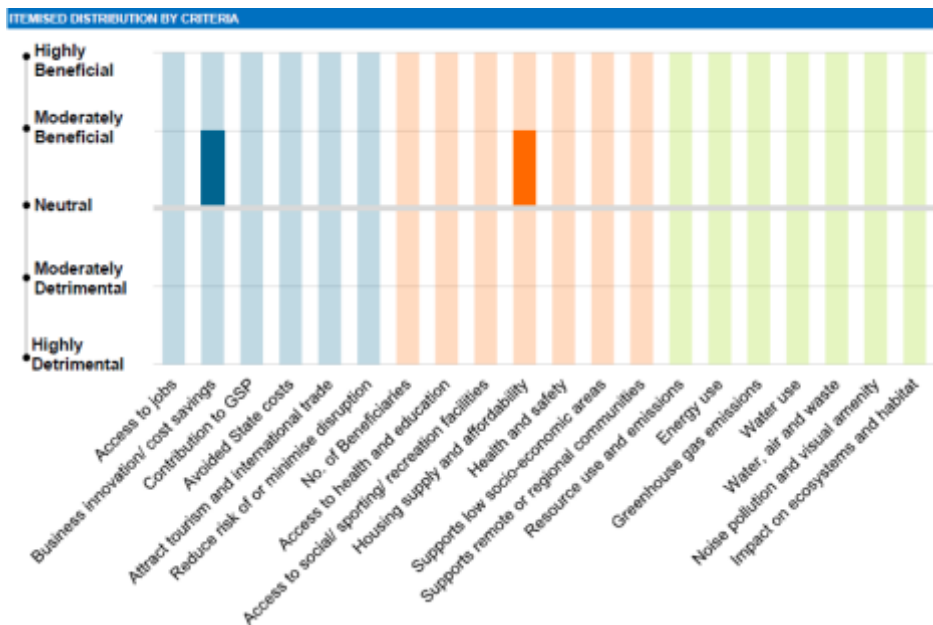
How does this option perform under different scenarios?

Supercity	Neutral
Westside Story	Neutral
Regional Cities	Neutral
Accelerated Climate Change /Mitigation	Neutral
Prolonged/ Severe Economic Downturn	Neutral
Biosecurity Threat	Neutral

How does this option work with others?

This option would be supported by an affordable housing infrastructure plan (SCP) which provides forward projections for the provision of new properties. It is also supported by SHS1, SAH and AHR, which provide complementary regulatory reform that may simplify development of new properties.

What are the economic, social and environmental impacts of this option?



Commentary:

The privatised model encourages innovation by private companies. There would be little effect on the public economy, however, there is the risk of artificially changing the housing market as demand for assets increases or decreases.

Risks and opportunities

Social housing is potentially not as attractive an investment market in comparison to the defence sector, which may reduce the viability of the scheme. If a model is developed that includes property care, as offered in the DHA model, this risk can be practically mitigated, but mitigating the perceived risk may be more difficult. A financial premium in addition to meeting the gap between rent received and market rent is likely to be required to support the model implementation. This option would be more feasible financially if it housed more moderate income households who could pay a reduced market rent as compared to supporting very low income households. This may also make the option more attractive to investors but may not be acceptable to government as it would not target the most in need. There is also a risk that at the end of the lease period the tenant still requires affordable housing and there is no other housing option for the household to transition to.

Evidence base

AECOM/PwC, *Assessment 2: Economic, social and environmental assessments and option relationship mapping*, 2016

Deloitte/Aurecon, *Assessment 1: Options analysis report*, 2016

Social housing stock expansion SHE

Option type

New assets

Location

Statewide

Sector

Health and human services

Certainty of evidence

Medium

Direct option cost

>\$10 billion

Option lead time

5–10 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 7: Provide better access to housing for the most vulnerable Victorians

Significant	Significant	Significant	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option proposed the provision of 50,000 additional subsidised housing dwellings that would be owned and operated by state government or the community housing sector, and operated as public or community housing, collectively called 'social housing'. Social housing supports the most vulnerable Victorians on very low incomes who would otherwise be in significant housing stress in the private rental market or are unable to sustain a tenancy due to their complex needs.

We estimate that there is currently an unmet requirement for access to affordable housing for approximately 75,000 to 100,000 vulnerable low income households in Victoria. This unmet requirement could be addressed through the provision of new social housing (as proposed in this option), affordable private rental market supply, increased financial support packages or a combination of all of the above (further detail in *What is this option? cont'd*).

What is the level of community support?

There was a moderate level of discussion of the recommendation for affordable rental housing provision, which includes this option. Responses were generally positive.

What do we think of this option and why?

This option was recommended in the strategy in part (ref. 7.4.3) because it could make a substantial contribution towards providing new dedicated affordable housing dwellings that we believe are needed over the next 10 years. While the option consulted on proposed the provision of 50,000 new dwellings, a specific quantum of housing was not recommended in the strategy, as further analysis is required. Determining the quantum requires detailed investigation and planning, as outlined in the option for an affordable housing infrastructure plan (SCP) (further detail in *What do we think of this option and why? cont'd*).

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	Relates to key point/option for discussion
Regional Growth Plans	Contributes to implementing policy

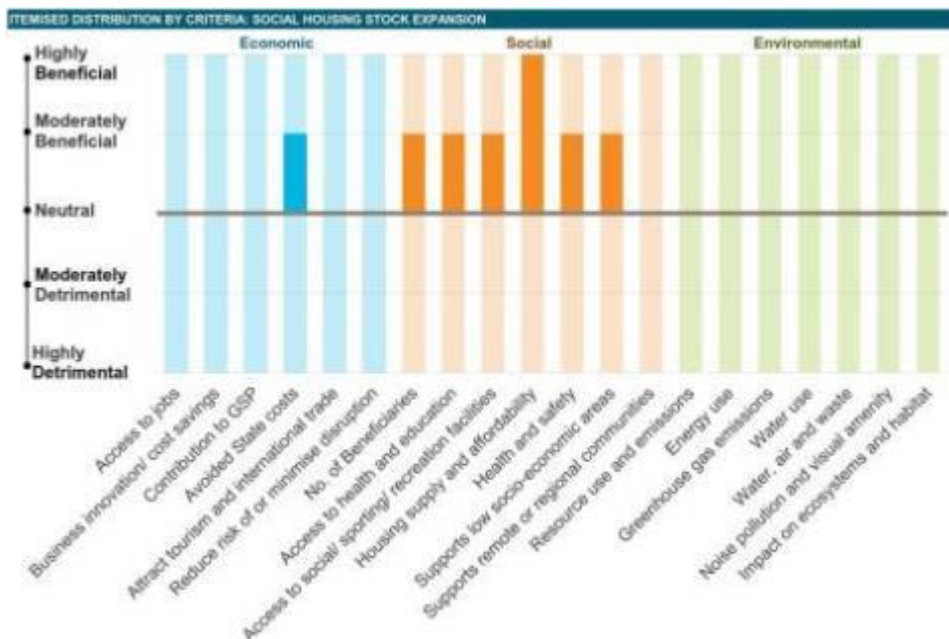
How does this option work with others?

The benefit of this option will only be fully realised if it is provided as part of a pathway of complementary housing solutions, rather than an isolated solution. Developing the affordable housing infrastructure plan (SCP) will be critical to determine the quantum, type and location of housing solutions required. The housing solution options that are complementary include ARH, CHP, HRA, RTR and TSA. The option affordable housing sector planning system amendment (SHS1) is an enabler to this option, as it would facilitate planning approvals.

How does this option perform under different scenarios?

Supercity	+	Reflecting population growth
Westside Story	+	Reflecting population growth
Regional Cities	+	Reflecting population growth
Accelerated Climate Change /Mitigation	++	Increased migration of climate refugees requiring housing
Prolonged/ Severe Economic Downturn	++	Increased number of households suffering housing stress
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



Commentary:

This option is expected to have broad social benefits by providing increased availability of social housing for vulnerable Victorians. A social benefit is not indicated for rural and regional communities as this is a statewide initiative, affecting all regions equally

What is this option? (cont'd)

Currently, Victoria's dedicated social housing supply is made up of around 65,000 public and 18,500 community housing dwellings. Public housing is a form of long-term subsidised rental housing owned and managed by government, rented to low income households at no more than 25 per cent of total household income and subject to tight eligibility criteria. Community housing, like public housing, is a type of long-term subsidised rental housing. However it is managed by non-government community housing providers and is for people on low to moderate incomes with a housing need. Many of the community housing properties are owned by the organisation, while some are owned by the Department of Health and Human Services or rented from private landlords with government funding. The community housing organisations are registered and regulated by the state government. Specialist community housing organisations focus on housing particular tenant groups, such as the aged, homeless youth, people living with disabilities, and others.

The National Disability Insurance Scheme commenced its roll out in Victoria in July 2016. Introduction of the scheme is likely to impact on the demand for affordable rental housing, but exactly how it will do so is unknown. This will need to be monitored closely as the scheme is implemented.

Developing the affordable housing infrastructure plan option (SCP) will be critical to determine the quantum, type and location of affordable private rental housing required. Further information providing context on this option is required is provided within the background information on option SCP.

What do we think of this option and why? (cont'd)

It is acknowledged that social housing is an expensive option for government to provide and then manage on an ongoing basis. The alternative large scale housing response is affordable private rental stock (ARH). Due to the lead time required for option ARH, in the 0- 5 year period, social housing provision will be the main source of new affordable housing stock.

With the best information that we are able to obtain, we believe that the provision of approximately 30,000 new dedicated affordable dwellings in the next ten years could be an appropriate infrastructure response to address the current unmet demand for housing, delivered under this option as social housing or as affordable private rental housing option (ARH).

Risks and opportunities

The creation of large social housing developments has the potential to generate local zones of entrenched disadvantage, as experienced with the large social housing towers built in inner Melbourne in the 1950s. To mitigate this, mixed use and smaller developments should be targeted. Provision of new social housing provides the opportunity to construct dwellings to match forecast future demographic changes of social housing tenants. This could include housing to accommodate emerging needs from an ageing population, better support tenants with disabilities and provide for smaller households.

Funding

Should government choose to pursue this program, it will then need to consider funding options. Below is a range of potential funding mechanisms which could be examined to help fund the program.

Potential funding mechanisms

General government revenue	User charges	Beneficiary charges	Property development	Asset sales
✓	✓		✓	

General government revenue is likely to continue to be a major source of funding for programs like social housing stock expansion.

Property development could also be considered. Opportunities to sell land or provide development rights could be examined to deliver a combination of social and private housing, with the new social housing stock returned to the state. Other opportunities could also be examined, such as leasing parts of premises within or around the social housing. For example, leasing ground floor premises with a street frontage for commercial purposes such as a supermarket, café or laundromat.

Charging rent is a form of user charge and should continue to be collected; however, we recognise that existing social housing rental payments (including subsidies received such as Commonwealth Rent Assistance payments) are only expected to partially contribute to the cost of social housing.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then we have highlighted that while the recommendation timeline is 0-30 years a concerted effort will be required in the early part of this period.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Affordable development outcomes, *Improving access to affordable housing*, 2016

Commonwealth of Australia, *The road home: A national approach to reducing homelessness*, 2008

Hulse, K, et al, *Changes in the supply of affordable housing in the private rental sector for lower income households, 2006–11*, 2014

Hulse, K, et al, *Supply shortages and affordability outcomes in the private rental sector: Short and longer term trends*, 2015

Productivity Commission, *Report on government services volume G*, 2016

SGS Economics and Planning, *Rental affordability index: Quarter 2 – 2015*, 2015

Social housing flexible use SHF

Option SHF is addressed in SHA - Public housing asset management. The option has been assessed as too small scale to have a place in the strategy in its own right.

Social housing government role change

SHG

Option type

Better use through coordination processes
Better use through contractual processes

Location

Statewide

Sector

Health and human services

Certainty of evidence

Low

Direct option cost

\$100 million–\$500 million

Contribution to meeting the need

Need 7. Provide better access to housing for the most vulnerable Victorians – **Low**

What is this option?

This option would see the government's role shift to focus on providing sufficient supply of social housing as client rather than as main developer and manager of social housing. In short, this would be a shift from a provider of social housing to being purely a funder and regulator. The government would then focus on regulating the sector and driving the necessary growth in supply through grant programs, private rental assistance programs, integrated outcomes-based service funding, planning levers and other financial instruments to seed growth. Registered housing agencies could then become the service deliverer/manager/operator of social housing.

Under this option many organisations would be providing housing and, consequently, the government would need to ensure that there is still a central point of contact for tenants entering the system and enable efficient tenant transfer between housing organisations. To take on this increased role, housing organisations will also require government support and monitoring to ensure that they build capacity to provide certainty of service.

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were polarised. The regional jury had mixed views on this option.

What do we think of this option and why?

This option was not recommended in the strategy as the currently defined role of government in this sector is not preventing any of the options proposed in this strategy taking place. This may be a policy worth considering as part of a broader housing policy focus, but it needs to be led from a service delivery perspective, not as part of an infrastructure strategy.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

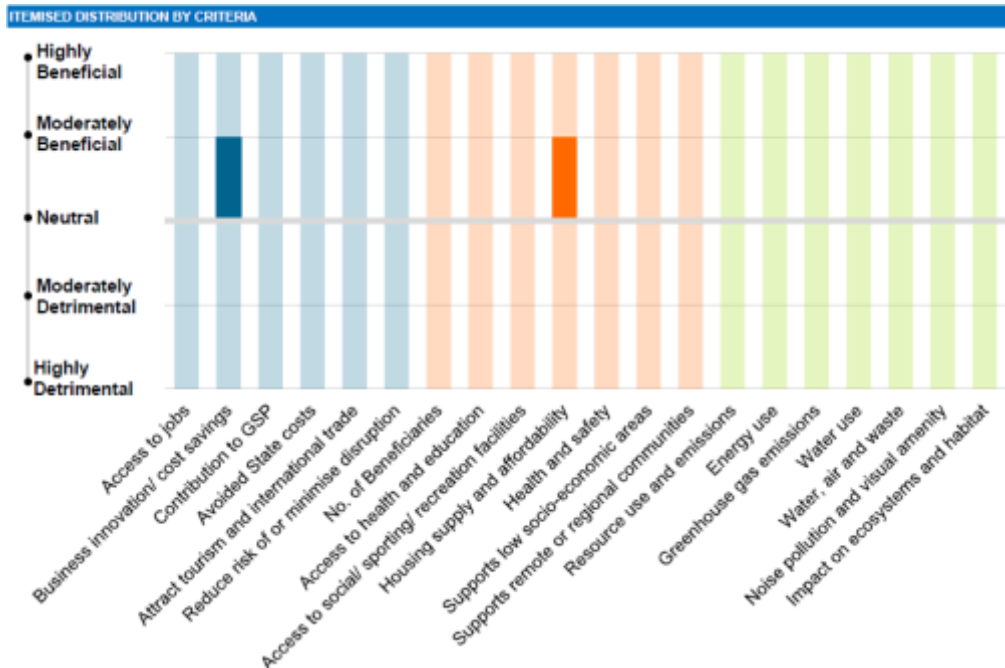
How does this option perform under different scenarios?

Supercity	Neutral	
Westside Story	Neutral	
Regional Cities	Neutral	
Accelerated Climate Change /Mitigation	+	Increased migration of climate refugees requiring housing
Prolonged/ Severe Economic Downturn	+	Increased number of households suffering housing stress
Biosecurity Threat	Neutral	

How does this option work with others?

This option is an enabler to any option proposing the provision of affordable housing assets, including options ARH, CHP, SHA, SHE and TSA.

What are the economic, social and environmental impacts of this option?



Commentary:

For the state government, this option could be effective to encourage increased partnerships with the private sector potentially providing cost savings to government.

Risks and opportunities

Victorian government housing authorities manage public housing which makes up approximately 80 per cent of available social housing, while community housing associations and registered housing providers provide the remaining 20 per cent of social housing as community housing. Community housing organisations range in size from 400 properties to 2000 properties. The capacity of existing organisations is therefore varied and some organisations are not equipped to immediately take on a much greater responsibility required under this option. To be successful, the transfer of management will have to be undertaken to progressively address this significant risk.

The proposal offers the positive benefit of the public housing sector being regulated and monitored on a uniform platform to the community housing sector.

Evidence base

AECOM/PwC, *Assessment 2: Economic, social and environmental assessments and option relationship mapping*, 2016

Deloitte/Aurecon, *Assessment 1: Options analysis report*, 2016

Social housing private provision to increase stock SHP1

*Option SHP1 is addressed in ARH - Affordable
private rental provision*

Social housing tenant transition to private stock SHP2

Option type

Changing behaviour through information

Location

Statewide

Sector

Health and human services

Certainty of evidence

Low

Evidence base

Deloitte/Aurecon, *Assessment 1: Options analysis report*, 2016

Direct option cost

\$100 million–\$500 million

Contribution to meeting the need

Need 7. Provide better access to housing for the most vulnerable Victorians – **Low**

What is this option?

Provision of assistance through training and support services to individuals in social housing to enable them to gain employment to move to affordable housing and the private rental market. This would free up capacity within the social housing system for those with different needs. Housing Victoria promotes and assists tenants with training and employment but this is not specifically targeted at transitioning individuals to access the non-government housing market.

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option was not recommended as a standalone option in the strategy. Instead, we have recommended the option form part of a broader recommendation (ref. 7.2.1) with a housing rental assistance and advocacy program extension (HRA). This is in recognition of the complex needs of many tenants as they transition from social housing. Our assessment is that providing training and support in isolation will have a low contribution to meeting the need.

Affordable housing sector planning system amendment

SHS1

Option type

Changing behaviour through land use and planning controls

Location

Statewide

Sector

Health and human services

Certainty of evidence

Medium

Direct option cost

\$1 million–\$10 million

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 7: Provide better access to housing for the most vulnerable Victorians

Low	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Amend the planning system to provide an alternative statutory approval process for affordable housing developments on public and private land, to facilitate growth in supply by ensuring projects are not subject to a lengthy approvals process, but where local community issues are still incorporated in the decision-making process. Two examples of models that could be considered are the 'Fast Track Government Land Service' model and the approach taken during the delivery of the commonwealth government's social housing initiative from 2009 to 2012.

This alternative approach would expedite the approvals process by centralising the decision-making authority and removing third party notification and appeal rights. As the state government would take on a greater role in the local government planning process under this option, a partnership approach would be required to balance the impact of statewide decisions on the local community (further detail in *What is this option? cont'd*).

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally polarised. Both citizen juries made recommendations in support of this option.

What do we think of this option and why?

This option was recommended in the strategy (ref. 7.3.1) because it will support the delivery of social housing by making the planning approvals process easier. Social housing projects have a stigma within the community and in some instances third-party participation in planning processes are inappropriately used as a mechanism to object to the use of the development rather than its form.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	Consistent
Regional Growth Plans	Contributes to implementing policy

How does this option perform under different scenarios?

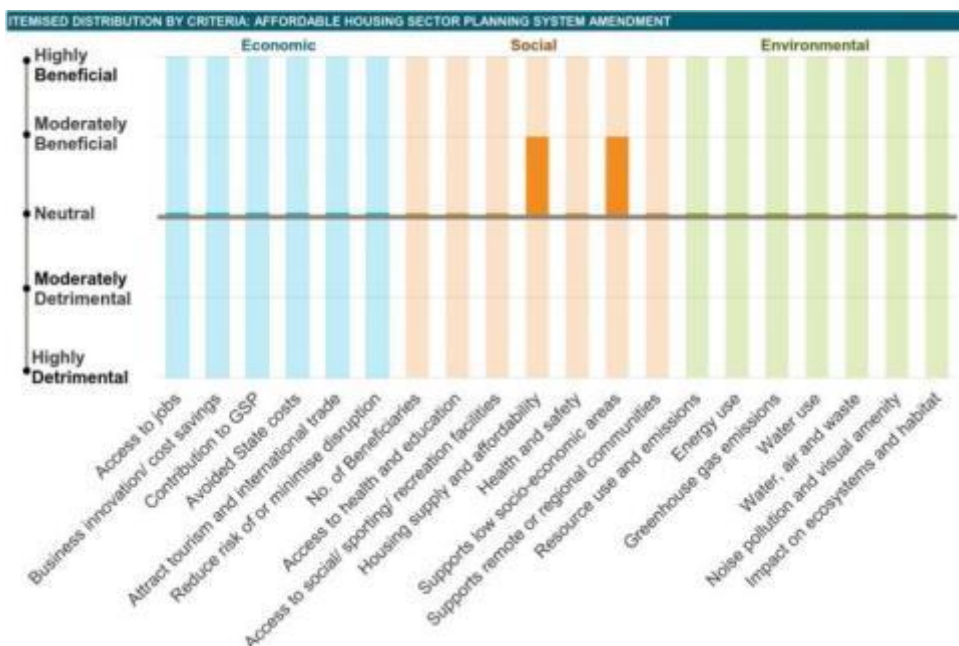
Supercity	+	Reflecting population growth
Westside Story	+	Reflecting population growth
Regional Cities	+	Reflecting population growth
Accelerated Climate Change /Mitigation	++	Increased migration of climate refugees requiring housing
Prolonged/ Severe Economic Downturn	++	Increased number of households suffering housing stress
Biosecurity Threat	Neutral	

How does this option work with others?

This option is an enabler to any option proposing the provision of affordable housing assets, including options AHC, ARH, CHP, SHA, SHE, SHD1 and TSA.

Integrated government service and infrastructure planning (SIP) could assist with identifying areas that should be prioritised for additional affordable housing.

What are the economic, social and environmental impacts of this option?



Commentary:

This option is anticipated to benefit housing supply and affordability. Broader benefits are not recognised in the assessment as the option impacts a small component of the housing sector.

What is this option? (cont'd)

Victoria's current planning system contains only relatively broad objectives and strategies relating to affordable housing supply via the State Planning Policy Framework (SPPF), and no specific tools exist to achieve them. Under this option it is proposed that this is addressed, with affordable housing specifically defined. Ideally, areas identified for future provision of defined affordable housing would be identified in strategic plans that would have been through a community consultation process. After that process, it may be possible to turn off third-party notice requirements through an appropriate zoning schedule.

During the implementation of the commonwealth government's social housing initiative, a form of this option was introduced from May 2009 until June 2012 and was successful in reducing approval timeframes and facilitating the delivery of new dwellings. Given the significant shortfall in affordable housing, prioritising the need for social housing over third party notification and appeal rights should be considered.

Risks and opportunities

The risk with this option is where the state takes a greater role, local government is excluded from the planning process and there are local concerns within the community. This can be managed through the adoption of a partnership approach between local and state government.

This option could support improved social mix in developments by creating incentives for developers to include affordable housing in their developments.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Davison, G., et al *Understanding and addressing community opposition to affordable housing development*, 2013

Social housing “social rental” model SHS2

*Option SHS2 is addressed in ARH - Affordable
private rental stock provision*

Social housing stock transfer model

SHS3

Option type

Better use through coordination processes

Better use through contractual processes

Location

Statewide

Sector

Health and human services

Certainty of evidence

Medium

Direct option cost

\$100 million–\$500 million

Contribution to meeting the need

Need 7. Provide better access to housing for the most vulnerable Victorians – **Low**

What is this option?

This option would involve the transfer of management and ownership of existing public housing assets, including land title, from government to the community housing sector. Potential benefits to the state resulting from stock transfer include:

- The opportunity to bring new private finance through community housing organisation's debt capacity.
- Increased provider revenue streams resulting from tax concessions that are not available to the state government and tenant's access to commonwealth rent assistance.
- Service improvements for tenants, resulting from community housing sector governance and management practices.
- Community renewal achieved through investment in the facilities.

The suitability of this approach depends on the condition of the assets that are to be transferred, the financial and regulatory terms of the transfer and tenant considerations.

What is the level of community support?

There was a limited discussion of the recommendation Public housing asset management, which includes this option.

What do we think of this option and why?

This option was recommended in the strategy (ref. 7.2.1) because it is a mechanism for achieving improved service delivery and asset management practice within the social housing sector. It is not applicable in all instances due to many social and economic factors. Under public housing asset management (SHA), it is recommended that the existing public housing asset base is reviewed. This would include an assessment of the asset's suitability for stock transfer. The initiative is supported in principle across all levels of government.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

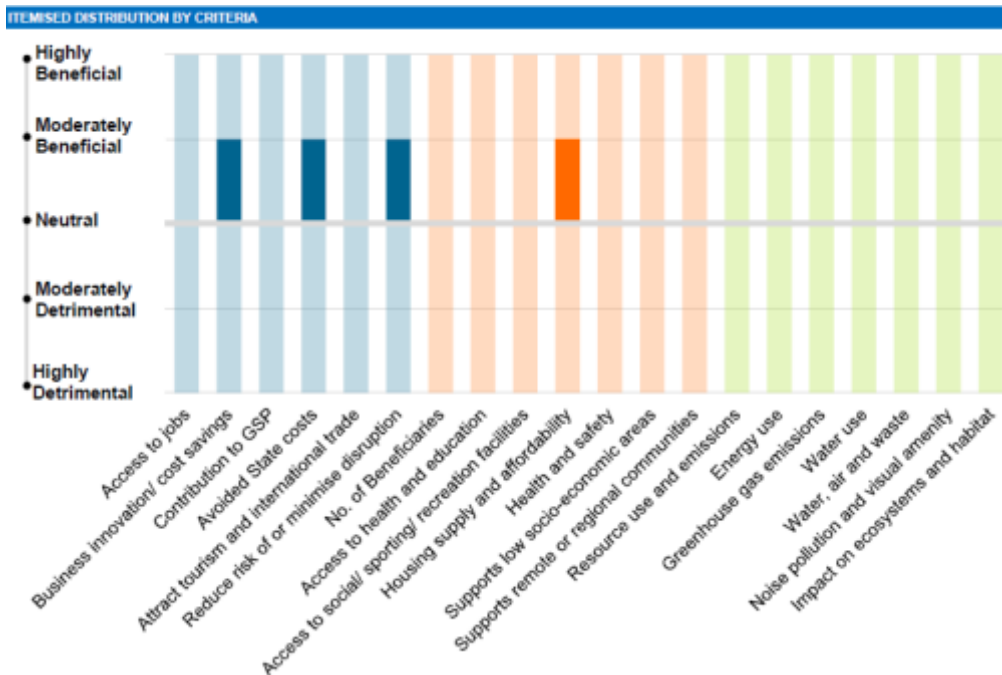
How does this option perform under different scenarios?

Supercity	Neutral
Westside Story	Neutral
Regional Cities	Neutral
Accelerated Climate Change /Mitigation	Neutral
Prolonged/ Severe Economic Downturn	Neutral
Biosecurity Threat	Neutral

How does this option work with others?

This option forms a component of public housing asset management (SHA), which considers the transfer of stock and title as part of the review of existing public housing.

What are the economic, social and environmental impacts of this option?



Commentary:

This option stands to increase economic productivity within the social housing sector by encouraging community housing organisation investment in assets. The adoption of this option would result in a reduction of state government spending on social housing.

Risks and opportunities

There is a risk that the community housing sector assesses the management transfer as too high a risk without appropriate maintenance and long-term funding support for some properties and consequently a transfer may not be suitable.

The shift from public housing to community housing may also be opposed by some parts of the community, tenants and within parts of government. Tenants may particularly resist the change due to the potential uncertainty and risk that current guarantees to long-term affordable housing may be eroded or removed and concerns that some tenants with complex needs may not be supported by community housing agencies.

The key opportunity is for public housing assets to be managed under a regulated community housing framework that provides a higher degree of accountability and performance. The option could allow community housing providers to apply a more localised and personal housing services response, which is likely to also be important if properties are redeveloped in the future.

Additional notes

Changes to recommendations and option name from the draft strategy

This option was recommended in the draft strategy. Since then we have refined the recommendation by removing the term 'rationalisation' from the recommendation title and description. This was in response to stakeholders misinterpreting it as involving a net reduction to the number of dwellings. We have also highlighted that while the recommendation timeline is 0-30 years a concerted effort will be required in the early part of this period. The reference to stock transfer occurring 'where appropriate' has been removed as stakeholders found it ambiguous.

Evidence base

AECOM/PwC, *Assessment 2: Economic, social and environmental assessments and option relationship mapping*, 2016

Deloitte/Aurecon, *Assessment 1: Options analysis report*, 2016

Dawson H et al, *Public housing transfers: past present and prospective*, AHURI Final Report No. 215, 2013

Social housing tenant transfer within a community SHT

The option has been identified as an objective of the system, not an option in its own right. This objective should be able to be achieved if options SHE -Social housing stock expansion and SHA - Public housing asset management are implemented.

School infrastructure funding certainty SIF

Option type

Better use through information
Better planning for new/expanded assets

Location

Statewide

Sector

Education and training

Certainty of evidence

Medium

Direct option cost

<\$100 million

Contribution to meeting the need

Need 9. Provide access to high-quality education infrastructure to support lifelong learning – **Moderate**

What is this option?

The Department of Education and Training (DET) has a relatively sophisticated model to forecast demand for new schools as well as understanding the need for requirements for upgrades and maintenance of existing schools. Currently, there is limited transparency about this data which can lead to ad hoc decision-making and lack of certainty about funding to match the investment pipeline. This option would require the government to publish a proposed plan for school capital works (new and upgrades) against a proposed five year timeline for delivery and alongside a long-term funding allocation for the proposed pipeline. This would remove decision-making from short-term budget cycles and provide more certainty to enable schools, the community and local government to understand when and where schools are expected to be delivered and upgraded (further detail in *What is this option? cont'd*).

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive.

What do we think of this option and why?

This option was recommended in the strategy (ref. 9.3.1) because increased transparency about the five year priorities for future school provision reduces the need for community advocacy, minimises ad hoc decision-making and provides greater certainty and sufficient lead time to enable co-investment to occur. As the planning data and information for new schools prioritisation already exists, it would be a low cost option to require this data to be published.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

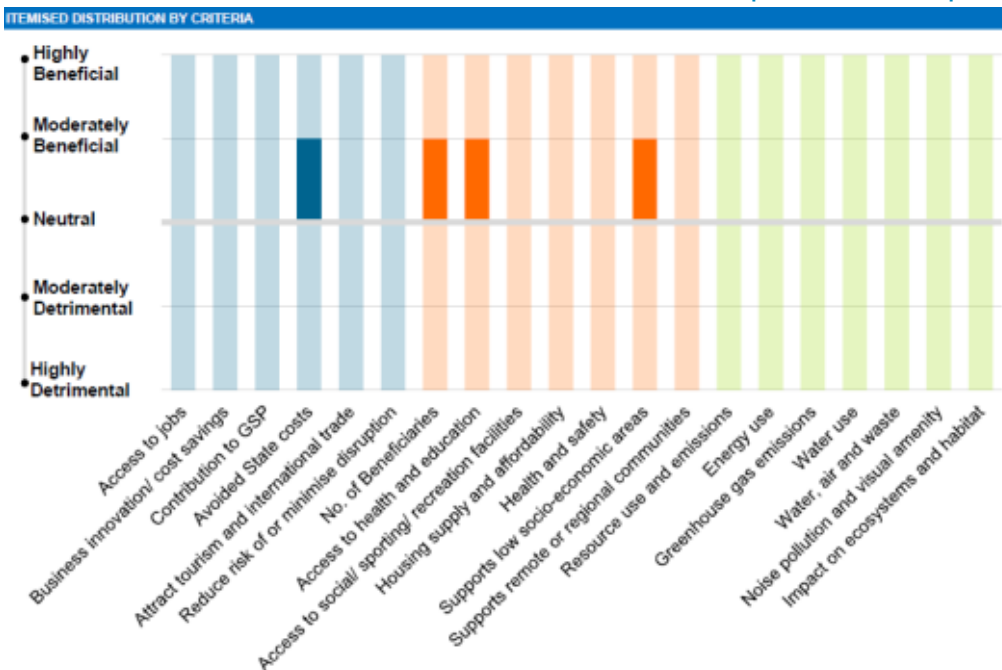
How does this option perform under different scenarios?

Supercity	Neutral
Westside Story	Neutral
Regional Cities	Neutral
Accelerated Climate Change /Mitigation	Neutral
Prolonged/ Severe Economic Downturn	Neutral
Biosecurity Threat	Neutral

How does this option work with others?

This option enables future schools to be planned with shared facilities as outlined in schools as community facilities (SCF). Integrated government service and infrastructure planning (SIP) would enable other government departments to share service planning and identify opportunities for integrated delivery outcomes such as timing future school delivery with public transport improvements.

What are the economic, social and environmental impacts of this option?



What is this option? (cont'd)

This option would provide certainty and ultimately improve access to schools over the longer term, as there would be greater transparency between where the anticipated growth and maintenance pressures are and when forecast investments will occur.

Risks and opportunities

Rates of growth can unexpectedly change, there may be instances where reprioritisation will need to occur and this might result in community expectations not being met. This risk needs to be managed, as the wider social and economic benefits of transparency are greater than the alternative of not disclosing the investment priorities.

There are some risks for government when nominating future school sites for acquisition, as this can elevate land owner expectations and the cost of the land. This can be managed through the use of appropriate tools such as public acquisition overlays and compulsory acquisition, but this in turn can slow down the acquisition process. It can also result in government being liable to pay compensation to the land owner.

There will be increased opportunities for councils and other funding partners to co-invest in schools and particularly for investment in shared facilities such as early years, arts and sports facilities. Currently, the period of time between government announcing a new school and the construction of a new school is insufficient to enable councils, in particular, to align budgets and funding allocations. This results in a number of missed opportunities to construct shared facilities.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then the wording of this recommendation has been refined to better reflect the need for more transparent communication, in response to feedback that 'assisting communities to understand' was patronising.

Change in scope

In version one of the *Draft options book*, we had an option School shortages (SSS). We merged that with this option for two reasons:

- The most effective way to minimise community concerns about school shortages is to publish the list of future school investment priorities so that communities have certainty about when schools will be upgraded and or new schools delivered. This includes the sharing of the planning data to communicate with communities how the prioritisation for future investments are made, including understanding where capacity exists in existing schools.
- Publishing the future investment priorities would provide opportunities for co-investment with funding partners or even public-private sector partnerships which could deliver some efficiencies and savings for government. Savings could be redirected to fund additional schools.

Evidence base

AECOM/PwC, *Assessment 2: Economic, social and environmental assessments and option relationship mapping*, 2016

Deloitte/Aurecon, *Assessment 1: Options analysis report*, 2016

Integrated government service and infrastructure planning SIP

Option type

Better use through coordination processes

Better planning for new/expanded assets

Location

Statewide

Sector

All

Certainty of evidence

Low

Direct option cost

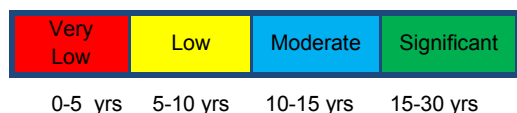
\$25 million–\$50 million

Option lead time

<1 year

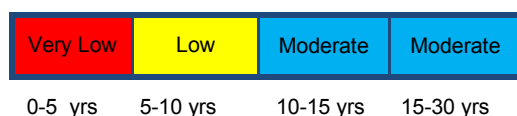
Contribution to meeting the need (assumes instantaneous implementation)

Need 1: Address infrastructure demands in areas with high population growth



Need 11: Improve access to middle and outer metropolitan major employment centres; and

Need 12: Improve access to jobs and services for people in regional and rural areas



See further assessments in AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

What is this option?

This option would formalise and simplify a whole-of-government service and infrastructure and planning process that would facilitate investment prioritisation at a spatial level. This could be regionally, subregionally or across multiple local government areas. Integration across government service and infrastructure planning processes can enable state government to collaborate across portfolios with local governments and potentially the commonwealth government to integrate infrastructure planning and prioritisation. This is a governance reform option that requires an authorised, resourced and accountable lead agency to coordinate three levels of government to jointly plan for short, medium and long-term infrastructure that facilitates service delivery. The planning priorities would require an evidence base and clear lines of reporting. The priorities would be based on shared principles for managing growth, or even decline, and would require sharing evidence and service plans within and across government.

What is the level of community support?

There was a high level of discussion of this option during consultation. Responses were generally positive. This option was recommended by the regional citizen jury.

What do we think of this option and why?

This option was recommended in the strategy (ref. 1.5.1, 2.4.1 and 11.1.2) because improved coordination and reduced siloed decision-making will lead to better service delivery, land use outcomes, investment decisions and infrastructure prioritisation processes. The option would ideally support the three levels of government to work together. However, we suggest in the first instance (0-5 years) that state government establish more formalised joint service planning processes across its departments and agencies. Government needs to nominate a lead agency to be accountable for this integration and planning. Locally identified priorities could be a useful input to government service and infrastructure planning.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	Relates to key point/option for discussion
Regional Growth Plans	N/A

How does this option work with others?

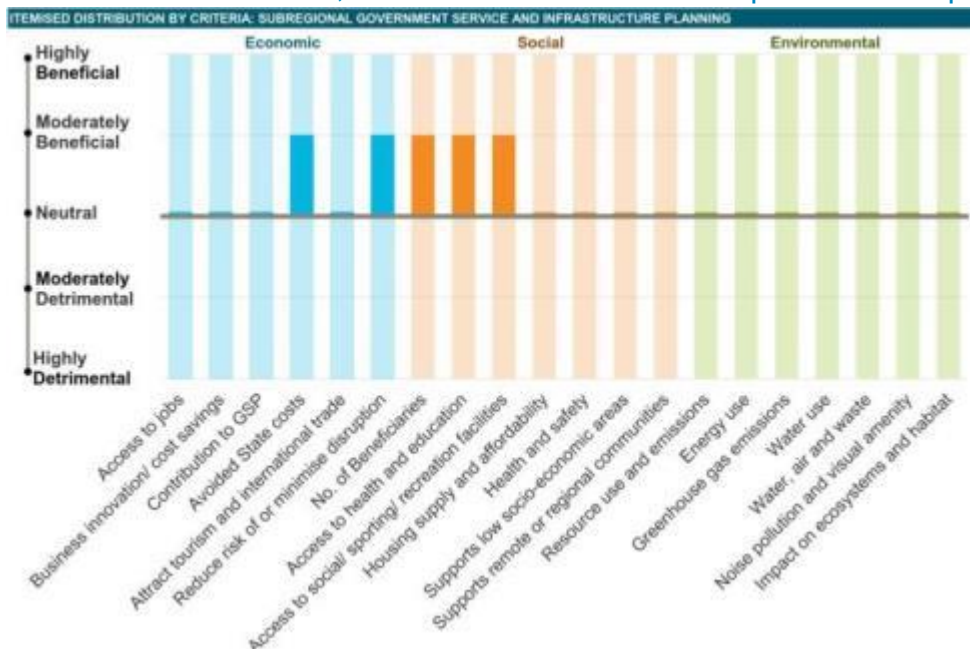
This option would enable many options that require joint planning such as affordable housing provision (ARH), housing intensification around train stations (UDC) and along transport corridors (STO). It can also enable regional planning to align planning for growth with infrastructure investments such as future level crossing removals (MLC) and delivery of new train stations and tram lines (such as CRE, MRE1, WRE1, WRE2, WVV, GWR, GRE, CCT, and MAH).

How does this option perform under

Supercity	++	Increased need for integrated infrastructure responses
Westside Story	++	Increased need for integrated infrastructure responses
Regional Cities	++	Increased need for integrated infrastructure responses
Accelerated Climate Change /Mitigation	Neutral	
Prolonged/ Severe Economic Downturn	++	Increased need for integrated infrastructure responses
Biosecurity Threat	Neutral	

different scenarios?

What are the economic, social and environmental impacts of this option?



Commentary:

Integrated service and infrastructure planning should lead to more efficient delivery of infrastructure and wider community benefits.

Risks and opportunities

There is a risk that key stakeholders could be reticent to share service planning data for probity reasons. This can be managed by ensuring that government information is managed in a confidential way and is not shared with community and businesses where this would be inappropriate.

This option involves the establishment of connection across all levels of government to better align service delivery, land use and infrastructure planning. This would improve integrated outcomes such as coordinating the delivery of improved public transport with delivery of new infrastructure.

Other opportunities include being able to better align a range of funding sources and deliver integrated facilities.

Additional notes

Integrated planning

Discussions that occur across government and at a spatial level can yield innovative approaches to service delivery, better utilisation of existing infrastructure and a more collaborative approach to larger-scale future planning. This is likely to support evidence-based infrastructure planning in metropolitan areas that are experiencing high levels of growth as well as in regional areas where there can be a mix of population growth and decline occurring at the same time in one region.

