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Victoria's Draft 30-Year Infrastructure Strategy

Volume 1



INFRASTRUCTURE
VICTORIA

About us

Infrastructure Victoria is an independent advisory body with three functions:

- \ preparing a 30-year infrastructure strategy for Victoria, which is refreshed every three to five years
- \ providing written advice to government on specific infrastructure matters
- \ publishing research on infrastructure-related issues.

Infrastructure Victoria also supports the development of sectoral infrastructure plans by government departments and agencies.

The aim of Infrastructure Victoria is to take a long-term, evidence-based view of infrastructure planning and inform community discussion about infrastructure provision.

Infrastructure Victoria does not directly oversee or fund infrastructure projects.

Aboriginal acknowledgment

Infrastructure Victoria acknowledges the traditional owners of country in Victoria and pays respect to their elders past and present, as well as elders of other Aboriginal communities. We recognise that the state's infrastructure is built on land that has been managed by Aboriginal people for millennia.





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Foreword

Since Infrastructure Victoria released our first 30-year infrastructure strategy in 2016, the Victorian Government has allocated many billions of dollars for new infrastructure, first in response to rapid population growth, and most recently in response to the Victoria's devastating bushfires and the shock of the COVID-19 pandemic. This dramatic rise is producing record infrastructure investment, including on new transport, health, education, social housing and tourism infrastructure.

Victoria's population boomed in the last decade, adding more than 1.2 million people. The COVID-19 pandemic has abruptly halted this rapid growth. The Victorian Government, along with the Australian Government, local governments, businesses and the community have been focussed on responding to the pandemic above all else since it started. But COVID-19 is not the only challenge Victoria faces now and over the next 30 years. It must also respond to other events, including climate change, technological disruptions, demographic shifts, economic dislocations and emergencies.

We are yet to fully understand the COVID-19 pandemic's impacts. It has caused drastic changes to people's lives and behaviour, including their infrastructure use. Infrastructure Victoria is further investigating these impacts before producing the final strategy, including by modelling extra scenarios to consider their effects. More immediately, the Victorian Government must continue managing the pandemic and assisting Victoria's economic recovery. In recognition, we have identified those draft recommendations that are particularly relevant for short-term recovery.

This draft strategy builds on the recommendations and findings from our 2016 strategy and incorporates lessons from its development. We've reviewed our previous recommendations, consulted widely with the Victorian Government, other stakeholders, and the community, and incorporated extra research and modelling evidence into this draft.

It aims to help Victoria address existing infrastructure pressures and prepare for the future. Our draft recommendations seek to better use existing infrastructure, manage demand, and help plan the timing and location of necessary new infrastructure.

Publishing this draft strategy marks the beginning of our most important step – hearing your view of our draft recommendations. We are seeking your feedback and evidence on this draft strategy, to help us shape the final strategy to be tabled in the Victorian Parliament in 2021.

This document is a draft, and we fully expect that some of the recommendations will change and evolve in response to feedback, further analysis, extra evidence and new information.

This is a unique opportunity for you to shape Victoria's infrastructure for the next 30 years. We look forward to the conversation.

Jim Miller

Chair, Infrastructure Victoria

Michel Masson

CEO, Infrastructure Victoria



Executive summary

Much has changed in the four years since we released Victoria's first 30-year infrastructure strategy. Victoria, like the world, is responding to the impacts of the COVID-19 pandemic, including with record infrastructure investment. The pandemic has affected Victorians' health, changed their everyday lives and behaviours, hampered their movement, increased unemployment and under-employment, and tipped the economy into recession. Changes in people's behaviour has affected their use of infrastructure, which we will continue to monitor. Before this, Victoria endured the 2019-20 summer bushfires, exacting heavy tolls on the people, ecologies and infrastructure it affected.

In the last four years, the Victorian Government has committed to Victoria's largest infrastructure program, significantly raising infrastructure investment. It also announced many policy changes. This included releasing its revised metropolitan planning strategy, *Plan Melbourne*, outlining Melbourne's planned growth trajectory to 2050. It also set a new target of net zero greenhouse gas emissions by 2050 in the *Climate Change Act 2017*.

These crises and decisions demonstrate that infrastructure needs and context can evolve rapidly, and infrastructure plans must be regularly reviewed and updated. This draft strategy deliberately revises many recommendations we have made previously and adds new recommendations in light of Victoria's changing circumstances. But we retain a long-term view of Victoria's infrastructure needs over the next 30 years, remembering that infrastructure lasts many decades, and must meet both immediate needs and those in the far future.

Infrastructure is more than roads, bridges, hospitals and schools. It underpins Victoria's economic productivity, social equity and connectedness, and ecological impact. It can help reduce social disadvantage. This draft strategy contains 95 draft recommendations for infrastructure policies, reforms and projects, spanning many types of infrastructure, based on extensive evidence, research and consultation. Our draft recommendations are interlinked, interconnected and combine to achieve their objectives. They are grouped thematically, assembling draft recommendations that work together to achieve a more prosperous, inclusive and sustainable Victoria.

Confront long-term challenges

Victoria's recent experiences underline that events are uncertain and unpredictable. Long-term strategy must be adaptable and resilient, able to adeptly change and recalibrate in different circumstances, while confronting long-term challenges. A changing climate means infrastructure must be resilient to new climatic conditions, and a 2050 net zero emissions target refocuses Victoria's infrastructure needs to support phasing out the burning of coal, oil and gas. New technologies are emerging that can radically alter infrastructure demand and give governments new tools to manage it. There is a risk of further pandemics occurring, and infrastructure can assist with mitigating their effects. Victoria is affected by global economic and geopolitical shocks and must retain options to respond to a reshaped global economy. Additionally, sudden changes in international trade in recyclable materials have disrupted Victoria's recycling and resource recovery industries, creating an opportunity to build a more circular economy.



This draft strategy contains 95 draft recommendations for infrastructure policies, reforms and projects, spanning many types of infrastructure, based on extensive evidence, research and consultation.

Manage urban change

A decade of rapid population growth has strained Victoria's infrastructure, creating congestion and shortfalls as the state struggled to keep up. The population growth pause induced by the COVID-19 pandemic allows time to catch up and recalibrate, helping ensure systems and policies are in place to better manage population growth when it eventually returns. This includes better integrating Victoria's land use and infrastructure planning, so they work together to guide housing and commercial construction to the most appropriate locations and provide the right infrastructure at the right time. Suitable and well-located areas in established parts of Melbourne can accommodate more new homes in the future, helping maximise use of existing infrastructure. Additionally, reforms can help manage transport demand to make better use of existing and new transport infrastructure by using prices to help people make more informed choices about when and how they travel. And Victoria can better maintain and adapt its existing economic, social and community infrastructure to lengthen its lifespan and keep it fit for contemporary conditions.

Harness infrastructure for productivity and growth

Managing demand and squeezing maximum efficiency from existing infrastructure can do much to improve the productivity and effectiveness of the infrastructure we already have. But it will not meet all infrastructure needs for a productive and equitable state, especially if the state returns to rapid population growth. Some future major transport projects may be required, as well as social and environmental infrastructure to support rapidly growing communities and reduce disadvantage. But with likely fiscal constraints, infrastructure projects must be carefully selected to deliver maximum benefits to the community, considering all options, and ensuring they perform under different future scenarios. Selecting the right infrastructure at the right time can support the productivity of Victoria's economy, prepare for future needs, and ensure people can access the infrastructure and services they need for their social and economic wellbeing. The Victorian Government should conduct detailed feasibility studies and business cases before committing to new projects, so they can be assured their investments serve Victoria best.

Develop regional Victoria

Regional development is more than simply generating construction activity. Infrastructure can support a region's competitive strengths, help adapt to economic change, and address socio-economic disadvantage for some of Victoria's most vulnerable communities. Building connectivity, especially between businesses and markets, can help Victoria's regions develop. Infrastructure can also help strengthen wellbeing in regional Victoria by connecting people to essential resources at key life stages.



Victoria's infrastructure is only one facet of the state's economic performance, social outcomes and ecological sustainability, and cannot solve every problem alone.

But combined with good governance, innovative and competitive businesses and industry, strong public and social services, and a thriving and flourishing community, infrastructure can help create a prosperous, inclusive and sustainable long-term future.

Insight

Long-term strategy in a time of pandemic

We recognise that we are publishing this draft strategy during a period of significant uncertainty. The COVID-19 pandemic is adding further complexity to other trends including technological disruption, climate change and the ageing and growth of Victoria's increasingly diverse population.

The pandemic is a global health and economic crisis that has claimed lives, destroyed jobs and changed the way Victorians work, travel and interact. Lockdowns, operating restrictions for businesses and recession have affected employment, travel, immigration and trade. Many people have changed their behaviour in response, such as by working and learning from home. The sheer scale of the challenge has also put pressure on government finances, supply chains, and telecommunications networks.

This draft strategy aims to provide the Victorian Government with the best available evidence on which to base future decisions. We recognise the trajectory of the COVID-19 pandemic, and subsequent changes in other trends may require these to be adjusted over time. But we also believe our draft recommendations highlight short, medium and long-term infrastructure initiatives that will make a real difference to Victorians. We have undertaken extensive modelling to help inform these recommendations (see page 9), including considering different scenarios for population growth, infrastructure investment, and population and employment distributions. Our efforts to gather further evidence and insights about the effects of COVID-19 will continue as we finalise the strategy.

It is too early to determine the full impacts of COVID-19, but Victoria will clearly need to adjust to a changed society and economy. The Victorian Government has already made a huge investment in pandemic recovery. This draft strategy separately identifies those draft recommendations that can build on these investments to assist the recovery.

These draft recommendations meet the criteria of being relatively fast, low cost and labour intensive. More generally, using infrastructure well, and investing where it will make the greatest difference, will help to stimulate economic activity, address historic priorities, and position the state to develop and become more resilient in the long term, particularly as economic recession leaves resources more constrained.

Some priorities existed before the COVID-19 pandemic, and these will not disappear during recovery. Infrastructure can help Victoria to prepare for climate change, transition to a sustainable economy powered by clean energy, support equity in access to employment and services, and address the particular infrastructure needs of regional areas. To these significant existing challenges, we now need to add the risk of further pandemic events over the coming decades.

We have also identified areas where the Victorian Government can act now to address future demand. These include investments in transport, rapidly growing suburbs and social infrastructure to provide Victorians the opportunities, access and support they need into the future. The impacts of COVID-19, including recession and reduced immigration, are likely to impact growth, at least in the short term. But while this impact may defer some demand, it will not prevent it. Both the population and demand for infrastructure will likely increase significantly in the period to 2050.

This draft strategy reflects our understanding of Victoria's long-term infrastructure priorities and is based on the best evidence we could find or generate. It is, however, a draft – and we want to test our thinking with you. We will use your input, extra research, and further modelling on the impacts of changing behaviour, to deliver the best possible advice to the Victorian Parliament in 2021. See pages 10-11 for information on how to get involved.

Insight

Examining different scenarios for Victoria's future

When preparing this draft strategy, we wanted the best evidence of the current challenges facing Victoria's infrastructure. We worked with Arup, AECOM and Victoria University to develop different possible scenarios for Victoria's future.