This option could also support planning for a sector need such as for health, transport, justice, education or affordable housing. It will be important to include local government in this governance reform option as soon as practicable. Ideally, Commonwealth government will also participate in integrated service and infrastructure planning as well.

This process is separate from the Victorian Government's recently announced Regional and Metropolitan Partnerships. While those partnerships might facilitate stronger engagement with the community and business to identify local priorities and plans, it is also important that governments have improved capacity to service plan together. Often this planning will involve confidential information, such as plans for new infrastructure that may have an impact on land values. There are a number of probity reasons why this information should not be made available to community in early stages of government decision-making.

Next steps

- Nominate a lead agency to be authorised, resourced and accountable for across state government joint service and infrastructure planning.
- Establish processes for joint evidence based service and infrastructure planning.
- Develop clear lines of reporting into government that can inform business case development.
- Develop a process to enable locally developed priorities and plans to inform integrated government services and infrastructure planning without compromising the need for government to work confidentially across its portfolios and agencies.
- Once the state government has an improved and more integrated infrastructure planning process implemented, include local government and ultimately federal government in joint planning processes.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Schools with low performance SLP

*Option SLP is addressed in SOO- School demand
management*

Schools with low enrolments in rural areas SLR

*Option SLR is addressed in a new option Schools as
community facilities SCF*

SmartBus network extensions and service increases SNE

Option type

Incremental expansion of existing services

Location

Melbourne

Sector

Transport

Certainty of evidence

Low

Direct option cost

\$750 million–\$1 billion

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 1: Address infrastructure demands in areas with high population growth

Moderate	Significant	Significant	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

Need 11: Improve access to middle and outer metropolitan major employment centres

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Expand the existing SmartBus (Premium) network to connect employment centres with more residential catchments with a higher frequency public transport network. It will focus on increasing the percentage of Melbourne residents who can access non-central employment centres within 30 minutes. In addition to more SmartBus routes, existing services will be enhanced by improving the frequency and efficiency of the bus network and increasing peak hour priority. This option expands the existing SmartBus orbital network, with additional routes particularly covering the inner and western suburbs and connections to Melbourne Airport. Providing additional SmartBus services will increase bus mode-share, potentially reduce congestion on key arterial roads/freeways as people shift from car to public transport and increase access to non-central city employment centres. Providing additional bus services to the airport is likely to increase bus mode-share and improve access (further detail in *What is this option? cont'd*).

What is the level of community support?

There was a moderate level of discussion of the recommendation, SmartBus network, which includes this option. Responses were generally positive.

What do we think of this option and why?

This option was recommended in the strategy (ref. 1.3.3 and 11.5.3) because high-frequency SmartBus-style services will play an important role in addressing increasing travel demands as Melbourne grows, and particularly in the period before Melbourne Metro and associated rail improvements become operational. In particular, SmartBus services have and will continue to provide strong network connectivity through orbital services, enabling people to better connect to high-capacity radial services such as tram and heavy rail. They can also play a critical role in forming part of mass transit networks for major employment centres and to provide a trunk access network supported by local bus networks. Key areas of priority are in the western suburbs and around the inner city.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

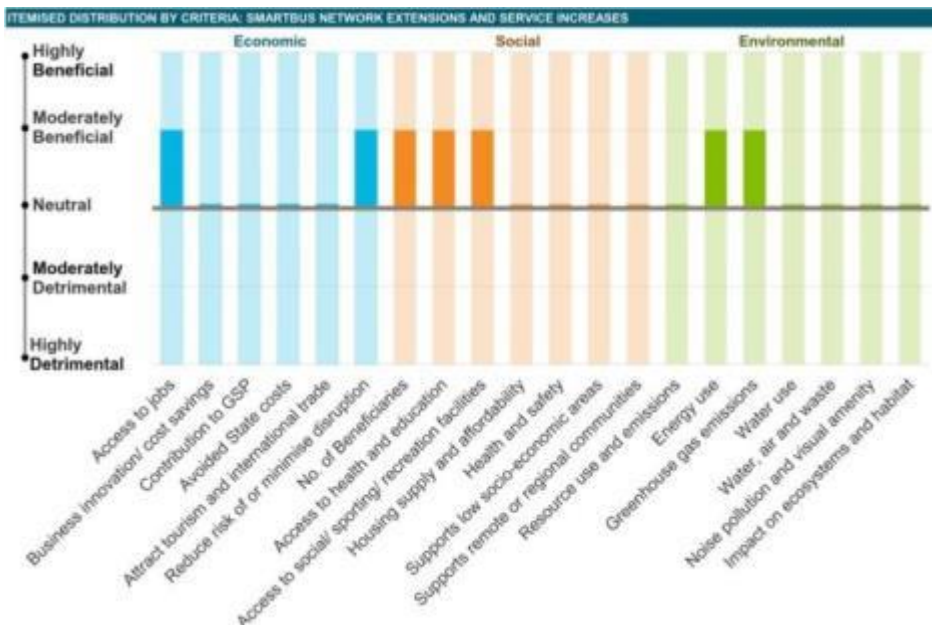
How does this option perform under different scenarios?

Supercity	++	Supports mode shift to address congestion
Westside Story	+	Supports mode shift to address congestion
Regional Cities	+	Supports mode shift to address congestion
Accelerated Climate Change /Mitigation	+	Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	-	Less demand for travel
Biosecurity Threat	Neutral	

How does this option work with others?

This option is a dependency for SmartBus network expansion under option Employment centre mass transit network (MTN). This option complements multi-modal interchange improvements (MII), public transport accessibility (PTV) and road space allocation (RSA) in improving overall network accessibility. This option also plays a key partnering role in growth area bus service expansion (LBS) to enable people from growth areas to travel from where they live to other places across the network. The ability of this option to ease road congestion will be dependent on it being combined with demand management measures such as TNP.

What are the economic, social and environmental impacts of this option?



What is this option? (cont'd)

SmartBus services are characterised by high frequency, long span of hours and direct route patterns. Extensions of SmartBus services should be prioritised on high-patronage local bus routes or routes in close proximity to major transfer points and activity centres, with the intent of increasing access to activity centres and key transport nodes, and of increasing overall network connectivity. This option may also entail the reorganisation of some SmartBus routes to better connect with activity centres rather than providing a theoretical one-seat ride around the perimeter of the region.

Route additions and alterations that could support these goals include:

- Extend routes 905, 906, 907 and 908 into Docklands to serve emerging high-intensity employment and population clusters.
- Splitting orbital bus 903 into two separate routes (one from Altona and one from Mordialloc) both terminating at Melbourne Airport.
- Upgrade peripheral routes 513 and 828 to SmartBus standards.
- Add route 246 as the first SmartBus-quality 'inner orbital'.
- Upgrade routes 216 and 220 into radial SmartBus routes.

Risks and opportunities

There is a risk that the new services may not be supported without sufficient promotional coverage and linking key job centres and services that people need to visit. Providing new bus networks with very low passenger numbers takes services away from other locations that may have a greater need.

An opportunity exists to coordinate additional bus services with train timetabling changes. This coordination would support more efficient journeys for passengers from their home to their destination.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

School demand management SOO

Option type

Better use through public service delivery and approval processes

Better use through coordination processes

Changing behaviour through information

Location

Statewide

Sector

Education and training

Certainty of evidence

Medium

Direct option cost

<\$1 million

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 1: Address infrastructure demands in areas with high population growth

Low	Low	Low	Low
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0-5 yrs 5-10 yrs 10-15 yrs 15-30 yrs

Need 9: Provide access to high-quality education infrastructure to support lifelong learning

Moderate	Moderate	Moderate	Moderate
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0-5 yrs 5-10 yrs 10-15 yrs 15-30 yrs

What is this option?

This option proposes to review and improve the tools available to manage demand for schools. This could include improving perceptions of less desirable schools through better information, and/or address the causal factors for why some schools are not considered desirable. This would improve the ability of the network to meet demand by relieving pressure on some schools and increasing the use of underutilised resources and excess space at others. Mechanisms for a network of schools to work together to lift the performance of the entire network could also be explored, such as a hub and spoke approach, with a high performing lead school assisting other schools. This would help to address why sometimes one school within a network may be perceived as more desirable and attracts more enrolments, leaving adjacent schools with spare capacity and would also support sharing of school facilities, resources and even teachers.

What is the level of community support?

There was limited to no discussion of this option during consultation. This option was opposed by the regional jury. The metropolitan jury did not recommend the option, but suggested further work should be undertaken.

46 per cent of people surveyed as part of community research were supportive of school children attending government schools being required to attend the schools closest to where they live.

What do we think of this option and why?

This option was recommended in the strategy (ref. 9.1.1) because addressing the causal factors for why some schools are less desirable than others will lead to relieving pressure on highly desirable schools and better use of underutilised resources and assets in other schools. We think a network approach to managing demand such as a hub and spoke approach would assist. A higher performing school could assist other schools that are not considered to be as desirable (further detail in *What do we think of this option and why? cont'd*).

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

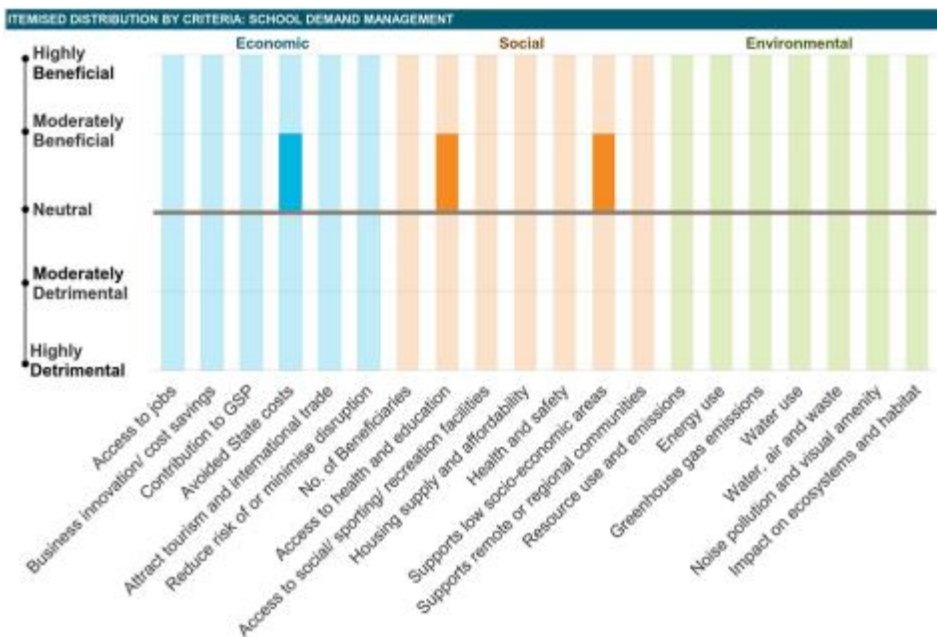
How does this option perform under different scenarios?

Supercity	+	More efficient use of existing assets
Westside Story	+	More efficient use of existing assets
Regional Cities	+	More efficient use of existing assets
Accelerated Climate Change /Mitigation	Neutral	
Prolonged/ Severe Economic Downturn	Neutral	
Biosecurity Threat	Neutral	

How does this option work with others?

Schools can unlock resources for sharing through technology (SRS) which could benefit some schools with limited curriculum offerings, or through highly skilled educators teaching across multiple sites. Increased attendance at local schools would support more walking and cycling options such as active established areas (AEA).

What are the economic, social and environmental impacts of this option?



Commentary:

There are social connection benefits where more students are connected with their local communities. There are environmental benefits where more students walk to school and economic efficiencies where assets are better utilised.

What do we think of this option and why? (cont'd)

This could mean sharing teachers, resources and school facilities. This would not only lead to better student outcomes across a network but would mean that communities would place less pressure on government to build new schools where adjacent less desirable schools remain underutilised. If more students walked, cycled or took public transport to their nearest school, this would reduce traffic congestion, increase active lifestyles and improve social connections within neighbourhoods

Risks and opportunities

Addressing causal factors for why a school is not considered to be desirable will often be challenging. Sometimes it may just be perception; in other instances it may be that some schools are unable to attract high quality teachers. Additional resources are likely to be required to turn some schools around.

This option would recognise best practice education practices and resources and facilitate sharing of this across schools; this would not only benefit students but teachers as well. Encouraging teachers and schools to more proactively share will require strong policy leadership to enable this to occur.

A number of submissions discussed some of the complexities about addressing 'causal factors' to counteract school disadvantage. They also suggested that it can be challenging for schools with high levels of disadvantage to attract shared resources and for more desirable schools to want to share with these schools. For example, schools with high numbers of students and families experiencing disadvantage can find it challenging to attract experienced teachers, maintain facilities, upgrade information technology and provide support for vulnerable families.

Additional notes

Previous scope

In the first version of the *Draft options book* this option was called School boundary enrolment. With further investigation we decided that rather than imposing boundaries on highly desirable schools, it is more equitable to address causal factors for why some schools in a network can be desirable and others less desirable. The scope of this current option changed and no longer focuses on school boundaries.

In addition, in the first version of the *Draft options book* we had an option called Schools with low performance (SLP). We merged that option with this revised option SOO. The network approach, as now proposed in this option, should assist to address low performing schools.

Finally, in the first version of the *Draft options book* we had an option called School shortages (SSS). We think that by more actively managing demand for schools and by working towards underutilised schools being better used, this will enable government to target investment to where the real pressures for new schools are required.

Next steps

- Develop criteria for identification of schools that are considered less desirable.
- Identify causal factors that make these schools less desirable.
- Identify mechanisms to improve the causal factors, including network approaches to improve schools within a network, such as higher performing school sharing resources/teachers with other schools in the network. This will include a need to review existing Department of Education and Training policies and procedures to ensure there are no barriers to preventing sharing of teachers and resources across schools.
- Review the definition of 'school network' with a view to over the medium to longer term more strongly embed walkability, cycling and public transport accessibility to defining catchments of local school networks. This will become particularly important in metropolitan areas that are growing and becoming denser.

- Develop an agreed monitoring and evaluation framework to measure improvement in perception of schools over time, including increased enrolments.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Sport and recreational facility strategic investment SRF

Option type

Better use through coordination processes
 Better use through information
 Better use of through refurbishment of existing assets
 Incremental expansion of existing assets
 New assets

Location

Statewide

Sector

Cultural, civic, sporting, recreation and tourism

Certainty of evidence

Medium

Direct option cost

\$500 million–\$750 million

Option lead time

10-15 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 1: Address infrastructure demands in areas with high population growth; and

Need 4: Enable physical activity and participation

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

As sport and recreation infrastructure around the state comes to the end of its useful life and population growth continues, investment is required to:

- Upgrade and increase the capacity of existing sport and recreation facilities through the application of a number of different approaches (such as better use of technology, synthetic surfaces etc.) to enable more intensive and longer use.
- Maintain and renew existing sport and recreation facilities to reflect the needs of a diverse community and support increased participation.
- Deliver new infrastructure.

What is the level of community support?

There was a high level of discussion of this option during consultation. Responses were generally positive. This option was opposed by the regional citizen jury.

What do we think of this option and why?

This option was recommended in part in the strategy (ref. 4.3.2) because there is increasing demand for sport and recreation facilities and changing preferences for participation, but much of the existing infrastructure is ageing and not suitable to meet these preferences. At this stage, we have not recommended a funding strategy. We think it is important to get the decision-making right to ensure that future state government investment decisions are strategic and help to deliver agreed outcomes through a stronger evidence base and more transparent decision-making. It is likely that the framework will identify a need for additional state government funding (as provided in the scope of this option) beyond the amounts provided through the current grants program. A key area for additional funding will likely be refurbishment of existing assets, though there is an opportunity for this funding to be provided as part of an incentive fund (recommendations 1.4.4, 2.3.2 and 5.4.2). Importantly, this planning should occur across multiple local government areas, facilitated by state government. Local government is a key provider of these facilities and will need to be a partner in this work.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Consistent

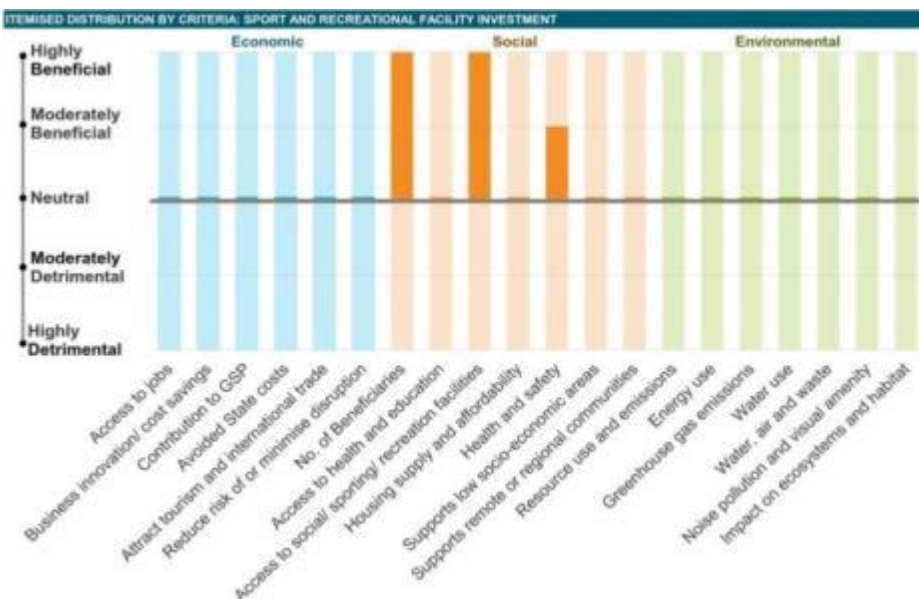
How does this option work with others?

This option has a complementary relationship (and in some cases is an alternative) to both schools as community hubs (SCF) and community space shared use agreements (CSS1). These two options have the potential to support the use of school grounds or other community spaces to support sport and recreation (e.g. school ovals for weekend local football). In addition, the option seeking the refurbishment or rationalisation of community space (CSR) could provide an opportunity for the rationalisation and refurbishment of sport and recreational facilities.

How does this option perform under different scenarios?

Supercity	+	More efficient use of existing & new assets
Westside Story	++	More new infrastructure required
Regional Cities	+	More efficient use of existing & new assets
Accelerated Climate Change /Mitigation	Neutral	
Prolonged/ Severe Economic Downturn	Neutral	
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



Commentary:

Through investment in sporting and recreational infrastructure, this option is expected to have strong benefits for access to social, sporting and recreation facilities. This would support greater physical activity, and so could support better health outcomes. In addition, this option could have benefits for amenity.

What is this option? (cont'd)

This option would require government to take a view across local government boundaries, informed by the best quality data reflecting key trends in participation, to establish criteria and priorities for focusing this investment.

Risks and opportunities

Performance of the option will depend on organisational design and receptiveness of stakeholders to the governance structure.

There is a great opportunity to improve efficiencies in delivering sport and recreation infrastructure, for example, reducing the likelihood of oversupply of one infrastructure type due to the current grant program approach.

Additional notes

Next steps

In developing this framework, it is important that strong evidence underpins an understanding of changing preferences for sports and recreation. In part, this will require sporting associations to provide robust data on participant age, gender, postcode etc. It will also require data collection on more informal preferences. For example, ABS data shows that walking for exercise was the most popular physical recreational activity with 19 per cent of people aged 15 years and over walking for exercise at least once in the 12 months prior to interview. It is not clear whether the current grants funding provides opportunities for funding in this area, despite the important health benefits.

In undertaking planning across multiple local government areas, the recent Eastern Region Group of Councils planning is a useful model.

SGS Futures Report

The report argues that demand for ongoing investment in sport and recreational facilities is demonstrated in a number of ways:

- A significant percentage of facilities around the state are older than 25 years (33 per cent-70 per cent depending on region).
- Additional demand is expected to be between 23 per cent and 28 per cent depending on facility type by 2024.
- Councils have identified possible development/redevelopment cost of \$210 million annually over the next decade for sport and recreation projects.
- Based on the lack of resources available, a strategic planning approach is required to ensure greatest need is addressed.

VAGO report

The VAGO report highlights:

- The ageing state of recreation facilities around the state
- A strategic planning approach to be adopted when planning these facilities.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Australian Bureau of Statistics, *4177.0 - Participation in Sport and Physical Recreation Australia, 2013-14*, 2015

Australian Sports Commission/CSIRO, *Future of Australian sport*, 2013

Commonwealth of Australia, *The Crawford Report*, 2009

Inside Edge, *Melbourne east sport and recreation strategy*, 2016

SGS Economics and Planning, *Community sport and recreation futures paper 2014-2024*, 2014

Victorian Auditor-General, *Local government service delivery: Recreational facilities*, 2016

Stormwater harvesting and re-use

SRH

Option type

Incremental expansion of existing assets

New assets

Location

Statewide

Sector

Water and waste

Science, agriculture and environment

Certainty of evidence

Medium

Direct option cost

\$250 million–\$500 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 14: Manage threats to water security, particularly in regional and rural areas

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

Need 17: Improve the health of waterways and coastal areas

Significant	Significant	Significant	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option involves harvesting stormwater at greenfield sites in Melbourne and regional cities for use across a range of purposes.

Methods to capture and re-use stormwater range from installation of rainwater tanks at the household level to development of stormwater treatment systems that include wetlands, distribution systems and treatment technologies. This option proposes inclusion of stormwater harvesting projects in new urban developments. This option also proposes clearer incorporation of stormwater as a water resource in planning instruments and corresponding provision of technical and public health and safety guidance for increased uptake of stormwater harvesting projects (further detail in *What is this option? cont'd*).

What is the level of community support?

There was a moderate level of discussion of the recommendation Stormwater harvesting which includes this option. Responses were generally positive. Both citizen juries made recommendations in support of this option.

What do we think of this option and why?

This option was recommended in the strategy (ref. 14.2.2 and 17.2.1) because it presents a cost-effective opportunity to contribute to improving water security. Other alternatives to improve water security may require costly large scale investments. With the quantity of stormwater generated in Melbourne comparable to annual potable demand there is scope to improve how we utilise this water resource. It is, however, challenging to capture stormwater and the most effective opportunities appear to be in greenfield developments. In addition to improving water security, harvesting stormwater can significantly contribute to improving waterway health. Stormwater harvesting projects increase local resilience while taking advantage of the projected more frequent, more intense storm events for Victoria under climate change scenarios.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

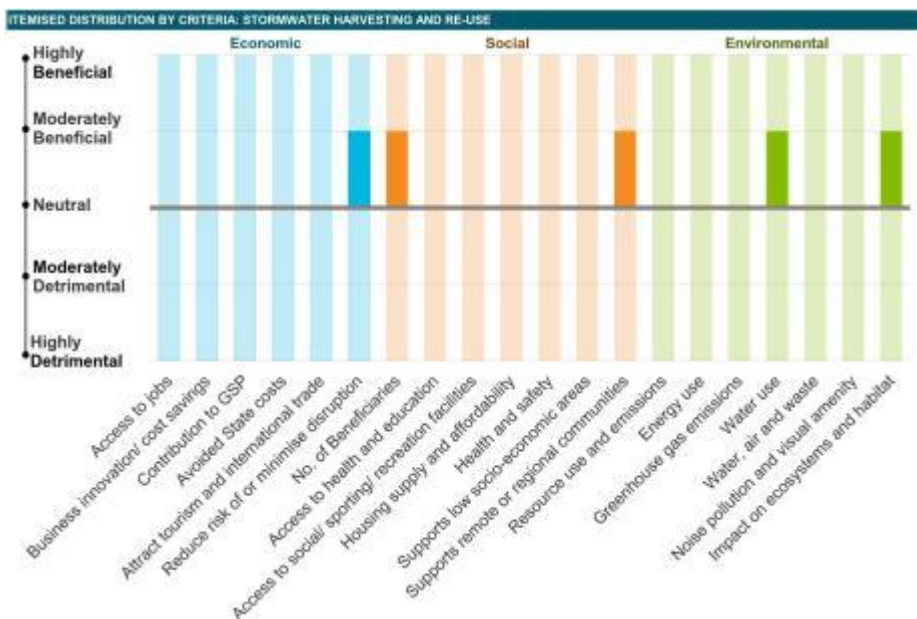
How does this option perform under different scenarios?

Supercity	++	Heightened need to conserve water resources
Westside Story	++	Heightened need to conserve water resources
Regional Cities	+	Heightened need to conserve water resources
Accelerated Climate Change /Mitigation	++	Acute need to conserve water resources
Prolonged/ Severe Economic Downturn	-	Less demand for water
Biosecurity Threat	Neutral	

How does this option work with others?

Implementing this option, and particularly if implemented in parallel with recycled wastewater for non-potable use (RTH), has the potential to delay major augmentation projects such as additional desalination capacity (WDP or WSA1) or recycled wastewater for drinking (RWW).

What are the economic, social and environmental impacts of this option?



What is this option? (cont'd)

During rainfall events a significant amount of water is currently collected in urban drainage systems and released into waterways or the ocean. This option considers harvesting of this resource for fit for purpose uses.

For stormwater to be managed effectively as a water resource, regulatory guidance, governance arrangements and long-term water resource planning implications will also need to be considered.

Harvesting stormwater during wet periods for use in drier periods can reduce reliance on mains water supply, free up water in storages for other uses, assist to mitigate the impacts of droughts, improve the health of waterways by directly mitigating against the impacts of urban stormwater runoff and assist to minimise impacts of storm events on drainage infrastructure.

Risks and opportunities

Smaller local stormwater harvesting systems can be difficult to manage and they can pose a greater risk of system failure with public health risk.

Local stormwater harvesting can, however, increase local resilience to climate change delaying the need for large scale augmentation projects. Stormwater harvesting systems have the additional benefit of being low cost technologies particularly when compared with non-rainfall dependent technologies such as recycled wastewater for drinking or desalination.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then we have updated the recommendation in light of the release of the Victorian Government *Water plan* (Oct 2016) and to recognise that the Essential Service Commission's new water pricing approach is being implemented (Oct 2016).

Scope change

This option was previously updated to omit the limitation to 'non-potable' use. This will allow water businesses and the community to discuss fit-for-purpose uses for stormwater harvesting. This can include meeting a range of outdoor and indoor water demands depending on the level of water treatment. Yarra Valley Water's Kalkallo stormwater harvesting and re-use project, for example, has been designed with the ultimate possibility of supplementing drinking (potable) water supplies.

Next steps

The immediate step to implementing this option would be a review of statutory instruments and planning frameworks (both water resource planning and planning in broader terms) to identify and address barriers to full utilisation of stormwater for all purposes, potable and non-potable. Actions would range from clarifying rights to alternative water sources in the *Water Act 1989* to ensuring that planning instruments do not limit opportunities for stormwater harvesting projects.

The timing for this recommendation (ref. 14.2.2) in the strategy is 5-30 years. This timing is intended to complement broader actions to ensure that governance arrangements (recommendation 14.1.1) and pricing processes (the base case assumption of the Essential Service Commission's water pricing review) provide a robust framework for alternative water supply investigations. This timing should however not preclude stormwater harvesting projects at existing greenfield sites from being identified immediately, and actions undertaken to ensure these options can be investigated further. This means for example reviewing existing precinct structure plans to ensure that opportunities for stormwater harvesting projects of the scale proposed by this option are not precluded.



Clarification of roles and responsibilities in stormwater management across water businesses and local government will also be required. A mechanism for innovation is provided in the new water pricing process. Stormwater harvesting may have broader benefits than urban water use and additional innovative aspects such as use for agricultural and environmental use should be pursued. A holistic and cost effective approach will however be required, one that considers increasing water security during dry periods in the first instance.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

National Water Initiative, *Australia's water blueprint: national reform assessment*, 2014

University of Melbourne, *Stormwater harvesting and the potential for new dams in Victoria*, 2016

Victorian Department of Environment, *Land, Water and Planning, Water for Victoria: Water plan*, 2016

School regional level maintenance contracts SRM1

Option type

Better use through coordination processes

Better use through contractual processes

Changing behaviour through information

Location

Statewide

Sector

Education and training

Certainty of evidence

Low

Direct option cost

\$1 million–\$10 million

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 9: Provide access to high-quality education infrastructure to support lifelong learning

Low	Low	Low	Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

There is a significant cost required to maintain ageing school infrastructure. This option proposes a reconsideration of school maintenance delivery by aggregating management at a regional level for cleaning and preventative and reactive maintenance contracts for schools.

Under the current devolved model, individual schools engage in maintenance and cleaning contracts. Economies of scale could be employed at a region level to have tighter control over these costs. Procurement practices will be led by the Department of Education and Training, but work/contract package boundaries would be negotiated on a regional and local level facilitated by the department. The department would provide oversight and guidance to ensure efficient procurement and best practice across the sector.

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option was recommended in part in the strategy (ref. 9.3.2). Specifically, it has been recommended to pilot the new regional maintenance model for schools within 0-5 years. This should demonstrate whether or not economies of scale could be derived at a regional level and provide tighter control over costs. The option will also enable data to be collected for a range of schools to enable better planning and budgeting of maintenance in the future. Under the existing devolved model there is no data captured to confirm if funds nominally allocated to maintenance are being effectively utilised, or even directed to maintenance. The option was assessed as having a low contribution as it is an enabler to the better application of maintenance and the outcome is still subject to how the system is implemented.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

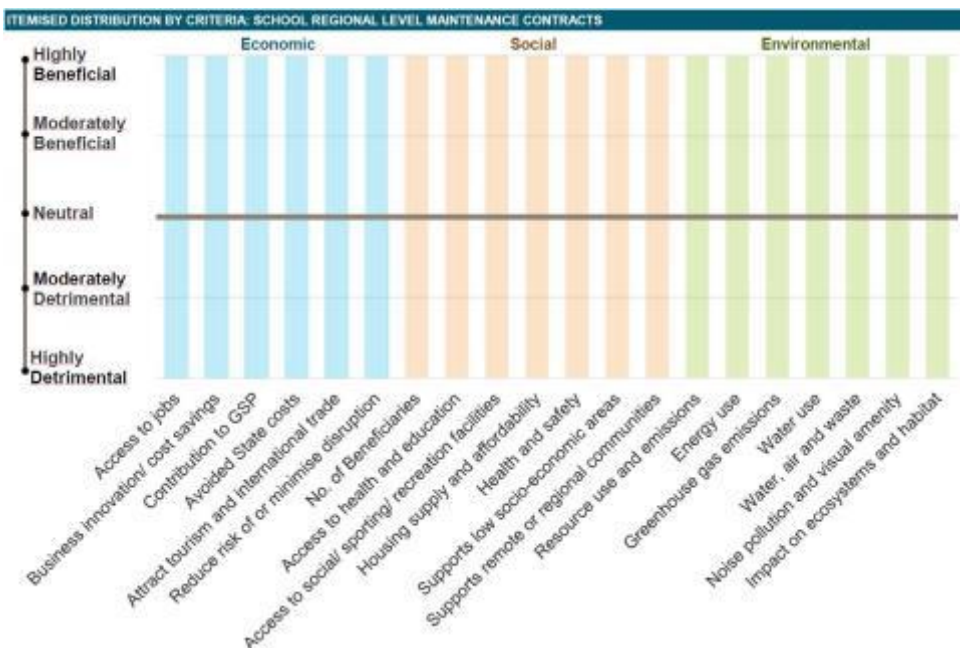
How does this option perform under different scenarios?

Supercity	Neutral
Westside Story	Neutral
Regional Cities	Neutral
Accelerated Climate Change /Mitigation	Neutral
Prolonged/ Severe Economic Downturn	Neutral
Biosecurity Threat	Neutral

How does this option work with others?

This option acts as an enabler to Schools as community facilities (SCF). Under the option SCF, school properties will be used more intensively for varied purposes, which is likely to require an increased management requirement to deliver maintenance. By removing the maintenance role from the school, adopting SCF will not increase the maintenance burden on the school.

What are the economic, social and environmental impacts of this option?



Commentary:

This is not anticipated to have appreciable economic, social or environmental impacts.



Risks and opportunities

If the needs of different schools in a region are too varied, economies of scale may be difficult to realise.

The framework implemented to centralise school maintenance and cleaning contracts could potentially be adopted by other government services to achieve cost savings while maintaining service quality.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Stormwater quality management

SRQ

Option type

Better use through coordination processes
 Changing behaviour through safety and environmental standards

Location

Statewide

Sector

Water and waste

Certainty of evidence

Medium

Direct option cost

\$1 million–\$10 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 16: Help preserve natural environments and minimise biodiversity loss

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

Need 17: Improve the health of waterways and coastal areas

Significant	Significant	Significant	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option is a regulatory review and guidance update to enable development of more comprehensive and targeted stormwater quality management measures. Water sensitive urban design (WSUD) principles can be better incorporated into regulatory frameworks and technical guidance on adopting these principles reviewed to reflect current research and better enable site-specific implementation. Stormwater quality management measures can be better applied across all development types. In addition to improving stormwater quality, this option will increase local resilience to storm events by reducing stormwater runoff flowrates (further detail in *What is this option? cont'd*).

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive.

What do we think of this option and why?

This option was recommended in the strategy (ref. 17.1.1) because it provides a major contribution to preserving natural environments, minimising biodiversity loss and improving the health of waterways at a relatively low cost. A lot of work has been done over the past two decades to better understand the composition of stormwater and develop a range of treatment measures to improve stormwater quality. Water sensitive urban design principles, which embody these treatment measures, are now incorporated in a range of construction and design approaches. Clearer links are however required between policy requirements to improve waterway health, current research on stormwater quality management and consistency in application across all development types. This will ensure that appropriate measures are being taken to address stormwater quality in a manner that reflects specific waterway requirements.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

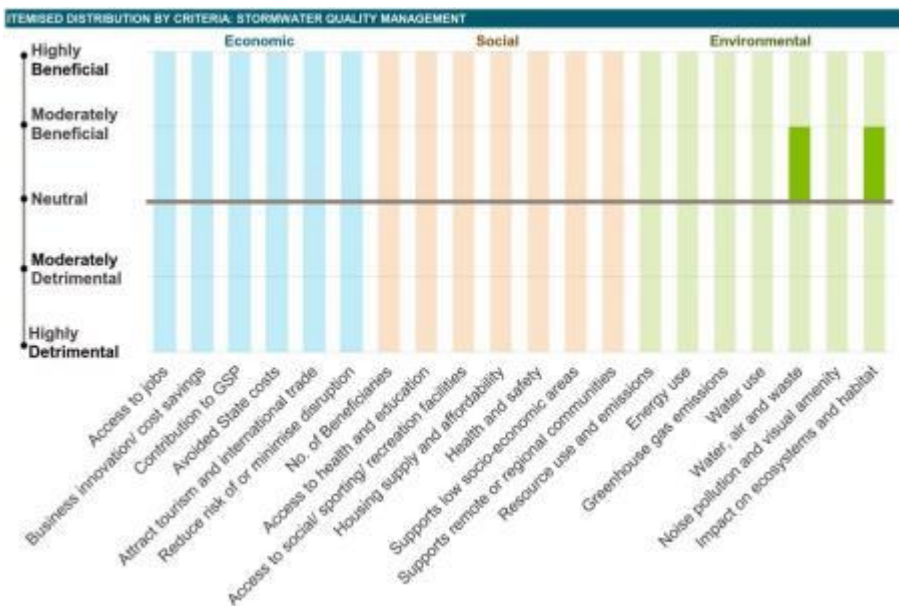
How does this option work with others?

Implementation of this option enables better use of stormwater for example for harvesting (SRH). This option complements green infrastructure design principles (UFF).

How does this option perform under different scenarios?

Supercity	++	Higher risk of greater pollutant loads in stormwater
Westside Story	++	Higher risk of greater pollutant loads in stormwater
Regional Cities	++	Higher risk of greater pollutant loads in stormwater
Accelerated Climate Change /Mitigation	++	Higher likelihood of frequent & intense storm events
Prolonged/ Severe Economic Downturn	-	Less demand for water
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



What is this option (cont'd)

Poor quality stormwater, for example that with pollutants and sediments, negatively impacts on river health and aquatic and marine ecosystems. Over time this affects biodiversity and yields from water catchments. While there have been significant developments in stormwater quality management in Victoria over recent decades, there is benefit in having a more comprehensive and consistent approach to improving stormwater quality.

Risks and opportunities

There is a risk that the full benefits of stormwater quality management infrastructure will not be realised without sufficient on-going maintenance.

There is an opportunity to incorporate aesthetic and social aspects in implementing this option and in doing so benefit both communities and the environment.

Additional notes

Next steps

Liaison with industry and academic institutions will be key in implementing this option. Next steps to implement this option would be to:

- expand stormwater management requirements (Clause 56 of the Victorian planning provisions) to all development types.
- update minimum requirements for water quality objectives based on current research. The Best Practice Environmental Management guidelines currently used for stormwater management is based on work undertaken almost two decades ago.
- outline policy requirements that are reflective of the health of specific waterways, for example through additional protection for waterways with the poorest water quality or greatest ecological value.
- clarify roles and responsibilities in stormwater management particularly across water businesses and local government and ensure these arrangements are reflected by requirements in planning controls.
- provide updated guidance material for agencies and industry to build capacity in applying stormwater management measures.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

City of Kingston, *Integrated water cycle strategy*, 2012

CSIRO, *Urban stormwater: Best practice environmental management guidelines*, 2006

Senate Environment and Communications References Committee, *Stormwater management in Australia*, 2015

Victorian Department of Environment, Land, Water and Planning, *State environment protection policy (Waters) review*, 2015

Victorian Department of Environment, Land, Water and Planning, *Water for Victoria: Water Plan*, 2016.

Walsh, et.al, *Urban stormwater runoff: A new class of environmental flow problem*, 2012

Unlocking school resources with technology

SRS

Option type

Better use through information

Location

Statewide

Sector

Education and training

ICT

Certainty of evidence

Medium

Direct option cost

\$750 million–\$1 billion

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 1: Address infrastructure demands in areas with high population growth; and

Need 2: Address infrastructure challenges in areas with low or negative growth; and

Need 12: Improve access to jobs and services for people in regional and rural areas

Moderate	Moderate	Moderate	Moderate
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0-5 yrs 5-10 yrs 10-15 yrs 15-30 yrs

Need 9: Provide access to high-quality education infrastructure to support lifelong learning

Significant	Significant	Significant	Significant
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0-5 yrs 5-10 yrs 10-15 yrs 15-30 yrs

What is this option?

The days of schools focusing on chalk and talk are over. Technological advances support new ways of learning, with individualised instruction and collaborative group learning by expanding access to content enabling personalised instruction, project-based pedagogies, collaboration for knowledge creation and delivery of feedback and formative real-time assessment. Use of digital technologies by students can take pressure off school assets and classroom spaces, with students able to undertake self-directed learning at home or in other learning spaces. Additional funding is required to expand and enhance the use of technology across the school network, including collaboration with Catholic and independent schools. A strong focus would be placed on regional schools, in particular those with low enrolment numbers or a limited curriculum offer (further detail in *What is this option? cont'd*).

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option was recommended in the strategy (ref. 2.2.2, 9.2.1 and 12.1.4) because enhanced digital technologies can improve learning outcomes, take pressure off school assets, encourage school-to-school learning and increase government and non-government school sharing. This option proposes additional funding in the order of 20 per cent above the current level of funding to sustain and supplement digital technology infrastructure for government schools across the state for the next 10 years. After that time we think that digital learning should become embedded as an integral part of school infrastructure. A strong focus should be placed on regional schools and schools that have a limited curriculum offer. This would leverage teaching resources from other school sites such as STEM or specialist language teachers.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

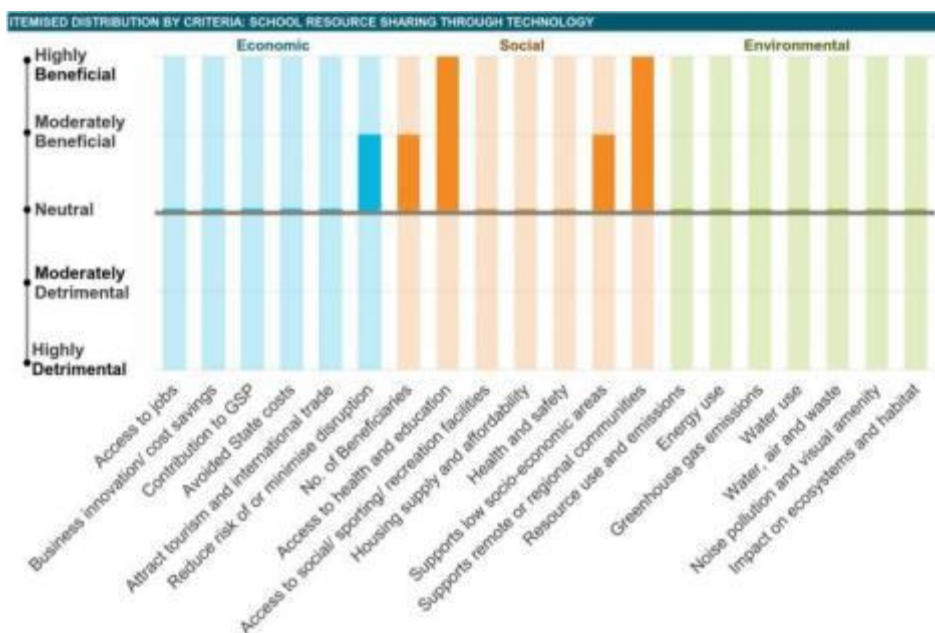
How does this option perform under different scenarios?