We used two transport models. The Victorian Integrated Transport Model (VITM) uses population growth and demographic projections to evaluate the performance of the transport network, particularly from transport infrastructure investment. The Victorian Land Use and Transport Integration (VLUTI) model considers how infrastructure investment could change the distribution of population and employment across Victoria. The innovative VLUTI model, developed by Victoria University, allows for land use and transport infrastructure to directly influence each other, causing changes in where people and jobs are located.

We used these two models to generate 12 different future scenarios for Victoria's population, employment, land use and transport infrastructure. Different scenarios allowed us to examine changes under different future circumstances. Scenarios differed in:

- \ **Timeframe:** We considered medium-term scenarios for 2036, and long-term scenarios for 2051.
- \ **Population growth:** We considered scenarios for low, medium and high future population growth. These were broadly comparable to the three variations the Australian Bureau of Statistics generates for their population projections.
- \ **Infrastructure investment:** We considered two different levels of transport infrastructure investment. A lower investment scenario represented little funding or development in transport infrastructure beyond that currently committed to by the Victorian Government.

A higher investment scenario represented transport investment continuing to develop greater capacity and connectivity to cater for increasing demand from population growth.

- \ **Population and employment distribution:** We used two different ways to project the future distribution of the Victorian population and employment. The first used small area land use projections, which remain static in traditional transport models. The second used the VLUTI model to allow a redistribution of the population. The VLUTI projections allocate significantly less population to Melbourne's growth areas.
- \ **Land use planning settings:** We considered a scenario with different land use planning settings, which allowed higher density populations in carefully selected areas near train stations and along transport corridors. We used the VLUTI model to understand the effects of this change on the distribution of population and employment.

We selected 12 combinations of these differences to produce our scenarios. You can find more detail about the individual scenarios in the *Problem Definition Modelling Outcomes* report, available at infrastructurevictoria.com.au.

The COVID-19 pandemic has introduced extra uncertainty in future projections. Our modelling scenarios give us insights into some potential changes, such as lower population growth. But people's behaviour has also shifted rapidly in response to the pandemic. For example, many people have rapidly adapted to working and learning from home, requiring less use of the transport network. No one knows if, or by how much, these behavioural changes may be sustained in the long term. Infrastructure Victoria will continue to monitor these behavioural changes as we prepare the final strategy. We are also undertaking more modelling to examine their potential consequences.

Get involved

This is a unique opportunity for you to shape Victoria's infrastructure for the next 30 years.

Hearing from you is a very important step in developing *Victoria's 30-Year Infrastructure Strategy*. We are seeking your feedback and evidence on our draft recommendations, to help us shape the final strategy to be tabled in the Victorian Parliament in 2021. This document is a draft, and we expect that some of the draft recommendations will change and evolve in response to your feedback, further analysis, extra evidence and new information.

We develop *Victoria's 30-Year Infrastructure Strategy* independently of the Victorian Government. Releasing this draft strategy allows Infrastructure Victoria to be completely transparent about the directions we are contemplating. It is a chance for you to share your perspectives, expertise, information and responses with us, so we can evaluate our directions and draft recommendations with them in mind.

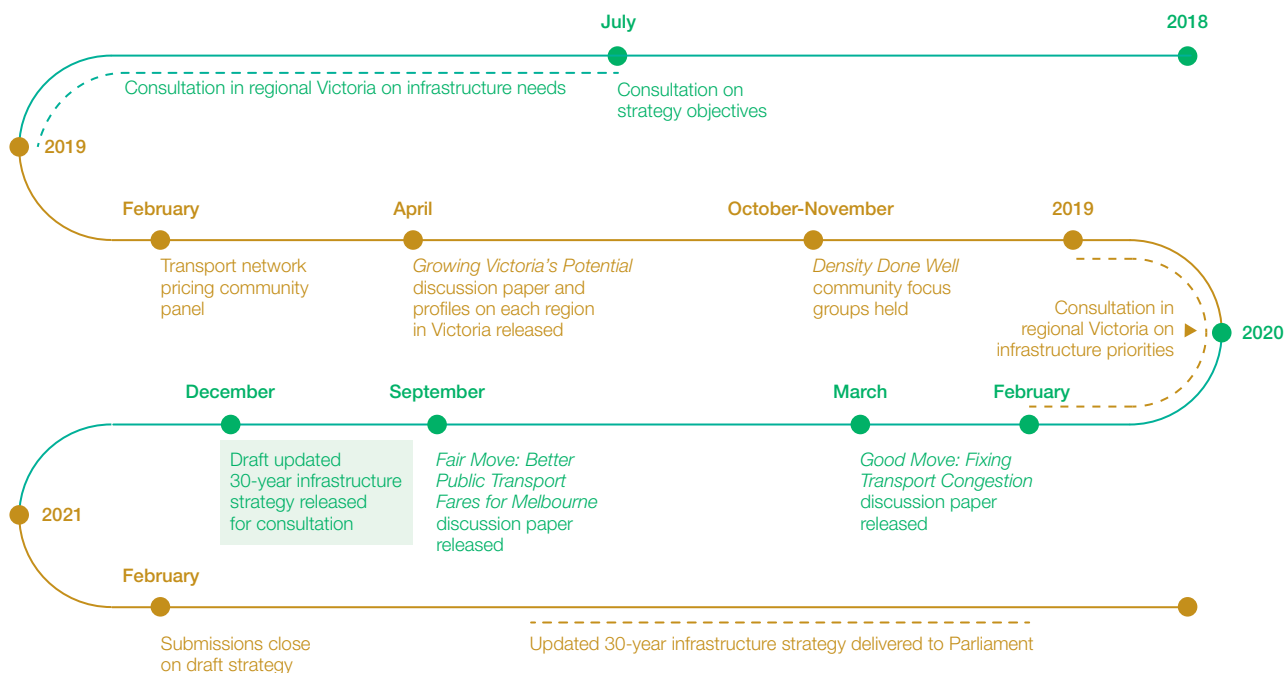
The strategy must work for Victorians

Community consultation is a hallmark of Infrastructure Victoria's approach. We have completed many other public engagement projects to help develop this draft strategy, including:

- \ Public polling on the objectives of the updated draft strategy
- \ Releasing a discussion paper, *Growing Victoria's Potential*, outlining strategic issues face Victoria
- \ Over two years, researching the infrastructure priorities of regional Victoria, comprising workshops, information sessions and a formal submissions process
- \ Targeted deliberative workshops in Melbourne suburbs on 'density done well', and how it can help more people live in great locations

- \ Convening a community panel to identify the conditions under which the public might accept changes to how people pay for roads and public transport
- \ Polling on the attitudes and perceptions of households towards waste sorting practices, and their willingness to adopt more sustainable behaviours.

What we heard from the Victorian community has informed this draft strategy and our wider research program. Reports on these activities are available at infrastructurevictoria.com.au.



We want to hear from you

The release of this draft strategy is your opportunity to let us know what is important to you as we plan for the state's infrastructure needs for the next 30 years.

To provide feedback on the draft strategy, please visit infrastructurevictoria.com.au before 26 February 2021. Through this website, you can get involved by:

[submit](#) 

Making a submission

☒ Yes ☐ No

Participating in an online survey



Attending an online forum

Infrastructure Victoria is responsible for providing an independent, evidence-based strategy to the Victorian Parliament, so our decision-making must be based on the best available information. We strongly encourage you to include credible evidence in your feedback.

Every section of this document concludes with a short list of discussion questions where we recognise further evidence and feedback may better inform our final recommendations. But we also welcome input that cuts across themes and draft recommendations, or the strategy as whole, including on the following questions:

- Do the draft recommendations work well together? For example, is the balance right between constructing new infrastructure and making better use of existing infrastructure?

- Do you have more evidence about the effectiveness of our draft recommendations in meeting their objectives?
- Can you advance extra, evidence-based recommendations that would help meet the strategy's objectives?
- Do you have extra information to inform the timing or indicative costing of a draft recommendation?

Formal submissions that you allow us to share will be published on our website.

Your input will shape recommendations to the Victorian Parliament

Your input and evidence will help us to strengthen the strategy and fine-tune our recommendations.

Once the consultation period closes, Infrastructure Victoria will use the outcomes of public consultation, as well as further modelling, research and analysis, to develop the final strategy. This will be delivered to Victorian Parliament in mid-2021.


The Victorian Government will then have up to 12 months to respond to the recommendations and create its own five-year infrastructure plan for implementation.

Staying informed is easy

To keep up to date with Infrastructure Victoria, sign up to our mailing list via our website or follow us on social media.

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To access our resource centre, visit infrastructurevictoria.com.au/resources

Get involved

Visit

infrastructurevictoria.com.au

to have your say on
our draft recommendations.

Objectives



01

Prepare for population change

Victoria's infrastructure meets new and shifting demands from a growing and changing population. Change will vary and occur in different ways including changing demographics, family structures, and cultural diversity.

02

Foster healthy, safe and inclusive communities

Victorians achieve and maintain good physical and mental health. They feel safe in their homes and communities, free from harm. They maintain social connections and participate in civic, cultural and community life.

03

Reduce disadvantage

All Victorians have the resources and capabilities for a good quality of life. They have equal access to opportunities regardless of their backgrounds, attributes or locations.

04

Enable workforce participation

Victorians develop the capabilities, and have the opportunities, to engage in enough secure and meaningful work.

05

Lift productivity

Victorians can maintain a good standard of living from an economy boosted by enhanced skills, innovation, market access and efficient investment.

06

Drive Victoria's changing, globally integrated economy

Victoria remains prosperous by staying attractive for trade and investment nationally and internationally, adapting to change and capitalising on economic opportunities.

07

Promote sustainable production and consumption

Victoria manages its resources sustainably, by minimising waste and preserving our natural assets for future generations.

08

Protect and enhance natural environments

Victoria protects natural environmental systems to preserve and enhance healthy, resilient and biodiverse ecosystems for future generations.

09

Advance climate change mitigation and adaptation

Victoria's community and economy adapts to the impacts of climate change and achieves the legislated target of net zero greenhouse gas emissions by 2050.

10

Build resilience to shocks

Victoria can better prevent, respond to, and recover from shocks. Victoria is less vulnerable to economic, technological, biological, ecological, and geopolitical disruptions and emergencies.



Approach

Under the *Infrastructure Victoria Act 2015*, Infrastructure Victoria must prepare an updated infrastructure strategy every three to five years.

This draft 30-year infrastructure strategy is an update and builds on the 2016 version. We have undertaken many activities to assist our approach to prepare this updated strategy. For our full methodology, please refer to Appendix C in Volume 2.

Consulting on and developing objectives

Infrastructure Victoria surveyed the Victorian community on the strategy objectives (see page 12). This confirmed substantial support for the existing objectives. Our objectives also align with the directions in the United Nations' Sustainable Development Goals (SDGs). In response to the survey feedback, and in line with the SDGs, we have adjusted the language of the objectives to make them clearer. You can find the survey report at infrastructurevictoria.com.au.

Releasing a discussion paper

In April 2019, Infrastructure Victoria published a discussion paper, *Growing Victoria's Potential*, framing some of the strategic issues confronting Victoria to inform the draft strategy. We have incorporated the feedback on this discussion paper in our analysis.

Focussing on regional infrastructure priorities

Infrastructure Victoria has undertaken a program of work to better understand the infrastructure priorities of Victoria's regions. This included substantial data collection and workshops held in each region to produce Regional Infrastructure Needs profiles. We used two frameworks designed to assess potential draft recommendations that either built on comparative advantage or addressed regional disadvantage, supported by stakeholder feedback. These appear as draft recommendations here. You can find all the related reports at infrastructurevictoria.com.au.

New modelling

Infrastructure Victoria has commissioned new modelling incorporating population, employment, transport infrastructure, land use planning and economics, so our draft recommendations are informed by the most up to date evidence. This includes considering different scenarios for population growth, population distribution and infrastructure investment. The modelling report can be found at infrastructurevictoria.com.au.

Undertaking new research and advice

Infrastructure Victoria undertook numerous research projects to gather more evidence on specific issues. We have published several research reports on transport

network pricing, infrastructure provision in different development settings, metropolitan infrastructure needs, social housing outcomes, water governance, housing targets and cost-reflective energy pricing, all available on our website. We have published three substantial reports on advice requested by the Victorian Government, including on future ports capacity, automated and zero emissions vehicles, and recycling and resource recovery infrastructure. We have also undertaken internal research projects on climate change, infrastructure for growth areas, density done well, integrated land use and infrastructure planning, energy transition, social and affordable housing, health infrastructure and justice and emergency services infrastructure. The findings of these new research and advice projects have been incorporated in the draft strategy and reflected in the draft recommendations.

Consulting experts

In many instances, Infrastructure Victoria commissioned pre-eminent experts to provide their views on developing evidence and draft recommendations for this draft strategy. For example, we drew on expert advisers to develop our assessment frameworks for Infrastructure Priorities for the Regions and established a Transport Advisory Panel to inform the development of draft transport recommendations. Our advice reports also used expert advisers to inform their findings.



Engaging stakeholders and the community

Throughout our evidence gathering, research and advice development, we have extensively engaged with stakeholders, including the Victorian Government, local governments, businesses, community organisations and the Victorian community. This includes multiple government and stakeholder reference groups for various strategy and research activities. We have engaged people consistently, in multiple ways, including surveys, deliberative forums, submissions processes and using digital and social media platforms (also see outline of engagement activities for the draft strategy in 'Get involved').

Reviewing and revising 2016 recommendations

Infrastructure Victoria has reviewed all the recommendations made in the 2016 strategy. We have used updated evidence, modelling and analysis to update them for inclusion in this draft strategy as draft recommendations. Some recommendations have been largely implemented or have made substantial progress, and do not reappear here. For others, the strategic context has changed, or new evidence has been produced, and the recommendations have been revised to reflect this. In reviewing recommendations, some new evidence suggested new actions, which have been included here as draft recommendations. We have documented government progress on the 2016 recommendations and their links with this draft strategy (see Appendix D of Volume 2). Progress has been

made in implementing most of our 2016 recommendations. Of the 137 recommendations, our review finds that 27 have been substantially completed, 95 are in progress, and 15 have not commenced.

More research and analysis to come

While we have developed the draft recommendations for consultation in this draft strategy, our analysis is not complete. We will conduct more detailed modelling before finalising recommendations and develop more detailed costings to ensure our recommendations are effective and affordable (see section 'From draft to final strategy' at the end of this document). Beyond evaluating the consultation feedback on our draft, this extra evidence will be used to inform the development of final recommendations. This includes reassessing the scope, funding and timing of draft recommendations.

Throughout our evidence gathering, research and advice development, we have extensively engaged with stakeholders, including the Victorian Government, local governments, businesses, community organisations and the Victorian community.

Summary of draft recommendations

Section 01

Confront long-term challenges

1.1 Navigate the energy transition

1. Accelerate the uptake of zero emissions vehicles

Within the next five years, require all new public transport buses and coaches, and government vehicle fleets, to transition to appropriate zero emissions vehicles where available. Incentivise zero emission freight vehicles, and develop design standards and payment principles for charging infrastructure. Consider other policy levers to phase out all internal combustion engine vehicles during the next 30 years.

2. Augment electricity transmission for renewable energy and resilience

Support augmentation of critical electricity transmission infrastructure by 2027-28 to accommodate new renewable energy generation and improve network resilience.

3. Identify and coordinate priority Renewable Energy Zones

Immediately identify and coordinate the development of priority Renewable Energy Zones, especially in the state's northwest.

4. Require 7-star energy-rated new homes in 2022, increasing towards 8 stars by 2025

Require all new homes to achieve a minimum 7.0 star NatHERS rating (or equivalent) by 2022, increasing towards 8.0 stars by 2025, either through the National Construction Code or Victorian regulations.

5. Mandate a home energy rating disclosure scheme

In the next five years, develop an energy efficiency disclosure scheme for the sale or rent of homes, to overcome information barriers and encourage energy efficiency improvements to existing homes.

6. Make Victorian Government buildings more energy efficient

Immediately mandate stronger minimum energy efficiency standards in both owned and leased Victorian Government buildings and set and report against retrofitting targets.

7. Reduce peak electricity use with demand management pricing

In the next 10 years, optimise use of existing electricity infrastructure by encouraging demand management pricing.

8. Allow new gas-free housing estates and review current gas policies

Allow new developments to proceed without mandatory gas connection and review all gas policies to consider options for future mitigation or transition strategies.

1.2 Respond to a changing climate

9. Specify climate scenarios and carbon value in assessing infrastructure

Immediately update and expand practical instructions on integrating climate-related

risks into infrastructure assessment, including on future climate scenarios and valuing emission reductions.

10. Strategically review climate consequences for infrastructure

Strategically review the climate change consequences for Victoria's infrastructure needs and priorities, commencing in November 2021 after delivering the first set of targets, pledges and plans under the *Climate Change Act 2017*.

11. Consider all water supply sources

Consider all water sources for supply augmentation, including identifying and addressing barriers to recycled drinking water within the next 10 years. When planning for future water supply, investigate all options including, but not limited to, recycled water, seawater desalination, stormwater harvesting and using water pipelines to move water between regions.

12. Progress integrated water cycle management

Accelerate progress toward an integrated model of water cycle management, starting by clarifying policy settings to allow the better use of stormwater and recycled water within five years.

13. Improve decision-making for urban water investment

In the next five years, clearly allocate the roles and responsibilities for urban water systems and major supply augmentation planning.





14. Strengthen agricultural water security by modernising irrigation

During the next 30 years, contribute funding toward planning and delivery of irrigation modernisation projects across regional Victoria.

15. Upgrade Victoria's emergency water network

Immediately assess the condition, capacity and security of Victoria's emergency water supply point network, and upgrade or replace inadequate supply points. Clarify ongoing responsibility for maintenance and funding to secure a resilient network.

16. Invest in protecting Victoria's coasts

In the next eight years, invest in coastal protection upgrades and maintenance, including beach and dune protection and rehabilitation, and storm surge protection, particularly for coastal tourism assets in Barwon, Great South Coast and Gippsland regions.

1.3 Embrace technological opportunities

17. Prepare for increasingly automated vehicle fleets

Immediately begin updating transport regulations to allow automated vehicle operation on the road network. In the next 10 years, upgrade roads and communications infrastructure to help facilitate increasingly connected and

automated vehicles, particularly for private and government fleets. Develop policy, business case and land use planning guidance to maximise the benefits of automated vehicles.

18. Facilitate integration of public transport with new mobility services

In the next five years, develop open access ticketing platforms to facilitate integration of public transport modes with new mobility services, incorporating better data sharing and collection. Remove public transport contract barriers to integration.

19. Incorporate personal mobility devices in regulation

In the next two years, incorporate nationally consistent rules for personal mobility devices in Victorian legislation, develop a standard and statewide regulatory framework for shared mobility schemes, and update existing active transport design standards to better accommodate devices.

20. Transform road network operations for all current and future modes

In the next five years, integrate management systems for different road-based transport modes. Allow for real-time management and communication, and prepare roads for emerging transport technologies.

21. Use innovation to deliver better models of health care

Within five years, help slow the growth in demand for hospital infrastructure by funding a comprehensive statewide health innovation strategy to promote better models of health care.

22. Modernise courts through digitisation and contemporary shared facilities

Immediately increase court efficiency and meet demand by digitising suitable court systems and procedures. Invest in new contemporary, adaptable, multi-jurisdictional court facilities during the next 10 years.

23. Improve technology and infrastructure for a responsive police service

In the next 10 years, invest in technological capacity to better support a responsive police service, and deliver infrastructure to enable a contemporary hub-and-spoke policing model, co-located with health and human services where appropriate.

1.4 Stay connected to global markets

24. Optimise capacity at the Port of Melbourne

Support efforts to progressively optimise the Port of Melbourne's capacity, and actively take steps to manage amenity implications for community acceptance, as identified in our *Advice on Securing Victoria's Ports Capacity*.

25. Act now to protect the future Bay West Port option

Immediately identify and secure land and apply planning protection for transport corridors and buffers for a future Bay West Port, particularly future road and rail connections within the Urban Growth Boundary, and commence environmental monitoring. Around 2040, begin detailed planning for the port.

26. Purchase land for Melbourne's future freight terminals

In the next five years, buy the land and develop business cases for new intermodal freight terminals and precincts at Truganina and Beveridge to deliver a terminal in time for the completion of the Inland Rail project.

27. Construct an outer metropolitan road and rail corridor

Within two years, determine staging for the outer metropolitan rail and road corridor. Construct the E6 motorway in the next 20 years, and progressively construct the outer metropolitan road and rail corridor in the next 30 years, including integrating a rail freight line, subject to detailed feasibility studies and business cases.

1.5 Build a circular economy

28. Facilitate improved recycling infrastructure for priority materials

Immediately focus efforts to increase and upgrade waste processing infrastructure on six priority materials. Facilitate increased recovery and reprocessing capacity and

capability for paper and card, plastics and organics by 2025. Revisit funding mechanisms and align recycling infrastructure with land use planning.

29. Strengthen end markets for recycled materials

Immediately accelerate market development for recycled materials by updating standards and specifications, and explicitly require the Victorian public sector to use recycled products where feasible. In the next five years, support research, development and demonstrations to build confidence and demand for recycled products.

30. Address barriers to recycling and reducing waste

In the next year, reduce recyclable material contamination by supporting greater consistency in kerbside and commercial collection and separation of glass, paper, cardboard and organic materials. Immediately define and implement behaviour change programs to reduce contamination, and consistently maintain these programs in the next 30 years.

31. Minimise waste and improve residual waste infrastructure planning

In the next two years, improve infrastructure planning for managing residual waste, and further clarify the role of waste-to-energy facilities. Over the next 30 years, consistently invest in waste avoidance through behaviour change programs, pricing, regulation and incentives.



Section 02

Manage urban change

2.1. Integrate land use and infrastructure planning

32. Produce public plans for priority infrastructure sectors

In the next five years, develop and publish long-term infrastructure plans for priority infrastructure sectors for which the Victorian Government maintains substantial responsibilities, including sequencing and timelines for investment.

33. Publish Victoria's transport plan

Immediately develop and publish Victoria's integrated transport plan. Require transport and land use plans to align with each other.