Supercity	+	More efficient use of existing assets
Westside Story	+	More efficient use of existing assets
Regional Cities	++	More efficient use of existing assets
Accelerated Climate Change /Mitigation	Neutral	
Prolonged/ Severe Economic Downturn	Neutral	
Biosecurity Threat	Neutral	

How does this option work with others?

This option is complemented by 21st century libraries (LLH) and schools as community facilities (SCF). While school sites can provide access to all students for digital learning, some students do not have online access in their homes. It is therefore important that other publicly available places can provide this access. This option also complements school demand management (SOO) where high performing schools could provide on-line teaching resources to other schools that offer a more limited curriculum.

What are the economic, social and environmental impacts of this option?



Commentary:

There would be significant community benefit for students in rural and remote areas to access a wider range of learning opportunities through digital technology.

What is this option? (cont'd)

Students can also connect, interact, share and learn with others outside of their classroom and school through virtual learning that is either synchronous (log in at the same time) or asynchronous (access in own time) providing greater subject choice and extension and enrichment learning opportunities.

Risks and opportunities

The full potential of improved ICT connectivity may not be realised if teachers are not trained in how to use the equipment practically and in how to incorporate technology into the delivery of education. Greater implementation of ICT technology may also require additional technical support specialists to ensure the continued viability of technology use within the school system. Attracting and retaining suitably qualified specialists to more regional and remote communities may be difficult.

Access and use of ICT outside the school environment may improve its effectiveness within schools. As such, greater use of ICT to promote and enable learning outside of formal school settings could complement the benefits provided by this option.

This option could be prioritised to schools where there is not sufficient curriculum offer now, such as rural schools.

Additional notes

Current funding

The Department of Education and Training currently spend in the order of \$125 million per year to support digital technology in existing state schools.

Proposed future funding

We think there is a need to increase this funding by an additional 20 per cent in order to sustain and supplement digital technology in schools for the next ten years. After that time this should be reviewed. We think that digital learning should be embedded as an integral part of schools after that time. The increased funding should cover the following:

- Access to NBN and high speed reliable Wi-Fi within schools
- Access to hardware for teachers to record and present on-line lessons and material
- Video conferencing
- Presentation screens
- Cloud suites and on-line content
- Equity funding to subsidise disadvantaged students to purchase devices
- Digital labs
- Professional ICT support for teachers and schools.

Changed scope

In the first version of the *Draft options book*, we considered an option called School campus utilisation (SCU1) that proposed to maximise the use of school sites through double streaming, or staggering start times of schools. After considering some of the logistical and workforce issues of that option, we decided that school assets could be better shared through digital learning technology.

Sharing teachers and resources

A review of existing Department of Education and Training policies and procedures will be required to ensure there are no barriers to prevent schools sharing teachers and resources across school sites through the use of technology.

Community research

Eighty nine per cent of people surveyed as part of community research supported improving information technology in schools to allow for a broader curriculum to be offered across schools.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Small scale solar energy regulation

SSE

Option type

Better use through information
Changing behaviour through regulation

Location

Statewide

Sector

Energy

Certainty of evidence

Medium

Direct option cost

\$1 million–\$10 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 18: Transition to low carbon energy supply and use; and

Need 19: Improve the resilience of critical infrastructure

Low	Low	Low	Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Reviewing and updating regulations to streamline decision making processes for the installation of small scale solar (also known as distributed solar or 'solar PV') on industrial and commercial buildings. This option would also improve the information provided to businesses on the process of installing solar PV and potential for grid connections where these are being considered.

What is the level of community support?

There was limited discussion of this option during public consultation.

What do we think of this option and why?

This option was recommended in part in the strategy (ref. 18.2.3) because at a relatively low cost this option can assist to ensure that projected growth in small scale solar is efficient from a technical perspective. This option is rated as providing a low contribution because in itself it does not accelerate uptake of low emission technology. We, however, consider that the benefits in ensuring the significant projected uptake in distributed solar is as effective as possible merit a recommendation. To date, households have led the uptake of this technology and future growth is likely to see increased uptake in the commercial sector. This option would make information easily available to business owners on the benefits of installing rooftop solar, financial aspects to consider, design feasibility and implementation aspects of which to be aware.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

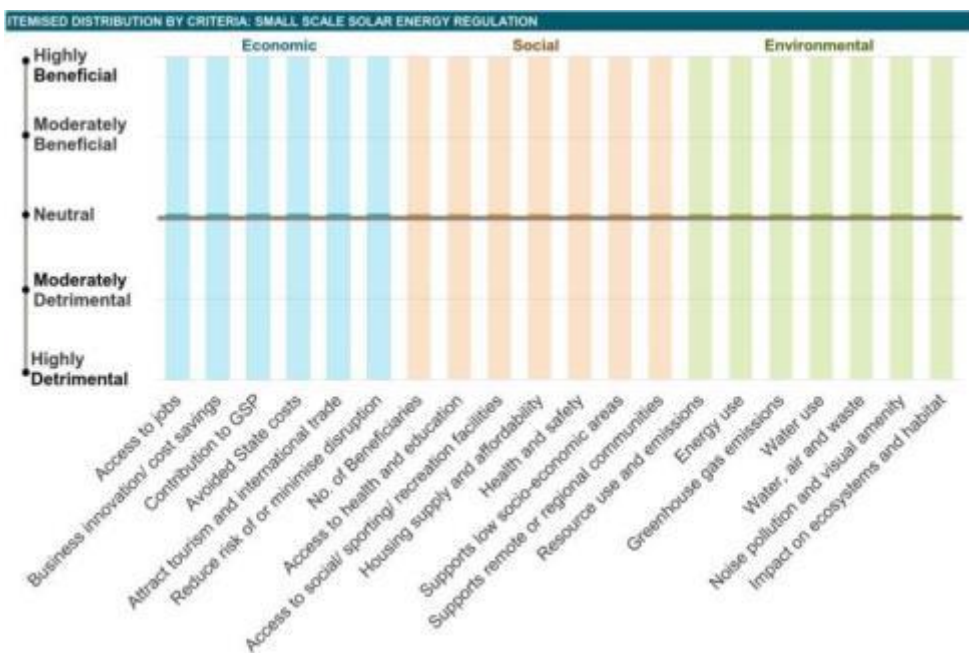
How does this option perform under different scenarios?

Supercity	+	Increased need for effective renewable energy development
Westside Story	+	Increased need for effective renewable energy development
Regional Cities	+	Increased need for effective renewable energy development
Accelerated Climate Change /Mitigation	++	Acute need to reduce carbon emissions
Prolonged/ Severe Economic Downturn	-	Less demand for energy
Biosecurity Threat	Neutral	

How does this option work with others?

This option complements small-scale solar power technologies (LSE) and options to improve energy use efficiency in existing and new developments (EDM1 and EED respectively).

What are the economic, social and environmental impacts of this option?



Commentary:

This option is anticipated to result in small scale and voluntary uptake of solar PV by commercial and industrial users. The impacts of the option are anticipated to be broadly neutral.

Risks and opportunities

This option may not address other barriers to expanded use, for example, potential changes to other policies or regulations.

This option presents an opportunity to encourage the scaling-up of the solar PV to the commercial and industrial sectors, through information dissemination.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Clean Energy Council and NSW Office of Environment and Heritage, *Guide to installing solar PV for businesses in NSW*, 2016

Climateworks, *Commercial buildings emissions reduction opportunities*, 2010

International Renewable Energy Agency, *The power to change: Solar and wind cost reduction potential to 2025*, 2016

Smartbus service provision increase SSP

*Option SSP is addressed in SNE – Smartbus network
extensions and service increases*

School shortages SSS

Option SSS is addressed in:-

SIF – School infrastructure funding certainty

SOO – School demand management

SCF – Schools as community facilities

School sector-wide planning information

SSW

Option type

Changing behaviour through information

Changing behaviour through regulation

Location

Statewide

Sector

Education and training

Certainty of evidence

Medium

Direct option cost

<\$100 million

Contribution to meeting the need

Need 9. Provide access to high-quality education infrastructure to support lifelong learning – **Low**

What is this option?

The ability to effectively plan new schools is possibly being hampered by the limited information available on private sector assets. Regulation providing access to planning data would allow a more holistic view to be undertaken. This option would encourage further sector-wide planning between government and non-government providers. Improved understanding of priorities for investment would assist in better planning decisions and assist with decision-making about timing and sequencing of school delivery.

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option was not recommended in the strategy because the Department of Education and Training can already work collaboratively with the non-government sector without government having to make legislative or regulatory changes to make this happen. There is merit for the Department of Education and Training and non-government schools to share data for the purposes of improving planning and better understanding where growth pressures are. This option made a low contribution to Need 9.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

How does this option perform under different scenarios?

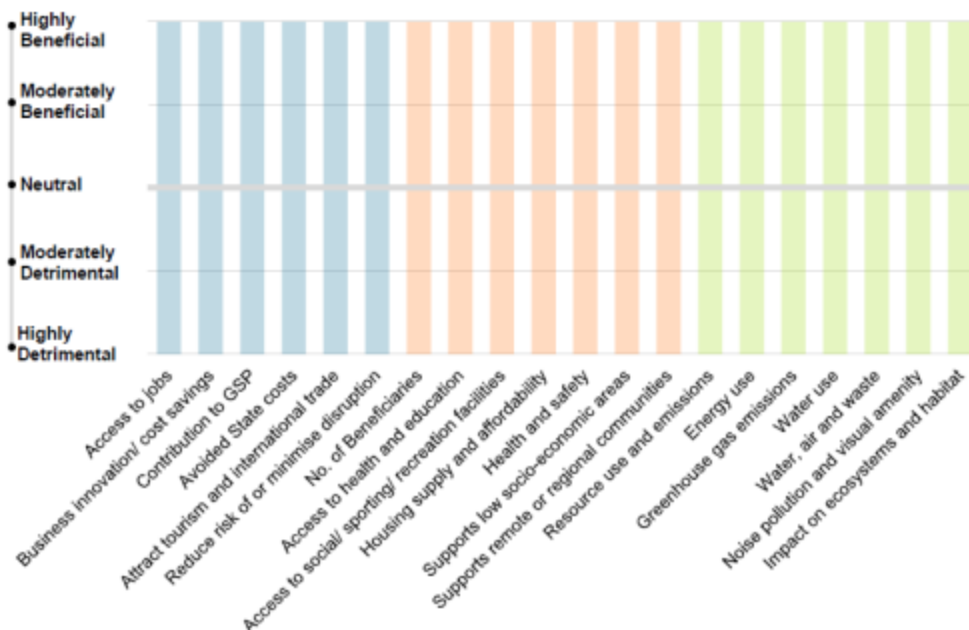
Supercity	Neutral
Westside Story	Neutral
Regional Cities	Neutral
Accelerated Climate Change /Mitigation	Neutral
Prolonged/ Severe Economic Downturn	Neutral
Biosecurity Threat	Neutral

How does this option work with others?

By making sector-wide information publicly available, this option would enable more effective planning of new schools across both government and non-government systems. It would assist in school demand management (SOO) and enable more effective targeting of maintenance and new school funding (SIF).

What are the economic, social and environmental impacts of this option?

ITEMISED DISTRIBUTION BY CRITERIA



Commentary:

No net impacts identified.



Risks and opportunities

There would be some risks associated with the sharing of planning data. These risks could be managed through an appropriate partnership agreement. As the Catholic Education Office is the second biggest provider of schools, in the first instance it might be worth trialling this option between Department of Education and Training and the Catholic Education Office. Other non-government schools might choose to enter into a partnership at a later stage.

Evidence base

AECOM/PwC, *Assessment 2: Economic, social and environmental assessments and option relationship mapping*, 2016

Deloitte/Aurecon, *Assessment 1: Options analysis report*, 2016

School and tertiary education cooperation

STE

Option type

Better use through coordination processes

Location

Statewide

Sector

Education and training

Certainty of evidence

Low

Direct option cost

<\$1 million

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 9: Provide access to high-quality education infrastructure to support lifelong learning; and

Need 12: Improve access to jobs and services for people in regional and rural areas

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Establish partnerships between schools and tertiary education providers to facilitate the sharing of infrastructure through specific educational programs, strengthening pathways for school students to transition to tertiary education and make available Vocational and Educational Training (VET) courses to the wider community through using existing schools. This would be, particularly beneficial in regional and remote areas, to provide increased access to VET courses.

Commonwealth and state governments are currently encouraging such partnerships through the Trade Training Centres in Schools and Technical Schools programs. The option includes the need to identify and address regulatory barriers that can prevent the sharing of schools such as the workforce arrangements required for VET teachers working in a school setting and duty of care requirements for school aged students.

What is the level of community support?

There was limited to no discussion of this option during public consultation. This option was recommended by the regional citizen jury.

What do we think of this option and why?

This option was recommended in the strategy (9.4.1) because it would investigate and reduce any regulatory barriers that prevent tertiary education being provided on school sites. This option would likely be of most benefit to regional areas, where access to VET courses can be limited. Increasing access to education and training in regional areas to address skills shortages would deliver economic and social benefits to these communities.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

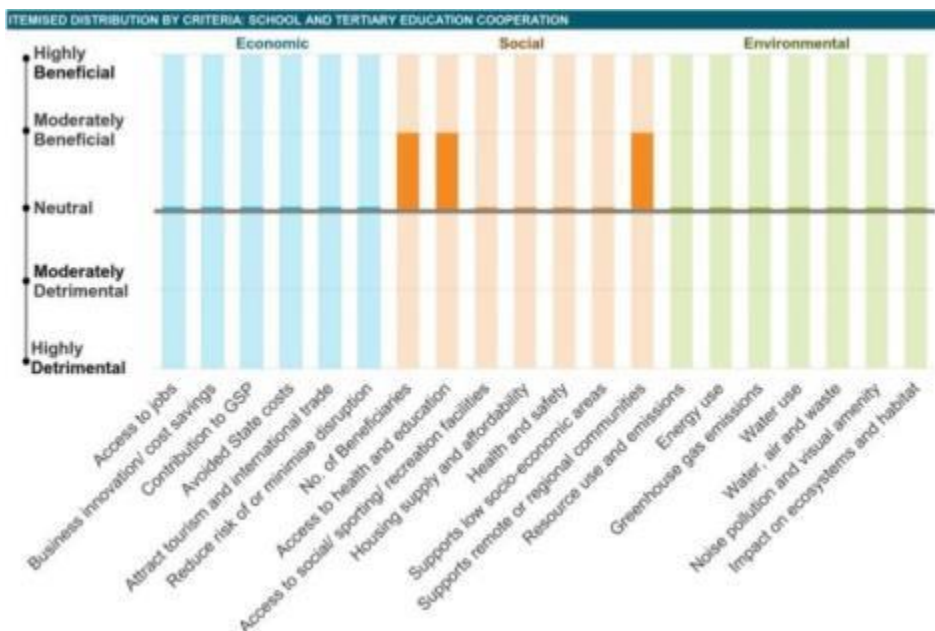
How does this option perform under different scenarios?

Supercity	+	More efficient use of existing assets
Westside Story	+	More efficient use of existing assets
Regional Cities	+	More efficient use of existing assets
Accelerated Climate Change /Mitigation	Neutral	
Prolonged/ Severe Economic Downturn	Neutral	
Biosecurity Threat	Neutral	

How does this option work with others?

This option is complemented by TAFE recapitalisation. (TAF) which promotes the use of TAFE colleges for wider community access, which could include secondary students. Both options promote the cooperation and maximisation of community access to school and tertiary education (STE). Shared use agreements (CSS1) will enable sharing of the facilities.

What are the economic, social and environmental impacts of this option?



Risks and opportunities

There has been a history of uncertain funding in the TAFE sector which, if continued, could pose a risk for future partnerships.

This option could broaden the educational opportunities in regional areas.

Additional notes

Next steps

- Identify existing regulatory barriers that prevent VET courses from being delivered on school sites.
- Set-up inter-jurisdictional processes to remove barriers.
- Facilitate delivery of additional VET courses to be delivered on existing school sites both for existing school students and wider community access.
- Focus on regional areas with limited access to VET courses in the first instance, particularly where improved access to training could address regional skill shortages.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Strategic transit-oriented centres and corridors

STO

Option type

Better use through land use and planning controls

Location

Statewide

Sector

All

Certainty of evidence

Medium

Direct option cost

\$10 million–\$25 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 1: Address infrastructure demands in areas with high population growth; and

Need 10: Meet growing demand for access to economic activity in central Melbourne; and

Need 11: Improve access to middle and outer metropolitan major employment centres

Moderate	Moderate	Moderate	Moderate
----------	----------	----------	----------

0-5 yrs

5-10 yrs

10-15 yrs

15-30 yrs

What is this option?

Transit-oriented development is the intensification of medium to high density housing, services and businesses around existing (or proposed) major public transport infrastructure. This option is to prioritise transit-oriented development in and around National Employment Clusters such as Latrobe, Sunshine and Monash, major regional employment centres, Metropolitan Activity Centres such as Box Hill and Footscray and their supporting transport corridors (further detail in *What is this option? cont'd*).

What is the level of community support?

There was a high level of discussion of this option during consultation. Responses were generally positive. This option was recommended by the metropolitan citizen jury. The jury recommendation included better utilisation of existing inner suburban multi-modal transport hubs such as Box Hill and Camberwell to encourage residential development and provide access to jobs and services.

What do we think of this option and why?

This option was recommended in the strategy (ref. 1.1.2, 10.1.2 and 11.1.1) because it maximises the use of existing infrastructure and supports economic activity in middle and outer metropolitan employment areas. This option has a moderate contribution to needs 1, 10 and 11. The intensification of housing, services and business activity in employment centres and along their transport corridors will provide the opportunity for more people to access a range of jobs and services close to where they live. State government has a leadership role to designate areas for change, working in partnership with local government. Priority locations for more intensive development would be major employment areas such as Monash, Latrobe and Sunshine National Employment Clusters (NECS), as well as the Metropolitan Activity Centres such as Footscray, Box Hill, Dandenong, Ringwood, Broadmeadows and Frankston as well as their transport corridors.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	Relates to key point/option for discussion
Regional Growth Plans	N/A

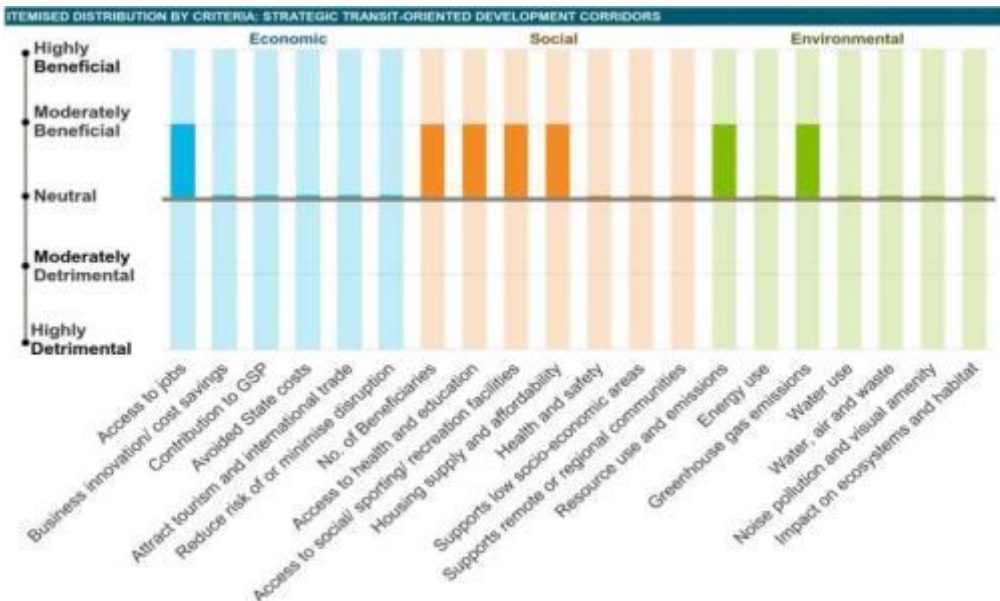
How does this option work with others?

Implementation of this option should occur with key transport improvements, in particular new or upgraded stations (WVW, GWR, GRE, MRE1, WRE1, MII and MLC). There are a number of complementary options that support development of intensive transit oriented centres and corridors, in particular, employment centre mass transit network (MTN), integrated government service and infrastructure planning (SIP) and green infrastructure (UFF). This option is complementary to compact urban development (UDC). Upgrades to existing community facilities (CSR) would be required in established areas experiencing growth.

How does this option perform under different scenarios?

Supercity	++	Supports mode shift to address congestion
Westside Story	+	Supports mode shift to address congestion
Regional Cities	+	Supports mode shift to address congestion
Accelerated Climate Change /Mitigation	+	Supports more carbon efficient travel
Prolonged/ Severe Economic Downturn	+	Enables more affordable transport options
Biosecurity Threat	Neutral	
Bay West	+	Facilitates transport corridor creation or upgrade when required
Hastings	+	Facilitates transport corridor creation or upgrade when required

What are the economic, social and environmental impacts of this option?



What is this option? (cont'd)

Transit-oriented development would be achieved by:

- Applying planning provisions that enable residential and mixed use development in employment centres and along transport corridors that service the centres
- Consideration of transport demand management measures to maximise access to public transport infrastructure to increase use of active transport, and reduce congestion.
- Identification of infrastructure upgrades required to support intensification.

Intensification of housing around jobs would reduce travel time and congestion, and increase the opportunity for residents to walk and cycle to existing employment and activity centres.

Risks and opportunities

There can be high levels of community resistance to residential intensification in existing established suburbs, including along transport corridors. Development needs to be undertaken with sensitivity to the surroundings.

This option assumes that some infrastructure would need to be upgraded in these established areas. It remains a complex process to collect contributions from developers towards the cost of upgrading and retrofitting existing infrastructure. The state government current efforts to develop and implement a standard development infrastructure contribution for established areas would assist to address this issue.

The effectiveness of this option in greenfield and other areas depends on commitment to identify and support emerging employment centres and to invest in new public transport services.

Funding

Should government choose to pursue this policy, it will then need to consider funding options. Below is a range of potential funding mechanisms which could be examined to help fund the impacts of this policy.

Potential funding mechanisms

General government revenue	User charges	Beneficiary charges	Property development	Asset sales
		✓	✓	

Strategic transit-oriented centres and corridors would require planning scheme changes that are likely to increase the value of land in certain areas. To capture part of this value, government could consider beneficiary charges such as developer contributions where rezoning and/or development provide financial gains to property developers. Reforms to infrastructure contributions in established areas are currently underway in Victoria, which aim to simplify the developer contribution process. Funding raised by development contributions could be reinvested in those areas to meet infrastructure needs arising from intensification.

Property development could also be considered. For example, land and air rights surplus to government requirements within areas where land is rezoned could be sold or leased. Property development can assist in putting underutilised government land and space to higher and better uses, creating added value through improved amenity, access to services and more choice in services. Funding raised could be reinvested in those areas to meet infrastructure needs arising from intensification. This is occurring near Jewell train station in Brunswick, a suburb experiencing high levels of development. VicTrack will invest in upgrades to the forecourt and public realm at the station following the sale of two sites next to the station for property development.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then we have refined the recommendation to clarify medium and high density would be applicable, and highlight different types of employment centres, in response to stakeholder confusion about the scope. We have also clarified that this should be a state led approach as a number of submitters felt the role for the state government was unclear.

Context

The projected population for Victoria will require a concerted effort across all levels of government.

In November 2016, the Commonwealth Government responded to the recommendations in Infrastructure Australia's report *Australian Infrastructure Plan*. In their response, the Commonwealth Government supported Infrastructure Australia's recommendation 2.3 that to meet the demands of population, growth Sydney, Melbourne, Brisbane and Perth should accelerate the delivery of high-quality, higher density development within established urban areas. This option is generally consistent with the intent of that recommendation that "governments should take steps to reduce urban sprawl and ensure the majority of new housing supply is medium to high-density and delivered in established urban areas".

When planning for growth, the State government must align infrastructure planning and investment with growth opportunities. There must also be ongoing improvements to local and state infrastructure as change occurs. The State government has many policy and investment levers that can assist the creation of accessible, prosperous and healthy communities.

This option builds on existing land use policy and aims to drive planning for change and better align infrastructure and development outcomes. It aims to support the development of a network of employment centres across the metropolitan area and within major regional cities such as Ballarat, Bendigo and Geelong. A key part of supporting the on-going economic activity of existing and emerging employment centres, metropolitan activity centres, and regional cities is understanding the economic role and infrastructure realities of the network of centres in a regional/subregional context. Regional/subregional framework planning should determine the role of the centres, their strengths and constraints and major infrastructure opportunities. Successful employment centres will be an outcome of more proactive collaborative leadership in areas designated for high change and in need of infrastructure investment to support growth in jobs and services. The Victorian Planning Authority (VPA) has already commenced planning for National Employment Centres (NECs), some Metropolitan Activity Centres (MACs) and some regional centres. This planning work should be built on as part of implementing this option.

Next steps

The key steps to be taken to implement this option are as follows:

1. State led regional/subregional plans

The State government should lead the preparation of regional/sub regional framework plans for growth that better align land use with infrastructure provision and investment. The plans would be state led to set clear development objectives for employment centres and associated major transport corridors by considering centres within a regional/subregional context. This work will be important to determine areas for intensification and land use change, and infrastructure investment priorities, such as major transport connections.

2. Develop and implement strategic land use plans

Detailed land use and infrastructure plans should be developed for each centre. This would include building on existing strategic planning work to ensure strategic land use plans reflect the overarching state and local planning and infrastructure objectives and priorities. The State will need to work in partnership with the respective local governments, stakeholders and the community to set the strategic land use outcomes, infrastructure directions and

place making improvements to achieve the vision and objectives for each centre in line with the regional/subregional plans.

The plans for each centre should:

- Provide detailed land use and infrastructure directions that implement the government's strategic vision and objectives for growth, support intensification of medium and high density residential development, employment and business activity and make these centres great places to work and live. This will include the planning to achieve built form outcomes in areas that are appropriate for medium and high density housing and business intensification around transport infrastructure. This will also recognise and respond to heritage and environmental values of the area.
- Provide the detailed planning for new and upgraded infrastructure and detail the design and integration opportunities of major infrastructure investments.
- Identify existing and future social, utility and transport infrastructure capacity, including urban design, landscape, open space, active transport and amenity improvements.
- Include estimates of the population, housing and commercial growth potential enabled by the proposed changes to inform regional/subregional monitoring and on-going planning for infrastructure upgrades.

3. Planning scheme amendment within 5 years

Once land use and infrastructure plans, or 'blueprints' for growth are prepared, the plans should be implemented into planning schemes and state oversight of infrastructure delivery and change should occur.

Planning schemes should be amended within 5 years for centres nominated for change.

4. Development approval processes

Development approval processes should support the implementation of strategic land use and infrastructure plans. These processes can assist in facilitating and attracting growth to these important employment centres, including expediting approval to incentivise development in areas designated for high change. Fast track planning approvals may be required to facilitate sought after land use and design outcomes and/or to ensure development in high change areas is not unreasonably delayed.

Mechanisms to accelerate and incentivise development in areas designated for growth should be considered, such as an opt-in code assess/VicSmart approval process supported by a Standard Advisory Committee or a Ministerial approval process, and removal of appeal rights.

Government could also incentivise growth and attract investment through funding the provision of additional infrastructure.

5. Monitor change over time

The state government should monitor land use change to ensure timely infrastructure upgrades, and to capitalise the land use opportunities of future infrastructure investment. This should be led by state government.

Costing of option

The direct option cost for this option includes planning scheme changes but not the associated cost of development, future infrastructure upgrades or future infrastructure savings.

Scope changes

The Residential and commercial property densification option (RCP) from the first version of the *Draft options book* has been included in this option. The scope of this option originally proposed transit oriented corridors and now includes transit oriented centres and corridors.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Heart Foundation, *Density does matter*, 2014

KPMG/Arup/Jacobs *Economic appraisal and demand modelling*, 2016

SGS Economic and Planning, *Comparative costs of urban development: a literature review*, 2016

Stanley, J and Brain, P, *Investing in Melbourne's National Employment Clusters*, 2016

South Yarra Metro Station SYM

Option type

New assets

Location

Melbourne central subregion

Sector

Transport

Certainty of evidence

Medium

Direct option cost

\$1 billion–\$3 billion

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 1: Address infrastructure demands in areas with high population growth; and

Need 10: Meet growing demand for access to economic activity in central Melbourne

Very Low	Very Low	Very Low	Very Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Provide a new station in the proximity of the existing South Yarra Station, on the alignment of the Melbourne Metro Rail Project. The additional station would increase the number of journeys for which people could travel to and from South Yarra without interchanging, increase the number of trains stopping at South Yarra, and allow interchanges to occur at South Yarra which would otherwise occur elsewhere in the network.

What is the level of community support?

There was limited discussion of this option during public consultation.

What do we think of this option and why?

This option was not recommended in the strategy because of the high cost for a very low contribution. While there would be localised benefits to some users, the economic, social and environmental assessment found no net benefits overall.

Previous analysis by Public Transport Victoria (PTV) in preparing the Melbourne Metro (MM) business case found that the cost benefit ratio for this project ranged between 0.1 to 0.4. Infrastructure Victoria reviewed alternative evidence prepared by the City of Stonnington and found that the differences in assumptions would not lead to a material change in the cost benefit ratio. As a result, we view the cost benefit analysis undertaken by PTV to be a reliable assessment of the economic performance of this option.

Without the construction of the South Yarra Metro Station, rail passengers will be able to access the Melbourne Metro by changing trains at Caulfield or Flinders Street/CBD South stations. Infrastructure Victoria recognises that the existing South Yarra station will need upgrading to meet patronage growth with better access and transfer facilities. These upgrades should be considered for delivery under option Metropolitan rail station interchange upgrades (MRI).

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

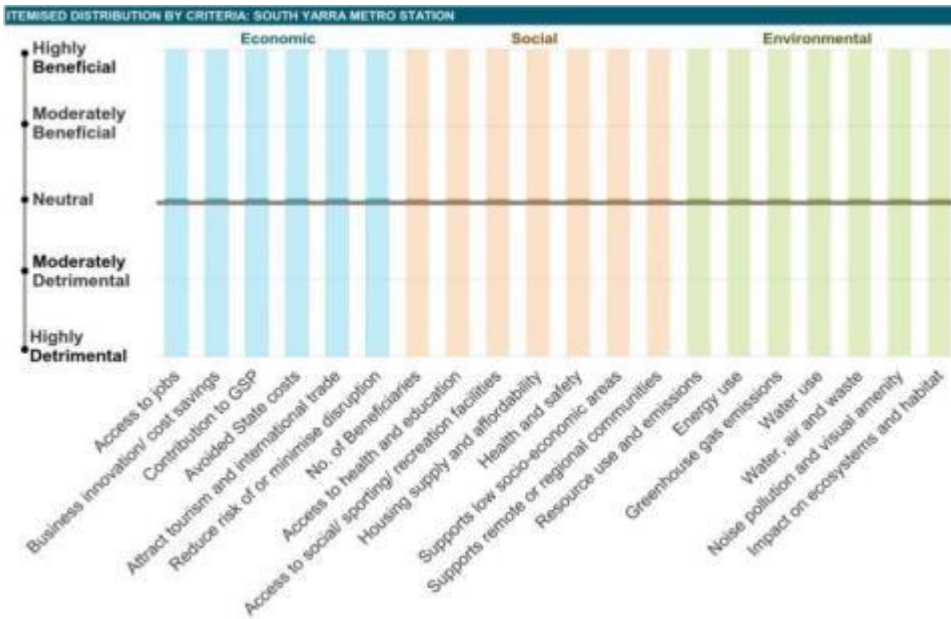
How does this option perform under different scenarios?

Supercity	+	Supports mode shift to address congestion
Westside Story	Neutral	
Regional Cities	+	Supports mode shift to address congestion
Accelerated Climate Change /Mitigation	+	Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	-	Less demand for mass transit
Biosecurity Threat	Neutral	

How does this option work with others?

No key relations with other options have been identified.

What are the economic, social and environmental impacts of this option?



Commentary:

This option is associated with localised benefits to access for those in the catchment area of the station. While these benefits are positive for those in the catchment area, they are considered to be marginal resulting in neutral overall ratings.

Risks and opportunities

There is a risk of significant disruption to traders and locals in this highly populated and trafficked area during the construction of this additional station at South Yarra.

This option would provide an opportunity for over-site development above the new station.

Additional notes

Cost benefit discussion

In the preparation of advice on this option, we assessed both the PTV and City of Stonnington (CoS) assumptions and analysis. The findings by PTV in the Melbourne Metro (MM) business case were queried by CoS.

CoS has queried both the construction cost and the station patronage forecasts (which would influence the public transport consumer surplus benefits), so it is instructive to consider what scale of change in those figures would be required in order for the additional station to achieve a cost benefit ratio of 1.0. The most optimistic assessment in the PTV analysis assumed slower travel times for public transport users who would benefit from running express through South Yarra could be disregarded (a non-standard cost benefit analysis approach). Building off this figure, a cost benefit ratio of 1.0 could be achieved by either:

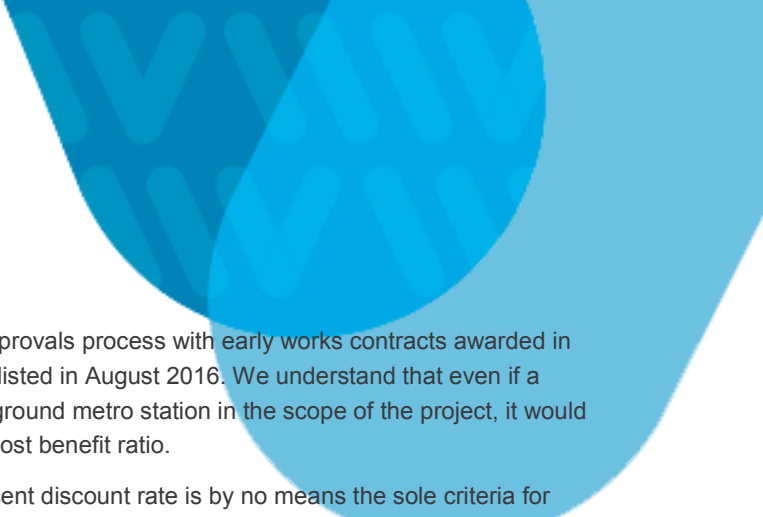
- Costs reducing to be only one-third of current estimate (noting that the assessment is already based on the a lower end cost of \$700 million, where a much better passenger interchange outcome has been estimated to cost \$970 million, and the benefits are based on the latter); or
- Public transport user benefits increasing to be 7–8 times greater than PTV's projections (noting that the majority of the benefits included in the cost benefit ratio did not relate to public transport users); or
- Some lesser combination of the above.

CoS analysis challenged the cost estimate for a new station and identified scope changes which they initially believed could reduce the cost by up to \$300 million. It was unclear from the CoS analysis that the identified reduction in cost could be applied to the \$700 million figure or only to the higher cost estimate option of \$970 million. Later evidence tendered during the Melbourne Metro Rail Enquiry into the environmental effects of the project did not suggest that a substantial cost saving could be made from the alternative track arrangements proposed. It is also noted that a potential saving of \$200-300 million proposed by CoS did not include major rail works required elsewhere to support a simpler track configuration at South Yarra. Overall, we do not have cause to think a metro station could be constructed at South Yarra for substantially less than \$700 million.

In April, CoS released projected patronage figures that differed significantly from PTV figures. The PTV projected daily patronage of 23,000 appeared very unfavourably with the CoS projection of 40,000 in 2031 as the later included Dandenong services stopping at South Yarra. The PTV projection assumes that South Yarra is bypassed by Dandenong services operating in the new MM tunnel. A more appropriate figure for comparison would have been the PTV projection that included a metro station at South Yarra in 2031 which has a projected daily patronage of 34,000. While this is lower than the CoS projection, we do not think that the higher CoS patronage figures would materially increase the cost benefit ratio from the PTV analysis. When comparing both existing and projected patronage numbers we do not believe that an appropriate comparison had been made between the PTV and the CoS figures.

In August, during the environmental effects hearings, CoS tendered evidence showing that the PTV and CoS estimates of forecast patronage for the station in 2031 without the removal of Dandenong services into the MM tunnel were very similar (PTV estimated 39,000 and CoS estimated 41,000 daily entries and exits). Both of these comparisons suggest that there is no material difference in patronage that could significantly increase the user benefits.

Overall, the alternative design solutions and patronage projections put forward by CoS have been reviewed and do not give Infrastructure Victoria cause to doubt the cost benefit analysis undertaken by PTV.



The MM project is at an advanced stage of the planning and approvals process with early works contracts awarded in June 2016 and the tunnelling and station works tenderers shortlisted in August 2016. We understand that even if a decision was taken immediately to include the additional underground metro station in the scope of the project, it would lead to material project delays, which could further reduce the cost benefit ratio.

While achieving a cost benefit ratio greater than 1.0 at a 7 per cent discount rate is by no means the sole criteria for assessing investment merit, this method is well suited to assessing major transport infrastructure projects, and covers a wide range of economic, social and environmental factors. With core results from PTV indicating the additional station has a cost benefit ratio of 0.2 and Net Present Value of -\$535 million, Infrastructure Victoria has not recommended this option in the strategy.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

City of Stonnington, *South Yarra station patronage*, 2016

McDougall, W. *Effect of Melbourne metro project at South Yarra*, 2016

Victorian Department of Economic Development, Jobs, Transport and Resources, *Melbourne Metro business case*, 2016

TAFE recapitalisation

TAF

Option type

Better use through information

Better use through regulation

Location

Statewide

Sector

Education and training

Cultural, civic, sporting, recreation and tourism

Certainty of evidence

Medium

Direct option cost

\$100 million–\$500 million

Contribution to meeting the need

Need 9. Provide access to high-quality education infrastructure to support lifelong learning – **Moderate**

What is this option?

This option includes the rejuvenation of TAFE assets for wider shared community use such as providing secondary school students with access to technology, equipment and 3D printers.

As a first step, an audit of existing TAFE assets is required to identify opportunities for sharing facilities. This would assist to realise maximum value from the existing TAFE estate and then ensure the full cost of asset ownership, including maintenance funding and future asset investment is strategically planned to optimise wider community use as well as meet industry requirements. This will ensure that Victorian government assets are adequately funded and maintained.

What is the level of community support?

There was limited to no discussion of this option during public consultation. This option was recommended by the regional citizen jury.

What do we think of this option and why?