34. Review Victoria's infrastructure contribution system to cover gaps

In the next two years, review Victoria's many infrastructure contributions schemes to create a consistent and efficient system that contributes to local and Victorian Government infrastructure costs. A revised infrastructure contribution system can apply more broadly, including in established suburbs, growth areas, peri-urban areas, and regional cities.

2.2 Create thriving urban places

35. Support more homes in priority established places

In the next year, identify new priority locations in established suburbs for residential intensification to better use existing infrastructure. Following this, review planning settings in partnership with local government to allow increased housing density and establish design panel reviews for development applications.

36. Deliver very low income housing with inclusionary zoning

Immediately change and actively apply planning rules to provide affordable rental housing for Victorians on very low incomes in places re-zoned for more intensive residential use.

37. Develop an interconnected open space network

Immediately provide direct funding, and reform the developer open space contribution scheme, to create an interconnected open space network and extend Melbourne's urban tree canopy.

38. Partner with local governments to fund pedestrian infrastructure

Partner with local government to fund pedestrian infrastructure upgrades to connect people to priority places, including central Melbourne, the Monash National Employment and Innovation Cluster, other activity centres and railway stations.

39. Transform cycling in Melbourne, Ballarat, Bendigo and Geelong

In the next five years, deliver separated cycle ways and invest in train station bicycle parking facilities to expand the cycling network in Melbourne, Ballarat, Bendigo and Geelong. Immediate priorities include connections within and between Melbourne CBD and surrounding suburbs, and connections to the Monash, Latrobe and Sunshine National Employment and Innovation Centres.

40. Improve walking and cycling data to better estimate travel impacts and benefits

Immediately begin developing better walking and cycling information and data. In the next three years, incorporate this data and information into Victorian Government transport models used for strategic and project planning, and project appraisal.

41. Reallocate road space to priority transport modes

Immediately begin delivering road space reallocation initiatives to assist with COVID-19 recovery, including projects to better support and enforce priority movement through streets and places. Adopt a 5-year target for delivery of further road space allocation initiatives.

Legislate for faster, simpler, and more consultative road space reallocation in government decision-making.

42. Redesign tram routes

In the next 10 years, redesign tram routes, including short shuttle routes, and reserve land for future tram depots, for more capacity in fast growing inner Melbourne areas.

43. Activate urban renewal with new tram links

Immediately fund the northern Fishermans Bend tram connection for delivery by 2026. Within two to five years, commit to delivering a tram extension to Arden, and to the former defence site at Maribyrnong, if required.

44. Plan for public transport accessibility, including tram stop upgrades

Release a new Accessible Public Transport Action Plan within one year and fund public transport accessibility upgrades, including priority tram stops, to achieve the legislated 2032 accessibility targets.

2.3 Steer changes in travel behaviour

45. Adopt peak and off-peak public transport fares

Introduce permanent peak and off-peak fares on public transport and discontinue payment options that undermine their demand management effects.

46. Price each public transport mode differently

Immediately introduce different fares on each public transport mode to reflect their different costs and benefits and to encourage their best use.

47. Abolish the free tram zone

Immediately abolish the free tram zone to improve safety and access for those who need it most.

**48. Remove annual charges while introducing distance-based pricing for electric vehicles**

Remove annual up-front charges, such as registration fees, while introducing a distance-based road user charge for electric vehicles in the next two years. Consider extending this to other types of vehicles on an opt-in basis, allowing for expansion over time.

49. Appoint an independent transport pricing adviser

Immediately appoint an independent body to advise on and monitor transport prices.

50. Increase and extend the Melbourne Congestion Levy on parking

In the next two years, review the Melbourne Congestion Levy on parking to increase its value, expand the properties it applies to, and cover a wider area including Richmond, South Yarra, Windsor and Prahran. Consider applying a similar levy to other highly congested parts of Melbourne which have good public transport alternatives.

51. Incorporate congestion pricing for all new metropolitan freeways

Apply congestion reducing tolls to all new metropolitan freeways, including the North East Link.

52. Trial full-scale congestion pricing in inner Melbourne

In the next five years, trial full-scale congestion pricing in inner Melbourne.

53. Trial demand-responsive pricing on parking in inner Melbourne

Trial demand-responsive pricing on street and council-controlled parking in inner Melbourne in the next five years.

54. Price parking at major public transport hubs, all train stations and park-and-rides

In the next five years, introduce pricing of parking at major public transport hubs, followed by all train stations and park-and-rides, to help encourage using public and active transport for access.

55. Phase out fixed road user charges and introduce user pays charging

In the next 10 years, replace fixed road user charges with variable distance-based and congestion charges. Ensure user pays charging reflects the relative costs of providing roads, and encourages drivers to change their behaviour.

2.4 Adapt infrastructure for modern needs**56. Require accessible buildings for public services**

Immediately establish an accessibility upgrade fund to contribute towards priority building upgrades to meet contemporary accessibility standards. By 2032, require all Victorian Government provided and funded services to be delivered from premises meeting contemporary accessibility standards.

57. Rapidly renew old public housing

Rapidly renew dilapidated public housing properties, with a priority to renew at least half of all older low-rise apartments and older three-bedroom detached dwellings by 2031.

58. Upgrade and rebuild public hospital infrastructure

In the next 10 years, complete the renewal of the Royal Melbourne Hospital and complete planning for upgrading and rebuilding the Alfred and Austin Hospitals to meet future healthcare demand.

59. Build back better after emergencies

In the next year, consider policy changes and funding mechanisms so high priority public infrastructure destroyed by emergencies is built to a more resilient standard or in less vulnerable locations.

60. Expand the legislated definition of critical infrastructure and improve information flows

Immediately consider expanding the Victorian definition of critical infrastructure beyond energy, water and transport. Expand information sharing capabilities across and beyond critical infrastructure sectors.

61. Incorporate lessons of emergency reviews

Incorporate and act on emergency management and infrastructure resilience recommendations from current bushfire and pandemic inquiries and other reviews underway.

Section 03

Harness infrastructure for productivity and growth

3.1 Shape the transport network for better access

62. Reshape the metropolitan bus network

By 2025, reshape the metropolitan bus network in Melbourne's north-west and south-east in time for the opening of the Melbourne Metro tunnel, including by delivering premium bus services that offer increased frequency and faster travel times. In the next 10 years, continue these reforms elsewhere, including revising the coverage standard and using more flexible bus services in lower demand areas.

63. Connect suburban jobs through premium buses and road upgrades

In the next five years, create new premium bus services and better roads to connect outer and new growth suburbs to National Employment and Innovation Clusters and major employment centres. Consider using a better premium bus service instead of trams on the Wellington Road corridor to Rowville.

64. Increase suburban rail corridor services and capacity

Develop and progressively deliver a prioritised, 15-year network service upgrade program for Melbourne's suburban train corridors, including track, signalling and train carriage projects that expand services and help encourage development in locations able to manage extra population growth. Continue to improve service frequency towards a turn up and go service for more of the day.

65. Reconfigure the city loop for cross-city train services

Immediately after the Melbourne Metro opens in 2025, reconfigure the city loop to allow for more cross-city train services.

66. Prepare for Melbourne Metro Two

Within five years, complete the Melbourne Metro Two business case to protect the land required to construct it. To manage and grow demand along the proposed corridor, introduce premium bus services between Newport and Fishermans Bend, and between Victoria Park and Parkville, within five years.

67. Protect a future option for a new cross-city motorway

Within five years, determine an updated future alignment and preserve the option for constructing, if required, a new motorway linking the Eastern Freeway and CityLink.

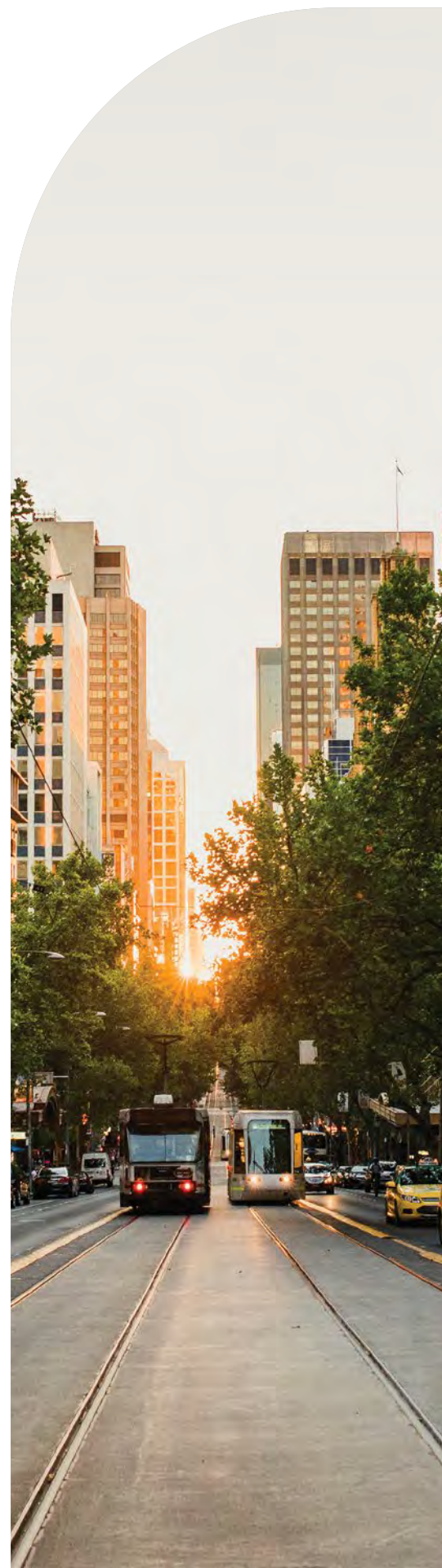
3.2 Plan for growth areas

68. Prioritise and oversee infrastructure delivery in growing communities

Within two years, empower an appropriate government body to monitor infrastructure delivery in new growth areas and priority urban renewal precincts, and proactively advise on delivery sequencing and funding. In the next five years, develop program business cases for growth areas and precincts that consider the timing, sequencing and funding of necessary infrastructure.

69. Expand rail access in outer suburbs

In the next five years, complete plans to progressively expand access to rail services in growth areas and purchase remaining land required for rail corridors and stations. Immediately introduce premium bus services toward Clyde, Wollert and the Mornington Peninsula. Develop business cases to improve the Melton, Wallan and Wyndham Vale corridors, and conduct a feasibility study for a Wollert public transport corridor.



70. Expand and upgrade Melbourne's outer suburban road network

In the next five to 15 years, deliver a program of upgrades to Melbourne's arterial road and freeway network beyond what is currently funded, focusing on congested roads and corridors in outer metropolitan and growth suburbs council areas.

71. Target 30% tree canopy coverage in new growth areas

Achieve 30% tree canopy coverage in new growth areas by mandating coverage during precinct development. Fund relevant Victorian Government agencies and local government to plant, replace and maintain canopy trees.

3.3 Align social infrastructure with better service delivery**72. Co-design an Aboriginal Community-Controlled Infrastructure Plan**

Immediately commence a co-design process with Aboriginal Victorians to develop a plan to guide investment in Aboriginal community-controlled infrastructure to meet current and future social, economic and cultural needs.

73. Set targets to grow social housing

Immediately set a transparent social housing growth target to reach at least the national average of 4.5 social housing dwellings for every 100 households by 2031.

74. Build new hospital capacity

In the next five years, reserve land for future hospital sites. Over 30 years, build new public hospital capacity to meet Victoria's future needs, especially demand increases from Melbourne's rapidly growing outer northern and western suburbs.

75. Deliver infrastructure for a better mental health system

Immediately establish a dedicated infrastructure fund to support a better mental health system, building on the recommendations of the Royal Commission into Victoria's Mental Health System.

76. Plan and consistently deliver corrections and youth justice infrastructure while managing demand with policy settings

Plan and consistently deliver corrections and youth justice infrastructure while managing demand. By 2023, undertake long-term corrections and youth justice infrastructure planning, alongside policy measures that reduce short-term volatility and prison demand. In the next 15 years, consistently deliver a pipeline of corrections and youth justice infrastructure to meet long-term demand.



Section 04

Develop regional Victoria

4.1 Enhance market access and productivity

77. Deliver funding certainty for regional road maintenance and upgrades

Within two years, specify clear levels of service for each type of regional road and bridge. Following this, dedicate an ongoing program to fund regional road and bridge maintenance and upgrades to meet these service levels. Funding should be prioritised based on improving safety, decreasing vehicle emissions, and lifting economic productivity.

78. Revise the Murray Basin Rail project plan

Immediately revise the Murray Basin Rail project plan, informed by the project's business case review.

79. Fund an ongoing regional rail freight maintenance program

Immediately fund an ongoing periodic regional freight rail maintenance program, informed by a publicly available network asset management plan.

80. Continue to address regional Victoria's digital connectivity gaps

In the next five years, continue delivering regional digital connectivity improvements, and review the need for further government investment following the roll-out of the Digital Future Now initiative.

4.2 Unlock regional economic growth opportunities

81. Upgrade power supply for agriculture and regional manufacturing

In the next five years, contribute toward strategic power supply infrastructure upgrades for agriculture and regional manufacturing, where an independent assessment demonstrates significant potential for increased productivity, competitiveness and growth.

82. Plan for future investments in regional nature-based tourism infrastructure

In the next five years, develop a Victorian nature-based tourism strategy to guide industry development and prioritise further investments.

83. Develop a Victorian Aboriginal tourism strategy

Partner with Traditional Owners to develop a Victorian Aboriginal tourism strategy in the next five years to guide future Aboriginal tourism investments, including through Joint Management Plans.

84. Boost tourism infrastructure by allowing more national parks to grant long leases

Attract investment in Victoria's regional tourism industry by immediately allowing more national parks to grant leases for up to 49 years for infrastructure proposals that meet specific criteria and complement environmental and heritage values.

4.3 Connect the regions to help strengthen wellbeing

85. Reform regional public transport to meet local needs

In the next five years, gradually redirect some regional transport funding to redesigned, integrated local transport services, based on regional needs assessments, and incorporating flexible services that meet local needs.

86. Improve resilience of regional telecommunications infrastructure

In the next 10 years, develop more resilient regional telecommunications infrastructure so communities can stay safe during emergencies, including greater network redundancy and back-up power supply.

87. Fund regional libraries to provide better internet access

Immediately provide funding for regional and rural libraries to improve community access to fast, free internet services, leveraging existing library infrastructure.

88. Use rural schools for children's specialist and allied telehealth services

Retrofit or better use selected rural school infrastructure for children's specialist and allied telehealth services to improve children's health and development. Immediately begin with a trial in Wimmera Southern Mallee.

4.4 Foster regional Victorians' health, safety and inclusion

89. Deliver multipurpose shared social service facilities in the regions

Immediately undertake collaborative inter-agency planning for regional social services to identify opportunities for multipurpose shared facilities, then deliver them where appropriate in partnership with local governments and community organisations.

90. Support regional councils to update, repurpose or retire outdated community infrastructure

Fund regional councils in the next five years to update, repurpose or retire outdated community infrastructure for better service delivery.

91. Create climate-adapted facilities for rural communities

In the next five years, fund local governments to plan and help deliver a network of designated, accessible climate-adapted community facilities, to manage the health impacts of extreme heat and bushfire smoke.

92. Build regional residential alcohol and drug rehabilitation facilities

Within five years, build residential detoxification and rehabilitation facilities in regional Victoria to provide equitable access to alcohol and other drug treatment.

93. Fund more Youth Foyers in regional Victoria

Fund more Youth Foyers in regional Victoria, beginning with Geelong, Wodonga and Bendigo by 2026, to build on existing education infrastructure and support vulnerable young people.

94. Expand social housing in regional centres, in locations with good access

Focus social housing investments in regional centres, near access to transport and services, to contribute to a target of 4.5 social housing dwellings for every 100 Victorian households by 2031.

95. Make social housing suitable for changing local climates

Prioritising northern Victoria, continue to deliver a long-term program of modifying social housing to be climate resilient by improving the energy efficiency and energy affordability of residences.





High-priority actions to assist the recovery from COVID-19

Infrastructure Victoria has identified all the draft recommendations in this draft strategy as priorities. The draft recommendations are all important to achieving our objectives and, in many instances, they will contribute to the social and economic recovery of Victoria from the effects of COVID-19.

In its 2020-21 State Budget, the Victorian Government invested in early action to assist the COVID-19 recovery over the next two years. Infrastructure investments and policy changes can provide immediate economic stimulus which creates jobs across a range of locations, industries and skill levels. Early action can also help enable safe work and travel, foster productive use of technology and assist those adversely affected by the pandemic.

The Victorian Government can also continue to reinforce positive behavioural changes people developed during the pandemic and mitigate less productive ones that risk becoming entrenched. Early action can both assist in the short-term recovery and management of the COVID-19 pandemic, while also making progress in delivering investments and reforms that make sense in the longer term. For example, investment in clean energy infrastructure can assist with short term economic recovery while better positioning Victoria to respond to climate change and become a cheap, clean energy jurisdiction.

In light of this, we have identified the following high priority actions the Victorian Government can take in the short-term to

assist with the recovery from COVID-19. These actions can be implemented over the next 18-24 months at relatively low cost. They are 'no regrets' actions that meet current needs and will contribute to building a better future for Victoria. The 2021-21 Victorian Budget has made a strong start on commencing many, though not all, of these high priority actions.

Upgrade and deliver additional social housing

Upgrading and delivering additional social housing is an opportunity for the Victorian Government to rapidly and broadly deliver economic stimulus across the state while also helping meet the very large and growing unmet need for social housing.

57. Rapidly renew old public housing.

73. Set targets to grow social housing.

94. Expand social housing in regional centres, in locations with good access.

95. Make social housing suitable for local climates.

Make public transport safer, fairer and more efficient

Reforming the way people pay for Melbourne's public transport will make public transport safer, fairer and more efficient. It will also make travel cheaper for most people; particularly low-income earners.

Making permanent a system of off-peak travel and adopting lower fares for tram and bus will help spread demand and make travel cheaper. Off-peak and bus travel are also disproportionately used by those on lower incomes, making these reforms fairer as well.

Fare reform will reduce crowding and facilitate social distancing, as well as provide cheaper travel at a time of economic hardship. Abolishing the free tram zone would reduce crowding and increase safety and access for those who need it most. These measures will also help maintain confidence in the public transport system.

45. Adopt peak and off-peak public transport fares.

46. Price each public transport mode differently.

47. Abolish the free tram zone.

Enable more active transport and increase interconnected open space

Many more people would like to walk or cycle for both exercise and work journeys as a result of COVID-19. Providing more active transport infrastructure and high quality, connected open green space as soon as possible will enable people to maintain their physical health and travel safely. Delivering this infrastructure can be done rapidly and will provide short-term economic stimulus.

- 37. Develop an interconnected open space network.
- 38. Partner with local governments to fund pedestrian infrastructure.
- 39. Transform cycling in Melbourne, Ballarat, Bendigo and Geelong.
- 41. Reallocate road space to priority transport modes.

Fast-track government building upgrades

Economic stimulus can be rapidly and flexibly provided by delivery of needed upgrades to Victorian Government owned and occupied buildings, including improvements to energy efficiency and accessibility upgrades.

Regional communities have particular opportunities for economic stimulus by constructing better, more resilient facilities to replace outdated or damaged infrastructure.

- 06. Upgrade energy efficiency of government buildings.
- 56. Require accessible buildings for public services.
- 59. Build back better after emergencies.
- 90. Support regional councils to update, repurpose or retire outdated community infrastructure.
- 91. Create climate-adapted facilities for rural communities.

Enable clean energy investment

Investment in clean energy infrastructure will assist with economic recovery and better position Victoria to become a cheap, clean energy jurisdiction. Augmenting electricity transmission infrastructure for new renewable energy generation and developing Renewable Energy Zones are priority enablers for clean energy investment.

- 02. Augment electricity transmission for renewable energy and resilience.
- 03. Identify and coordinate priority Renewable Energy Zones.

Support better mental and physical health with additional infrastructure

Delivering additional infrastructure can support better mental health at this time of pressure, respond to the recommendations of the Royal Commission into Victoria's Mental Health System and also provide economic stimulus during construction.

- 75. Deliver infrastructure for a better mental health system.
- 92. Build regional residential drug and alcohol facilities.



Continued
on next page.



Bolster online service delivery and the regional digital economy

Public and health services have an opportunity to continue the online service delivery transformation spurred by COVID-19. Bolstering online service delivery, particularly in the health system and courts, will deliver better and more efficient services – especially for regional Victorians.

Improving digital connectivity in regional Victoria can bolster the regional digital economy, enable more people to continue working remotely and provide economic stimulus during construction.

- 21. Use innovation to deliver better models of health care.**
- 22. Modernise courts through digitisation and contemporary shared facilities.**
- 80. Continue to address regional Victoria's digital connectivity gaps.**
- 87. Fund regional libraries to provide better internet access.**
- 88. Use rural schools for children's specialist and allied telehealth services.**

Deliver regional road and rail freight maintenance

Immediately funding prioritised regional road maintenance and upgrades, and an ongoing regional freight maintenance program, will provide economic stimulus in the regions while simultaneously boosting safety, decreasing emissions and increasing productivity by addressing much-needed maintenance deficiencies.

- 77. Deliver funding certainty for regional road maintenance and upgrades.**
- 79. Fund an ongoing regional freight maintenance program.**

Support sustainable regional economic growth

The recovery from COVID-19 can be environmentally and economically sustainable. There is a pressing need for improved recycling infrastructure, particularly in regional Victoria where it can contribute to sustainable economic growth. An increasing demand for domestic tourism in the wake of the pandemic provides an impetus for investment in nature-based tourism infrastructure in regional Victoria.

- 28. Facilitate improved recycling infrastructure for priority materials.**
- 82. Plan for future investments in regional nature-based tourism infrastructure.**



Meeting our objectives

This draft strategy makes 95 draft recommendations towards achieving our 10 objectives. In addition, a common theme running through this draft strategy is integrating land use and infrastructure.

The table below maps out how our draft recommendations align our draft strategy objectives, and also shows their alignment with the theme of integrating land use and infrastructure planning.