This option was recommended in the strategy (ref. 9.4.2) because TAFE assets should be utilised more effectively and in doing so could support better asset renewal and maintenance. Opportunities for shared community use could include new partnerships such as with community education providers and mechanisms to share the cost of asset maintenance and management. Sharing of facilities for wider community use also enables a community benefit. An audit of existing assets is required to understand opportunities for sharing of facilities. This option is scaled down in the recommendation and does not include a funding strategy. It is assumed that government expenditure will remain constant, although sharing of facilities and better use of assets would be expected to result in efficiencies and increased revenue for the TAFE institutes.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

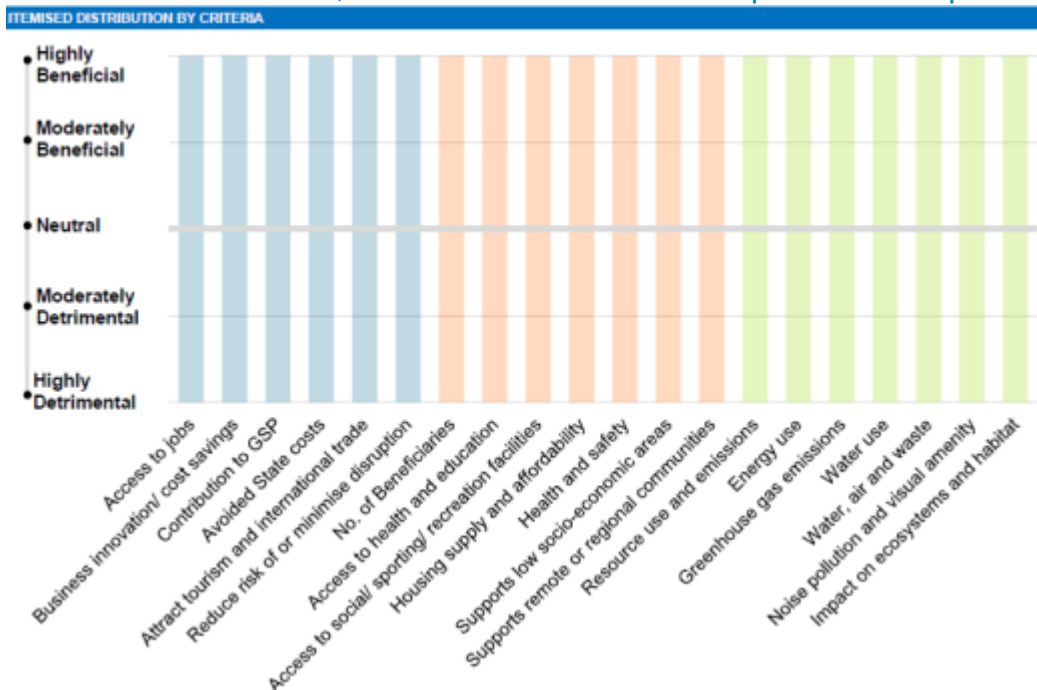
How does this option perform under different scenarios?

Supercity	Neutral	
Westside Story	Neutral	
Regional Cities	Neutral	
Accelerated Climate Change /Mitigation	Neutral	
Prolonged/ Severe Economic Downturn	+	Retraining may be required
Biosecurity Threat	Neutral	

How does this option work with others?

This option is complemented by school and tertiary education (STE) which promotes the use of school facilities for community access to TAFE education which could include the use by secondary students. Both options promote maximising community access to TAFE education and assets. Shared use agreements (CSS1) will enable sharing of the facilities.

What are the economic, social and environmental impacts of this option?



Commentary:
No net impacts identified.

Risks and opportunities

An implementation risk is that without incentives TAFE asset managers may not choose to participate in the opening up of facilities for shared community use. Shared use agreements may be required to manage the sharing of costs, insurance, maintenance etc.

This option would help manage the risk for government in terms better managing of ageing TAFE infrastructure/assets

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then we have clarified that community education programs such as neighbourhood houses and U3A could be appropriate services for sharing TAFE assets, in response to feedback from the sector.

Background

Contestable market change in 2009 created challenges for TAFE providers previously reliant upon government funding. Market adjustment has resulted in excess TAFE space, closures and deterioration in the condition of these assets.

Next steps

- Undertake and audit of existing TAFE campuses
- Identify facilities that could be shared for wider community use
- Identify partners, such as local councils, schools, community education providers and community organisations who would be interested in sharing facilities
- Broker partnerships
- Develop shared use agreements

Evidence base

AECOM/PwC, *Assessment 2: Economic, social and environmental assessments and option relationship mapping*, 2016

Deloitte/Aurecon, *Assessment 1: Options analysis report*, 2016

Technology enabled health care

TEH

Option type

Better use through technological innovations

Location

Statewide

Sector

Health and human services

ICT

Certainty of evidence

High

Direct option cost

\$100 million–\$250 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 3: Respond to increasing pressures on health infrastructure, particularly due to ageing

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

Need 2: Address infrastructure challenges in areas with low or negative growth; and

Need 12: Improve access to jobs and services for people in regional and rural areas

Significant	Significant	Significant	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

The option is to develop a statewide technology solution that enables ‘telehealth’ or activities like video conferencing and remote monitoring within public health service delivery. The solution would be operated on the secure network proposed under the option digital health embedded across the health system (EEA) and enable technologies to ‘plug-in’ and share information. Additional upfront investment to establish a minimum capability in telehealth is required. This investment would continue existing work to develop infrastructure, standards and protocols for adoption of telehealth by public sector health providers.

What is the level of community support?

There was limited discussion of this option during public consultation.

Ninety two per cent of people surveyed as part of community research supported more delivery of healthcare through technology.

What do we think of this option and why?

This option was recommended in the strategy (ref. 2.2.3, 3.1.2 and 12.1.6) because the option provides improved access to health services for regional and rural communities, with a significant contribution noted under need 12. In the future the option also has the potential to significantly change how health services are delivered based on the greater ability to monitor patients remotely. This option could be considered as ‘base case’, as the government has established a telehealth unit, however this option recommends that government spends more in years 5-10, beyond what is currently committed. This timeframe is recommended to allow further development of remote monitoring applications by the private sector and the delivery of digital health (EEA), which is a critical enabler for this option, to be progressed.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

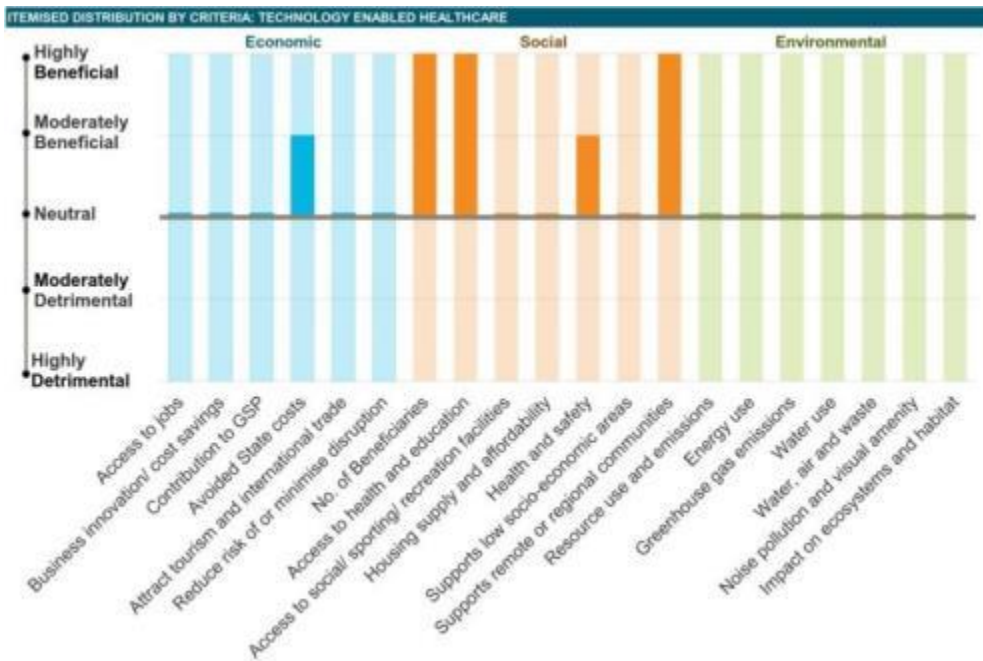
How does this option perform under different scenarios?

Supercity	Neutral	
Westside Story	Neutral	
Regional Cities	+	As services are less in regional areas
Accelerated Climate Change /Mitigation	Neutral	
Prolonged/ Severe Economic Downturn	Neutral	
Biosecurity Threat	++	As enhanced systems will aid addressing the threat

How does this option work with others?

Digital health embedded across the health system (EEA) is a critical enabler to this option.

What are the economic, social and environmental impacts of this option?



Commentary:

This option is expected to have strong benefits for access to health care by using ICT to reduce the need for patients to travel to receive services. Regional and remote communities in particular are expected to benefit. The reduced need to travel is reflected in avoided state costs.

Risks and opportunities

Provision of infrastructure to enable telehealth to support health service delivery is only one component of implementing telehealth systems. There are significant issues around the medico-legal aspects of remote health service delivery, related to who is actually responsible and liable for the treatment recommended for a patient. Whilst these issues are not insurmountable, they need to be resolved for the system to operate. Funding for remote monitoring is another issue that needs to be progressed, as the current funding system under Medicare does not reimburse many scenarios involving remote monitoring

This option may be more suitable for certain kinds of health services than others, and so there is an opportunity to target the implementation of telehealth services.

Additional notes

Next steps

A key enabler for this option is the development of the secure network proposed under digital health embedded across the health system (EEA). Accordingly, setting a timeframe for EEA to be implemented will be a key determinant to planning the broader expansion of telehealth. Ongoing initiatives for videoconferencing should continue to be taken to business case and considered.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Victorian Department of Health and Human Services, *Statewide system design, service and infrastructure plan for Victoria's health system, Stakeholder discussion paper*, 2016

Major hospital redevelopments THR

Option type

Better use through refurbishment of existing assets

Incremental expansion of existing assets

New assets

Location

Statewide

Sector

Health and human services

Certainty of evidence

Medium

Direct option cost

>\$10 billion

Option lead time

5–10 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 3: Respond to increasing pressures on health infrastructure, particularly due to ageing

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option provides for major public sector hospital development projects in the 0-30 year period. In Victoria there are several major public hospital campuses that provide a combination of statewide services for highly unique or complex conditions and specialist services. Typically these facilities are updated on an incremental basis, but at times due to the aged state of the asset or an identified health service gap, these facilities are redeveloped on existing or new hospital sites as a consolidated major development project. Projects in this category would have a capital value in excess of \$500 million (further detail in *What is this option? cont'd*).

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option was recommended in part in the strategy (ref. 3.2.4) because three inner Melbourne hospitals are aged and offer a risk to ongoing safe and reliable health service delivery. Specifically, it was recommended that government respond to the aged condition of the Alfred, Royal Melbourne and Footscray hospitals, with a view to completing a major refurbishment or new facility construction within 10-15 years. While Footscray hospital does not meet the classification of being a 'major hospital', we have treated it as part of the scope of this option because the approach to Footscray is interlinked with the others. Otherwise growth in inner city demand for lower level health services will increase the service load at the major hospitals. Depending on the detailed scope developed and funding constraints, all hospitals may not be fully redeveloped in the 10–15 year timeframe; however, a strategy should be confirmed for all three facilities in this period.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

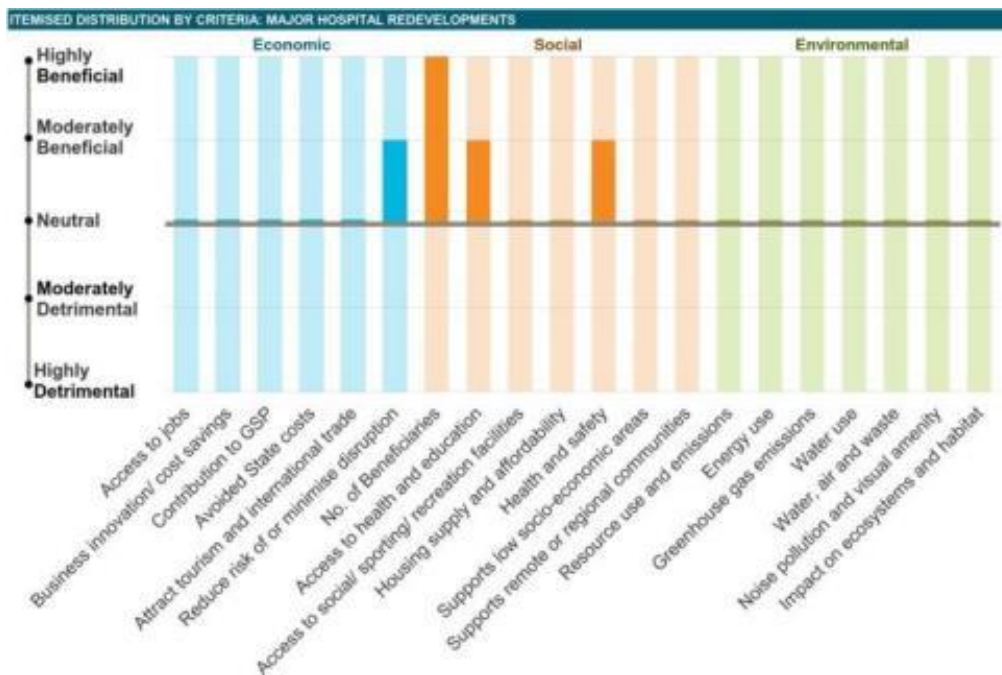
How does this option perform under different scenarios?

Supercity	+	Increased demand
Westside Story	+	Increased demand
Regional Cities	+	Increased demand
Accelerated Climate Change /Mitigation	Neutral	
Prolonged/ Severe Economic Downturn	+	Increased demand
Biosecurity Threat	++	Increased demand

How does this option work with others?

This option is enabled by health infrastructure coordinated planning (HIC) and is complementary to health service modernisation and expansion (HIM).

What are the economic, social and environmental impacts of this option?



Commentary:

By maintaining and repurposing capacity, this option is considered to have benefits for the resilience of the health care system and its ability to meet future demand. Due to the statewide nature of the facilities this option is highly beneficial across a large number of beneficiaries.

What is this option? (cont'd)

Recent examples of major hospital campus upgrades include:

- Bendigo Hospital Redevelopment
- New Royal Children's Hospital project
- Victorian Comprehensive Cancer Centre
- The planned Victorian Heart Hospital

Existing facilities that are in need of major redevelopment or replacement in the medium term include the Alfred Hospital and Royal Melbourne Hospital. In the longer term new facilities will be required to support population growth or a new statewide specialist health service.

The Department of Health and Human Services is undertaking a service and infrastructure plan for Victoria's health system which is due to be published in mid-2017 and will outline the strategic direction for existing and new facility development. Once this is published, next steps will be to

- Determine a strategy for responding to the aged condition of the Alfred, Royal Melbourne Hospital and Footscray hospital to efficiently service the specialist and complex statewide health services, as well as the lower order needs of the inner city, with a view to a major refurbishment or new facility construction in the 10-15 year timeframe.
- Identify other hospitals that will potentially require establishment or major redevelopment in the 20-30-year timeframe and prioritise accordingly.

Risks and opportunities

Renovating or incrementally expanding hospitals presents operational challenges and may be higher risk than greenfield development.

There is an opportunity when planning for new facilities to locate new hospitals near transport links or other complementary infrastructure.

Funding


Should government choose to pursue this program, it will then need to consider funding options. Below is a range of potential funding mechanisms which could be examined to help fund the program.

Potential funding mechanisms

General government revenue	User charges	Beneficiary charges	Property development	Asset sales	Donations and requests
✓			✓	✓	✓

General government revenue will continue to be a major source of funding for programs like major inner city hospital refurbishment or replacement as the benefits from such investment are usually widely distributed across the community.

Property development could also be considered, for example, commercially leasing parts of the premises within or around a new hospital or expansion of a hospital. Opportunities could range from retail (such as cafés and shops) to providing space for private providers. Property development for hospitals can assist in creating added value through improved amenity, access to services and more choice in services. Property development has been used in previous



significant hospital projects, such as the Royal Children's Hospital project where the new hospital provides expanded childcare facilities and includes a range of shops and services for staff, patients, families, carers and visitors.

Additionally, any hospital sites that are no longer fit-for-purpose and surplus to government requirements should be sold which can provide a one-off funding boost. This has the additional benefit of allowing sites to be available for higher and better uses.

Donations and bequests should also continue to be pursued; however, we recognise that they will only ever make a small contribution to a project.

Additional notes

Scope change

In version 1 of the *Draft options book*, this option was titled 'Major inner city hospital refurbishment or replacement' and classified as a concept for further development.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Victorian Department of Health and Human Services, *Statewide system design, service and infrastructure plan for Victoria's health system, Stakeholder discussion paper*, 2016

Tram network extensions TNE

Option type

Incremental expansion of existing assets

Location

Melbourne

Sector

Transport

Certainty of evidence

Medium

Direct option cost

\$1 billion–\$3 billion

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 1: Address infrastructure demands in areas with high population growth; and

Need 11: Improve access to middle and outer metropolitan major employment centres

Moderate	Moderate	Moderate	Moderate
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0-5 yrs 5-10 yrs 10-15 yrs 15-30 yrs

Need 10: Meet growing demand for access to economic activity in central Melbourne

Low	Low	Low	Low
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0-5 yrs 5-10 yrs 10-15 yrs 15-30 yrs

What is this option?

Extend tram lines and complete network links with other major transport and destination hubs.

Extending the tram network contributes to amenity and the attractiveness for businesses and people to relocate to new areas and supports higher land use densities. Tram extensions to train stations promote multi-modal travel and mode shift. This increases people's ability to access employment, services and activities in their local areas.

This option supports enhanced access to the central city and middle and outer metropolitan major employment centres.

What is the level of community support?

There was limited discussion of this option during public consultation. This may be as it was not recommended in the draft strategy. The Doncaster tram service option (DTS), which is now included as part of this option, was recommended by the metropolitan citizen jury.

What do we think of this option and why?

This option was not recommended in the strategy because of the high capital cost of building tram extensions compared to buses, which also have greater flexibility in deployment. While we believe that a program of tram extensions is not warranted, individual tram extensions might be considered on a case-by-case basis, as there may be instances where the implementation of a tram extension may offer the best value solution. For example, tram extensions to a high-activity generator (such as a major shopping centre or university), or which improve network connectivity in a way that is likely to generate significant mode shift to public transport, may have particular value.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

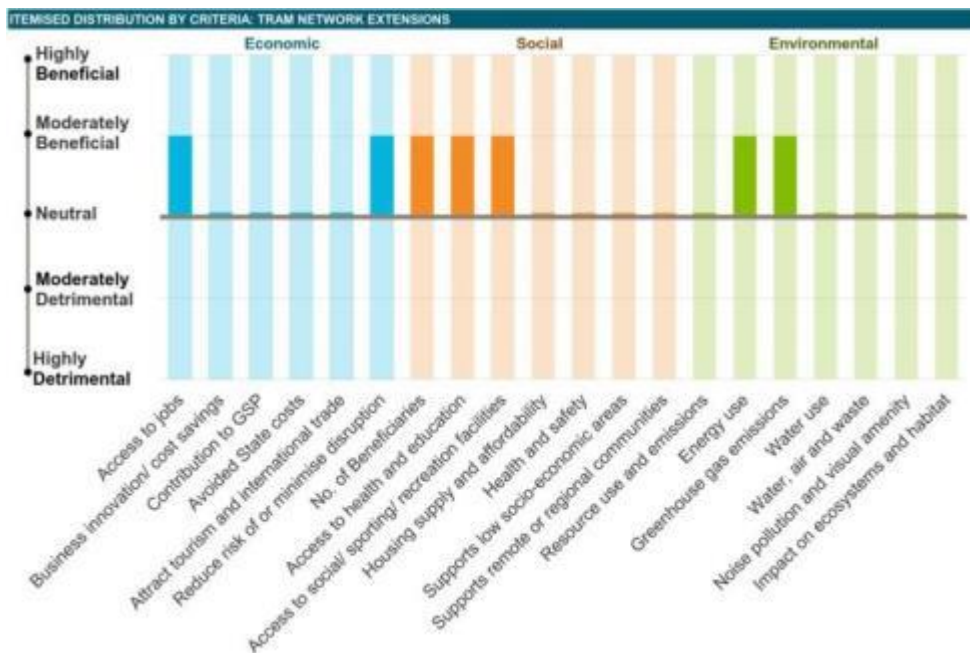
How does this option perform under different scenarios?

Supercity	+	Supports mode shift to address congestion
Westside Story	+	Supports mode shift to address congestion
Regional Cities	+	Supports mode shift to address congestion
Accelerated Climate Change /Mitigation	+	Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	-	Enables more affordable transport options
Biosecurity Threat	Neutral	

How does this option work with others?

This option is dependent upon High capacity trams (HCT4) to run the additional services on the extended routes. Road space allocation changes (RSA) will complement TNE allowing more efficient tram operations and improving average travel speeds.

What are the economic, social and environmental impacts of this option?



Risks and opportunities

Much of the construction of this option will occur in existing road corridors, however, the risk of major disruption is assumed to be managed during the planning phase.

There is an opportunity to upgrade multi-modal interchanges with other forms of transport with the construction of tram extensions.

Additional notes

What is this option?

Priorities for implementation include:

- Connections with heavy rail and other public transport, e.g. the extension of route 5 Malvern to Darling railway station.
- Connections to major activity centres, e.g. the extension of Route 48 North Balwyn to Doncaster shopping centre.
- High-demand connecting bus corridors, e.g. the extension of Route 75 Vermont South to Knox shopping centre.
- Missing tram network links and connections, e.g. the extension of Route 82 Footscray to Docklands.

Another example of strategic network extension is represented by the potential for an inner-orbital tram route from Nicholson Street, along Brunswick Road and southbound on Royal Parade to the planned Parkville Station from Melbourne Metro 1, which would help relieve the congested tram routes 1 and 8 (Lygon Street) as well as offer the opportunity for improved connections into Melbourne CBD.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Real time public transport information

TNI

Option type

Changing behaviour through information

Better use through information

Location

Statewide

Sector

Transport

Certainty of evidence

Low

Direct option cost

\$10 million–\$25 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 10: Meet growing demand for access to economic activity in central Melbourne

Low	Low	Low	Low
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0-5 yrs 5-10 yrs 10-15 yrs 15-30 yrs

What is this option?

Develop an ICT platform that can coordinate real time data from all public transport operators to allow private software developers to create applications that will support commuters to make real time and plan multi-modal decisions about their journey. This data could be made publicly available through Victoria's Open Data Directory based on the Transport for London example.

Real time information has the potential to reduce and spread peak period demand and assist passengers to better deal with disruptions on the network. This will improve the comfort of services to passengers, reduce barriers to accessing public transport and increase the utilisation of existing transport infrastructure.

What is the level of community support?

There was limited to no discussion of this option during public consultation. This option was recommended by the regional citizen jury.

What do we think of this option and why?

This option was recommended in the strategy (ref. 10.4.1) because it can both improve the operation and public experience of public transport at relatively low cost.

While this option has been described as involving the roll out of ICT infrastructure, the central aspect which will support its success is ensuring the public release of data in a form which can be used by app developers. However, there are likely to be a range of infrastructure changes (e.g. sensors, GPS systems) which could support a level of service similar to TramTracker across all modes, and also support multi-modal trip-making.

Public Transport Victoria is in the process of releasing open source tracking data for all its modes – tram, bus and train. Over time, greater information could also be made available regarding congestion and crowding on the network, real-time travel alternatives when there are service disruptions, and other factors which may influence more efficient travel decisions.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

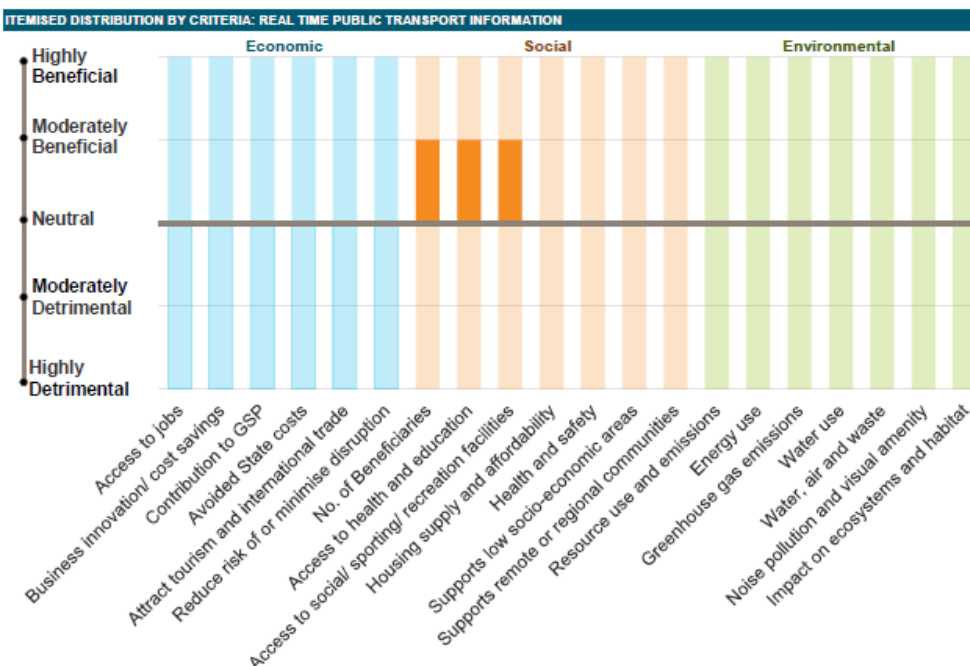
How does this option work with others?

This option will be dependent upon the use of real time data generated from the central regional rail control centre (CRR2), key movement corridor incident management (CRR1) and Integrated transport control centre (ITC). It is also a complement to multi-modal interchange improvements (MII) in encouraging people to have confidence in taking multi-modal journeys.

How does this option perform under different scenarios?

Supercity	+	Supports mode shift to address congestion
Westside Story	+	Supports mode shift to address congestion
Regional Cities	+	Supports mode shift to address congestion
Accelerated Climate Change /Mitigation	+	Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	-	Less demand for travel
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



Commentary:

Travellers are projected to use better information to choose their route and mode of travel, potentially resulting in less peak demand, mode shift, and reduced disruption on the network. This option will allow businesses and commuters to make better use of existing transport networks, and improve access to a range of services and community activities.

Risks and opportunities

There is a risk that the new network may struggle to successfully integrate and coordinate data from different transport modes and operators. This could lead to project delays and cost overruns.

In addition to passengers receiving service updates from a central source, there may be an opportunity to develop the new system to enable passengers to contribute to the updates and reporting of delays to services and tracking satisfaction levels. This could provide immediate information to help people plan their journeys and engender a degree of responsibility and ownership of their transport network.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then we have changed the scope of this recommendation to focus on other types of data relating to passenger loads and other factors relating to service quality. This is in response to Public Transport Victoria's announcement that it will release all data in open source format to enable utilisation by third party app developers, and therefore much of the initial scope of the recommendation is base case.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Tram network link extensions TNL

Option TNL is addressed in TNE – Tram network extensions

Transport network price regime

TNP

Option type

Changing behaviour through economic charging

Location

Statewide

Sector

Transport

Certainty of evidence

Medium

Direct option cost

\$1 million–\$10 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 10: Meet growing demand for access to economic activity in central Melbourne; and

Need 13: Improve the efficiency of freight supply chains

Moderate	Moderate	Significant	Significant
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0-5 yrs 5-10 yrs 10-15 yrs 15-30 yrs

Need 11: Improve access to middle and outer metropolitan major employment centres

Moderate	Moderate	Moderate	Moderate
----------	----------	----------	----------

0-5 yrs 5-10 yrs 10-15 yrs 15-30 yrs

What is this option?

Overall pricing review to manage demand for travel at peak/non-peak times across the entire transport network to achieve a number of objectives:

- Most efficient use of assets
- Spread the peak/traffic volume
- Encourage public transport use (including optimising most affordable public transport: buses)
- Capture true cost of transport types, particularly private vehicle use
- Encourage less car use to the central city and major employment centres
- Incentivise heavy vehicle use of roads during determined times
- Reduce travel time and improve travel time reliability for private vehicles and freight.

Pricing options could include fixed tolls on particular roads, satellite-enabled tolling, and variable tolls based on demand (e.g. dynamic-pricing).

What is the level of community support?

There was a high level of discussion of this option during consultation. Responses were generally positive. Both citizen juries made recommendations in support of this option.

What do we think of this option and why?

This option was recommended in the strategy (ref. 10.2.2, 11.2.2 and 13.1.2) for implementation within 5–15 years because our assessment is that it will likely play a key role in effectively managing demand and optimising network performance, and thereby addressing congestion. Expanding the role of transport network pricing can contribute significantly to improved access to economic activity in the central city, depending on the model adopted, with moderate to significant contributions to improved access to middle and outer suburban employment areas and freight efficiency over time (further detail in *What do we think of this option and why? cont'd*).

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

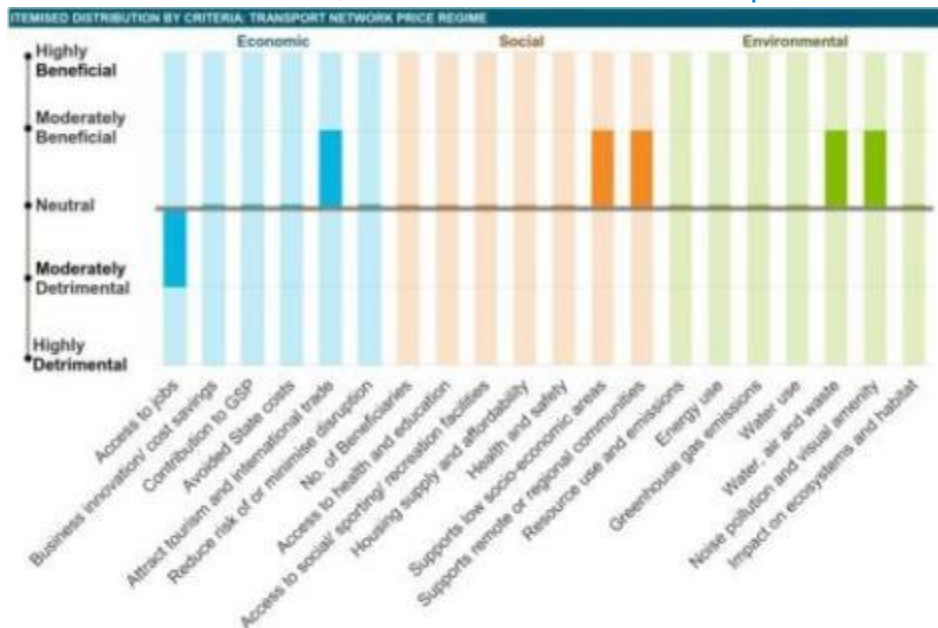
How does this option work with others?

This option has a relationship with almost every transport-related option. It may reduce the need for options that expand road network capacity, particularly around central Melbourne and major employment centres. The relationship to each option would depend upon the pricing regime and locational attributes. It is likely to increase demand for public and active transport. And we anticipate it will be essential for optimising the use of new transport technologies, such as driverless vehicles.

How does this option perform under different scenarios?

Supercity	++	Reduces congestion, improves access
Westside Story	++	Reduces congestion, improves access
Regional Cities	++	Reduces congestion, improves access
Accelerated Climate Change /Mitigation	++	Smoother traffic flows, contains demand
Prolonged/ Severe Economic Downturn	-	Could increase inequity of access
Biosecurity Threat	Neutral	
Bay West	+	Reduces congestion, improves reliability
Hastings	+	Reduces congestion, improves reliability

What are the economic, social and environmental impacts of this option?



What do we think of this option and why? (cont'd)

It can also contribute to improved environmental outcomes by encouraging people to shift from cars to higher capacity forms of travel. It could avoid or defer the need for further large-scale road capacity investments as Melbourne grows, but would need to be paired with public transport improvements. The potential for equity impacts will, however, need to be managed.

Risks and opportunities

There is an opportunity to drive cultural changes for start and finish times for work and school, which could support greater flexibility in workplaces and more optimised use of services like schools.

These are the risks listed in our research paper:

- Price sensitivity – prices required to reduce congestion so high they have other negative consequences.
- Land use impacts – it is not clear whether TNP will promote or discourage better land use.
- Unintended consequences for example, in London exemptions for ride share is argued to have led to congestion associated with a greater number of rideshare trips e.g Uber.

Funding

Transport Network Pricing is a major pricing reform that helps to change transport user behaviour. It could also generate revenue which could help fund some transport infrastructure.

Like other user charges, government would need to consider a number of issues in designing a transport network pricing regime. This includes how the pricing regime, across all modes (including roads and public transport), balances competing objectives such as changing behaviour, managing demand and cost recovery. User charges can be designed in a way to make pricing fairer and adjustments can be made for those who may be unfairly disadvantaged.

A transport network pricing regime would need to be designed carefully so that people choose the best mode for the right trip, for instance, walking for a short trip instead of boarding an overcrowded tram.

Infrastructure Victoria is examining transport network pricing as part of our research program. We are focussing on road pricing in metropolitan Melbourne as a first step towards a comprehensive transport network pricing regime. Our first paper is available on our website. It outlines the problems with the current approach to transport pricing and the benefits and limitations of introducing a new road pricing regime. We think the objective of this regime should be to manage demand rather than to recover costs.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then the timing of this recommendation been changed from 5-10 years to 5-15 years to ensure that transport improvements are in place ahead of the introduction of pricing and so that implementation of the reform can be staged, depending on the design of the scheme and access to enabling technologies. The funding advice associated with this recommendation has also been updated to focus on managing demand rather than recovering costs.

Background

The current pricing structure for usage of the network does not provide incentives for efficiently using the network. Road charges are not linked to how, when or where people use the roads or the costs of providing and operating transport infrastructure.

In Victoria, Transurban has undertaken a trial of road pricing. This included an examination of the impact various pricing options had on driver behaviour. The results are positive with respect to driver acceptance and behaviour.

User charges can have two objectives. They can help recover the cost of infrastructure and provide incentives for users to use infrastructure more efficiently by managing or shifting demand. The objective chosen will affect how user charges are designed and set.

The current set of charges for using the road have been imposed for a variety of reasons without common objectives in mind. These include:

- Registration and insurance costs for private vehicle users, which are not dependent on the use of the road network. This means private vehicle users do not equitably pay for their level of asset use. This also results in inefficient use of roads. Motorists are encouraged to use the network as much as possible – including people who could have substituted a car journey with a public transport trip – resulting in higher levels of congestion, slower travel times and more pollution. It also means that those who seldom drive their cars are subsidising high-frequency users.
- Fuel excise is a partial proxy for a distance-based user charge for driving. However, the revenue from the tax flows to the commonwealth and has no link to road funding. In addition, the increased use of more fuel-efficient vehicles and expected future adoption of electric vehicles will erode the link between fuel consumed and distance travelled and the usefulness of fuel excise as a proxy user charge.
- The parking levy is a price signal on driving into the central city. There is mixed evidence on its effectiveness. Even if it does reduce travel to inner Melbourne, it does not deter through traffic.
- While there are some tolled roads across Melbourne, these tolls were set to cover costs, rather than changing demand across the network.

Fares in the public transport network are heavily subsidised and do not reflect the true cost of using these services. However, the negative externalities for public transport use are less than for private vehicles. Public transport fares are the same for all modes (buses, trams and heavy rail) with only limited recognition of peak or off-peak use or distance travelled (especially in the metropolitan area). There have been experiments to vary fares based on the time of day.

One of the largest ongoing costs for transport is road maintenance and the biggest contributor to pavement damage is heavy vehicles. Though there are existing heavy vehicle charges for road usage, these charges are by class, by kilometre rather than related to specific roads. There is a national reform process underway which focuses on heavy vehicles. Infrastructure Victoria supports this process

There is now extensive experience with road pricing in London, Milan, Singapore, Stockholm and other places. Their experiences emphasise the usefulness of trials and the importance of making complementary investments in public transport ahead of introducing road pricing. All have found substantial reductions in traffic volume and congestion as well as other positive outcomes. There is also an interesting trial of distance-based pricing in Oregon which demonstrated how concerns about privacy can be addressed. A more detailed analysis of all of these international experiences is in our paper, *The Road Ahead* available on our website infrastructurevictoria.com.au.

Transport Modelling

Infrastructure Victoria commissioned KPMG, Jacobs and Arup to undertake transport modelling for a number of options being considered for the strategy, including a variety of 'build' and 'non-build' transport options. This allowed major transport projects to be quantitatively assessed alongside several technology, policy and reform options such as this one. In addition, economic analysis was undertaken for the 'build' options to estimate a cost benefit ratio. The options were modelled individually, mostly on a standalone basis, with a number of options then also tested in various combinations.

This analysis was undertaken on a different basis and produced different results to what is presented the options book, which was prepared by AECOM/PWC with the intention of allowing a mixture of qualitative and quantitative assessment

across the full range of options, across all sectors and needs. While on the face of it these two analyses reference similar metrics, different assumptions and methodologies have been applied. In particular, the KPMG/Jacobs/Arup assessment provided purely relative ratings of each option's contribution to the needs, with the ratings scale set by the performance of only the select range of options modelled. This had the result of showing some transport options as making a “high” contribution to Need 18 (transition to lower carbon energy supply and use) simply because they were the highest of the options modelled; however, in Infrastructure Victoria’s judgement most transport sector options will make a much lower contribution than energy sector options, as transport comprises a much smaller proportion of total carbon emissions. It provides a useful assessment for sorting the relative contribution of the options modelled, but should not be taken as an absolute assessment. In contrast, the assessments developed in the AECOM/PwC assessment considered the full range of options identified for each need and provided more of an 'absolute' assessment.

With these caveats in mind, however, the results of this alternative analysis are helpful inputs into Infrastructure Victoria’s ‘global’ assessment, and in preparing the strategy we have come to a considered view based on the totality of evidence available to us.

In terms of the KPMG/Jacobs/Arup analysis of this option, a number of different methods for road network pricing were modelled, including (1) a double cordon, one around the CBD and one around the inner ring of suburbs, and (2) a combination of a single cordon around the CBD and distance-based charging.

The modelling found that a double cordon-pricing scheme would lead to a decrease in the number of vehicle trips into the CBD, with the inner region experiencing a significant decrease in congested travel. As such, it has the capacity to emulate the ‘school holiday effect’ – relative to the non-school report is estimated to lower the road traffic across the metropolitan road network by between 4.9 per cent and 7.4 per cent during the morning peak.

The second method – the combined cordon and distance-based charge – was found to have broader impacts across the transport network and would further reduce the attractiveness of car trips. Vehicle kilometres travelled decreased more in outer regions of Melbourne under this pricing scheme. Because the spatial changes to demand occur further from the CBD when distance-based pricing is applied, it caused an increase in bus patronage relative to the double cordon pricing scheme. This is because the bus network extends across metropolitan Melbourne, providing an alternative to car travel across the wider regions that would be impacted by a distance-based charge.

Both pricing schemes provide notable improvements to carbon emissions and freight efficiency. However, lower congestion was also found to result in improved accessibility only when there were also improvements to public transport. Road pricing implemented in conjunction with investment in public transport resulted in significant shift to public transport and a drop in vehicle kilometres travelled, alleviating congestion. Combining additional public transport infrastructure with road pricing leads to network-wide improvements in access to employment and education.

For more detail, consult the ‘*Economic appraisal and demand modelling*’ report to Infrastructure Victoria.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria’s draft 30-year infrastructure strategy*, 2016

KPMG/Arup/Jacobs, *Economic appraisal and demand modelling*, 2016

Infrastructure Victoria, *The Road Ahead*, 2016

Transurban, *Changed conditions ahead*, 2016

Train platform utilisation TPU

*Option TPU is addressed in MRC – Metropolitan rail
capacity upgrades*

Torquay rail extension TRE

Option type

New assets

Location

Geelong regional city

Barwon region

Sector

Transport

Certainty of evidence

Low

Direct option cost

\$250 million–\$500 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 10: Meet growing demand for access to economic activity in central Melbourne; and

Need 12: Improve access to jobs and services for people in regional and rural areas



What is this option?

Extend the regional passenger rail network to Torquay. The new rail line would extend to Torquay as a spur line off the Geelong-Warrnambool rail line between the existing Marshall and Waurn Ponds Stations. This extension will connect the growth areas around Armstrong Creek and Torquay with the regional city of Geelong and the central city in Melbourne. By constructing this rail extension it will be possible to reduce reliance on private vehicles in these new growth areas and enable more efficient access to jobs and services in Geelong and Melbourne.

What is the level of community support?

There was a moderate level of discussion of the recommendation Torquay transport links, which includes this option. Responses were generally positive.

What do we think of this option and why?

This option was recommended for further investigation in the strategy (ref. 12.3.2). Specifically, it is recommended that planning and investigation work is completed within 0-5 years to reserve a public transport corridor between Torquay and Geelong because of the need to prepare for a future high capacity link for this growth area. In addition, there is a risk that this growth corridor could be cut off from having a high capacity transport link that it may require in the future without reservations being put in place now. Our recommendation focuses on completing work to reserve the corridor with a view to the construction of a bus or rail link within 15-30-years. This reservation will support protection for all options and will be activated for use as a busway or railway as demand warrants. In the short-term, public transport in the corridor can be provided through option Regional bus upgrades (RBU) to support trips from Armstrong Creek and Torquay to Geelong and Melbourne. As noted in the assessment, the contribution is expected to increase over time with higher growth in the longer term planned for this corridor.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

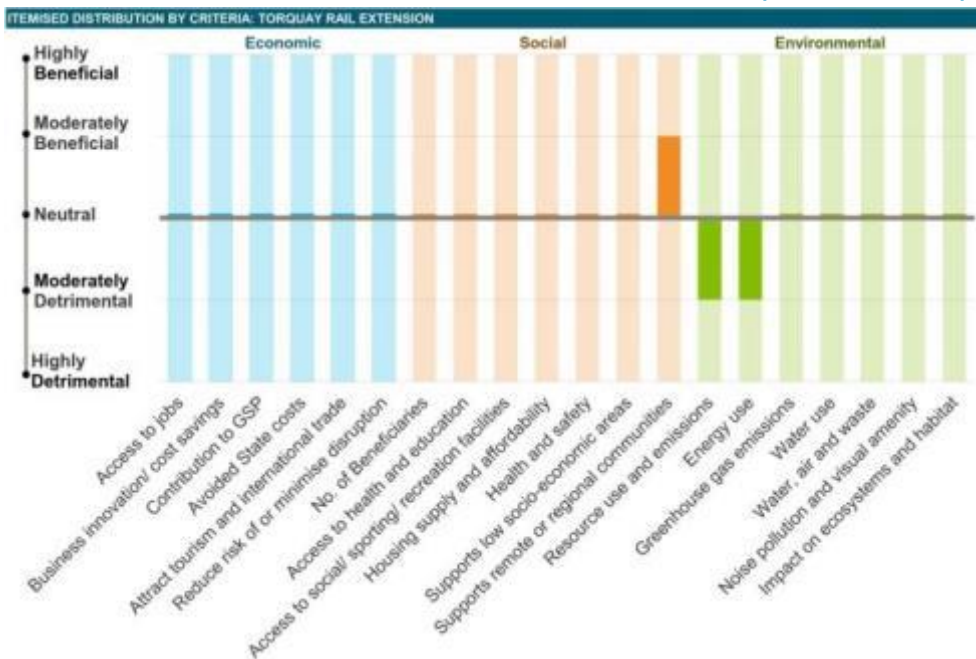
How does this option perform under different scenarios?

Supercity	+	Supports mode shift to address congestion
Westside Story	+	Supports mode shift to address congestion
Regional Cities	+	Supports mode shift to address congestion
Accelerated Climate Change /Mitigation	+	Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	-	Less demand for travel
Biosecurity Threat	Neutral	

How does this option work with others?

This option is dependent upon on option Regional rolling stock expansion (RRS) and Regional train link upgrades (RTL) to operate the new services.

What are the economic, social and environmental impacts of this option?



Risks and opportunities

The staged approach may reduce the efficacy of this option, as people may not use the transport connection if it is not as high quality as a heavy rail service.

This creates the opportunity to further develop the transport corridor between Geelong and Torquay through Armstrong Creek with greater densities.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended for corridor protection in the draft strategy. Since then we have increased the strength of the recommendation by applying the correct use of planning terminology to 'reserve' the corridor.

Next steps

Further consultation with the Armstrong Creek and Torquay communities is required to help inform the scale and nature of the development of this transport corridor. This would include feedback on the relative costs and benefits of each mode and implementation timelines.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Supportive housing responses TSA

Option type

Incremental expansion of existing assets

New assets

Location

Statewide

Sector

Health and human services

Certainty of evidence

Medium

Direct option cost

\$100 million–\$250 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 7: Provide better access to housing for the most vulnerable Victorians

Significant	Significant	Significant	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option considers the provision of supportive housing responses for vulnerable households who require additional support to establish and maintain a tenancy. The accommodation proposed in this option relates to short-term accommodation with integrated support services. The accommodation is not aimed to be permanent and usually is only provided for clients for 12–18 months, during which time households actively work with their support provider to access long-term housing once stabilised (further detail in *What is this option? cont'd*).

What is the level of community support?

There was a moderate level of discussion of the recommendation Crisis and transition accommodation, which included this option. Responses were mixed with concerns raised with some forms of the transitional accommodation proposed and that provision of longer-term housing solutions were a higher priority.

What do we think of this option and why?

This option was recommended in part in the strategy (ref. 7.4.2) because an immediate increase in the supply of short-term housing responses is required for highly vulnerable Victorians, particularly households escaping family violence, people exiting prison and young people. This option proposes the provision of supportive housing for 600 people, however, a specific quantum was not recommended in the strategy, as further analysis is required. Determining the quantum requires detailed investigation and planning, as outlined in the affordable housing infrastructure plan option (SCP). Based on the best information we are able to obtain, we believe the provision of short term accommodation to support approximately 350 to 750 people, provided as crisis accommodation (CHP) or supportive housing, could be an appropriate infrastructure response. A supportive housing response is recommended for households that require assistance to transition to longer-term housing. Supportive housing responses are not an appropriate long-term housing response and the effectiveness of the option will be dependent on the availability of longer-term affordable housing supply.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

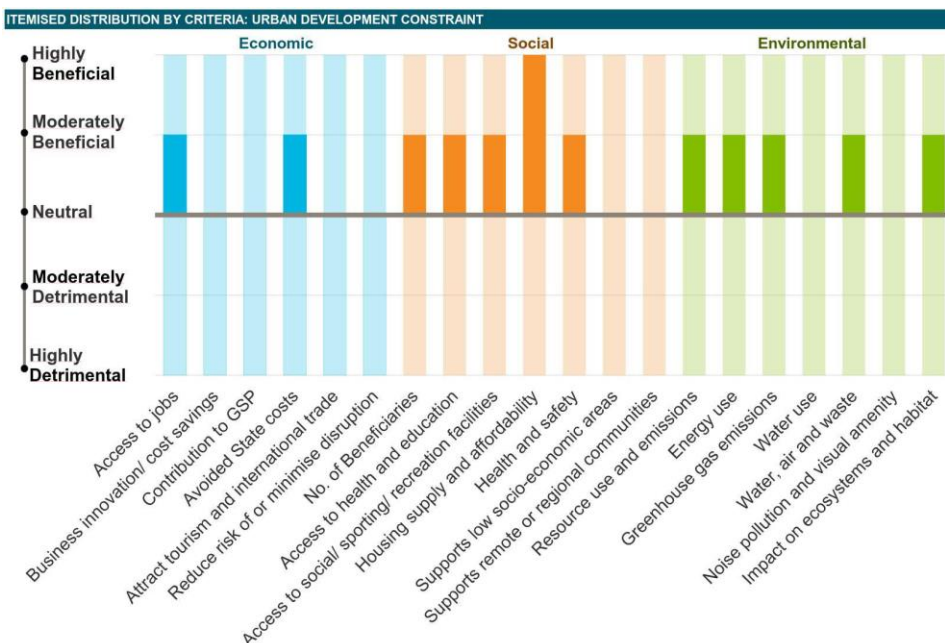
How does this option work with others?

The benefit of this option will only be fully realised if it is provided as part of a pathway of complementary housing solutions, rather than an isolated solution. Developing the Affordable housing infrastructure plan (SCP) will be critical to determine the quantum, type and location of housing solutions required. The housing solution options that are complementary include ARH, CHP, HRA, RTR and SHE.

How does this option perform under different scenarios?

Supercity	+	Reflecting population growth
Westside Story	+	Reflecting population growth
Regional Cities	+	Reflecting population growth
Accelerated Climate Change /Mitigation	++	Increased migration of climate refugees requiring housing
Prolonged/ Severe Economic Downturn	++	Increased number of households suffering housing stress
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



Commentary:

This option is expected to result in avoided state costs, by limiting adverse outcomes from homelessness such as increased hospital visitation or increased interaction with welfare services. The option is also considered to improve the resilience of social services to address severe housing stress.

What is this option? (cont'd)

There is no comprehensive source of evidence on the number of people requiring supportive housing solutions. We have therefore provided evidence coming from several data sources that often don't reflect the full need when considered in isolation.

Key statistics include:

- In 2014-15 the total number of clients presenting to specialised homelessness agencies was 102,793 clients, 37 per cent of who were homeless at the point of contact and 48,456 who had experienced homelessness at some time in 2014-15. Six per cent of all clients had repeat periods of homelessness and nearly one third did not have their accommodation need met.
- The Victorian daily average unmet need for accommodation was estimated at 115 persons.
- 247 people counted as sleeping on the street in Melbourne CBD, June 2016.
- 22,773 persons were estimated to be homeless in Victoria in 2011, 1,091 of whom were 'living rough' (living in improvised dwellings, sleeping out or in tents).

Supportive housing requires an additional subsidy to cover the support services component, in addition to the accommodation cost. This subsidy is seen as beneficial in achieving the longer-term benefit of households being able to successfully transition into other housing outcomes when stabilised.

This option will provide a tailored housing response that is required for particularly vulnerable household groups such as vulnerable young people, particularly those exiting care, who are at risk of homelessness or repeat homelessness and require additional support to maintain a tenancy. Between half and one third of young people exiting state care (estimated 400 persons per annum) will experience homelessness in the first two years after leaving care.

If all persons living rough were provided with crisis or supportive housing, accommodation would be required for an estimated 1,100 people. This option has been assessed assuming the provision of supportive accommodation for 600 people, configured in the following facilities:

- Two supported accommodation facilities for households exiting homelessness and with complex needs (70 units per facility, predominantly studios).
- Managed accommodation providing accommodation for 160 people in approximately 20 facilities. Examples of existing facilities include Melbourne City Mission Frontyard accommodation refuge, and the Jesuit Social Services' Next Steps (Dillon House) and Perry House models.
- Eight 'youth foyer' facilities to accommodate up to 40 young people in each facility, who are actively studying with a priority given to persons exiting state care.

Risks and opportunities

Without development of appropriate 'exit points' from transitional accommodation this option could be ineffective at contributing to the overall need of providing better access to housing for the most vulnerable Victorians. This option presents opportunities to explore a range of different transitional housing models across the state, including youth facilities, women only facilities, scattered-site models or other kinds of targeted facilities.

Additional notes

Changes to recommendations and option name from the draft strategy

This option was recommended in the draft strategy. Since then the scale of this recommendation has been reduced in response to the government's recently announced investment in crisis accommodation (commitments made up until the end of November 2016). The title of the option and the recommendation has also been changed in response to feedback from the housing sector about the appropriate terminology.

Community research

Ninety three per cent of people surveyed as part of community research supported the provision of more crisis and transition housing.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Affordable development outcomes, *Improving access to affordable housing*, 2016

Train station carparking improvement TSC

Option type

Incremental expansion of existing assets

Location

Statewide

Sector

Transport

Certainty of evidence

High

Direct option cost

\$100 million–\$250 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 1: Address infrastructure demands in areas with high population growth; and

Need 10: Meet growing demand for access to economic activity in central Melbourne; and

Need 11: Improve access to middle and outer metropolitan major employment centres

Low	Low	Low	Low
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0-5 yrs 5-10 yrs 10-15 yrs 15-30 yrs

Very Low	Very Low	Very Low	Very Low
----------	----------	----------	----------

0-5 yrs 5-10 yrs 10-15 yrs 15-30 yrs

What is this option?

Construction of new or expanded rail station car parks to increase capacity of park-and-ride facilities across the regional and metropolitan networks. Recently completed car park expansion projects include Syndal, South Morang and Donnybrook Stations. The benefits include potential reductions to local road congestion and improved access to the central city for employment and services

What is the level of community support?

There was a high level of discussion of this option during consultation. Responses were generally positive.

What do we think of this option and why?

This option was not recommended in the strategy because it was considered that a standalone program of train station car parking improvements was not required independent of existing upgrade programs and the parking increases that will accompany specific rail projects recommended in the strategy.

Car parking improvements make a low contribution to meeting needs 1 and 10 and a net negligible contribution to economic, social and environmental indicators. We consider that the existing upgrade program of \$20 million in the 2016-2017 State Budget to be delivered by VicTrack and other programs will meet the bulk of car parking requirements. In metropolitan areas, upgrades to local bus services through growth area bus service expansion (LBS) and active travel improvements such as bicycle and walking path expansion and improvement (BWP2) may provide better network and health outcomes than expansion of car parking. Furthermore, developments in driverless vehicles could reduce the need for large parking areas in the longer term.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

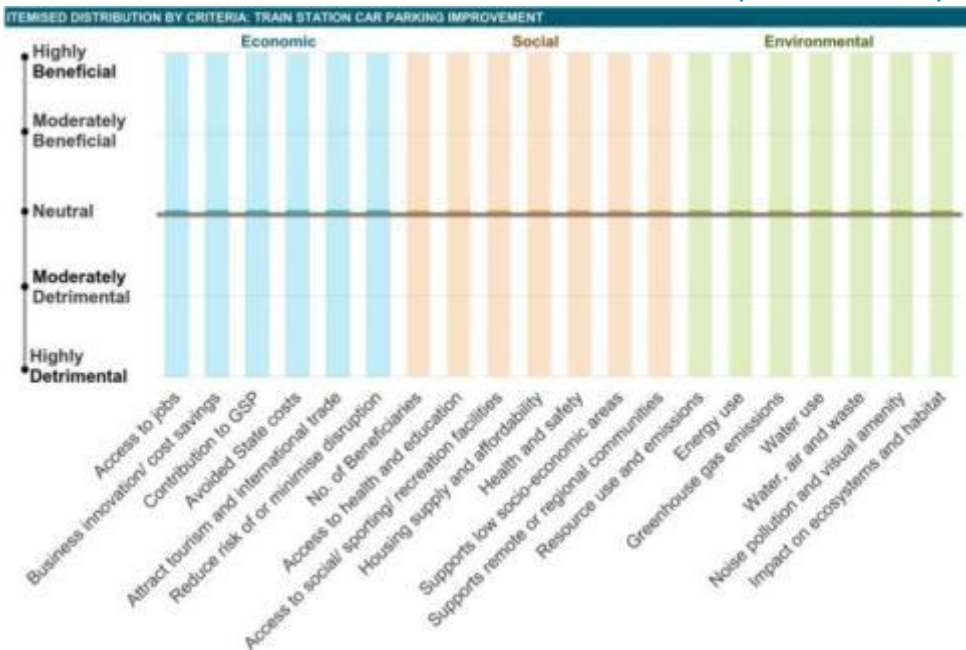
How does this option work with others?

For applicable train stations, TSC is a strong complement to growth area train station upgrade and provision (GAT).

How does this option perform under different scenarios?

Supercity	++	Supports mode shift to address congestion
Westside Story	+	Supports mode shift to address congestion
Regional Cities	+	Supports mode shift to address congestion
Accelerated Climate Change /Mitigation	+	Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	-	Less demand for mass transit
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



Commentary:

This option is expected to improve access to public transport and in doing so, encourage mode shift. This option is anticipated to have benefits for access to jobs, and social infrastructure. However, based on the investment proposed, these benefits are not expected to be appreciable. Similarly, through encouraging mode shift, this option is likely to have positive but not net impacts on emissions and resource use.



Risks and opportunities

There is a risk that providing additional parking at train stations will encourage people who live close to the station to drive rather than walk or ride. This could lead to reduced health benefits from active transport and the additional capacity not being available to those that live far from the station.

There is an opportunity with the construction and upgrade of station car parking to deliver general station amenity upgrades such as additional lighting, landscaping and repainting. In addition to providing better access to all transport users, the amenity works could encourage greater use of public transport.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Public Transport Victoria, *Regional railway station car park audit DRAFT*, 2014

Public Transport Victoria, *Metropolitan railway station car park audit DRAFT*, 2014

'Travelsmart' programs TSP

Option type

Better use through changing behaviour

Location

Statewide

Sector

Transport

Certainty of evidence

Medium

Direct option cost

\$1 million–\$10 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 10: Meet growing demand for access to economic activity in central Melbourne; and

Need 12: Improve access to jobs and services for people in regional and rural areas

Very Low	Very Low	Very Low	Very Low
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0-5 yrs 5-10 yrs 10-15 yrs 15-30 yrs

Need 11: Improve access to middle and outer metropolitan major employment centres

Low	Low	Low	Low
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0-5 yrs 5-10 yrs 10-15 yrs 15-30 yrs

What is this option?

Government to develop 'TravelSmart' programs to encourage alternative travel options that can enable better use of transport assets. Alternative travel options include walking, cycling and carpooling.

What is the level of community support?

There was limited discussion of this option during public consultation. This may be as it was not recommended in the draft strategy.

What do we think of this option and why?

This option was not recommended in the strategy because while TravelSmart programs around Australia have had a useful role to play in reducing the use of passenger vehicles, evidence indicates that the results overall have been mixed.

The reintroduction of or use of programs similar to TravelSmart could still have some role to play in helping to address growing demand for access to central Melbourne (e.g. through promoting mode shift to active transport, or increased carpooling). It is likely, though, that initiatives such as improving the availability of real time data (particularly for use by third parties in mobile apps) would be more effective in driving behaviour change and provide better value. It should also be noted that in the absence of additional investment in transport networks and supporting infrastructure, the potential for city-wide gains from TravelSmart-type programs may be limited.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

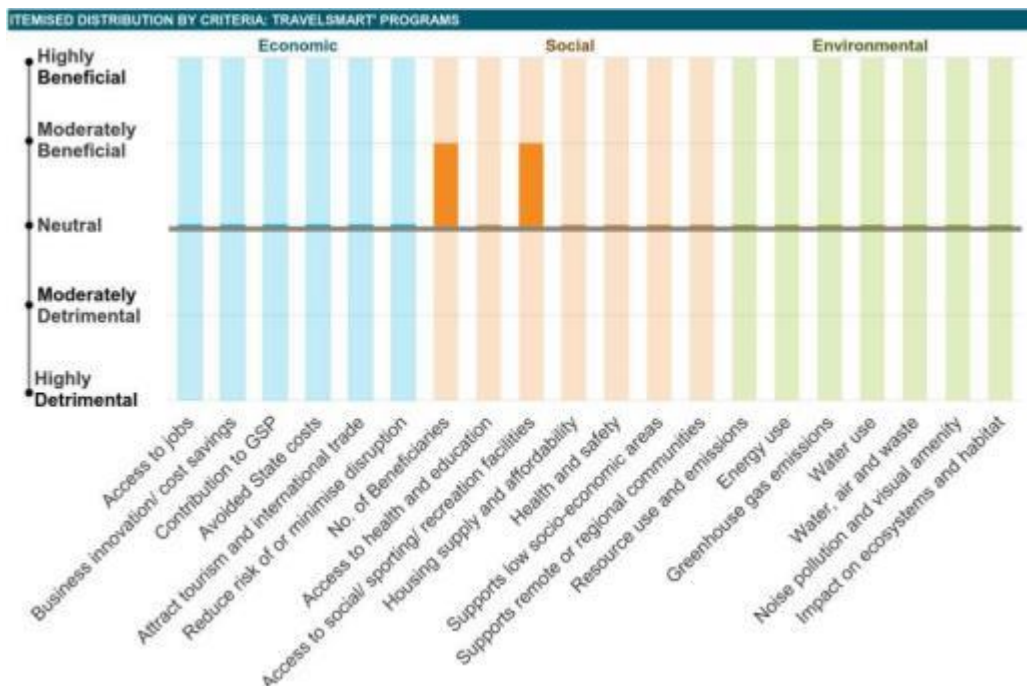
How does this option perform under different scenarios?

Supercity	+	Helps to manage congestion
Westside Story	+	Helps to manage congestion
Regional Cities	+	Helps to manage congestion
Accelerated Climate Change /Mitigation	+	Could lower energy use per passenger kilometre
Prolonged/ Severe Economic Downturn	+	More affordable transport options
Biosecurity Threat	Neutral	

How does this option work with others?

No significant relationships have been identified for this option other than the fact that the transport network pricing (TNP) would probably render this option unnecessary.

What are the economic, social and environmental impacts of this option?



Risks and opportunities

Increased flexibility in the workforce (for example flexi-time and all roles flex programs) could reduce incentives to car pool.

Factors external to the option, such as petrol prices, may increase the attractiveness of TravelSmart programs and could be targeted in marketing to support the programs.

This option could be combined with other options that improve the size or quality of active transport networks to improve their effectiveness.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Tram and train fleet modifications TTF

Option TTF is addressed in MRC – Metropolitan rail capacity upgrades

Tidal and wave energy

TWE

Option type

New asset

Location

Statewide

Sector

Energy

Certainty of evidence

Low

Direct option cost

\$50 million–\$100 million

Option lead time

5–10 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 18: Transition to low carbon energy supply and use

Low	Low	Low	Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

To generate an energy supply from ocean resources (tides and waves). This option involves converting the energy in tidal movements and ocean waves or swells into electricity. Tidal energy and wave energy are fundamentally different technical solutions. Wave energy is still fairly novel whereas there are large scale tidal projects that are being considered around the world, albeit at high cost. These include tidal barrages and sea bed tidal projects.

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option was not recommended in the strategy because ocean technology is still in the research and development phase and there is no clear role for the state. The Australian Renewable Energy Agency (ARENA) notes that ocean energy (wave, tidal and ocean thermal energy) technologies are at an early stage of development in Australia with deployments limited to small pilot scale projects. With more research, testing and innovation the feasibility of this technology may change in the short to medium term. The market is best placed to respond to cost effective opportunities to increase uptake of ocean energy in the medium to long term.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

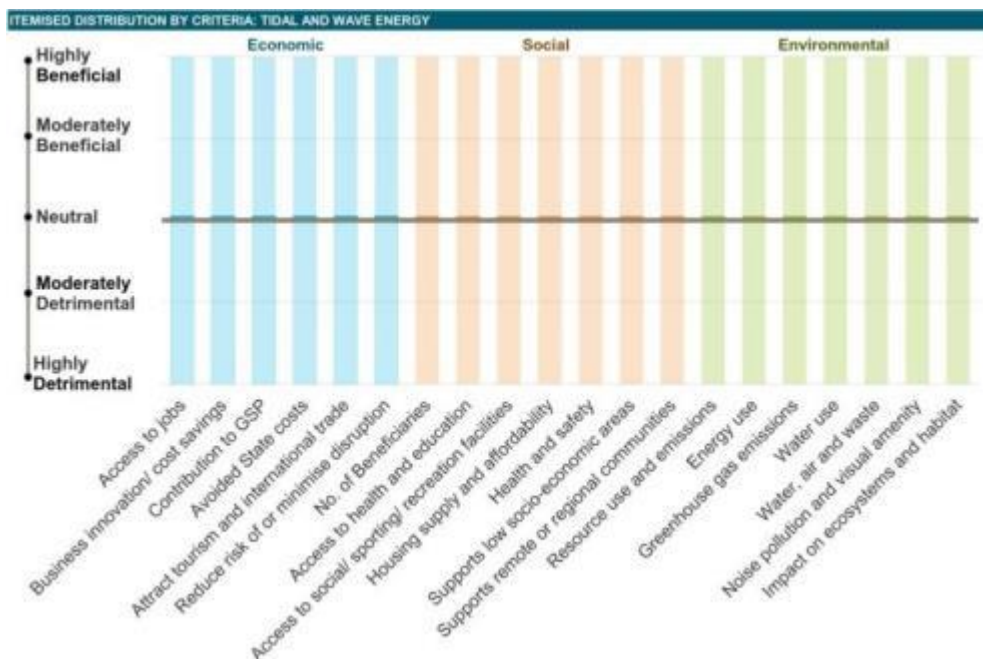
How does this option perform under different scenarios?

Supercity	+	Increased need for more reliable baseload supply
Westside Story	+	Increased need for more reliable baseload supply
Regional Cities	+	Increased need for more reliable baseload supply
Accelerated Climate Change /Mitigation	++	Acute need to reduce carbon emissions
Prolonged/ Severe Economic Downturn	-	Less demand for energy
Biosecurity Threat	Neutral	

How does this option work with others?

No key relationships have been identified.

What are the economic, social and environmental impacts of this option?



Commentary:

This option supports investment in what is currently a very high cost form of renewable energy. The option does not specify how much energy would be generated from tidal sources, however assuming a supply of 10 MW the impacts of this option are likely to be limited.

Risks and opportunities

The technology used for this option is high cost and is limited to trial use in many countries, so the evidence to support its adoption is low.

Depending on the technology used, there could be localised impacts on amenity space.

Geoscience Australia notes that for wave energy, the lack of control over the timing, rate or level of delivery can impact significantly on the potential for this resource as an electricity source.

There is an opportunity for technological advances to reduce the costs of tidal and wave energy projects and make these resources more competitive over time.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Australian Renewable Energy Agency, *Ocean energy*

Geoscience Australia, *Ocean Energy*



Recycled treated wastewater for non-potable peri-urban agricultural use TWR

Option TWR is addressed in RTA - Recycled treated wastewater for non-potable agricultural use

Compact urban development

UDC

Option type

Better use through land use and planning controls

Location

Statewide

Sector

All

Certainty of evidence

Medium

Direct option cost

\$10 million–\$25 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 1: Address infrastructure demands in areas with high population growth; and

Need 10: Meet growing demand for access to economic activity in central Melbourne; and

Need 11: Improve access to middle and outer metropolitan major employment centres

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option is to apply planning provisions that enable medium density residential development on land near existing infrastructure, such as public transport in the Principal Public Transport Network and activity centres, in Melbourne and regional cities, such as Geelong, Bendigo and Ballarat. In particular the intensification should be prioritised around transport infrastructure that has capacity for additional demand.

What is the level of community support?

There was a high level of discussion of this option during consultation. Responses were generally positive and supported the principles of urban consolidation across the state.

What do we think of this option and why?

This option was recommended in the strategy (ref. 1.1.1, 10.1.1) because it maximises the use of existing infrastructure and should contribute to reducing (or slowing) the need for infrastructure in new greenfield suburbs. Infrastructure provision for infill development is two to four times more cost effective than for greenfield development, where existing infrastructure in the established areas has the capacity to support increased demand. Melbourne's east and south are relatively well serviced by transport infrastructure, jobs and services. The Lilydale, Belgrave, Glen Waverley, Alamein, Frankston and Sandringham Lines have existing capacity and the Pakenham and Cranbourne Lines will have additional capacity after the completion of Melbourne Metro around 2026. Train stations and tram lines in established areas should be prioritised for compact, quality, walkable, high amenity neighbourhoods. State government has a leadership role to designate areas for change. Local government will be an important partner to enable housing intensification of the established urban areas. This option is equally applicable to the central city areas of regional cities such as Geelong, Ballarat and Bendigo.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	Relates to key point/option for discussion
Regional Growth Plans	Consistent

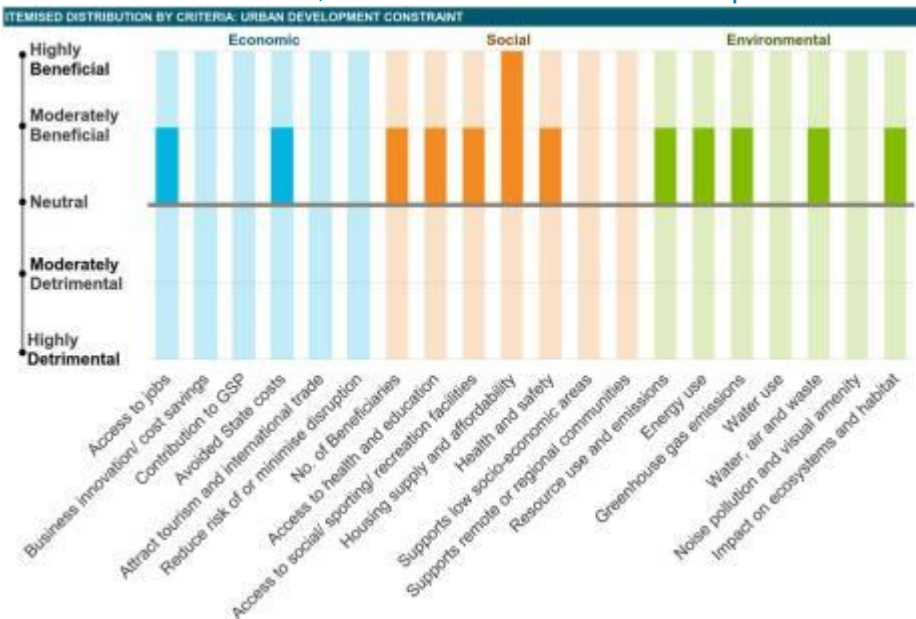
How does this option work with others?

There are a number of complementary options that support higher density residential development in the existing urban area. In particular, transport options, for example employment centre mass transit network (MTN), service delivery options, for example integrated government service and infrastructure planning (ref. SIP) and amenity options, for example green infrastructure (UFF). This option could also partner with strategic transit centres and corridors (STO) for optimum benefit. Upgrades to existing community facilities (CSR) would be required in established areas experiencing growth.

How does this option perform under different scenarios?

Supercity	++	Supports mode shift to address congestion
Westside Story	+	Supports mode shift to address congestion
Regional Cities	+	Supports mode shift to address congestion
Accelerated Climate Change /Mitigation	+	Supports more carbon efficient travel
Prolonged/ Severe Economic Downturn	+	Enables more affordable transport options
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



Risks and opportunities

There is a risk that without appropriate incentives or funding for infrastructure upgrades as growth occurs, this option may not meet its objectives. In greenfield areas, where there is little existing infrastructure, there are well established and tested developer contribution mechanisms for developers to contribute towards the cost of basic new infrastructure. These mechanisms are more complex to implement in established areas. The state government's current efforts to develop and implement a standard development infrastructure contribution for established areas would assist to address this issue.

Infill development can meet with community resistance in some constituencies and should therefore be undertaken with sensitivity to the surroundings.

The option presents an opportunity for more people to live closer to jobs and infrastructure and for government to make significant budget savings from leveraging existing infrastructure. This option will also provide increased opportunity for people to walk to public transport which supports a healthier and more sustainable lifestyle. Should this option not be implemented, the opportunity to utilise the capacity of existing infrastructure could be missed due to the potential for lower density development in areas that are well serviced with existing infrastructure.

Funding

Should government choose to pursue this policy, it will then need to consider funding options. Below is a range of potential funding mechanisms which could be examined to help fund the impacts of this policy.

Potential funding mechanisms

General government revenue	User charges	Beneficiary charges	Property development	Asset sales
		✓	✓	

Compact urban development would require planning scheme changes that are likely to increase the value of land in certain areas. To capture part of this value, government could consider beneficiary charges such as developer contributions where rezoning and/or development provide financial gains to property developers. Reforms to infrastructure contributions in established areas are currently underway in Victoria, which aim to simplify the developer contribution process. Funding raised by development contributions could be reinvested in those areas to meet infrastructure needs arising from intensification.

Property development could also be considered. For example, land and air rights surplus to government requirements within areas where land is rezoned could be sold for property development. Property development can assist in putting underutilised government land and space to higher and better uses, creating added value through improved amenity, access to services and more choice in services. Funding raised could be reinvested in those areas to meet infrastructure needs arising from intensification. This is occurring near Jewell train station in Brunswick, a suburb experiencing high levels of development. VicTrack will invest in upgrades to the forecourt and public realm at the station following the sale of two sites next to the station for property development.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then the scope of the recommendation has been expanded as we received feedback that it could be applicable beyond the regional cities of Geelong, Ballarat and Bendigo to apply to any cities with existing infrastructure capacity. It has also been refined to focus on medium density housing in established areas. We have also clarified that the initial focus should be on inner and middle ring eastern and southern suburbs well-served by existing infrastructure, and noted that this should be a state led approach as a number of submitters felt the role for state government was unclear.

Background research

Research undertaken by SGS (2016) found that infrastructure provision to greenfield lots cost approximately 2-4 times more than infill in established areas, provided there is capacity within existing infrastructure to support additional people. They also noted a strong correlation between density and infrastructure costs, whereby the cost of infrastructure decreases as density increases. The research suggested that the cost efficiencies could be replicated in greenfield areas by lifting housing densities to commensurate levels. This was due to the potential costs of disruption and adaptation which arise from improving infrastructure in infill or brownfield situations. However, a focus only on the cost of infrastructure fails to consider broader issues of providing housing in different established areas and greenfield contexts, such as social outcomes, affordability, access to jobs, the greenhouse gas intensity of transport and development delivery/timing constraints.

Context

Accommodating Victoria's projected population will require a concerted effort across all levels of government. When planning for growth, the state government must align infrastructure with growth opportunities. There must also be ongoing improvements to local and state infrastructure as change occurs. The state government has many policy and investment levers that can assist the creation of accessible, prosperous and healthy communities.

This option builds on current policy and trends of urban renewal and housing intensification across the existing residential areas. For example, from 2010 – 2014, residential development in established residential areas provided approximately 25 per cent of Melbourne's overall new housing supply. The percentage of new housing in established areas is even higher (approximately 60 per cent) when new housing from the renewal of commercial and former industrial land is included.

In November 2016, the Commonwealth Government responded to the recommendations in Infrastructure Australia's report *Australian Infrastructure Plan*. In their response, the Commonwealth supported Infrastructure Australia's recommendation 2.3 that to meet the demands of population growth, Sydney, Melbourne, Brisbane and Perth should accelerate the delivery of high-quality, higher density development within established urban areas. This option is generally consistent with the intent of that recommendation that "governments should take steps to reduce urban sprawl and ensure the majority of new housing supply is medium to high-density and delivered in established urban areas".

This option aims to drive planning for change and better align infrastructure and development outcomes. Planning for vibrant '20 minute neighbourhoods' anchored by a train station or major public transport route requires proactive collaborative leadership. Government has the opportunity to plan for the integration of land use and infrastructure in areas that are well serviced by existing, renewed or future infrastructure such as new stations, for example as part of the level crossing program (MLC).

The intensification of housing in areas that are well serviced with infrastructure and jobs can meet the challenges of growing Melbourne's population equitably and sustainably. While we have initially prioritised the south and east train lines due to their transport and services capacity, this state led process should continue to occur in other areas of Melbourne and regional cities, such as Ballarat, Bendigo and Geelong where there is potential to increase medium density residential intensification around existing infrastructure.

The inner and middle ring suburbs in the south and east have a relatively high level of accessibility to jobs and services and will require relatively modest investments in transport infrastructure to accommodate additional demand over the next 30 years. This will include the need to provide additional capacity (with the most substantial item beyond current commitments being the introduction of 10 car trains on the Cranbourne and Pakenham lines – our recommendation HCT2). A review of the capacity of the tram network could also identify opportunities to intensifying housing along tram corridors.

There are many areas in Melbourne's inner and middle ring southern and eastern suburbs that are already accommodating a significant increase in residential intensification, however we believe a review is required to identify areas located close to public transport that do not have enabling zoning particularly in instances where there are limited heritage or environmental constraints. All opportunities to accommodate more people in areas well served by a range of transport options and jobs and services should be explored.

While this state led planning process should initially focus on Melbourne's inner and middle eastern and southern suburbs,

Next steps

1. State led integration of planning for growth and infrastructure investment

Our consultation on this option highlighted a diversity of views but some things have been made clear. There needs to be more whole of government leadership to plan for growth and intensification. This is important to ensure existing improvements and upgrades to infrastructure, including local amenity improvements, occur to support communities undergoing population growth.

State led regional/subregional framework planning should identify priority precincts and centres for change. This should include identification of areas that:

- are well serviced with existing infrastructure, particularly public transport infrastructure.
- require additional detailed strategic land use and infrastructure planning.
- require a more consistent application of zones that will enable intensification of housing.

2. Build on existing strategic planning work

Precincts and centres for change will require state and local government collaboration to ensure that strategic land use plans can deliver agreed development objectives. Many local governments have already prepared strategic land use plans. This planning should be built on and may need to be reviewed and updated.

These plans should:

- Develop detailed land use and infrastructure directions to implement the government's strategic vision and objectives for growth and to support additional medium density housing in highly liveable, walkable, permeable precincts and centres that are well connected to public transport. This will include planning to achieve built form outcomes including medium density housing of around 4-6 storeys, depending on local context, and the response to recognised heritage and environmental values.
- Assess infrastructure capacity and identify infrastructure requirements and upgrades. The plans should also identify opportunities for land use change as infrastructure investment occurs.
- Apply the Plan Melbourne 20 minute neighbourhood principles to ensure that areas of change are high amenity areas and walkable.
- Include estimates of the residential growth potential enabled by the proposed changes, to inform regional/subregional monitoring and on-going planning for infrastructure development.

3. Planning scheme amendment within 5 years

The adoption of new and revised strategic land use plans, for precincts and centres nominated for change, will lead to planning scheme amendments within 5 years.

4. Monitor changes over time

The assessment and monitoring of infrastructure capacity such as transport, open space and stormwater, are required to inform ongoing programs for infrastructure upgrades and to ensure upgrades occur in response to capacity constraints, as growth occurs. This is particularly important in rapidly changing inner and middle ring locations.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Heart Foundation, *Density does matter*, 2014

KPMG/Arup/Jacobs, *Economic appraisal and demand modelling*, 2016,

SGS Economics and Planning, *Comparative costs of urban development: A literature review*, 2016

Stanley, J and Brain, P, *Investing in Melbourne's National Employment Clusters*, 2016

Victorian Government, *Managing residential development Taskforce, Overarching report and State of play reports*, 2016

Green Infrastructure UFF

Option type

Better use through regulation
Incremental expansion of existing assets
New assets

Location

Statewide

Sector

Science, agriculture and environment
Transport
Cultural, civic, sporting, recreation and tourism
Water and waste

Certainty of evidence

Medium

Direct option cost

\$250 million–\$500 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 1: Address infrastructure demands in areas with high population growth; and

Need 4: Enable physical activity and participation; and

Need 16: Help preserve natural environments and minimise biodiversity loss; and

Need 17: Improve the health of waterways and coastal areas

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option seeks to improve existing and deliver new green infrastructure across Melbourne and regional cities and towns. As our urban settings intensify, there is a need for public spaces to enable planned and incidental exercise (including to support mental health), support biodiversity through increasing shaded areas and incorporate water sensitive design to mitigate flooding events (further detail in *What is this option? cont'd*).

What is the level of community support?

There was a high level of discussion of the recommendation Green infrastructure, which includes this option. Responses were generally positive. This option was recommended by the metropolitan citizen jury. Ninety five per cent of people surveyed as part of community research supported the proposal to create more green spaces.

What do we think of this option and why?

This option was recommended in the strategy (ref. 1.4.6, 4.2.3 and 16.3.1) because government needs to actively guide the planning and fund the delivery of high quality green infrastructure in urban settings to realise its numerous benefits over the next 0-30 years. These benefits increase over time, for example, with the growing challenges of heat island effect. Despite the multiplicity of benefits, there is no clear accountability for planning and delivering this infrastructure. Notwithstanding the efforts of local government (such as City of Melbourne) to focus on urban forests, the delivery of green infrastructure can be ad hoc and opportunistic rather than strategic and holistic. In the strategy, we have recommended a more compact urban form to leverage existing infrastructure, but this could present liveability challenges unless green infrastructure is considered alongside other infrastructure needs. The first step in implementing this option is to produce a green infrastructure plan in partnership with local government to determine the priorities for investment. As there is a great opportunity to unlock restricted public land held by water or transport authorities, costs for land acquisition and related works have been scaled down from this option's direct option cost.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	Relates to key point/option for discussion
Regional Growth Plans	N/A

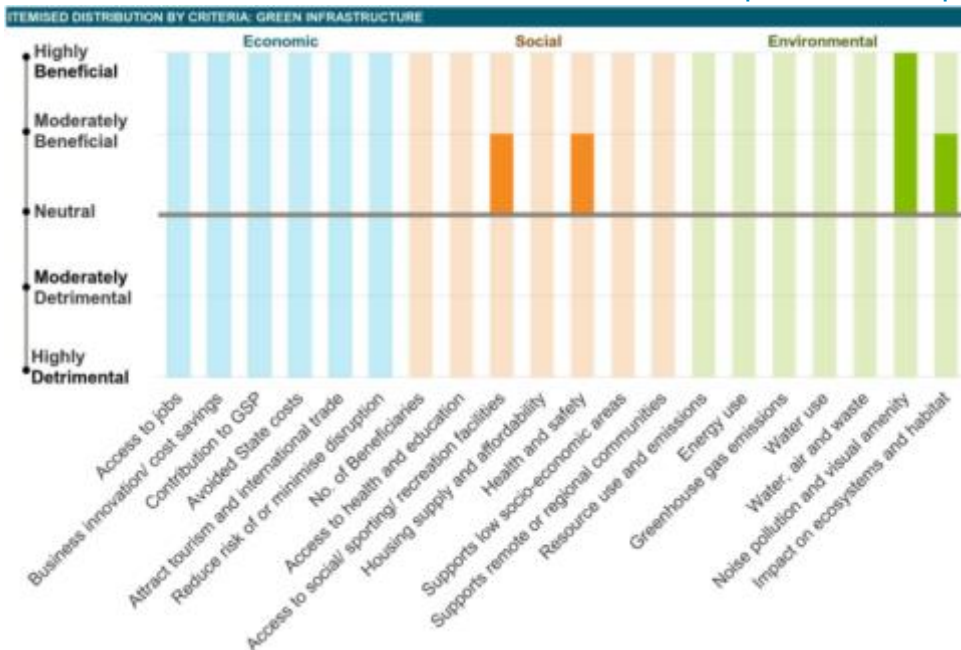
How does this option perform under different scenarios?