Table: Our draft recommendations help achieve the draft strategy objectives

No.	Recommendation	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
1	Accelerate the uptake of zero emissions vehicles		●			●		●		●	
2	Augment electricity transmission for renewable energy and resilience					●	●	●	●	●	
3	Identify and coordinate priority Renewable Energy Zones					●	●	●	●	●	
4	Require 7-star energy-rated new homes in 2022, increasing towards 8 stars by 2025		●			●	●		●	●	
5	Mandate a home energy rating disclosure scheme		●			●	●		●	●	
6	Make Victorian Government buildings more energy efficient		●			●	●		●	●	
7	Reduce peak electricity use with demand management pricing			●		●	●		●	●	
8	Allow new gas-free housing estates and review current gas policies						●	●	●	●	
9	Specify climate scenarios and carbon value in assessing infrastructure								●	●	
10	Strategically review climate consequences for infrastructure						●	●	●	●	
11	Consider all water supply sources	●	●			●	●		●	●	
12	Progress integrated water cycle management	●	●			●	●		●	●	
13	Improve decision-making for urban water investment	●				●	●			●	
14	Strengthen agricultural water security by modernising irrigation					●	●		●	●	
15	Upgrade Victoria's emergency water network		●						●	●	
16	Invest in protecting Victoria's coasts							●	●	●	●
17	Prepare for increasingly automated vehicle fleets		●		●	●			●	●	●
18	Facilitate integration of public transport with new mobility services		●	●	●	●			●	●	
19	Incorporate personal mobility devices in regulation		●		●		●				
20	Transform road network operations for all current and future modes		●			●					
21	Use innovation to deliver better models of health care	●	●	●		●			●	●	
22	Modernise courts through digitisation and contemporary shared facilities	●	●			●					
23	Improve technology and infrastructure for a responsive police service		●								
24	Optimise capacity at the Port of Melbourne	●				●	●	●			
25	Act now to protect future Bay West Port option	●				●		●			●

		Objectives									
		1	2	3	4	5	6	7	8	9	10
		Prepare for population change	Foster healthy, safe and inclusive communities	Reduce disadvantage	Enable workforce participation	Lift productivity	Drive Victoria's changing, globally integrated economy	Promote sustainable production and consumption	Protect and enhance natural environments	Advance climate change mitigation and adaptation	Build resilience to shocks
No.	Recommendation										
26	Purchase land for Melbourne's future freight terminals	●			●	●	●				●
27	Construct an outer metropolitan road and rail corridor	●			●	●	●				●
28	Facilitate improved recycling infrastructure for priority materials					●	●	●	●	●	●
29	Strengthen end markets for recycled materials					●	●	●		●	
30	Address barriers to recycling and reducing waste					●		●		●	
31	Minimise waste and improve residual waste infrastructure planning					●		●		●	
32	Produce public plans for priority infrastructure sectors	●	●	●	●	●	●			●	●
33	Publish Victoria's transport plan	●	●	●	●	●	●			●	●
34	Review Victoria's infrastructure contribution system to cover gaps	●									●
35	Support more homes in priority established places	●	●		●	●			●		●
36	Deliver very low income housing with inclusionary zoning	●	●	●	●						●
37	Develop an interconnected open space network	●	●						●	●	●
38	Partner with local governments to fund pedestrian infrastructure	●	●	●						●	●
39	Transform cycling in Melbourne, Ballarat, Bendigo and Geelong	●	●	●						●	●
40	Improve walking and cycling data to better estimate travel impacts and benefits		●		●	●				●	●
41	Reallocate road space towards priority transport modes	●			●	●		●		●	●
42	Redesign tram routes	●	●			●					
43	Activate urban renewal with new tram links	●	●	●	●	●	●				●
44	Plan for public transport accessibility, including tram stop upgrades	●	●	●	●						●
45	Adopt peak and off-peak public transport fares	●			●	●		●			●
46	Price each public transport mode differently			●				●			
47	Abolish the free tram zone		●			●		●			
48	Remove annual charges while introducing distance-based pricing for electric vehicles					●		●		●	●
49	Appoint an independent transport pricing adviser			●		●		●			
50	Increase and extend the Melbourne Congestion Levy on parking	●				●		●			
51	Incorporate congestion pricing into all new metropolitan freeways, bridges and tunnels	●				●		●			
52	Trial full-scale congestion pricing in inner Melbourne	●				●		●			
53	Trial demand-responsive pricing on parking in inner Melbourne	●				●		●			
54	Price parking at major public transport hubs, all train stations and park-and-rides	●		●				●			
55	Phase out fixed road user charges and introduce user pays charging	●				●		●		●	
56	Require accessible buildings for public services	●	●	●	●						
57	Rapidly renew old public housing	●	●	●							●
58	Upgrade and rebuild public hospital infrastructure	●	●			●					●
59	Build back better after emergencies		●	●						●	●
60	Expand critical infrastructure definition and improve information flow		●	●				●		●	●
61	Incorporate lessons of emergency reviews		●					●		●	●

Objectives

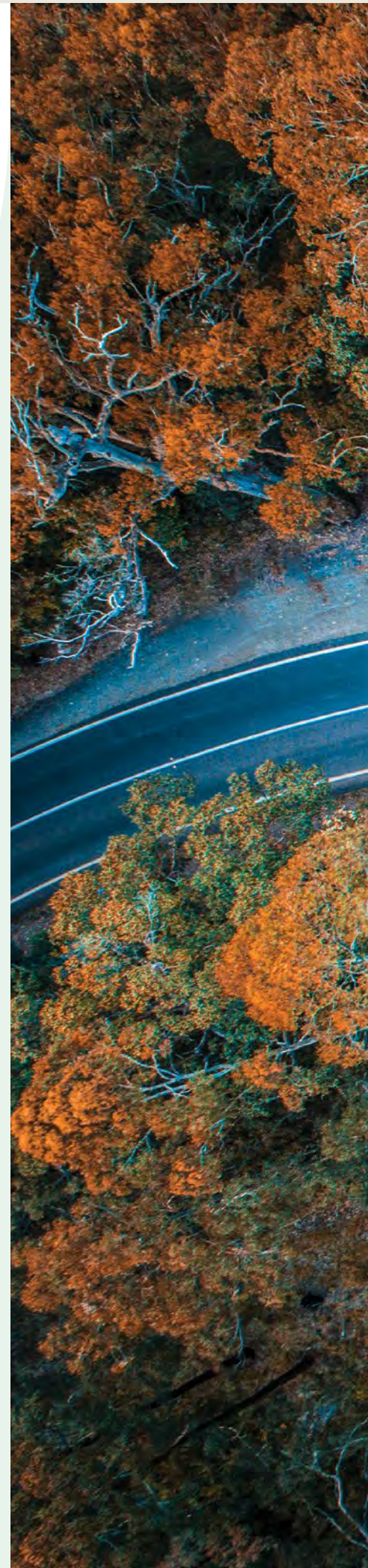
No.	Recommendation	Objectives										Align with land use and infrastructure integration
		1 Prepare for population change	2 Foster healthy, safe and inclusive communities	3 Reduce disadvantage	4 Enable workforce participation	5 Lift productivity	6 Drive Victoria's changing, globally integrated economy	7 Promote sustainable production and consumption	8 Protect and enhance natural environments	9 Advance climate change mitigation and adaptation	10 Build resilience to shocks	
62	Reshape the metropolitan bus network	●	●	●	●					●		
63	Connect suburban jobs through premium buses and road upgrades	●	●		●	●	●			●		●
64	Increase suburban rail corridor capacity	●			●	●	●					●
65	Redesign the city loop for cross-city train services	●			●	●	●					
66	Prepare for Melbourne Metro Two	●			●	●	●					●
67	Protect a future option for a new cross-city motorway	●			●	●	●					●
68	Prioritise and oversee infrastructure delivery in growing communities	●	●			●						●
69	Expand rail access in outer suburbs	●	●	●	●	●	●					●
70	Expand and upgrade Melbourne's outer suburban road network	●	●		●	●	●					●
71	Target 30% tree canopy coverage in new growth areas	●	●	●					●	●		●
72	Co-design an Aboriginal Community-Controlled Infrastructure Plan	●	●	●	●	●						
73	Set targets to grow social housing	●	●	●								●
74	Build new hospital capacity	●	●	●							●	●
75	Deliver infrastructure for a better mental health system	●	●	●	●	●					●	
76	Plan and consistently deliver corrections and youth justice infrastructure while managing demand with policy settings	●	●			●					●	
77	Deliver funding certainty for regional road maintenance and upgrades	●	●		●	●	●			●	●	
78	Revise the Murray Basin Rail project plan		●			●	●					
79	Fund an ongoing regional rail freight maintenance program		●			●	●					
80	Continue to address regional Victoria's digital connectivity gaps				●	●	●				●	
81	Upgrade power supply for agriculture and regional manufacturing					●	●				●	
82	Plan for future investments in regional nature-based tourism infrastructure				●		●		●			●
83	Develop a Victorian Aboriginal tourism strategy		●	●	●		●					●
84	Boost tourism infrastructure by allowing more national parks to grant long leases				●	●	●		●			●
85	Reform regional public transport to meet local needs	●	●	●	●						●	●
86	Improve resilience of regional telecommunications infrastructure		●	●		●				●	●	
87	Fund regional libraries to provide better internet access	●	●	●	●							
88	Use rural schools for children's specialist and allied telehealth services		●	●	●	●						
89	Deliver multipurpose shared social service facilities in the regions	●	●	●		●						●
90	Support regional councils to update, repurpose or retire outdated community infrastructure		●	●		●						●
91	Create climate-adapted facilities for rural communities		●	●						●	●	
92	Build regional residential alcohol and drug rehabilitation facilities		●	●								
93	Fund more Youth Foyers in regional Victoria		●	●	●							
94	Expand social housing in regional centres, in locations with good access	●	●	●								●
95	Make social housing suitable for changing local climates		●	●				●		●	●	


Confront long-term challenges

Section 01

Victoria has faced depressions, wars, pandemics, technological disruption and natural disasters throughout its history. We have successfully navigated them to build a peaceful, prosperous and inclusive society. Successive crises like the COVID-19 pandemic and the 2019-20 summer bushfires demonstrate how future predictions can rapidly and unexpectedly change.

Unforeseen events can alter long-term trajectories, and Victoria must be equipped to rapidly respond, adapt, and embed resilience to future shocks. Allowing innovation to thrive, adapting swiftly to change, and better managing risk will help Victoria to flourish in the future.





The pandemic has helped many people to transition to work and study from home, saving them time previously spent commuting and contributing to reduced transport congestion.

The COVID-19 pandemic has resulted in a tragic loss of life, significant disruptions to communities and households, and greater economic hardship for many. Some businesses have closed permanently, and significant numbers of people have lost their jobs. Many people have had to dramatically change their behaviour, and find new, sometimes better ways to manage their lives. Disruptions can bring positive opportunities where people can adapt and respond. For example, the pandemic has helped many people to transition to work and study from home, saving them time previously spent commuting and contributing to reduced transport congestion.