Supercity	++	Can reduce heat island effect, protect biodiversity
Westside Story	++	Can reduce heat island effect, protect biodiversity
Regional Cities	+	Can reduce heat island effect, protect biodiversity
Accelerated Climate Change /Mitigation	++	Can reduce heat island effect
Prolonged/ Severe Economic Downturn	Neutral	
Biosecurity Threat	Neutral	

How does this option work with others?

This option is complementary to consideration of how to develop more water sensitive design in Victorian cities (SRQ), as these green spaces can accommodate flooding events. Community space utilisation and deregulation (CSU) and shared-use agreements (CSS1) are complementary tools to delivering green infrastructure, as there may be spaces which have regulatory barriers to development as green infrastructure. This option could also link with habitat corridors (HCL) where regional and urban areas are proximate.

What are the economic, social and environmental impacts of this option?



Commentary:

This option is anticipated to also have beneficial impacts for improved water use in parks such as natural filtering and storage system at Trin Warren Tam-boore in Royal Park.

What is this option? (cont'd)

The Australian standard describes green infrastructure as the network of natural and built landscape assets, including green spaces and water systems within and between settlements. Individual components of this environmental network, such as gardens, parks, recreation areas, highway verges and waterways, are sometimes referred to as 'green infrastructure' assets.

Victoria has some great parks and green spaces that are the result of planning decisions both in the past (e.g regional city botanical gardens) or in recent times (e.g precinct structure planning process in growth areas). As Melbourne and Victoria's population grows, addressing the resultant infrastructure challenges is not just about transport, schools or hospitals; there is also a strong case for considering the provision of green infrastructure as an equally valid need.

One challenge is that Victoria's existing parks and green spaces are not often linked or connected. This can limit their use for physical activity and limit their suitability as areas for biodiversity to flourish. In addition, with growing public space that is paved, such as roads, there is a lack of urban areas that are permeable to deal with flood events, which could be more likely in the years ahead.

With the high-cost of land, it is a significant challenge for local governments in the inner urban areas of Melbourne to plan and deliver green infrastructure for its local community. As green infrastructure can act as a network, planning this infrastructure from within municipal boundaries limits the opportunities to create interconnected green spaces.

This option considers a role for the state government to provide greater leadership in this area.

Risks and opportunities

The risk with this option is that the land required to implement green infrastructure in urban environments is already often developed or has a high-cost to purchase. However, there are opportunities with urban renewal projects to set aside land as part of the subdivision to provide this green space. Another risk is that there is unclear management and maintenance accountability for the green infrastructure, which could undermine its benefits.

A key opportunity for green infrastructure is to mitigate against storm water or run-off pollution as well as flooding events. Stormwater and recycled greywater can be both filtered by green infrastructure but also be used to irrigate it, particularly important for times of drought.

Green infrastructure enables the development of microclimates to offset heat stress on humans, flora and fauna and built assets.

Additional notes

Benefits

The benefits of green infrastructure include:

- Creating space for activity to address obesity and diabetes rates and reduced fitness particularly in young children.
- Creating space to address social exclusion noting Victoria's ageing population and the increasing importance of positive mental health.
- Creating opportunities for walking and cycling for transport.
- Providing shade to mitigate the heat island effect to address the challenges of climate change and heat related death.
- Protecting and enhancing natural environments and supporting biodiversity by providing the critical connections within and between ecosystems.
- Reducing emissions and addressing air quality, including acting as a carbon sink.

- Providing a more efficient and effective means of managing stormwater to protect against flooding (higher permeability compared to paved roads or public spaces).
- Delivering energy savings through natural temperature regulation.

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then the timing of this recommendation has been expanded from 0-15 years to 0-30 years to signal it is an ongoing program. This better reflects its relationship with the recommendations related to a more compact urban form, as concluding the program after 15 years would be counter to our view that green infrastructure is essential to support ongoing liveability. We have also refined the next steps based on recent evidence of opportunities to use restricted public land.

Next steps

A lead government agency will need to establish a strong governance framework, partner with local government, develop an evidence base and establish clear outcomes to facilitate the delivery of green infrastructure. A key aspect to this work is the mapping and GIS data which informs opportunities for new green infrastructure links, as the aim is to provide contiguous networks. This data could be owned and maintained by that lead government agency and released publicly (consistent with the Victorian government's Data Access Policy) to support, in particular, local government planning.

Key next steps could involve reviewing the previous work done by Parks Victoria; both the proposed refresh of *Linking People and Spaces* in 2010 and related planning work for the Metropolitan Trails Network (MTN). Similarly, but more recently, the former Metropolitan Planning Authority undertook extensive work on an open space strategy, including undertaking mapping from GIS data. This found across metropolitan Melbourne a significant amount of restricted public land (up to 9,000 hectares) with open space potential. This mapping could be expanded to include the rest of the state. This work also considered a related boulevard strategy to green street level environments. Important considerations through this work was whether the planning system, including open space provision mechanisms and the operation of the Subdivision Act, sufficiently provides for green infrastructure in new or changing communities.

The mapping shows that there are opportunities to explore utilisation of existing planned infrastructure corridors (e.g. electrical easements), underutilised spaces (e.g. golf courses), urban renewal sites (e.g. Arden-Macaulay) or old infrastructure (e.g. Melbourne Outfall Sewer). There is also restricted public access land held by schools and other government bodies such as VicTrack and VicRoads. Melbourne Water in particular is a key stakeholder for opening up restricted public land by virtue of its large land holdings but also because research by the Cooperative Research Centre (CRC) for Water Sensitive Cities shows that blue-green infrastructure (bringing together water cycle management and green infrastructure) is an optimal approach.

Areas with low canopy cover may be a useful place to prioritise effort, (see Victoria Institute of Strategic Economic Studies' work as an example). The west of Melbourne is shown in particular as having very low tree canopy levels. Also areas with high growth should be prioritised to ensure that liveability is preserved and enhanced.

It is noted however that open space requirements do not necessarily align with green infrastructure. Green infrastructure supports physical activity but may not always provide open space for formal or informal sport participation where tree canopies, habitat or water catchments are a priority for achievement of other outcomes.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Bowen, K. J., and Parry, M., *The evidence base for linkages between green infrastructure, public health and economic benefit*, 2015

City of Melbourne, *Urban forest strategy*, 2014

City of Melbourne, *Resilient Melbourne strategy*, 2016

Ellaway et al, *Graffiti, greenery, and obesity in adults: Secondary analysis of European cross sectional survey*, 2005

Standards Australia, *Australian Standard 5334-2013: Climate change adaptation for settlements and infrastructure – A risk based approach*, 2013

Victorian Centre for Climate Change Adaptation Research, *Urban heat reduction through Green Infrastructure (GI): policy guidance for State Government*, 2015

Victorian Environmental Assessment Council, *Melbourne metropolitan investigation: final report*, 2011

Victoria Institute of Strategic Economic Studies, *Green infrastructure economic framework summary report*, 2015

VPA, *Melbourne's open space land data*, 2016

Urban planning and approvals process for health facilities

UPA

Option type

Better use through land use and planning controls

Location

Statewide

Sector

Health and human services

Certainty of evidence

Low

Direct option cost

\$1 million–\$10 million

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 3: Respond to increasing pressures on health infrastructure, particularly due to ageing

Low	Low	Low	Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option proposes to amend the regulatory planning process to remove barriers and better facilitate development approvals processes for aged care facilities in established areas. There is a demand for increased provision for aged care facilities in established neighbourhoods, so that people can remain within their communities as they age. Many aged care services are delivered by the not-for-profit and private sector who design, build and maintain these facilities. At present the sustainability of the aged care sector relies on continued investment by these parties. Current planning requirements impact the availability of development sites in metropolitan Melbourne and often result in a long approvals process. This also impacts the appetite for continued private sector development. Residential aged care developments are increasingly providing facilities to cater for in excess of 100 beds, consistent with the 'ageing in place' model and financial viability constraints (further detail in *What is this option? cont'd*).

What is the level of community support?

There was limited discussion of this option during public consultation.

What do we think of this option and why?

This option was recommended in part in the strategy (ref. 3.4.1) because it will enable residential aged care facilities to be more easily provided in established areas. We recommended that the planning system be reviewed, rather than immediately amended to better understand and remove impediments to deliver more residential aged care. The review was recommended because under the system the private and non-government sectors are experiencing significant delays in obtaining approvals. Without intervention the impact will compound over time, with increased demand for facilities. The importance of maintaining the amenity of existing residents in established areas is acknowledged; however, we believe a better balance in regulation to facilitate the development of aged care facilities could occur.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

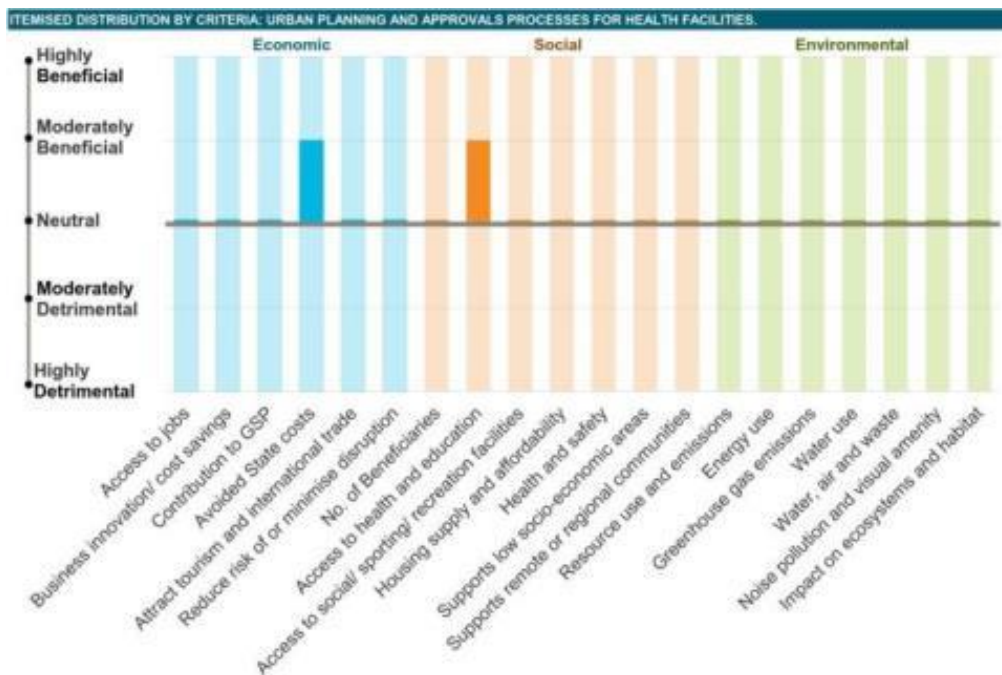
How does this option perform under different scenarios?

Supercity	+	Increased demand for housing
Westside Story	+	Increased demand for housing
Regional Cities	+	Increased demand for housing
Accelerated Climate Change /Mitigation	++	Increased migration of climate refugees requiring housing
Prolonged/ Severe Economic Downturn	++	Increased number of households suffering housing stress
Biosecurity Threat	Neutral	

How does this option work with others?

This option is a critical enabler for aged care facility expansion (ACF).

What are the economic, social and environmental impacts of this option?



Commentary:

This option is also anticipated to result in avoided state costs. By creating incentives for the private sector to provide aged care services, this option may relieve pressure on state funded health services.

What is this option? (cont'd)

Land value, particularly in inner metropolitan area of Melbourne, makes it cost prohibitive to provide a facility of this scale without multi-level construction. Whilst residential aged care facilities are a permitted use in all residential zones, the height restrictions imposed on developments under the local zone provisions make it difficult for aged care providers to find viable development sites in established areas.

To facilitate the social objective of allowing people to remain within their existing communities as they age, and to meet demand requirements, it is important that government develop strategies to support the provision of aged care facilities established areas.

Issues for consideration for aged care facilities include:

- Streamlining development approvals, eg adopting a 'code asses' approach.
- Recognising retirement villages in the planning system in a similar approach to aged care facilities.
- Addressing aged care facility requirements in strategic plans.
- Providing height or density bonuses in nominated locations.

Brisbane city council has recently implemented a suite of reforms similar to those discussed to stimulate the provision of aged care facilities.

Risks and opportunities

Concessions offered to developers, such as reduced building setbacks, would need to be applied sensitively to preserve amenity for residents and stakeholders.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Brisbane City Council. *Brisbane city plan 2014 factsheet – Planning for the future of aged care*, 2016

Victorian data analytics centre VDA

Option type

Better use through information

Location

Statewide

Sector

ICT

Certainty of evidence

Medium

Direct option cost

\$100 million–\$250 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 1: Address infrastructure demands in areas with high population growth

Significant	Significant	Significant	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

Need 2: Address infrastructure challenges in areas with low or negative growth; and

Need 10: Meet growing demand for access to economic activity in central Melbourne; and

Need 11: Improve access to middle and outer metropolitan major employment centres; and

Need 13: Improve the efficiency of freight supply chains; and

Need 19: Improve the resilience of critical infrastructure

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Strengthen the data analytics capability of the recently announced Victorian data agency. This agency would then identify and develop the processes needed (e.g. algorithms/software) to make big data usable for operational management platforms and for planning purposes, including performance reporting. For example, it would apply advanced and predictive analytics to transport data (including from fixed public assets and probe data from vehicles) to enable real time, dynamic, centralised management of the transport system, particularly for the road network and on-road public transport, with the object of optimising transport system capacity and improving travel time reliability.

What is the level of community support?

There was limited discussion of this option during public consultation. This may be as it was not recommended in the draft strategy.

What do we think of this option and why?

This option was not recommended in the strategy, as the Victorian Government is already doing work in this area. As part of the Victorian Government's Information Technology Strategy 2016-2020, it recently announced the establishment of a government data agency in early 2017, among whose objectives is the building of data analytics capacity.

Analysis of 'big data' is expected to play a growing role in future management of government assets. The effectiveness of these strategies and initiatives will be reviewed by Infrastructure Victoria in the next Infrastructure Victoria strategy update.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

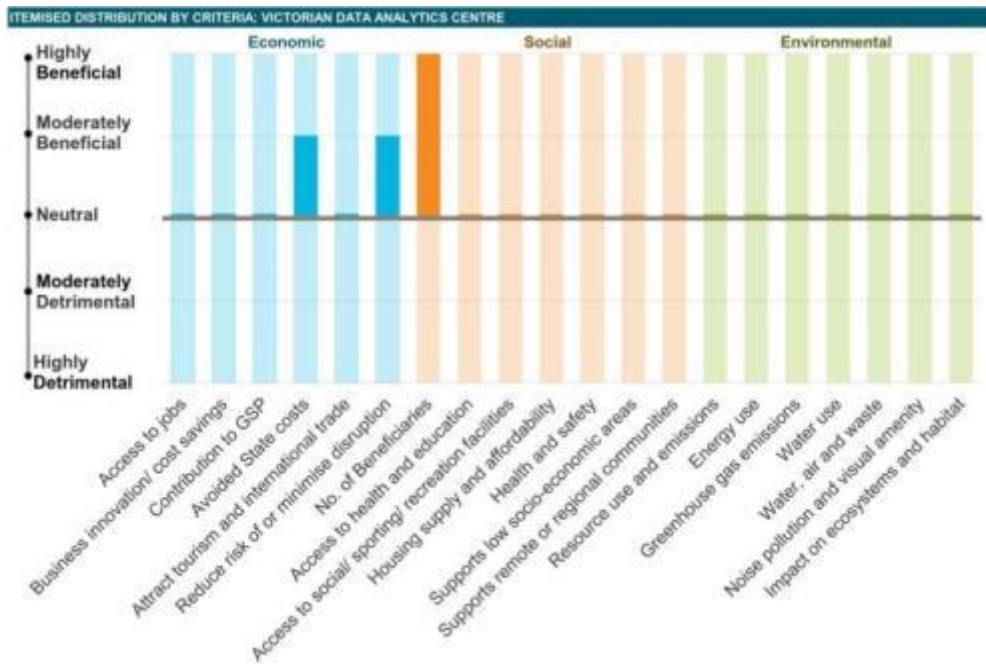
How does this option work with others?

This option would be complementary to integrated control centres (ITC), real time transport information (TNI), advanced driver assistance (ADA), and automated car technology (ACT).

How does this option perform under different scenarios?

Supercity	++	Supports efficient management of transport networks
Westside Story	+	Supports efficient management of transport networks
Regional Cities	+	Supports efficient management of transport networks
Accelerated Climate Change /Mitigation	+	Supports efficient management of transport networks
Prolonged/ Severe Economic Downturn	Neutral	
Biosecurity Threat	+	Improve transport system resilience

What are the economic, social and environmental impacts of this option?



Risks and opportunities

Barriers may exist if access to data is restricted or it contains confidential information that carries privacy concerns.

Using real-time data allows planners to provide precise forecasts on the current situation in the specific area where people and goods are on the move. Traffic management can respond to bottlenecks in real time using vehicle density data and charging for access to additional lanes. Adjusting speed limits in hazardous conditions can reduce accident rates, while adjusting traffic lights to create a 'green wave'; allowing vehicles to move across several intersections without stopping reduces congestion, fuel waste, and delays.

Using real-time data, signals on major roadways can automatically retime and coordinate the signals to the most efficient interval for the current traffic density. Transit operators can track and manage their vehicle fleets using fleet tracking systems and real-time passenger usage data. Road safety can be improved with up-to-date information that identifies potential conflicts between cyclists and heavy vehicle traffic. Parking in urban areas can be improved with apps that help car and truck drivers to find vacant parking spaces. In urban transport, real-time data can optimise usage by sharing loads and vehicles.

Additional notes

While the intent of the option has merit, data analytics capability should also be further developed at a transport portfolio level, not only with the central data agency.

Delivery mechanisms for data analytics capabilities and allocation of responsibilities between centralised and specialised/operational data functions should be considered separately to the use of advanced/predictive analytics to support transport system management.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Vocational education long-term funding certainty VEL

Option type

Better use through public service delivery and approval processes

Better use through funding agreements

Location

Statewide

Sector

Education and training

Certainty of evidence

High

Direct option cost

<\$100 million

Contribution to meeting the need

Need 9. Provide access to high-quality education infrastructure to support lifelong learning – **Moderate**

What is this option?

Provide certainty to the vocational education sector by removing funding for maintenance and asset renewal from short-term budget cycles. This would enable strategic and long-term planning and investment of TAFE assets. TAFE asset management plans are prepared and updated annually to support strategic planning. This would significantly reduce the supply and demand mismatch across the TAFE educational offerings.

TAFE assets would benefit from strategic long-term planning and investment. This eliminates the short-term budget and election cycles and can provide for more effective maintenance and asset renewal.

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option was not recommended in the strategy because TAFE asset renewal and maintenance can be addressed through TAFE recapitalisation (TAF). We recognise that better asset management will assist TAFE colleges to remain high quality in order to attract a wide range of students and remain viable over the longer term.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

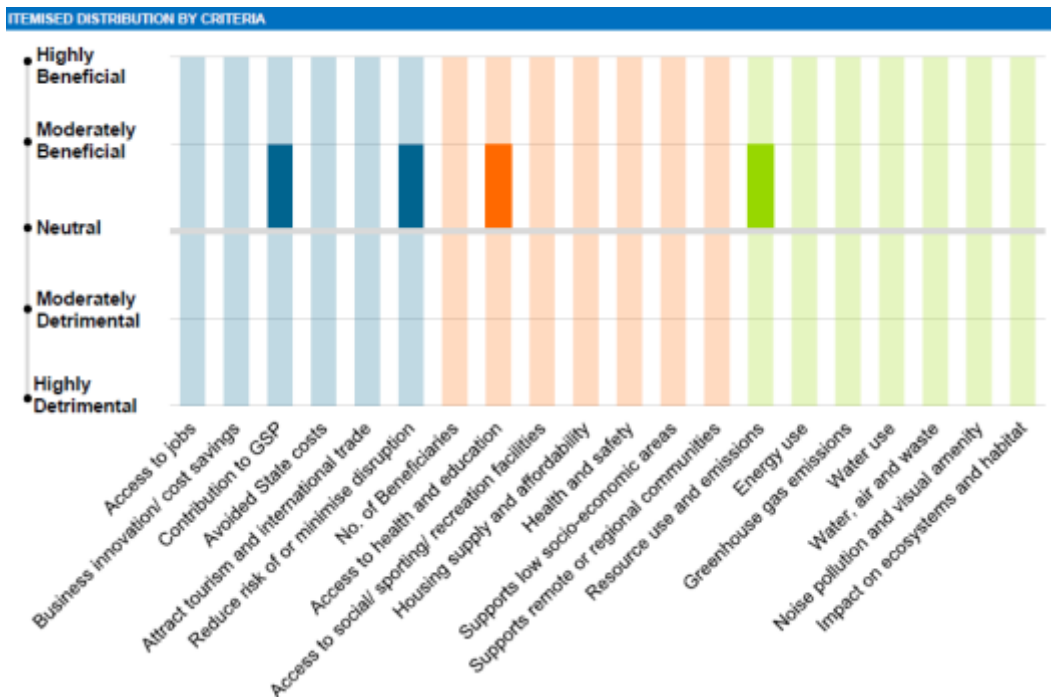
How does this option perform under different scenarios?

Supercity	Neutral
Westside Story	Neutral
Regional Cities	Neutral
Accelerated Climate Change /Mitigation	Neutral
Prolonged/ Severe Economic Downturn	Neutral
Biosecurity Threat	Neutral

How does this option work with others?

This option could be substituted by TAFE recapitalisation (TAF), which also addresses the need to better manage TAFE assets and renewal.

What are the economic, social and environmental impacts of this option?



Risks and opportunities

An implementation risk is that TAFE asset long-term planning would involve some sharing of data among TAFE providers. There could be issues relating to confidentiality of data.

Evidence base

AECOM/PwC, *Assessment 2: Economic, social and environmental assessments and option relationship mapping*, 2016

Deloitte/Aurecon, *Assessment 1: Options analysis report*, 2016

Water delivery efficiency in irrigation

WDE

Option type

Better use through refurbishment of existing assets

Incremental expansion of existing assets

New assets

Location

Regional and rural Victoria

Sector

Water and waste

Science, agriculture and environment

Certainty of evidence

High

Direct option cost

\$25 million–\$50 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 14: Manage threats to water security, particularly in regional and rural areas

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Irrigation delivery systems in Victoria were traditionally open channel based systems, and studies have previously shown that these systems lose large quantities of water through evaporation, leakage and seepage.

This option proposes additional investment to improve water delivery efficiency in open channel systems. A range of projects have been undertaken or are being planned to modernise irrigation systems and achieve water savings. Examples are the \$2 billion northern Victoria modernisation project, pipeline projects completed for the Wimmera Mallee system and a range of other projects across the state. This option seeks to close out modernisation initiatives by identifying additional areas that may benefit from delivery efficiency projects, including pipelining. This will involve assessment of irrigation water delivery systems that still have low delivery efficiencies and preparation of business cases for modernisation of these systems.

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option was recommended in the strategy (ref. 14.1.3) because it contributes to increasing water security by ensuring conservation of water resources. Over the last two decades projects to minimise water losses in irrigation water delivery systems have seen open channel irrigation systems increase their delivery efficiency and as a result generating water savings. Irrigation delivery efficiency is increasingly important in an era of water scarcity as recognised by the red paper *Reimagining infrastructure amid transformative change* (2015, QIC). The 2016-17 state budget included announcements to upgrade delivery infrastructure in the Werribee and Bacchus Marsh irrigation districts, mainly through pipelining. This option ensures that there are no irrigation systems still operating at sub-optimal delivery efficiencies.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

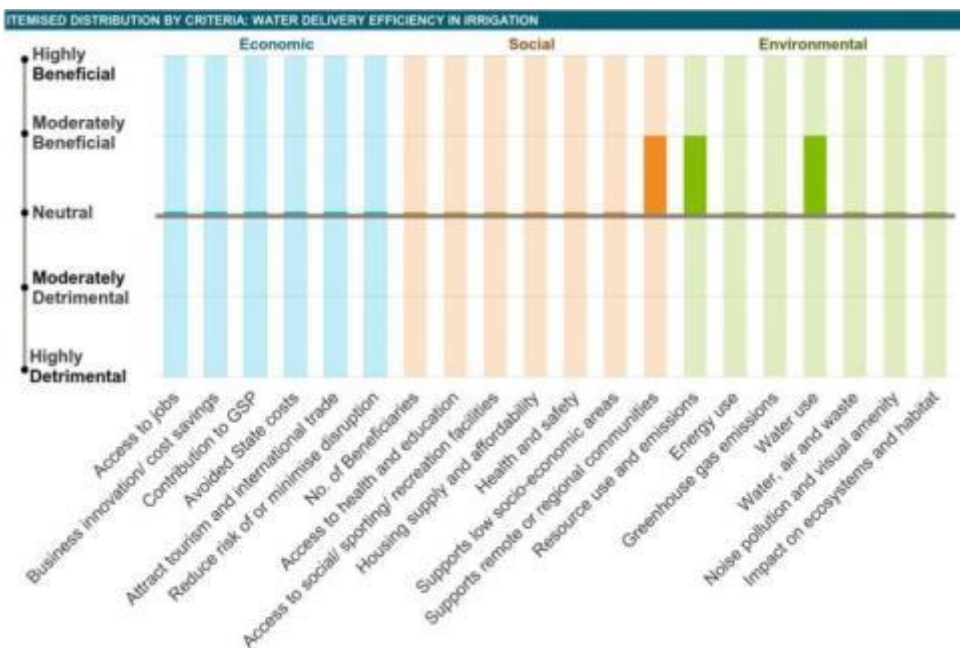
How does this option work with others?

No key relationships with other options have been identified.

How does this option perform under different scenarios?

Supercity	+	Heightened need to conserve water resources
Westside Story	+	Heightened need to conserve water resources
Regional Cities	+	Heightened need to conserve water resources
Accelerated Climate Change /Mitigation	++	Acute need to conserve water resources
Prolonged/ Severe Economic Downturn	-	Less demand for water
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?





Risks and opportunities

The option involves capital investment in specific existing irrigation systems. Care will need to be taken in prioritising sites to make sure that current land use is sustainable (economically and environmentally) and consistent with the implementation of other water strategies.

This option will improve the efficiency of water use as a key input to agriculture, which may have additional benefits for regional communities. Water efficiencies gained through implementation of the option could free up water entitlements for other uses, such as environmental flows, however, this may depend on funding arrangements.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

QIC, *Red paper: Reimagining infrastructure amid transformative change*, 2015

Victorian Department of Environment, Land, Water and Planning, *Water for Victoria: Water plan*, 2016

Victorian Government, *Irrigation upgrades for Werribee and Baccus Marsh*, 2016

Webb Dock freight rail access

WDF

Option type

New assets

Location

Melbourne central subregion

Sector

Transport

Certainty of evidence

Medium

Direct option cost

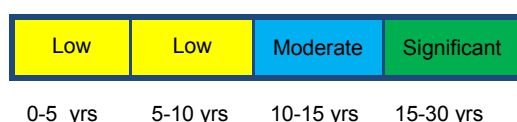
\$1 billion–\$3 billion

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 13: Improve the efficiency of freight supply chains



What is this option?

Provide rail access to Webb Dock to enable it to support end-to-end export and import supply chains. Webb Dock is currently being expanded to create capacity for an extra one million container ships a year in the Port of Melbourne and is due to start operating in early 2017. A new access road connecting Webb Dock to the Westgate Freeway is being developed but there is currently no provision for rail transportation. Providing rail access to Webb Dock would reduce the amount of freight being transported by road, including the number of freight road vehicle kilometres.

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive.

What do we think of this option and why?

This option was recommended in the strategy for further investigation (ref. 13.3.4) as it is likely that rail access will be required in the future to maximise use of the Webb Dock facilities. With the recent signing of a lease of the Port of Melbourne, the new operator will be required to deliver a rail access strategy within three years. In preparation for the submission of the rail access strategy, the government needs to prepare a port rail access policy to assist in assessing the operator's proposals and enable timely delivery of the best-value infrastructure option.

On the basis of available evidence, we think that rail access to Webb Dock could in time make a significant impact on freight efficiency over time. However, it also presents serious engineering challenges that could make it very expensive to deliver. Consideration should thus also be given, in the response to new operators, to the viability of any new technologies that could present a potentially more cost effective solution.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

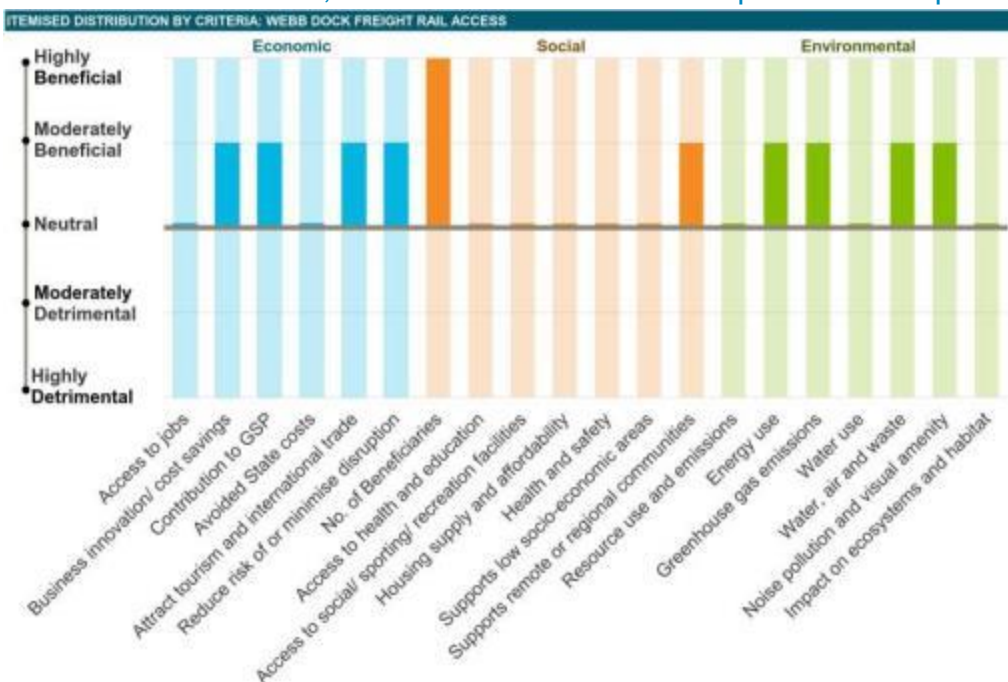
How does this option work with others?

Completion of freight precinct land use planning (FPL) protects the port from contrary adjacent land uses that would impact the operation of the port, and thus is complementary. Combining this option with a port of Melbourne container shuttle (PMM) could enable maximum value to be gained.

How does this option perform under different scenarios?

Supercity	++	Reduces conflicts between freight and road traffic
Westside Story	+	Reduces conflicts between freight and road traffic
Regional Cities	+	Reduces conflicts between freight and road traffic
Accelerated Climate Change /Mitigation	+	Facilitates more carbon efficient rail freight
Prolonged/ Severe Economic Downturn	-	Less demand for freight
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



Risks and opportunities

The key risk is that there is not a clearly identified two-track rail corridor reserved. Other risks could include contaminated soil from working in a presently decommissioned rail corridor and the difficulties constructing a crossing over the Yarra River. It is assumed that these would be managed during the construction phase.

The greatest opportunity for this option is to expand the capacity of the Port of Melbourne. This delays the need for a second port. The need for a significant refurbishment or re-build of the West Gate Bridge/other road infrastructure caused from the stresses of heavy truck traffic may also be reduced from potential mode shift from road to rail.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended for further investigation in the draft strategy. Since then the previous recommendation which related to Port of Melbourne rail access has been updated and a new recommendation for the Port rail shuttle has been included based on new evidence and stakeholder feedback that it should be changed from planning to delivery of the shuttle. The same level of detail is not currently available for Webb Dock rail access and it remains as a separate recommendation to plan for rail access as a longer-term proposition.

Next steps

The Fishermans Bend Taskforce is currently developing a master plan for a new housing and employment precinct. It is important that the master plan includes freight rail access to Webb Dock as in may be required in the longer term.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Jacobs for Department of Economic Development, Jobs, Transport and Resources, *Port Rail Shuttle project - supply chain analysis*, 20 February 2015

Department of Transport, Planning and Local Infrastructure, *Metropolitan Intermodal System, Project Development Report*, 30 September 2013

Wonthaggi desalination plant expansion WDP

Option type

Incremental expansion of existing assets

Location

Melbourne region

Sector

Water and waste

Certainty of evidence

Medium

Direct option cost

\$5 billion–\$10 billion

Option lead time

5–10 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 14: Manage threats to water security, particularly in regional and rural areas

Low	Low	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option would expand the capacity of Wonthaggi Desalination Plant to provide greater water security.

The plant can currently deliver up to 150 billion litres of desalinated water, but was built to allow for an upgrade to deliver up to 200 billion litres.

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option was recommended for further investigation in the strategy (ref. 14.3.1) as a possible means of future water supply augmentation, alongside a range of other options. This is because this option could increase resilience to water scarcity through an additional rainfall independent water supply, although the timing of the need is very uncertain and we have recommended identification of trigger points. Water supply in Victoria has traditionally relied on storages, and this has created risks to supply in extended dry periods. Given projections of a warmer, drier, future, technologies that supply water from rainfall independent sources should be considered.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

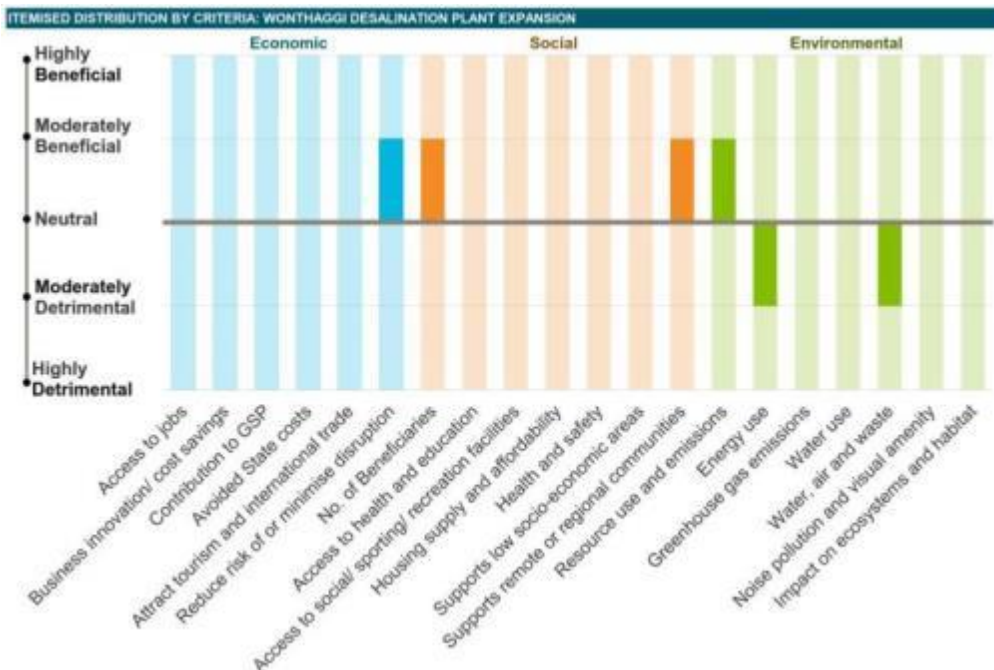
How does this option perform under different scenarios?

Supercity	++	Increased need to address water scarcity
Westside Story	++	Increased need to address water scarcity
Regional Cities	+	Would reduce reliance on regional storages in dry periods
Accelerated Climate Change /Mitigation	++	Acute need to address water scarcity
Prolonged/ Severe Economic Downturn	-	Less demand for water
Biosecurity Threat	Neutral	

How does this option work with others?

The costs and benefits of this option are likely to be considered alongside other water supply augmentation options such as recycled wastewater for drinking (RWW), new desalination capacity elsewhere in the state (WSA1) or additional groundwater capacity (WSA1).

What are the economic, social and environmental impacts of this option?



Commentary:

Sea water desalination is an energy intensive process.

Risks and opportunities

This option consolidates water production in Melbourne potentially limiting the contribution to resilience of other water networks compared to a new site for desalination elsewhere in the state.

This option could provide incremental expansion of water augmentation, and so more effectively match the rate of growth in demand compared to other options for large scale augmentation.

Funding

Though this option has only been recommended for further planning work as one of a range of possible solutions, should government choose to pursue this project, it will then need to consider funding options.

Potential funding mechanisms

General government revenue	User charges	Beneficiary charges	Property development	Asset sales
	✓			

Water projects like Wonthaggi desalination plant expansion are typically, and should continue to be, funded through user charges. For example, the cost of the current Wonthaggi desalination plant is being recovered through user charges. There are a large number of identifiable direct beneficiaries and user charges can provide a clear price signal to incentivise users to use water more efficiently by managing or shifting demand.

Like other user charges, government would need to consider balancing competing objectives, such as changing behaviour, managing demand, cost recovery and addressing social and environmental impacts.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended for further investigation in the draft strategy. Since then we have updated the recommendation in light of the release of the Victorian Government *Water plan* (Oct 2016) and to recognise that the Essential Service Commission's new water pricing approach is being implemented (Oct 2016).

We have also highlighted the importance of community engagement based on learnings from the millennium drought where major investments were made within a short timeframe and with limited consultation. These investment decisions have long-term implications for water businesses.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Aquasure, *The Victorian desalination process*

Infrastructure Partnerships Australia and Water Services Association of Australia, *Doing the important, as well as the urgent: Reforming the urban water sector*, 2015

Victorian Department of Environment, Land, Water and Planning, *Water for Victoria: Water plan*, 2016

Victorian Department of Environment, Land, Water and Planning, *Managing extreme water shortage in Victoria*, 2016

Western and Eastern treatment plant resilience

WET

Option type

Better use through refurbishment of existing assets

Location

Melbourne region

Sector

Water and waste

Certainty of evidence

Low

Evidence base

Deloitte/Aurecon, *Assessment 1: Options analysis report*, 2016

Direct option cost

>\$10 billion

Contribution to meeting the need

Need 19. Improve the resilience of critical infrastructure –
Low

What is this option?

This option considers the resilience of the Western and Eastern wastewater treatment plants to major operational disruptions.

Much of Melbourne is only connected to either the Western treatment plant or the Eastern treatment plant. Therefore, a failure or shock to one would result in large parts of the population not being able to access wastewater treatment facilities. This intervention proposes to improve the resilience of the treatment plants by providing the necessary upgrades to the plants and augmenting relevant pipe networks.

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option was not recommended in the strategy because it is likely to require significant investment (over \$10 billion) at a low contribution to meeting the need. Consultation with industry confirmed that the financial requirements of this option would be difficult to justify.

Western Interstate Freight Terminal WIF

Option type

New assets

Location

Melbourne western subregion

Sector

Transport

Certainty of evidence

Low

Direct option cost

\$750 million–\$1 billion

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 13: Improve the efficiency of freight supply chains

Moderate	Moderate	Moderate	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Development of a new interstate terminal and freight precinct at Truganina in Melbourne's west, as well as a rail link to the Interstate Rail Freight Network. Currently interstate containers bound for distribution in Melbourne are railed to terminals at Dynon adjacent to the port, and then trucked to the outer suburbs. The Dynon terminals have limited space and capacity, and can be difficult to access due to increasing congestion on the inner Melbourne road and rail networks. The Western Interstate Freight Terminal (WIFT) will move freight more efficiently by providing modern terminal facilities closer to the large industrial cluster in Melbourne's west, reducing the time and length of truck trips.

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were polarised.

What do we think of this option and why?

This option was recommended for further investigation in the strategy (ref. 13.3.3) because our assessment is that the new terminal will significantly improve Melbourne's freight handling capacity, particularly of the north-south and east-west national corridors. Specifically, it was recommended that trigger points be identified to inform a plan for the construction of the new terminal. These improvements could enhance national productivity by lowering the door-to-door cost of freight for interstate movements. The value of this option is likely to increase over time along with the scale of the freight task, and particularly once the existing Dynon terminal has reached capacity. However, it is likely that the Inland Rail project for the Melbourne to Brisbane freight rail line will be the driving need for new terminal (ref. 13.5.1). This option is not dependent on, but would be efficient to partner with, the port-rail shuttle (PMM) and Webb Dock rail access (WDF) (further detail in *What do we think of this option and why? cont'd*).