Infrastructure planners face uncertainty from the future effects of technology, population, climate, social preferences, economic conditions and emergencies. These uncertainties can change the effectiveness or productivity of infrastructure, change how people use it, or remove the need for any infrastructure at all. The rapid pace and

breadth of innovation and technological change will continue to reshape Victorians' interactions with one another and the wider world.

One way for infrastructure planners and policymakers to account for uncertainty is by considering multiple potential future scenarios. Rather than assuming a single future path, scenarios can examine different alternatives and the impacts on infrastructure that may last for decades. For this strategy, we have modelled multiple future scenarios for population growth, infrastructure investment and population distribution. Scenario planning and analysis can explore the different benefits of infrastructure choices in an uncertain future and the value of keeping options open for when things change. Building 'real options'¹ into plans and projects, and updating assumptions against evidence over time, means governments can make good infrastructure decisions now, with more confidence projects will still perform in unexpected circumstances.

Victoria is well-placed to adapt to and seize opportunities. Recovering from major shocks will take time but can prompt rethinking and new approaches to policy challenges. Climate change creates new risks but, by better understanding them, Victoria can seize opportunities to achieve its zero emissions goal, and improve its resilience to future climate conditions. Rapid technological disruption can result in changes to demand and the way infrastructure is used. Similarly, geopolitical changes, global economic developments and supply chain disruptions can affect international trade and export markets, creating both challenges and opportunities. For example, changes to international waste processing policies and markets have provided Victoria the opportunity and responsibility to overhaul recycling and resource recovery infrastructure for a more sustainable, circular economy.

1.1

Navigate the energy transition

Nations have agreed to limit global average warming to well below 2°C, and aim to limit warming to 1.5°C.¹ Global warming is fuelled by global greenhouse gas emissions.² Global greenhouse gas emissions from human activities must fall to net zero by 2050 to have a 50% chance of keeping warming below 2°C.³ All Australian states and territories have committed to net zero emissions by 2050, including Victoria. Business is also increasingly pricing climate change transition and physical risks into investment decisions, including by changing corporate valuations.⁴

Victoria's *Climate Change Act 2017* has established a system of coordinated, whole-of-economy initiatives to achieve a net zero emissions, climate resilient state.

It legislates a target for Victoria to achieve net zero greenhouse gas emissions by 2050. It also features rolling five-year targets, five-year pledges to reduce emissions and five-year climate change adaptation plans, while obliging all government policies, plans and decisions to consider climate change.⁵

Around 70% of Australia's greenhouse gas emissions are either directly attributable to or influenced by infrastructure.⁶ In Victoria, energy used to power electricity, gas and transport produces around 90% of emissions. This means Victoria must change the way it generates energy if it is to meet the legislated net zero emissions target by 2050. Emissions from electricity generation have declined since 2005, gas emissions have stayed relatively stable, and transport emissions have increased.⁷

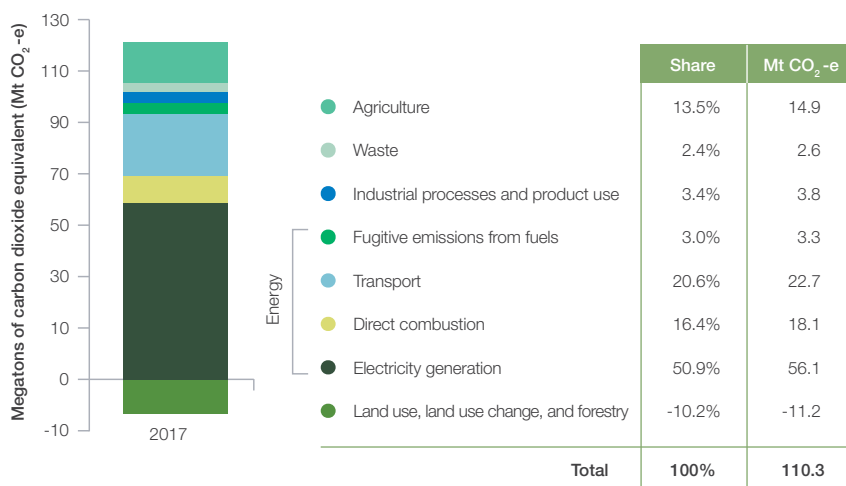
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Road vehicles, like cars and trucks, contribute almost 90% of transport emissions. To achieve net zero transport emissions, Victoria must adopt alternative zero emission transport technologies.

Figure 1: Victorian emissions by sector and energy sub-sectors, 2017

The diagram shows Victorian greenhouse gas emissions by sector, including the different energy sub-sectors, in 2017. Note that land use, land use change and forestry sequestered carbon that year, meaning it contributed a net negative contribution to greenhouse gas emissions.



Source: Victorian Greenhouse Gas Emissions Report 2019.

Energy powers Victoria's economy, keeps homes comfortable, and underpins the technology used by a modern society. A thriving future depends on reliable, affordable and sustainable energy, including efficient and productive energy infrastructure. Climate change mitigation, technological advances and changing consumer energy sources are disrupting Victoria's energy generation, transmission, distribution and use. Victoria has the knowledge, technology and resolve to manage the energy sector's transition.

Electricity will increasingly need to be sourced from renewable generation, like solar and wind energy. It will likely require a range of both large- and small-scale sources, from commercial wind and solar farms to household rooftop solar panels. Intermittent energy sources will need to be accompanied by greater dispatchable capacity to ensure a reliable energy supply, such as energy storage.

Road vehicles, like cars and trucks, contribute almost 90% of transport emissions. To achieve net zero transport emissions, Victoria must adopt alternative zero emission transport technologies, like electric and hydrogen vehicles. Achieving greenhouse gas emission reductions relies, in part, on decarbonising the power used for these vehicles, including electricity and gas.



Electricity is leading the charge

Victoria is already reducing its greenhouse gas emissions from electricity generation, with a 7.4% drop between 2005 and 2017.⁸ In 2017, the Hazelwood power station shut down, reducing greenhouse gas emissions by 15 million tonnes of carbon dioxide emissions a year,⁹ but removing 1600 megawatts of power from the state's electricity grid. The Latrobe Valley's three remaining coal-fired power stations generate most of Victoria's remaining electricity emissions.¹⁰ They are forecast to close in the next 30 years,¹¹ and will become more unreliable as they age.¹²

Victoria's central electricity challenge is managing the eventual closure of these power stations. This must be achieved while retaining affordable, reliable, zero emissions replacement energy, and ensuring the Latrobe Valley has a thriving economic future. Many inquiries, reports and strategies set out the reforms required to manage the energy transition and to secure benefits for energy consumers.^{13,14,15,16}

Victoria has legislated a new target of 50% renewable energy generation by 2030¹⁷ and is rapidly adding renewable energy generation, which is cheaper to build than new coal plants.¹⁸ Large-scale solar and wind farms are already connecting to the electricity transmission network, accounting for 38% of the state's total generating capacity.¹⁹ Many individual households are generating their own power using rooftop solar panels. Rooftop solar comprised 11% of generation capacity in 2018,²⁰ and will continue growing, supported by the Solar Homes Program.²¹ Networks need to adapt to allow two-way flows of electricity, which can involve distribution networks making location-specific investments to manage voltage issues.²²

Victoria's electricity transmission infrastructure has historically been configured to carry power from the Latrobe Valley power stations to places with high energy use, like Melbourne. But future large-scale renewable energy will be sourced from places with good sun and wind resources, such as the western region of the state. In some areas, weak transmission networks cannot currently carry large amounts of electricity and renewable energy generators are already having trouble exporting their electricity.²³ Victoria will need to better coordinate transmission and generation infrastructure to bring renewable electricity online in the right place at the right time.

Rapid renewable energy installation also creates new challenges for the stability of the electricity system.²⁴ Intermittent energy sources need stabilising with back-up, dispatchable power to reliably meet electricity demand when the sun is not shining, or the wind is not blowing. For example, this can include dispatchable resources like batteries or pumped hydroelectricity. These can be supported by new transmission infrastructure and power system services that improve voltage control, system strength, frequency management, power system inertia, and dispatchability.²⁵

Changes to Victoria's energy system need to be integrated with the National Electricity Market. Victoria's energy network is connected to other states and electricity can be transferred across state borders. The national Energy Security Board is working on a post-2025 market design for the National Electricity Market.²⁶ This includes supporting innovations, sending investment signals to ensure reliability, integrating rooftop solar and other

household energy investments, and incorporating large-scale renewable energy and new system security and resilience services.²⁷

Local communities can benefit from a more dispersed energy generation system, especially in regional Victoria. Several councils have declared climate emergencies²⁸ and renewable energy projects can help local governments pursue local net zero emissions targets. For instance, Warrnambool City Council recognises the link between its climate emergency motion and its W2040 and Green Warrnambool plans.²⁹ Renewable energy construction can create jobs that support electricity supply chains and provide expert services as demonstrated by the 30 specialist firms already operating in Barwon South West.³⁰ Regional electricity investment can be leveraged for extra community benefits, such as developing new skills to support renewable energy industries.

Victoria has legislated a new target of 50% renewable energy generation by 2030 and is rapidly adding renewable energy generation, which is cheaper to build than new coal plants.

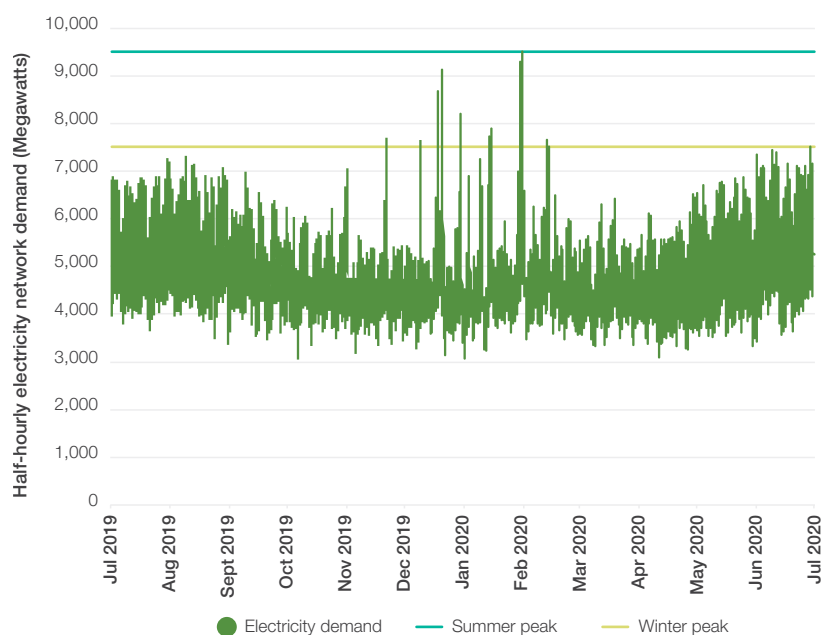
Managing and reducing energy demand makes the task easier

Electricity infrastructure must generate and transmit enough energy to meet the highest peak of electricity use or risk blackouts. But Victoria only needs this capacity a few times each year – usually on the hottest summer evenings when people return home and turn on their appliances, especially air conditioners. This capacity lies idle the rest of the time. For instance, maximum Victorian energy demand was

over 9200 megawatts in 2019, but only exceeded 7800 megawatts for 14 days – equivalent to the output of a coal-fired power plant. Reducing this peak can reduce the generation and network infrastructure Victoria needs and reduce the emissions generated. Avoiding the delivery of more infrastructure than is necessary will also reduce upward pressure on household electricity bills.