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

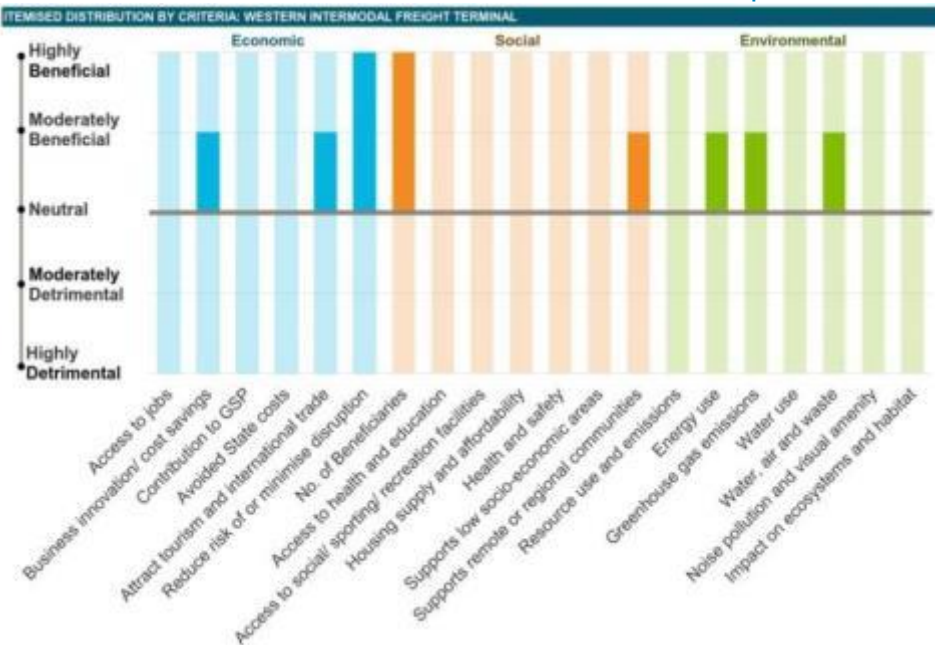
How does this option work with others?

This option would be complementary to the port rail shuttle (PMM) and Webb Dock rail access (WDF). It would be a dependency for the Melbourne to Brisbane inland freight rail line, and a likely dependency for intermodal freight hubs for regional Victoria (IFH).

How does this option perform under different scenarios?

Supercity	+	Reduces conflicts between freight and road traffic
Westside Story	+	Reduces conflicts between freight and road traffic
Regional Cities	+	Reduces conflicts between freight and road traffic
Accelerated Climate Change /Mitigation	+	Facilitates more carbon efficient rail freight
Prolonged/ Severe Economic Downturn	-	Less demand for freight transport
Biosecurity Threat	Neutral	
Bay West	++	Enhances rail supply chains, close to Bay West
Hastings	Neutral	

What are the economic, social and environmental impacts of this option?



What do we think of this option and why? (cont'd)

Establishment of a freight rail line to Truganina would enable this location to serve as a port-rail shuttle (PMM) terminal as well as an interstate rail terminal. Further investigation is required to determine the optimal rail access to WIF, which could include the rail reservation in the Outer Metropolitan Ring (OMR) transport corridor.

Risks and opportunities

This is a high cost asset that is dependent on long-term economic growth to become viable.

This option has the potential to significantly increase the capacity and reduce the cost of interstate freight transport in the north-south and east-west national corridors.

Funding

Should government choose to pursue this project, it will then need to consider funding options. Below is a range of potential funding mechanisms which could be examined to help fund the project.

Potential funding mechanisms

General government revenue	User charges	Beneficiary charges	Property development	Asset sales
✓	✓	✓		✓

The Western Interstate Freight Terminal (WIF) will predominately benefit businesses. Consistent with our principle of aligning costs with beneficiaries, business should significantly contribute to the cost of the project.

General government revenue could contribute to fund part of the project based on the public benefits delivered by the project, such as achieving broader strategic planning objectives, driving more efficient land use outcomes and meeting other social, economic and environmental objectives. Victoria could explore opportunities to seek federal government contributions for projects such as WIF. Federal funding was provided for the Moorebank intermodal terminal in Sydney.

Opportunities to raise additional funding could be pursued through beneficiary charges on nearby businesses if there is a substantial uplift in land values and business activity. A beneficiary charge would ensure that the government captures a portion of the increased value of the land surrounding the terminal following site selection. Beneficiary charges, such as developer contributions or a betterment levy, could be applied and funding raised could be invested in supporting infrastructure for the terminal and terminal precinct. Government could investigate using existing developer contributions such as the Growth Areas Infrastructure Contribution and developer contribution plans.

The development of WIF may create redundant capacity at Dynon, which could be sold or leased by the government to help reduce some of the cost to government. Government could consider urban renewal opportunities at this site that are compatible with abutting land uses.

User charges could also be explored, including access charges. For instance, as part of Victoria's rail access regime, freight operators pay access fees (user charges) to access providers to use the rail infrastructure.

If betterment levies, new developer contributions and user charges are considered by government, it should ensure that new charges do not unfairly duplicate each other or any existing charges.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended for further investigation in the draft strategy. Since then the scope of this recommendation has expanded to include detailing planning for the terminal on the basis of stakeholder feedback. We have also clarified that the timing for delivery may be in 5-15 years, rather than 10-15 years to better align with planning for the Inland rail (new recommendation ref. 13.5.1), depending on exact timing and staging for that project. While this option was assessed assuming that the WIF would be located at Truganina, further investigation to confirm the location is a necessary early step.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Jacobs for Department of Economic Development, Jobs, Transport and Resources, *Port Rail Shuttle project - supply chain analysis*, 20 February 2015

Department of Transport, Planning and Local Infrastructure, *Metropolitan Intermodal System, Project Development Report*, 30 September 2013

Water infrastructure optimisation through increased network connectivity

WIO1

Option type

Incremental expansion of existing assets

New assets

Location

Statewide

Sector

Water and waste

Science, agriculture and environment

Certainty of evidence

Medium

Direct option cost

\$100 million–\$250 million

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 14: Manage threats to water security, particularly in regional and rural areas

Low	Low	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option looks at increasing connections between water supply systems and water sources across the state to improve supply reliability. This would create greater flexibility in the water supply system and improve the ability to respond to shortages. Examples of connections previously provided to increase resilience in extended dry periods include the North South Pipeline and the Goldfields Superpipe. This option considers if additional connections or extensions would be beneficial in allowing water to move to highest value uses across the state.

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option was not recommended in the strategy because at this point there is limited evidence to propose additional major connections to the water grid. There are benefits in increasing connectivity of water supply systems, however, the merit of this may be limited by the cost effectiveness of these connections, differentiation in water supply sources (e.g. access to rainfall independent water sources) and likely changes in land use over time (e.g. changing or shifting agricultural production). The existing water grid provides water security to major towns and cities across Victoria and we assume additional smaller connections identified in *Water for Victoria* will proceed as required.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

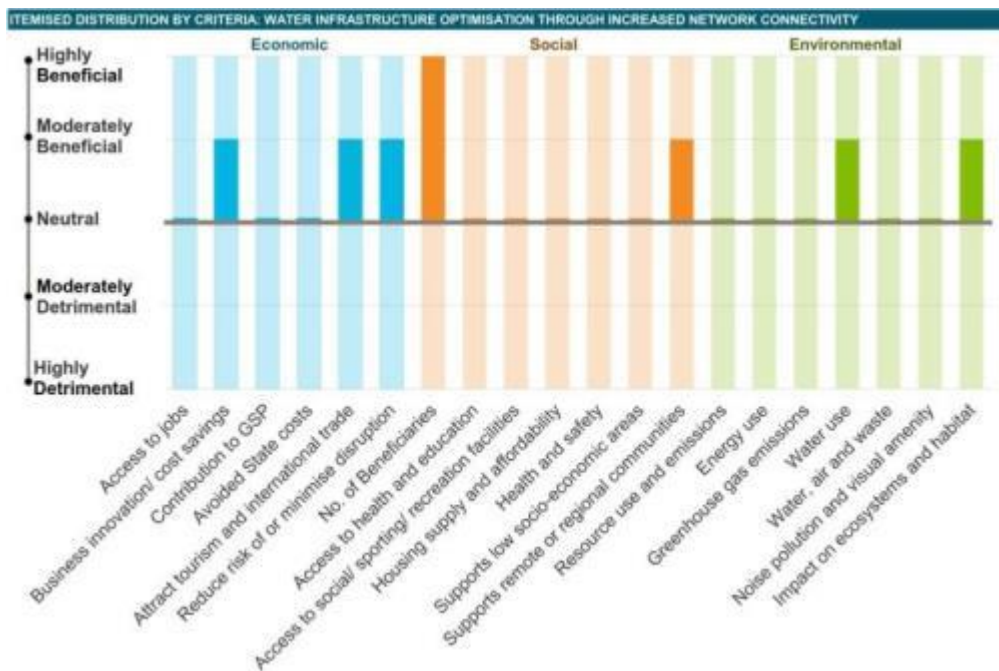
How does this option perform under different scenarios?

Supercity	+	Increased need to address water scarcity
Westside Story	+	Increased need to address water scarcity
Regional Cities	+	Increased need to diversify water resources
Accelerated Climate Change /Mitigation	+	Increased need to address water scarcity
Prolonged/ Severe Economic Downturn	-	Less demand for water
Biosecurity Threat	Neutral	

How does this option work with others?

Where viable this option would extend the geographical scope of the water market (WDE) and allow a larger pool of water resources to be shared amongst water users.

What are the economic, social and environmental impacts of this option?



Risks and opportunities

There is a risk of infrastructure redundancies where major new connections are implemented prior to long-term planning that considers limitations of existing water supply sources and likely areas suitable for additional augmentation.

There is an opportunity for this option to provide water security for some areas through connection to larger or more rainfall independent water sources.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Infrastructure Partnerships Australia and Water Services Association of Australia, *Doing the important, as well as the urgent: Reforming the urban water sector*, 2015

National Water Commission, *Urban water in Australia: Future directions*, 2011

Victorian Department of Environment, Land, Water and Planning, *Water for Victoria: Water plan*, 2016

Water infrastructure optimisation through governance arrangements

WIO2

Option type

Better use through coordination processes

Location

Statewide

Sector

Water and waste

Science, agriculture and environment

Certainty of evidence

Medium

Direct option cost

<\$1 million

Option lead time

<1 year

Contribution to meeting the need (assumes instantaneous implementation)

Need 14: Manage threats to water security, particularly in regional and rural areas

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option is a review to clarify governance arrangements in the water industry. This will provide role clarity, better facilitate long-term planning and investment decisions, and ensure optimal use of infrastructure.

Clear governance structures also enable timely discussions on water resource requirements for the future. For example, where alternative sources of water such as recycled wastewater or harvested stormwater are being considered, governance structures with clear ownership, roles and responsibilities would enable requirements for uptake of these resources to be identified and implemented in a timely manner. Clear governance structures can also assist in delivering financially resilient water businesses over the long term (further detail in *What is this option? cont'd*).

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option was recommended in the strategy (ref. 14.1.1) because it enables implementation of activities that increase water security at a relatively low cost. Major investments to secure water resources during the millennium drought revealed vulnerabilities to traditional planning approaches including limited community engagement. Moving into a new era of greater customer focus, competition and new players in the water market requires us to revisit governance arrangements (IPA WSAA 2015). For example, commitment to a corporatised model, independence and clear responsibility for security of supply, through transparent decision making authority, would better enable innovation and allow water businesses to robustly consider water management options with customers while providing clarity around regulatory requirements for public health and safety outcomes.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

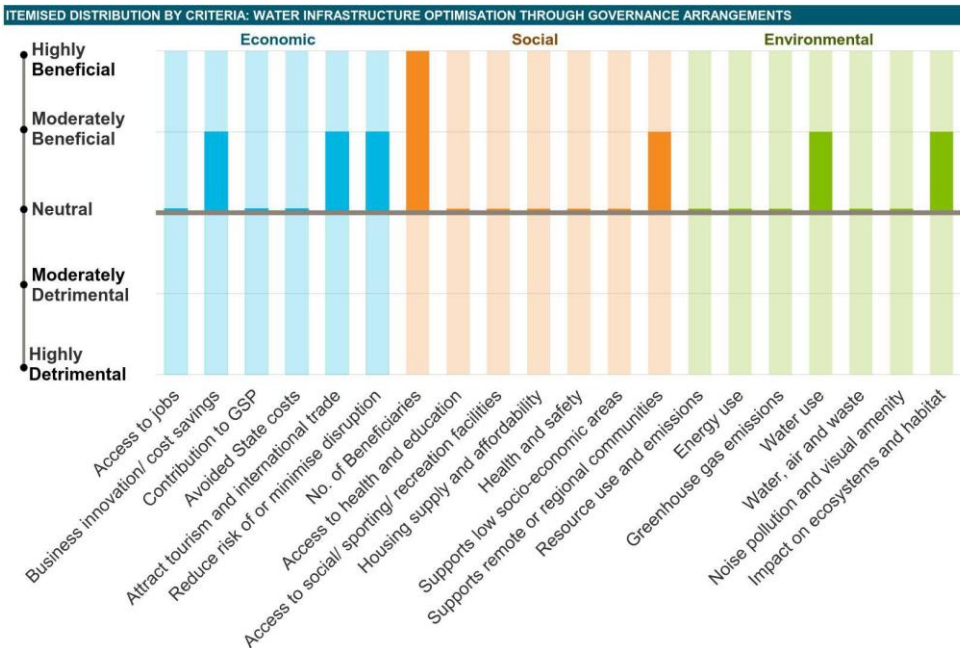
How does this option perform under different scenarios?

Supercity	++	Increased need for effective management of water resources
Westside Story	++	Increased need for effective management of water resources
Regional Cities	++	Increased need for effective management of water resources
Accelerated Climate Change /Mitigation	++	Acute need for effective management of water resources
Prolonged/ Severe Economic Downturn	-	Less demand for water
Biosecurity Threat	Neutral	

How does this option work with others?

Implementation of this option will enable the delivery of other options to better conserve water resources such as stormwater harvesting (SRH), recycling water for non-potable use (RTH), improved pricing signals for water (WME) and augmentations to water supply (RWW, WDP and WIO1).

What are the economic, social and environmental impacts of this option?



What is this option? (cont'd)

The water and wastewater management governance framework in Victoria is generally well regarded across Australia. This option builds on this by ensuring that governance arrangements enable planning in the long-term interest of customers. Simplified, clear and enforceable governance frameworks will assist in moving water to highest value uses in a timely and efficient manner. This will also ensure that policy and delivery functions are clear and that existing infrastructure is utilised efficiently through more targeted investment decisions and better institutional alignment.

Risks and opportunities

There is a risk that inefficient water management decisions are made without implementation of this option. For example, investment decisions may be delayed for too long or implemented during periods of water scarcity with limited opportunity for robust discussions with the community.

There is an opportunity for this option to drive innovation within the water sector by opening up discussions on a range of water demand and supply management measures and the use of a range of technologies.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then we have updated the recommendation in light of the release of the Victorian Government *Water plan* (Oct 2016) and to recognise that the Essential Service Commission's new water pricing approach is being implemented (Oct 2016).

Impact for local government

While there would be immediate benefits in clarifying governance arrangements for agencies and water businesses, this measure should also flow through to clarifying roles and responsibilities of local government. A number of water management aspects, from increased use of recycled water through third-pipe systems (recommendation 14.2.1) to stormwater management measures (recommendations 14.2.2 and 17.1.1) require better clarification of the role for local government. For example, there may be benefit in requiring local governments to refer to water businesses or agencies on stormwater management where developments are only connected to municipal drainage systems.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Infrastructure Partnerships Australia and Water Services Association of Australia, *Doing the important, as well as the urgent: Reforming the urban water sector*, 2015

National Water Commission, *Urban Water in Australia: future directions*, 2011

Productivity Commission, *Australia's urban water sector: Productivity Commission inquiry report*, 2011

Waterway infrastructure to remove pollutants WIR

*Option WIR is addressed in SRQ - Stormwater
quality management*

Water market development

WME

Option type

Better use through coordination processes
 Better use through technological innovations

Location

Statewide

Sector

Water and waste
 Science, agriculture and environment

Certainty of evidence

Medium

Direct option cost

\$10 million–\$25 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 14: Manage threats to water security, particularly in regional and rural areas

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option considers expansion of the water market in Victoria to incorporate different types of water users and different types of water products at the bulk water supply level. The water market played a key role in movement of water across northern Victoria during the millennium drought. It enabled water trading and movement of water to highest value uses. This option considers expansion of the water market to a broader range of water activities including urban, agricultural, industrial, environmental, firefighting and recreational water use. This also includes incorporation of different water products such as recycled treated wastewater and harvested stormwater. This will promote the use of price signals to determine the value of water and drive efficient usage through more sophisticated water trading.

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option was recommended in the strategy (ref. 14.1.2) because it enables management of risks to water shortages through the use of price signals. The ability to trade water is likely to become more important in managing risks and increasing resilience during dry periods. Given costs of large infrastructure connections, the benefits of this option may be more effectively realised at localised levels with benefits accumulating across the state. There is potential for this option to enable further innovation over the long term as different water products become relevant to the water sector and more water users are recognised. This will, however, require a significant amount of work to develop an appropriate trading platform and trading rules and ensure adequate information technology support.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

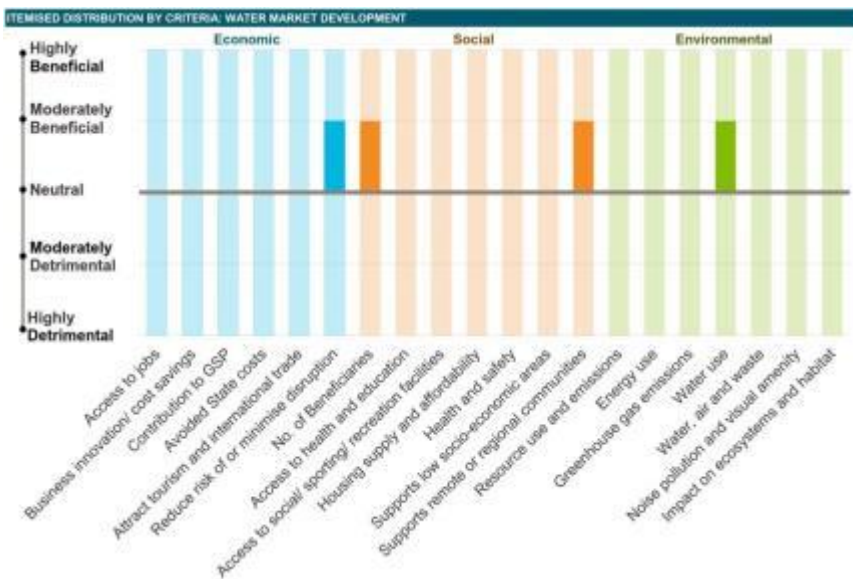
How does this option perform under different scenarios?

Supercity	+	Increased need to address water scarcity
Westside Story	+	Increased need to address water scarcity
Regional Cities	+	Increased need to address water scarcity
Accelerated Climate Change /Mitigation	++	Acute need to address water scarcity
Prolonged/ Severe Economic Downturn	-	Less demand for water
Biosecurity Threat	Neutral	

How does this option work with others?

This option would be strengthened by implementing governance changes (WIO2). Implementing this option would better enable customers to decide the potential scope for uptake of alternative water supply options e.g. desalination capacity (WDP, WSA1), stormwater harvesting (SRH) or recycled water (RTH, RWW).

What are the economic, social and environmental impacts of this option?



Risks and opportunities

The water market's capability to represent different water sources and the outcomes of water trading particularly during dry periods may be difficult to predict. There is a risk of infrastructure redundancies if more customers choose to manage their demand rather than pay for more expensive water.

There is also a risk of equity issues where operation of the water market leads to strong competition between water demands to meet basic needs and water demands to meet high value agricultural demands in extended dry periods.

There is an opportunity for this option to enable timely delivery of water to highest value uses particularly during dry periods. There is also an opportunity for this option, coupled with the ability to carry-over water, to further improve resilience by enabling bulk (urban) water suppliers and irrigators to manage water supply risks.

Additional notes

Background discussion

Victoria has had a water market since 1991. This market enables water users to buy and sell entitlements to water. A key advantage of this is clear price signals during dry periods which transparently allows water to move to highest value uses. Participants in the water market include users or owners of water, for example irrigators, water utilities, or the environmental water holder, and intermediaries such as brokers, conveyancers, banks. The government provides oversight of the market and continually improves trading rules and platforms. The Victorian Water Register has more information on operation of the market.

The water market has been increasingly active in northern Victoria where trades can also occur with counterparts in New South Wales and South Australia. This activity reflects broader water management reform in the Murray Darling Basin. There is scope to consider how the water market can be extended to the rest of Victoria. Given a 30-year outlook, there is also scope to consider how new entrants to the water market (e.g. water for firefighting or water for recreational use) and new water sources can be effectively incorporated into the market.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Australian Government Bureau of Meteorology, *Water market information*

Frontier Economics, *Potential water market expansion: A report prepared for Infrastructure Victoria*, 2016

National Water Commission. *The National Water Initiative – securing Australia's water future*, 2011.

Victorian Department of Environment, Land, Water and Planning, *Water for Victoria: Water plan*, 2016

Wastewater management in small towns

WMS

Option type

Better use through coordination processes

Location

Regional and rural Victoria

Sector

Water and waste

Certainty of evidence

Low

Direct option cost

\$1 million–\$10 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 17: Improve the health of waterways and coastal areas

Low	Low	Low	Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option focuses on investment in wastewater management in small towns. Failing septic tanks can cause environmental problems and pose public health and safety risks. Most small towns in Victoria have ageing septic tanks and would benefit from clearer planning on wastewater management. This option proposes government leadership on an approach to managing wastewater in small towns. This includes a review of current practice, governance arrangements and infrastructure requirements.

What is the level of community support?

There was limited discussion of this option during public consultation. This may be as it was not recommended in the draft strategy.

What do we think of this option and why?

This option was not recommended in the strategy because more evidence is required to better understand the environmental risks associated with unsewered properties and develop solutions. Research is required to establish the impact of ageing septic tanks on the environment including groundwater and waterways and identify locations where this is a critical issue. This will be key to determining the scope of a solution. Recommending a research study to meet a possible infrastructure requirement was deemed out of scope for the strategy. However, this will be reviewed should additional specific information become available.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

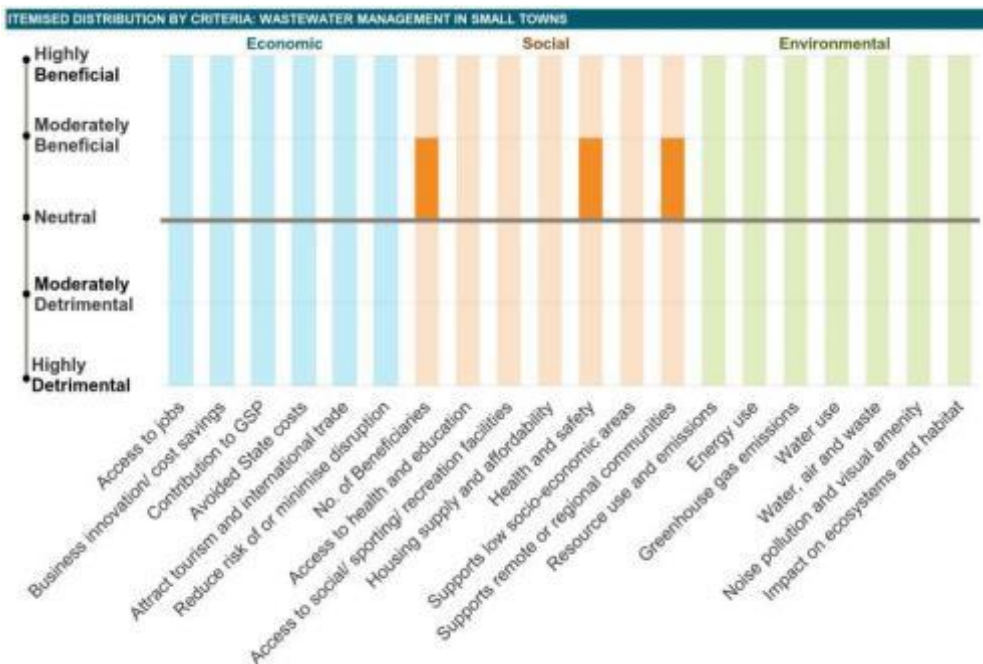
How does this option perform under different scenarios?

Supercity	Neutral	
Westside Story	Neutral	
Regional Cities	++	Increased need to address risks associated with use of septic tanks
Accelerated Climate Change /Mitigation	+	Increased need to maintain waterway health
Prolonged/ Severe Economic Downturn	+	Less demand for wastewater services
Biosecurity Threat	Neutral	

How does this option work with others?

No key relationships with other options have been identified.

What are the economic, social and environmental impacts of this option?



What is this option (cont'd)

The New South Wales Office of Water manages a Country Towns Water and Sewerage Program scheduled to run until 2016/17 and with a total funding commitment of more than \$1.2 billion. This program adopts *Best Practice Management of Water Supply and Sewerage Guidelines* which provide some advice on sewer backlog areas (areas serviced by septic tanks).

South Australia has also explored a community-based approach to wastewater management in rural townships that adopts integrated water cycle management principles.

Risks and opportunities

It may be difficult to align funding from different levels of government and private landholders to invest in solutions recommended through policy development.

This option could be expanded from existing septic tanks to include requirements and guidelines for new developments related to septic tanks.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

HDS Australia, *The South Australian approach to rural township community wastewater management*, 2010

NSW Department of Water and Energy, *Best practice management of water supply and sewerage guidelines*, 2007

Victorian Auditor-General, *Protecting our environment and community from failing septic tanks*, 2006

Water pricing reform

WPR

Option type

Better use through regulation

Location

Statewide

Sector

Water and waste

Certainty of evidence

Not determined

Evidence base

Infrastructure Partnerships Australia, *Water Services Association of Australia, Doing the important, as well as the urgent: Reforming the urban water sector*, 2015

Essential Services Commission, *Water pricing framework and approach: Implementing PREMO from 2018*, 2016

Essential Services Commission, *A new model for pricing services in Victoria's water sector*, 2016

Direct option cost

Not determined

Contribution to meeting the need

Likely to contribute to:

Need 14. Manage threats to water security, particularly in regional and rural areas

Need 17. Improve the health of waterways and coastal areas

What is this option?

This option involves reforming the water pricing process to increase incentives for efficiency and innovation at the retail water supply level.

Assuming that the water market will be developed to enable bulk water purchase across competing water uses in Victoria, this option considers the effectiveness of pricing approaches for water and wastewater treatment, distribution and retailing aspects. Current pricing approaches may not adequately provide signals for innovation in technology, operations or service delivery. For example, consumers may be interested in more opportunities to actively manage their water use through access to real time data. This can lead to optimised water supply and delivery models that increase resource use efficiency. Over the long term, this would benefit households, businesses and the environment.

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option was not recommended in the strategy because it is now considered base case. After the release of *All Things Considered*, the Essential Services Commission (ESC) also released a position paper proposing *A new model for pricing services in Victoria's water industry* (2016). The ESC has now also confirmed that this new model will be implemented by publishing the pricing framework and approach for water businesses (2016). The scope of changes proposed by the ESC would result in incentives for efficiency, innovation and improve customer engagement at the retail water supply level. The ESC's new pricing approach has therefore been adopted as base case in place of this option. We will continue to monitor progress in implementing this new methodology with a view to updating and re-scoping this option in the future if needed.

Wallan rail electrification WRE1

Option type

Incremental expansion of existing assets

Location

Melbourne northern subregion

Sector

Transport

Certainty of evidence

Medium

Direct option cost

\$3 billion–\$5 billion

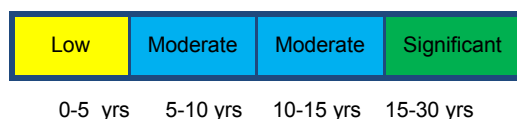
Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 1: Address infrastructure demands in areas with high population growth; and

Need 10: Meet growing demand for access to economic activity in central Melbourne



What is this option?

Extend the electrified metropolitan rail network to Wallan. The scope includes the utilisation of the Upfield Line via the reinstatement of tracks between Upfield to Somerton with duplication of the track between Gowrie and Upfield, construction of a new track pair from Roxburgh Park to Craigieburn and electrification works between Upfield and Wallan. It also includes upgrades to existing stations on this corridor and new stations at Lockerbie and Beveridge.

This extension to the electrified network will give greater access to the new growth areas in Melbourne's north through additional services to Seymour, Wallan, Upfield and Craigieburn. It will improve capacity and reliability across these lines and operations across the network. Furthermore it will enable more efficient access to central Melbourne and support access to jobs and services.

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive.

What do we think of this option and why?

This option was recommended in the strategy (ref. 1.3.8, 10.8.5) because it upgrades a section of the regional rail network that is projected to come under substantial pressure from metropolitan growth, and delivers improved services and reduced crowding for both metropolitan and regional passengers. It is recommended to be delivered in the early part of 15-30 years. The existing service, with lower capacity regional trains, is projected to be impacted by demand growth from the northern growth corridor. This option is dependent on additional capacity being provided to the Craigieburn and Upfield lines by the City Loop Reconfiguration (CLR) (ref. 10.10.1). In combination with CLR, the preliminary cost benefit ratio is modest, but this initial result likely underestimates the benefits. The reinstatement of the Somerton Link between the Craigieburn and Upfield Lines could be accelerated to support additional regional and Craigieburn services in the short term.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

How does this option work with others?

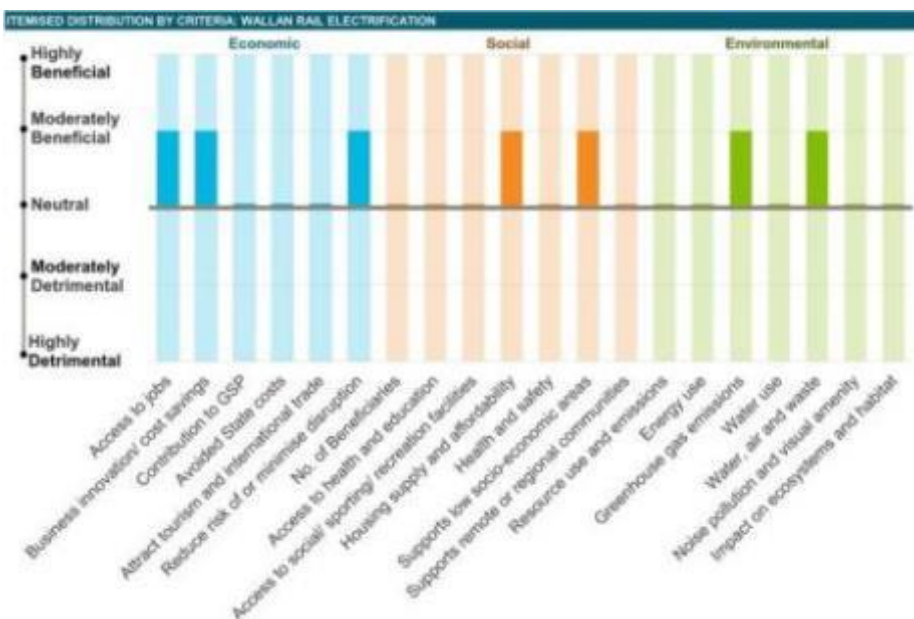
This option is dependent on the delivery of City Loop reconfiguration (CLR) to provide additional capacity for increased services. There are a number of other options that will complement this option and maximise the benefits including high capacity trains - 7 car (HCT3) and rail signals and fleet upgrade (RSF).

The ability of this option to ease road congestion will be dependent on it being combined with demand management measures such as transport network pricing (TNP).

How does this option perform under different scenarios?

Supercity	++	Supports mode shift to address congestion
Westside Story	+	Supports mode shift to address congestion
Regional Cities	+	Supports mode shift to address congestion
Accelerated Climate Change /Mitigation	+	Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	-	Less demand for mass transit
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



Risks and opportunities

With the change from diesel rolling stock to suburban electrified rolling stock, there is a risk that the community may not support the loss of carriage seating and conductor service. Negative sentiments might delay the roll out of the project and potentially the demand for the new services that electrification would offer.

There is the opportunity to enhance the greater power grid during the electrification of the regional rail lines. This could support power upgrades to growing communities along the rail corridor saving future disruption and capital costs.

Funding

Should government choose to pursue this project, it will then need to consider funding options. Below is a range of potential funding mechanisms which could be examined to help fund the project.

Potential funding mechanisms

General government revenue	User charges	Beneficiary charges	Property development	Asset sales
✓	✓	✓	✓	

General government revenue is likely to be a major source of funding for projects like Wallan rail electrification as the benefits of the project are shared by transport users in a broad area between Wallan and Melbourne's CBD.

Should this project include new train stations, beneficiary charges could be considered if there is a substantial uplift in land values and business activity in the vicinity of the new train stations. These include developer contributions, which could be levied on new developments occurring in the vicinity of new train stations. Parts of this project could be eligible for funding from existing developer contributions such as the Growth Areas Infrastructure Contribution. Some funding could also be raised from betterment levies applied to commercial and/or residential properties in a defined catchment around new train stations to capture a portion of the additional land and business value created by the project. If developer charges and betterment levies are both considered by government, it should ensure that new charges do not unfairly duplicate each other or any existing charges.

Property development could also be considered, for example, selling or leasing land and air rights surplus to government requirements at new train station sites for commercial, residential or retail development. Property development can assist in putting underutilised government land and space to higher and better uses, creating added value through improved amenity and access to services.

Existing user charges (public transport fares) should continue to be charged but are only expected to cover a portion of ongoing operating costs.

Infrastructure Victoria is examining transport network pricing as part of our research program. We think that the primary objective of a transport network pricing regime – where users pay to access and use the transport network – should be to manage demand, rather than to recover costs for infrastructure. We are focusing on examining road pricing regimes in metropolitan Melbourne as a first step towards a comprehensive transport network pricing regime that includes roads and public transport. Careful consideration must be given to the design of the regime to ensure it is efficient, fair and sustainable.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended in the draft strategy. Since then the scope of this recommendation has been refined to highlight that reinstatement of the Somerton Link between Craigieburn and Upfield lines could be accelerated in the short term and the possible benefits from an earlier delivery. We have also clarified that new stations are included in the scope of this recommendation. This is consistent with other similar rail extensions or electrification recommendations.

Transport modelling

Infrastructure Victoria commissioned KPMG, Jacobs and Arup to undertake transport modelling for a number of options being considered for the strategy, including a variety of 'build' and 'non-build' transport options. This allowed major transport projects to be quantitatively assessed alongside several technology, policy and reform options. In addition, economic analysis was undertaken for the 'build' options to estimate a cost benefit ratio, including for this option. The options were modelled individually, mostly on a standalone basis, with a number of options then also tested in various combinations.

This analysis was undertaken on a different basis and produced different results to what is presented throughout the options book, which was prepared by AECOM/PwC with the intention of allowing a mixture of qualitative and quantitative assessment across the full range of options, across all sectors and needs. While on the face of it these two analyses reference similar metrics, different assumptions and methodologies have been applied. In particular, the KPMG/Jacobs/Arup assessment provided purely relative ratings of each option's contribution to the needs, with the ratings scale set by the performance of only the select range of options modelled. This had the result of showing some transport options as making a "high" contribution to Need 18 (transition to lower carbon energy supply and use) simply because they were the highest of the options modelled; however, in Infrastructure Victoria's judgement most transport sector options will make a much lower contribution than energy sector options, as transport comprises a much smaller proportion of total carbon emissions. It provides a useful assessment for sorting the relative contribution of the options modelled, but should not be taken as an absolute assessment. In contrast, the assessments developed in the AECOM/PwC assessment considered the full range of options identified for each need and provided more of an 'absolute' assessment.

With these caveats in mind, however, the results of this alternative analysis are helpful inputs into Infrastructure Victoria's 'global' assessment, and in preparing the strategy we have come to a considered view based on the totality of evidence available to us.

The preliminary cost benefit ratio range of the Wallan Rail Electrification, in combination with the City Loop Reconfiguration (CLR) on which it is dependent, is 0.8 - 1.1 without wider economic benefits (WEBs) or 0.9 - 1.2 with WEBs, a modest result.

The modelling of the Wallan electrification, however, showed overcrowding to the north of Craigieburn even with the option in place, indicating the service plan did not match demand (it had not been optimised, due to the preliminary nature of the modelling) and suggesting that benefits had likely been underestimated. As such, the incremental contribution of the Wallan rail electrification to the above result would be very poor (costs outweighing the benefits) and further work would be required to undertake an assessment more reflective of the likely benefits.

While this is a modest economic result, it suggests this option is worthy of detailed economic assessment, including to resolve the identified service plan issue.

Next steps

Further project development should consider the opportunity to deliver the electrification to Wallan in stages. The first stage could involve the reinstatement of tracks between Upfield and Somerton with the diversion of regional services via the Upfield line to provide additional capacity on the Craigieburn line in the short-term. A second stage could then involve the extension of the electrified network from Craigieburn to Wallan. This staged approach could delay the need for delivery of the electrification component.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Public Transport Victoria, *Network development plan: Metropolitan rail*, 2012

Victorian Department of Economic Development, Jobs, Transport and Resources, *Melbourne Metro business case*, 2016

KPMG/Arup/Jacobs, *Economic appraisal and demand modelling*, 2016

Wollert rail extension WRE2

Option type

New assets

Location

Melbourne northern subregion

Sector

Transport

Certainty of evidence

Low

Direct option cost

\$500 million–\$750 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 1: Address infrastructure demands in areas with high population growth

Moderate	Moderate	Significant	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

Need 10: Meet growing demand for access to economic activity in central Melbourne

Moderate	Moderate	Moderate	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Extend the electrified metropolitan rail network to Wollert. The new electrified section would extend from Lalor to Wollert as a spur line off the South Morang Line. This extension to the electrified network will give greater access to the new growth areas in Melbourne's north and reduce reliance on private vehicles. It will enable more efficient access to central Melbourne and support access to jobs and services (further detail in *What is this option? cont'd*).

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive.

What do we think of this option and why?

This option was recommended for further investigation in the strategy (ref. 1.3.9 and 10.8.6) because of the need to prepare a feasibility study for a future high capacity link in this growth area to meet future demand for access to the central city. The rail extension to Wollert was assessed as providing a moderate to significant contribution over time to needs 1 and 10 for a moderate cost. There is a risk that this growth corridor could be further cut off from a high capacity transport link that it may require in the future without the feasibility work being completed. We have recommended this feasibility study to be completed within 0-5 years with a view to the construction of a bus or rail link within 15-30 years. This feasibility study should consider all transport modes for a staged activation as a busway or railway as demand warrants. In the short-term, public transport in the corridor can be provided through Growth area bus service expansion (LBS) and SmartBus network extensions and service increases (SNE) to support trips within the Wollert region and to access the central city. Although this option is rated as providing a significant contribution to meeting the needs, this new transport corridor will service a smaller population catchment area than the Melton (MRE1) or Wallan (WRE1) electrification options.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

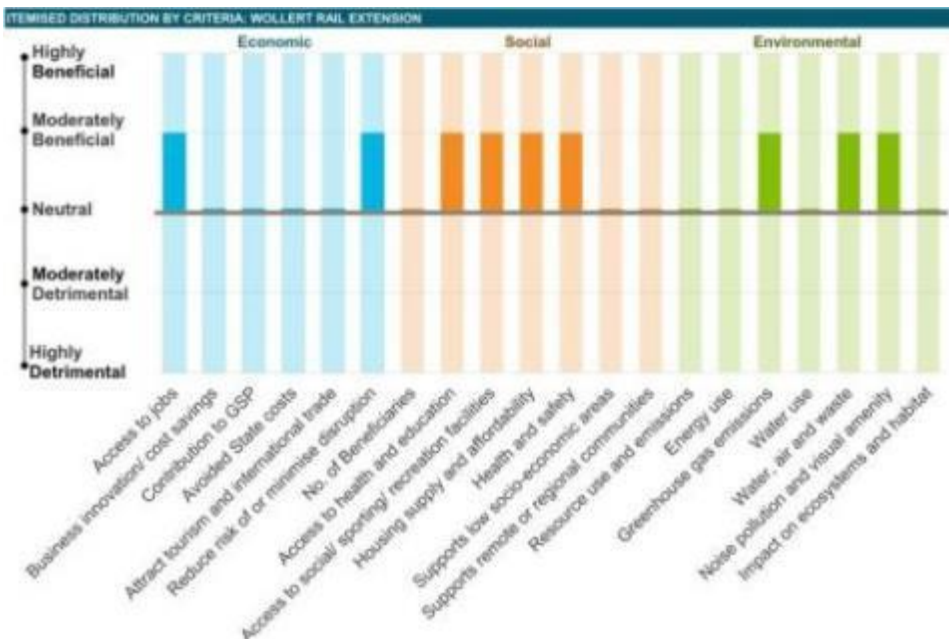
How does this option work with others?

This option is dependent on Melbourne Metro 2 (MMS) to provide capacity to the central city. There are a number of other options that will complement WRE2 and maximise the benefits of this option including high capacity trains - 7 car (HCT3) and rail signals and fleet upgrade (RSF). The ability of this option to ease road congestion will be dependent on it being combined with demand management measures such as transport network pricing (TNP).

How does this option perform under different scenarios?

Supercity	++	Supports mode shift to address congestion
Westside Story	Neutral	
Regional Cities	+	Supports mode shift to address congestion
Accelerated Climate Change /Mitigation	+	Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	-	Less demand for mass transit
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



What is this option? (cont'd)

To serve the growth areas of Epping North and Wollert in the nearer term (as well as define the corridor for potential future rail service) a new busway could be implemented utilising the median or edges of High Street. This bus rapid transit service could be operated to light rail standards (with complete traffic segregation, signal prioritisation, defined stations, and dedicated, potentially articulated rolling stock) and would include the provision of a convenient transfer arrangement both to/from trains at Lalor Station.

This staged approach could support the intensification of land development patterns necessary to support the future implementation of a full rail service.

Risks and opportunities

Without other network upgrades there is a risk that only a limited number of services may be delivered to Wollert. This could limit the number of people who switch from driving to taking the train to work and the resulting congestion reduction benefits.

There is an opportunity to integrate a new bus network around the rail extension to support efficient journeys from home to where people want to travel. This could reduce congestion on the surrounding suburban streets.

There is a risk that if the available sections of the corridor are not protected for a high capacity transport link then it may not be practical to deliver it in the future.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Public Transport Victoria, *Network development plan: Metropolitan rail*, 2012

Water supply augmentation WSA1

Option type

New assets

Location

Regional and rural Victoria

Sector

Water and waste

Certainty of evidence

Low

Direct option cost

\$5 billion–\$10 billion

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 14: Manage threats to water security, particularly in regional and rural areas

Significant	Significant	Significant	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option seeks to significantly increase water supply in Victoria through new desalination and new groundwater capacity. In the short-term, there are a number of initiatives available to secure water resources during dry periods. However, Victoria is still largely dependent on surface water resources. Assuming current climate projections that indicate that Victoria will have a warmer, drier climate in the future, this option considers additional major rainfall independent water supply sources that can provide water security. This may include new desalination capacity. It is unlikely that groundwater resources in Victoria can provide major water supply augmentation; however, this can be considered as well.

This option is different from the expansion of Wonthaggi desalination plant (WDP) in that it considers major new capacity for the long term.

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option was recommended for further investigation in the strategy (ref. 14.3.1) because major new desalination capacity or additional groundwater resources could be possible means for future water supply augmentation, alongside a range of other options. This option could provide a significant contribution to meeting need 14, although the timing of the need is very uncertain and we have recommended identification of trigger points. Water supply in Victoria has traditionally relied on storages, and this has created risks to supply in extended dry periods. Given projections of a warmer, drier future, technologies that supply water from rainfall independent sources should be considered.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

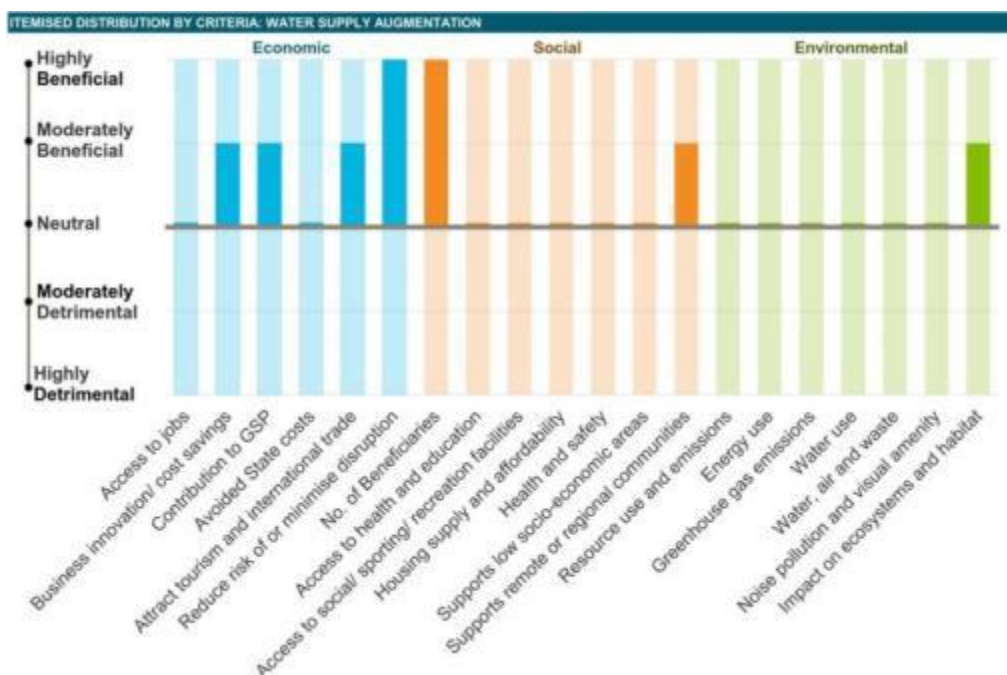
How does this option perform under different scenarios?

Supercity	++	Increased need to address water scarcity
Westside Story	++	Increased need to address water scarcity
Regional Cities	+	Would reduce reliance on regional storages in dry periods
Accelerated Climate Change /Mitigation	++	Acute need to address water scarcity
Prolonged/ Severe Economic Downturn	-	Less demand for water
Biosecurity Threat	Neutral	

How does this option work with others?

This option could be an alternative to recycling wastewater for drinking (RWW). The need for this option could be significantly delayed by localised water management solutions such as stormwater harvesting (SRH) and recycled water for non-potable use (RTH).

What are the economic, social and environmental impacts of this option?



Commentary:

Major new water supply augmentation outside of Melbourne may deliver economic and social benefits, through improved resilience to changes in rainfall availability.

Risks and opportunities

There is a risk that major extraction of groundwater resources would be limited by sustainable yields, however smaller scale localised solutions may be available. There is an opportunity to utilise advances in desalination technology to deliver additional rainfall independent water resources at lower costs.

Funding

Though this option has only been recommended for further planning work as one of a range of possible solutions, Should government choose to pursue this project, it will then need to consider funding options.

Potential funding mechanisms

General government revenue	User charges	Beneficiary charges	Property development	Asset sales
	✓			

Water projects are typically, and should continue to be, funded through user charges. For example, the cost of the current Wonthaggi desalination plant is being recovered through user charges. There are a large number of identifiable direct beneficiaries and user charges could provide a clear price signal to incentivise users to use water more efficiently by managing or shifting demand.

Like other user charges, government would need to consider balancing competing objectives, such as changing behaviour, managing demand, cost recovery and addressing social and environmental impacts.

Additional notes

Changes to recommendations from the draft strategy

This option was recommended for further investigation in the draft strategy. Since then we have updated the recommendation in light of the release of the Victorian Government *Water plan* (Oct 2016) and to recognise that the Essential Service Commission's new water pricing approach is being implemented (Oct 2016). We have also highlighted the importance of community engagement.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Infrastructure Partnerships Australia and Water Services Association of Australia, *Doing the important, as well as the urgent: Reforming the urban water sector*, 2015

South Eastern Australian Climate Initiative, *Climate and water availability in south-eastern Australia: A synthesis of findings from Phase 2 of the South Eastern Australian Climate Initiative (SEACI)*, 2012

Victorian Department of Environment, Land, Water and Planning, *Managing extreme water shortage in Victoria*, 2016

Victorian Department of Environment, Land, Water and Planning, *Water for Victoria: Water plan*, 2016

Water supply augmentation through building new dams

WSA2

Option type

New assets

Location

Statewide

Sector

Water and waste

Certainty of evidence

Medium

Direct option cost

\$250 million–\$500 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 14: Manage threats to water security, particularly in regional and rural areas

Low	Low	Low	Low
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

This option considers building new dams to provide additional water supply for Victoria.

While current climate projections indicate that Victoria will have a warmer, drier climate, this option considers water catchments that can provide suitable rainfall runoff yields to enable the construction of new dams. Benefits of this would be creation of additional water resources for consumptive purposes, therefore increasing water security.

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option was not recommended in the strategy because it is not likely to provide sufficient volumes for substantial augmentation to water supplies. Water in northern Victoria is fully allocated and there is a cap on further extraction for rivers that drain into the Murray Darling Basin. This means that there would be no opportunities for major dams in the north. In southern Victoria opportunities are limited with regards to suitable yields and are likely to be highly limited when environmental impacts are considered. Given projections of a warmer, drier future for Victoria, if major augmentation projects are being considered technologies that are independent of rainfall are likely to be more effective and environmentally sustainable. No economic, social and environmental impact assessment was undertaken.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	N/A
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

How does this option work with others?

Where feasible at a large scale, this option could be an alternative to other water supply augmentation options such as recycling wastewater for drinking (RWW), additional desalination capacity (WDP) or additional groundwater capacity (WSA1).

Risks and opportunities

Current projections indicate a likely reduction in rainfall in future and a subsequent reduction in rainfall runoff yields. Therefore, there's a risk of insufficient flows to fill large new dams. This is compounded by the need to ensure sufficient natural flows for the environment and to minimise further environmental degradation. Where feasible, and if included in design objectives, this option could, however, assist to mitigate the impacts of flooding. Whether this would be a cost effective approach to flood mitigation would however need consideration.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

South Eastern Australian Climate Initiative, *Climate and water availability in south eastern Australia, A synthesis of findings from Phase 2 of the South Eastern Australian Climate Initiative (SEACI)*, 2012

University of Melbourne, *Stormwater harvesting and the potential for new dams in Victoria*, 2016

Victorian Department of Environment, Land, Water and Planning, *Water for Victoria: Water plan*, 2016

How does this option perform under different scenarios?

Supercity	++	Increased need to address water scarcity
Westside Story	++	Increased need to address water scarcity
Regional Cities	+	Increased need to address water scarcity
Accelerated Climate Change /Mitigation	Negative environmental impact with lower rainfall runoff yields	
Prolonged/ Severe Economic Downturn	-	Less demand for water
Biosecurity Threat	Neutral	

Wind and solar energy generation large scale investments

WSE

Option type

Better use through subsidies

Better use through funding agreements

Location

Statewide

Sector

Energy

Certainty of evidence

Medium

Direct option cost

>\$10 billion

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 18: Transition to low carbon energy supply and use

Significant	Significant	Significant	Significant
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Statewide auction schemes to develop renewable energy. Based on developed targets for renewable energy development in Victoria, this option proposes to subsidise renewable energy generation by the implementation of a statewide auction scheme where proponents bid to develop renewable energy. Projects would be chosen on a 'value for money' basis, and proponents would enter into long-term contracts with the Victorian Government in some capacity. This would provide flexibility on project administration and cost recovery (further detail *in What is this option? cont'd*).

What is the level of community support?

There was a high level of discussion of this option during consultation. Responses were generally positive. This option was recommended by the regional citizen jury.

What do we think of this option and why?

This option was not recommended in the strategy because it is now considered base case. The renewable energy auction scheme recently announced by the government is likely to see the development of more wind and solar projects in Victoria as these technologies are currently mature, cost effective and scalable. This option has therefore been assumed to be base case, assuming that the government will monitor timely development of renewable energy resources.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

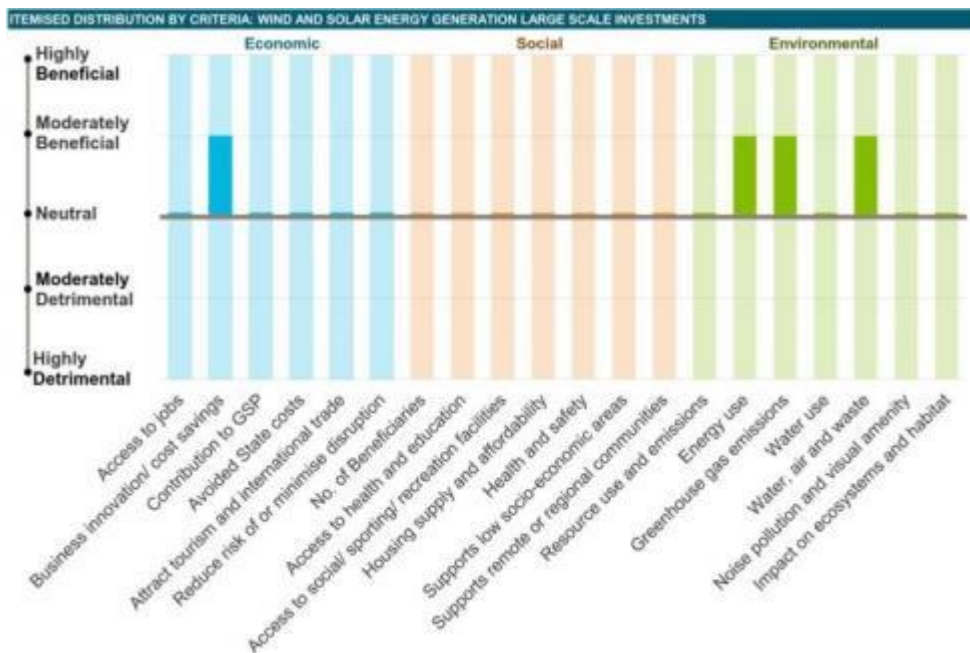
How does this option perform under different scenarios?

Supercity	+	Increased need for more energy supply
Westside Story	+	Increased need for more energy supply
Regional Cities	+	Increased need for more energy supply
Accelerated Climate Change /Mitigation	++	Acute need to reduce carbon emissions
Prolonged/ Severe Economic Downturn	-	Less demand for energy
Biosecurity Threat	Neutral	

How does this option work with others?

This option can complement withdrawal of brown coal generation (BCA, BCL) by developing large scale renewable energy generation.

What are the economic, social and environmental impacts of this option?



What is this option? (cont'd)

Evidence indicates that large scale wind and solar farms will be the major sources of low emission energy over the next 30-years. Any energy transition policy is therefore likely to focus on the build out of these generation technologies. This option involves the development of a program that subsidises investments in large-scale renewable generation in Victoria. Similar incentive schemes are currently in operation nationally, through the Large-scale Renewable Energy Target (LRET) and in states and territories, such as the ACT Renewable Energy Target.

Risks and opportunities

There is a risk that the benefits of this option would be limited by availability of options to manage intermittent energy supply, for example large scale battery storage technology or utilisation of gas supply. Intermittent energy sources can negatively impact on supply reliability.

There is a risk of unforeseen negative impacts on electricity prices.

Based on current technology developments, there is an opportunity however for large-scale investment in renewable energy to reduce the unit cost of power. This could provide savings for customers in the longer term.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

CSIRO, *Australian electricity market analysis report to 2020 and 2030*, 2014

Electric Power Research Institute, *Australian power generation technology report*, 2015

Victorian Department of Economic Development, Jobs, Transport and Resources, *Victoria's renewable energy roadmap*, 2015

Victorian Government, *Renewable energy targets to create thousands of jobs*, 2016

Water taxis/buses/ferries to the central city

WTB

Option type

New assets

Location

Barwon region

Melbourne western subregion and Melbourne central subregion

Sector

Transport

Certainty of evidence

Medium

Evidence base

Deloitte/Aurecon, *Assessment 1: Options analysis report*, 2016

Victorian Department of Planning and Community Development, *Melbourne ferries background study: Discussion paper*, 2013

Direct option cost

<\$100 million

Contribution to meeting the need

Need 10. Meet growing demand for access to economic activity in central Melbourne – **Negative/very low**

What is this option?

Utilising the bay and rivers to provide a waterborne public transport service to the CBD from points such as Portarlington, Williamstown, West Werribee and along the Yarra and Maribyrnong rivers. This would provide an alternative transport option to people living in the growth areas of Melbourne's west and Bellarine Peninsula. A discussion paper was released in 2013 to identify the preconditions that are necessary for viable commuter services between Docklands, Williamstown, Point Cook, Werribee South, Geelong and Portarlington. This option has been assessed on its merits, in the first instance from a neutral stance about the level of public or private involvement.

This service would offer a different transport experience to existing road and rail options for people accessing jobs and services in the central city.

What is the level of community support?

There was limited to no discussion of this option during consultation. The option was recommended by the metropolitan citizen jury, but was opposed by the regional jury.

What do we think of this option and why?

This option was not recommended in the strategy because no further evidence has been found that might alter Infrastructure Victoria's earlier assessment that this option performed poorly in terms of cost and contribution. However, while we do not think that government investment is warranted for such services, it is open to the private sector to offer ferry services to the market.

Wyndham Vale to Werribee rail extension WVW

Option type

Incremental expansion of existing assets

Location

Melbourne western subregion

Sector

Transport

Certainty of evidence

Medium

Direct option cost

\$500 million–\$750 million

Option lead time

1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 1: Address infrastructure demands in areas with high population growth; and

Need 10: Meet growing demand for access to economic activity in central Melbourne

Moderate	Moderate	Moderate	Moderate
0-5 yrs	5-10 yrs	10-15 yrs	15-30 yrs

What is this option?

Extend the electrified metropolitan rail network between Wyndham Vale and Werribee and construct a new station at Black Forrest Road. The extension will accommodate future growth in Werribee West and provide a direct rail to rail interchange for passengers travelling between the Geelong and Werribee lines. Since the completion of Regional Rail Link, Geelong services no longer use the Werribee rail corridor. Currently a bus service meets each train at Wyndham Vale to connect with Werribee Line services. This option will give greater access to the new growth areas in Melbourne's west through additional services and new stations. It will enable more efficient access to central Melbourne and support access to jobs and services such as at the East Werribee National Employment Cluster (NEC).

What is the level of community support?

There was a moderate level of discussion of this option during consultation. Responses were generally positive.

What do we think of this option and why?

This option was recommended in the strategy (ref. 1.3.4, 10.8.2 and 12.3.1) because of the need to provide additional capacity to meet the projected growth in demand on the Geelong-Melbourne transport corridor and improve travel times. The delivery of a new link between Wyndham Vale and Werribee makes a moderate contribution to the needs and a strong contribution across the economic, social and environmental indicators. This option was recommended for delivery within 5-15 years when the demand for the existing service schedule is likely to lead to overcrowding and increased travel times, particularly along the new Regional Rail Link section between West Werribee and Deer Park West. It will allow for the separation of through services from Geelong and additional short-starting services to access the central city via Werribee from the growth areas in western Melbourne (further detail in *What do we think of this option and why? cont'd*).

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Consistent
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	N/A

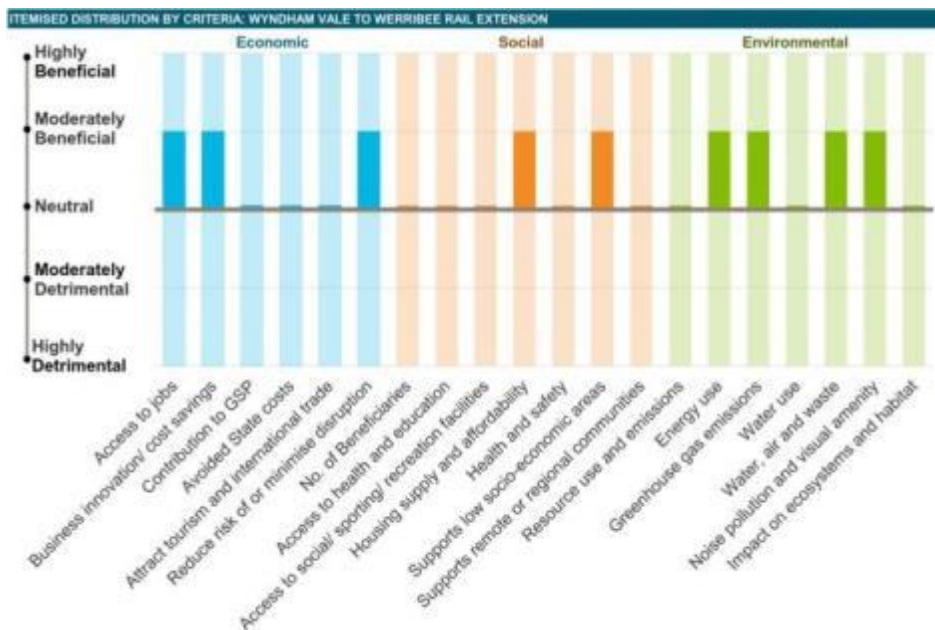
How does this option work with others?

There are a number of other options that will maximise the benefits of this option including growth area train station upgrade and provision (GAT), rail signals and fleet upgrade (RSF) and public transport train timetabling (PTT). This option also enables network expansions such as Geelong rail electrification (GRE) and Geelong and Werribee rail upgrades (GWR). The ability of this option to ease road congestion will be dependent on it being combined with demand management measures such as transport network pricing (TNP).

How does this option perform under different scenarios?

Supercity	++	Supports mode shift to address congestion
Westside Story	+	Supports mode shift to address congestion
Regional Cities	+	Supports mode shift to address congestion
Accelerated Climate Change /Mitigation	+	Supports more energy efficient travel
Prolonged/ Severe Economic Downturn	-	Enables more affordable transport options
Biosecurity Threat	Neutral	

What are the economic, social and environmental impacts of this option?



What do we think of this option and why? (cont'd)

In order to provide a medium term solution to the transport task on this corridor, WVV is recommended for implementation with options Geelong and Werribee rail upgrade (GWR) and Geelong rail electrification (GRE). The final sequence and timing of these individual options requires further investigation and development.

Risks and opportunities

Without other network upgrades there is a risk that only a limited number of services may be delivered along this connection. This could limit the number of people who switch from driving to taking the train to work and the resulting congestion reduction benefits.

There is an opportunity to relocate the Newport Workshops to Wyndham Vale with this option. This could free up valuable inner city land for redevelopment and provide employment in a high growth area.

Funding

Should government choose to pursue this project, it will then need to consider funding options. Below is a range of potential funding mechanisms which could be examined to help fund the project.

Potential funding mechanisms

General government revenue	User charges	Beneficiary charges	Property development	Asset sales
✓	✓	✓	✓	

General government revenue is likely to be a major source of funding for projects like Wyndham Vale to Werribee rail extension as the benefits of the project are shared by transport users along the regional rail corridor to Geelong and those in Melbourne's outer western suburbs. The capacity upgrades will also provide some relief to congested road networks in these areas of Victoria.

Beneficiary charges could be considered if there is a substantial uplift in land values and business activity in the vicinity of any new train stations. These include developer contributions, which could be levied on new developments near new train stations. This project could be eligible for funding from existing developer contributions such as the Growth Areas Infrastructure Contribution. Betterment levies on commercial and/or residential properties in a defined catchment in the vicinity of new train stations could also be explored. If developer charges and betterment levies are both considered by government, it should ensure that new charges do not unfairly duplicate each other or any existing charges.

Property development could also be considered, for example, selling or leasing land and air rights surplus to government requirements at new train station sites for commercial, residential or retail development. Property development can assist in putting underutilised government land and space to higher and better uses, creating added value through improved amenity and access to services.

Existing user charges (public transport fares) should continue to be charged but are only expected to cover a portion of ongoing operating costs.

Infrastructure Victoria is examining transport network pricing as part of our research program. We think that the primary objective of a transport network pricing regime – where users pay to access and use the transport network – should be to manage demand, rather than to recover costs for infrastructure. We are focusing on examining road pricing regimes in metropolitan Melbourne as a first step towards a comprehensive transport network pricing regime that includes roads and public transport. Careful consideration must be given to the design of the regime to ensure it is efficient, fair and sustainable.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Public Transport Victoria, *Network development plan: Metropolitan rail*, 2012

Wastewater system augmentation in high growth areas

WWS

Option type

Better use through refurbishment of existing assets
 Incremental expansion of existing assets
 New assets

Location

Statewide

Sector

Water and waste

Certainty of evidence

Low

Direct option cost

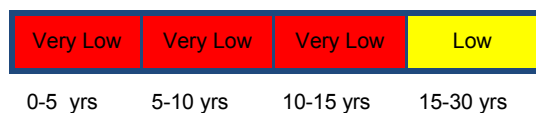
\$1 million–\$10 million

Option lead time

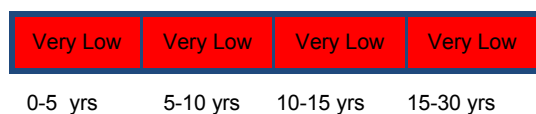
1–5 years

Contribution to meeting the need (assumes instantaneous implementation)

Need 1: Address infrastructure demands in areas with high population growth



Need 14: Manage threats to water security, particularly in regional and rural areas



What is this option?

This option seeks to increase sewerage and wastewater treatment capacity to manage future demands in Melbourne and regional cities and diversify wastewater management options.

For example, the sewerage system in metropolitan Melbourne is under increasing pressure as land subdivisions and development (e.g. for apartments) increase peak wastewater flow rates and volumes.

This option considers critical points in the sewerage system that may require augmentation or potential for additional localised wastewater treatment facilities.

What is the level of community support?

There was limited to no discussion of this option during public consultation.

What do we think of this option and why?

This option was not recommended in the strategy because no clear gaps in infrastructure planning were identified. Evidence suggests that water businesses are well placed to plan for population growth and incorporate demand forecast in planning wastewater infrastructure requirements for the long term. Wastewater management infrastructure is also in relatively good condition with upgrades regularly scheduled and completed.

How does this option relate to current state land use planning strategies?

Plan Melbourne 2014	Contributes to implementing policy
Plan Melbourne refresh 2015	N/A
Regional Growth Plans	Contributes to implementing policy

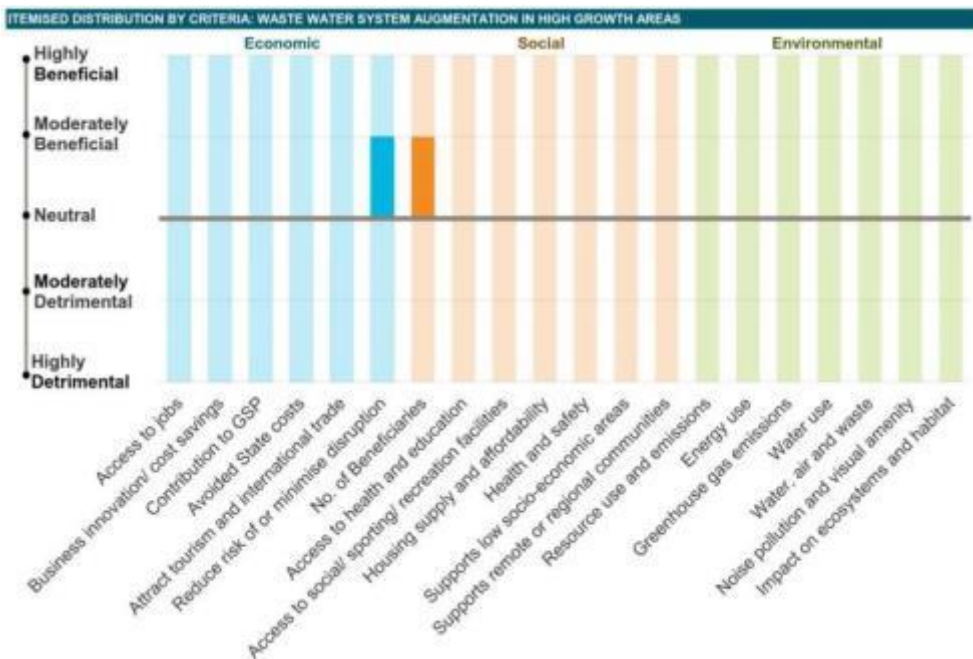
How does this option perform under different scenarios?

Supercity	+	Increased demand for wastewater services
Westside Story	+	Increased demand for wastewater services
Regional Cities	Neutral	
Accelerated Climate Change /Mitigation	+	More sewerage spills likely during floods and hot days
Prolonged/ Severe Economic Downturn	-	Less demand for wastewater services
Biosecurity Threat	Neutral	

How does this option work with others?

No key relationships with other options have been identified.

What are the economic, social and environmental impacts of this option?



Risks and opportunities

This option may duplicate the current planning role of water businesses.

There is an opportunity for this option to consider unforeseen changes in development such as higher than anticipated concentration of development in particular areas.

Evidence base

AECOM/PwC, *Assessment 3: Technical report to support Infrastructure Victoria's draft 30-year infrastructure strategy*, 2016

Deloitte/Aurecon, *Victorian infrastructure capability assessments: Water and waste*, 2016

Appendix 1: Australian Infrastructure Plan - Infrastructure Priority List and relevant options assessed by Infrastructure Victoria

The table below summarises Infrastructure Australia’s Infrastructure Priority List (IPL) as it relates to Victoria, along with links to the options Infrastructure Victoria has considered and comments on alignment between the IPL and the Infrastructure Victoria strategy.

Key differences between the two include:

- Geography: IPL considers the whole of Australia, Infrastructure Victoria’s strategy focuses on Victoria
- Sectors: IPL provides a multi-sector view although focused on transport, Infrastructure Victoria’s strategy covers nine sectors
- Time horizons: IPL is a 15 year view, Infrastructure Victoria’s strategy is a 30-year view
- Timings: IPL identifies the timing of each problem (with timing referring to delivery period only for projects, not initiatives), whereas Infrastructure Victoria’s strategy identifies the timing for completion of the recommended solution(s)
- Base Case: IPL identifies a number of projects and initiatives which Infrastructure Victoria’s strategy treats as base case because they have been committed for delivery, such as the Melbourne Metro Rail Project.

There are, however, many similarities, including a range of projects and initiatives set out in the IPL which also appear within the recommendations in Infrastructure Victoria’s strategy.

The version of the IPL considered here was released on 23rd November 2016, but drawing on the most recent version of Infrastructure Australia’s project and initiative summaries for supplementary information, dating from 17 February 2016.

Table 13: Infrastructure Australia Priority List compared to Infrastructure Victoria 30-year Strategy

Infrastructure Australia - Infrastructure Priority List				Infrastructure Victoria 30-year Strategy	
Problem description	Problem timescale	Proposed response	Classification	Options relevant to proposed response	Comments
Melbourne M80 Western Ring Road congestion	0-5 years	M80 Western Ring Road upgrade	High Priority Project		M80 Western Ring Road Upgrade included in base case.
Freight connectivity Melbourne-Brisbane	10-15 years (delivery period)	Inland Rail (Melbourne to Brisbane via inland NSW)	Priority Project	MBF	This was recommended for further planning, working with ARTC and the Commonwealth Government, to maximise benefits for Victorian freight operations.



Infrastructure Australia - Infrastructure Priority List				Infrastructure Victoria 30-year Strategy	
Problem description	Problem timescale	Proposed response	Classification	Options relevant to proposed response	Comments
Connectivity between Eastern Freeway and Melbourne CBD	0-5 years	Hoddle Street Capacity Upgrade	High Priority Initiative	ATM, DBI, HSP1, HSP2, RSA, TNP	Some aspects base case. While we considered some options specific to this corridor, our recommendations (e.g. 10.6.2, 10.6.3) reflect that this corridor is likely to be among high priority locations for traffic management and road space allocation upgrades, but not the only priority we consider.
Melbourne outer south east suburbs access to CBD	0-5 years	Cranbourne-Pakenham rail line upgrade	High Priority Initiative		Cranbourne-Pakenham rail line upgrade included in base case.
Melbourne rail network capacity	0-5 years	Melbourne Metro Rail (Melbourne CBD rail simplification and capacity upgrade)	High Priority Initiative		Melbourne Metro Rail Project included in base case.
Connectivity between West Gate Freeway and Port of Melbourne and CBD North	0-5 years	Road connection between West Gate Freeway and port of Melbourne and CBD North	High Priority Initiative		Western Distributor included in base case.

Infrastructure Australia - Infrastructure Priority List				Infrastructure Victoria 30-year Strategy	
Problem description	Problem timescale	Proposed response	Classification	Options relevant to proposed response	Comments
Melbourne south east road network congestion	0-5 years	Cranbourne and Pakenham Lines – level crossings removal	High Priority Initiative		Cranbourne and Pakenham Lines level crossings removal included in base case.
Connectivity between Melbourne’s Eastern Freeway and CityLink	0-5 years	Improve the connection between Eastern Freeway and CityLink	High Priority Initiative	ATM, EWE, RSA, TNP	A range of options could contribute to addressing this problem, and our recommendations take a multi-pronged approach, including regarding EWE (recommendations 11.5.8, 13.5.4).
National urban road network congestion	0-5 years	Network Optimisation Portfolio	High Priority Initiative	ATM, RSA	We have made similar recommendations regarding the use of technology and road space allocation to get the best use from the road network assets (e.g. 10.6.2, 10.6.3).
National strategic planning for future freight initiatives	0-5 years	National Freight and Supply Chain Strategy	High Priority Initiative		This work has been assumed to be base case, and will be an important contributor to supporting many of our recommendations and ensuring they are linked with planning that crosses state borders.
Future connectivity between Melbourne outer south west and outer north	0-5 years (corridor preservation)	Preserve corridor for Melbourne Outer Metropolitan Ring Road/E6	High Priority Initiative	ATM, OMR, RSA, TNP	A range of options could contribute to addressing this problem, and our recommendations take a multi-pronged approach, including regarding OMR, which we have defined as including the E6 corridor (recommendation 11.5.7, 13.5.3).



Infrastructure Australia - Infrastructure Priority List				Infrastructure Victoria 30-year Strategy	
Problem description	Problem timescale	Proposed response	Classification	Options relevant to proposed response	Comments
Future connectivity between east coast capital cities	0-5 years (corridor preservation)	Preserve corridor for East Coast High Speed Rail	High Priority Initiative	HSR	We have not made a recommendation regarding HSR but noted should the commonwealth government or private sector seek to pursue such a scheme, the state government would need to be an active participant, including input to the alignment (including assisting in corridor protection) and guiding any land use development.
Melbourne urban road network congestion	0-5 years	Melbourne level crossings removal	Priority Initiative	ATM, MLC, RSA, TNP	Many locations identified in the Australian Infrastructure Plan for level crossing removals have been included as base case, and our recommendation regarding sites beyond those currently committed (recommendation 11.3.3) is targeted at the development of a process to transparently identify and prioritise level crossings removals.
Access to Melbourne Airport	5–10 years	Melbourne Airport to CBD public transport capacity	Priority Initiative	ATM, HCT2, MAB, MAH, RSA, TNP	A range of options could contribute to addressing this problem, and our recommendations take a multi-pronged approach, including to upgrade bus connections (recommendations 10.9.1, 11.4.1) followed by a rail connection (recommendations 10.9.2, 11.4.2).



Infrastructure Australia - Infrastructure Priority List				Infrastructure Victoria 30-year Strategy	
Problem description	Problem timescale	Proposed response	Classification	Options relevant to proposed response	Comments
Melbourne outer western suburbs access to CBD	5–10 years	Melton Rail Line upgrade	Priority Initiative	HCT2, MRE1, TNP	Some aspects base case. We have recommended electrification of the Melton Rail Line (recommendations 1.3.6 and 10.8.3), but proposed completion be targeted for 10-15 years. We note that electrification is dependent on Melbourne Metro Rail Project (due for completion within 10 years).
Connectivity between M80 and Eastlink in outer NE Melbourne	5–10 years	Complete Metro Ring Road from Greensborough to the Eastern Freeway	Priority Initiative	ATM, NEL, RSA, TNP	A range of options could contribute to addressing this problem, and our recommendations take a multi-pronged approach, including regarding NEL (recommendation 11.5.6, 13.5.2), which we have proposed for completion within 10-15 years.
Melbourne outer northern suburbs access to CBD	10-15 years	Melbourne outer northern suburbs to CBD capacity upgrade	Priority Initiative	ATM, CLR, OMR, RSA, TNP, WRE1	A range of options could contribute to addressing this problem, and our recommendations take a multi-pronged approach, including regarding OMR (discussed above), Wallan Rail Electrification (recommendations 1.3.7, 10.8.4) and City Loop Reconfiguration (recommendation 10.10.1).
Freight rail connection Murray Basin to Ports of Geelong and Portland	0-5 years	Murray Basin rail upgrade	Priority Initiative		Murray Basin rail upgrade included in base case.

Infrastructure Australia - Infrastructure Priority List				Infrastructure Victoria 30-year Strategy	
Problem description	Problem timescale	Proposed response	Classification	Options relevant to proposed response	Comments
Melbourne aviation capacity	0-5 years	Melbourne Airport third runway	Priority Initiative		The 30-year strategy has not considered an option for a third runway at Melbourne Airport, as this is included in the private operator's current masterplan for the precinct.
Melbourne container terminal capacity	10-15 years	Melbourne container terminal capacity enhancement	Priority Initiative	PMC	Continued efficiencies at Port of Melbourne now included in base case.
Rail freight capacity constraint on ARTC network	0-5 years	Advanced Train Management System implementation on ARTC network	Priority Initiative		Not assessed as an option.
Constrained east coast gas supply	0-5 years	Connect gas suppliers to eastern gas markets	Priority Initiative	EGE	We have treated the current work being led by the Council of Australian Governments and carried out by the Australian Energy Market Commission to reform operation of the gas market as base case.

Appendix 2: Aligning with the Transport Integration Act 2010

An important step in the development of the strategy was the determination of its strategic framework, including guiding principles and objectives, supported by a consultation phase in early 2016. In developing these objectives we drew heavily from the policy considerations required of state and local government for infrastructure, as well as our legislated mandate. It was important that in developing the strategy, we had a clear sense of what we were trying to achieve, but also that we understood this in the context of what other infrastructure managers were trying to achieve.

One important set of policy considerations for which we have had regard are those contained in the *Transport Integration Act 2010*. This important legislation frames decision making by state government and, in particular circumstances, local government around transport. It is important to provide advice to government which has regard to the considerations set out in that Act, given that if our advice on transport matters is adopted, this will be progressed by bodies which are subject to the Act.

Our strategy considers nine sectors making it considerably broader than just the transport sector, so it was inappropriate for the objectives and principles set out in the Act to be applied directly to Infrastructure Victoria’s strategic framework. However, we gave consideration to each of the objectives and principles and Table 14 shows the strong alignment between the policy considerations in that Act and the strategic framework.

Table 14: The alignment of Infrastructure Victoria’s strategy framework with the Transport Integration Act 2010

Transport Integration Act 2010	Our framework
Social and economic inclusion objective	Objective: Reduce disadvantage Objective: Enable workforce participation
Economic prosperity objective	Objective: Lift productivity Objective: Drive Victoria’s changing, globally integrated economy Guiding principle: Promote responsible funding and financing
Environmental sustainability objective	Objective: Protect and enhance natural environments Objective: Advance climate change mitigation and adaptation Objective: Promote sustainable production and consumption
Integration of transport and land use objective	Objective: Prepare for population change Guiding principle: Integrate land use and infrastructure planning



Transport Integration Act 2010	Our framework
Efficiency, coordination and reliability objective	Objective: Lift productivity Guiding principle: Consider non-build solutions first Objective: Build resilience to shocks
Safety and health and wellbeing objective	Objective: Foster healthy, safe and inclusive communities
Principle of integrated decision making	Guiding principle: Consult and collaborate
Principle of triple bottom line assessment	Guiding principle: Drive improved outcomes
Principle of equity	Objective: Reduce disadvantage Objective: Prepare for population change
Principle of the transport system user perspective	Guiding principle: Consult and collaborate Guiding principle: Be open to change
Precautionary principle	Objective: Advance climate change mitigation and adaptation Objective: Build resilience to shocks
Principle of stakeholder engagement and community participation	Guiding principle: Consult and collaborate
Principle of transparency	Guiding principle: Draw on compelling evidence