Figure 2: Victoria uses peak electricity capacity only a few times a year

This graph shows the variation in Victorian energy demand.



Source: Australian Energy Market Operator, *Aggregated Price and Demand Data – Historical*, Victorian data from July 2019 to June 2020

Reducing and spreading this peak can reduce the generation and network infrastructure Victoria needs and reduce the emissions generated.



Globally, energy efficiency is predicted to be the single largest contributor to reducing greenhouse gas emissions.

Influencing energy consumption patterns can reduce overall electricity demand and shift some away from peaks. Demand management pricing allows all energy consumers to be rewarded with significant cost savings if they reduce their energy use or shift it away from peak periods. Better signals can also help households and business decide whether to invest in new technologies, for instance, choosing to install rooftop solar or batteries, and selling their excess solar energy back onto the grid. Better signals can also encourage them to export when the system requires it most.

Beyond simply shifting energy use, using electricity more efficiently helps reduce demand overall, ultimately saving on infrastructure costs. Globally, energy efficiency is predicted to be the single largest contributor to reducing greenhouse gas emissions.³¹ Energy use in buildings accounts for around one-third of Victoria's total greenhouse gas emissions,³² with

heating and cooling making up around 40% of home energy costs.³³ The energy efficiency of homes and buildings can lock in future energy demand, as they are long-lasting and can be difficult to change. More than half of Australia's 2050 building stock will be constructed during the next 30 years, at prevailing energy efficiency standards.³⁴ The remainder may need retrofitting to help prevent escalating energy costs and demand.

Energy efficiency becomes even more important in a future warmer climate, avoiding extra cooling costs and health consequences. Strengthening demand management pricing would provide further incentives to improve residential energy efficiency. Extensive economic research shows households respond to higher energy prices by adopting energy efficient technologies or spending more on energy saving measures.³⁵

Future technology will shape energy options and use

During the next 30 years, new technology will shape energy use, and provide new options to reduce greenhouse gas emissions and manage the energy system. Electric vehicles are already on the roads, and a trial of zero emission bus technology will soon commence for Victoria's public bus fleet. Work on new battery electricity storage technology is underway in Victoria,³⁶ including the installation a 300 megawatt battery. The Victorian Government is also currently investigating the science and exploring the viability of carbon capture and storage at commercial scale.³⁷

New demands for electricity will emerge, such as widespread adoption of electric vehicles. Electrification is the most mature and demonstrated technology for rapidly reducing transport emissions,³⁸ if paired with a decarbonised electricity sector. Electric vehicles are falling in price, extending in range, and purchases increased by 200% in 2019.³⁹ They may cost the same as conventional vehicles by the mid to late-2020s and have cheaper

running costs than conventional vehicles.^{40,41} Extensive electric vehicle uptake could compound electricity demand peaks if charging occurs in peak periods, such as if people return home from work, plug in their car and turn on their air conditioner. This magnifies the urgency of better managing energy demand. Providing incentives for people to charge electric vehicles during off-peak periods could potentially save approximately \$2.5 billion in extra infrastructure investment.⁴² For the adoption of electric vehicles to reduce the state's emissions, the Victorian Government will need to ensure that the energy and electric vehicle transitions happen in tandem.

While the electricity and transport sectors have potential pathways for achieving net zero emissions, the future is less clear for natural gas. Burning natural gas emits greenhouse gases, meaning Victoria will need to transition away from natural gas during the next 30 years to achieve its net zero emissions goal. This has implications for the extensive natural gas network, which

has over 33,000 kilometres of network infrastructure.⁴³ Victoria is the only state where most gas demand is from residential and small commercial customers, who mainly use it for heating and cooking. Over 80% of households are connected to the gas network.⁴⁴ Natural gas will still need to be supplied in the short to medium term, but work needs to begin on transition options.

A possible future option could be using the gas network to distribute clean hydrogen. Hydrogen technologies could represent a potential competitive economic advantage for Australia.⁴⁵ But the cost and application of hydrogen technology is still uncertain, particularly regarding whether retaining the reticulated household gas distribution network is necessary for the deployment of hydrogen technologies. No definitive answer can be assumed now, and immediately locking in a transition pathway may pre-empt a better future decision. Prudent actions can be taken now to reduce the size of the risks from a large potentially stranded asset.



Draft recommendations to help navigate the energy transition

Infrastructure Victoria makes the following draft recommendations to help manage the transition to achieve the Victorian target of net zero emissions by 2050, while retaining an affordable, sustainable and reliable energy system. They can also help support climate change adaptation (see section 1.2)

and regional economic development (see section 4.2). Elsewhere, we also make draft recommendations on improving resilience to emergencies (see draft recommendations 59, 60 and 61) and improving regional power supply (see draft recommendation 81).

1.1 Navigate the energy transition

Accelerate the uptake of zero emissions vehicles

Draft recommendation 01

Within the next five years, require all new public transport buses and coaches, and government vehicle fleets, to transition to appropriate zero emissions vehicles where available. Incentivise zero emissions freight vehicles, and develop design standards and payment principles for charging infrastructure. Consider other policy levers to phase out internal combustion engine vehicles during the next 30 years.

Transport is Victoria's second highest source of greenhouse gas emissions, and its emissions are growing.⁴⁶ Transport emissions are largely from burning petrol and other fossil fuels. These internal combustion engine vehicles also produce other gases and particulates harmful for people's health.

Energy sector decarbonisation offers an opportunity to also decarbonise the transport sector. New technologies allow production of low or zero emissions vehicles, either using electricity or hydrogen. Reaching net zero emissions by 2050 will require widespread adoption of zero emissions vehicles, including managing their potential demands on the energy system (see draft recommendation 7). If all vehicles were zero emissions, this would remove around 27 million tonnes of potential greenhouse gas emissions in 2046,⁴⁷ and substantially contribute towards Victoria's net zero emissions target by 2050. It could also deliver health benefits worth between \$270 and \$735 million each year, especially for people living in dense urban areas and along major road corridors.⁴⁸

Australia trails behind global leaders in adopting zero emissions vehicles.^{49,50}

The Australian Government holds many policy levers to accelerate zero emissions vehicle purchases, including importation rules and vehicle emissions standards. The Victorian Government should advocate for the Australian Government to use these options to encourage zero emissions vehicle adoption. The United Kingdom has recently announced a plan to end the sale of new non-electric cars and hybrid vehicles in 2035.⁵¹ In the absence of Australian Government action, the Victorian Government could set an end date for the sale and registration of internal combustion engine vehicles in Victoria.

The Victorian Government funds public buses and coaches, which comprise almost 70% of scheduled kilometres travelled by public transport vehicles.⁵² A three-year trial for zero emissions buses was recently announced. During the next five years, the Victorian Government should require public transport operators to begin purchasing new zero emissions buses and coaches as soon as feasible. The Victorian Government should also require all new vehicles in its substantial government fleet to be zero emissions, where appropriate models are available.

Many freight truck movements occur through residential areas, creating noise

and pollution. Consequently, hundreds of roads have restrictions, bans and curfews to limit truck movements.⁵³ Zero emissions freight vehicles are quieter and less polluting. Creating exemptions from some of these restrictions for zero emissions freight vehicles would incentivise faster adoption. In the next five years, the Victorian Government should incentivise zero emissions freight vehicles by reviewing restrictions on zero emissions freight movements on these roads. This particularly applies to roads leading to the Port of Melbourne, where Infrastructure Victoria has found the community impact of freight traffic could be a barrier to increasing the port's capacity (see draft recommendation 24).

Electric vehicles require charging infrastructure. The Victorian Government can encourage electric vehicle adoption by ensuring both public and commercial charging stations meet consistent standards for design and payment. In the next five years, the Victorian Government should develop standards governing the design and placement of electric vehicle public charging infrastructure and establish principles for smart charging and integrated payment systems so electric vehicle owners can use any provider to charge their vehicle.

1.1 Navigate the energy transition

Augment electricity transmission for renewable energy and resilience

Draft recommendation 02

Support augmentation of critical electricity transmission infrastructure by 2027-28 to accommodate new renewable energy generation and improve network resilience.

The electricity market is evolving from centralised coal-fired power generation to a highly diverse system dominated by renewable energy. However, Victoria's electricity transmission networks are designed to take power to consumers from coal-fired generators in the Latrobe Valley. These coal-fired generators will begin closing from 2029, and potentially earlier, and all are projected to close before 2048.⁵⁴ Renewable generation is locating in other areas of regional Victoria with good wind and solar resources.

Many renewable energy projects are planned in regional Victoria,⁵⁵ but some local transmission networks are already experiencing significant congestion, and limitations will become more common as more generation comes online.⁵⁶ The transmission infrastructure in these places is not designed for high generation volumes, or to accommodate the technical requirements of renewable generation.⁵⁷ The transmission network will need to be modified to improve capacity and unlock the potential of significant renewable energy resources.⁵⁸ To most efficiently plan new transmission infrastructure, it should align with high concentrations of renewable energy, such as in priority Renewable Energy Zones (see draft recommendation

3). Appropriate and timely transmission augmentation will leverage investment in renewable energy projects as well as enhance Victoria's system resilience and reliability.

The Australian Energy Market Operator (AEMO) is responsible for planning the state's transmission network. It has identified two critical transmission extensions for Victoria: Victoria–New South Wales Interconnector (VNI) West,⁵⁹ to better connect Victoria with New South Wales; and Marinus Link,⁶⁰ a cable project that would better connect Victoria with Tasmania. AEMO has also outlined the circumstances where these investments could be reconsidered.

VNI West would build a new transmission line across Victoria and could provide regional economic development opportunities. It will increase electricity sharing with New South Wales and improve access to the Snowy 2.0 project, a significant pumped hydro resource for Victoria to leverage.⁶¹ AEMO has identified multiple route options for VNI West, ranging from approximately 350 to 600 kilometres in length (see Figure 3a). The Victorian and Australian Governments are underwriting early works to support a route that will leverage a potential renewable energy zone

in Victoria's northwest and improve grid resilience against outages from events, such as extreme weather. The new transmission augmentation should be delivered by 2027-28 to mitigate the risk of the Yallourn power plant potentially closing early, but the timing and scope should be reviewed if the project costs are above \$2.6 billion. This may require the Victorian Government to consider expediting planning and approval processes.⁶²

The Marinus Link project would construct a second, and potentially third, High Voltage Direct Current cable between Victoria and Tasmania. This would provide reliable access to Tasmania's increasing hydroelectric generation and storage capacity, with three projects totalling 1.7GW shortlisted within the Battery of the Nation project to proceed to feasibility studies.⁶³ The Victorian Government can assist by progressing relevant design and approvals processes to support the project being shovel-ready by 2023-24. This timing would allow the first cable to be delivered by 2028-29, should it be required, or postpone the project to 2036-37 at the latest.⁶⁴ Cost recovery and allocation issues will need to be resolved before the project proceeds.⁶⁵

Draft recommendation 02 continued

Figure 3a: Potential future transmission augmentation for Victoria

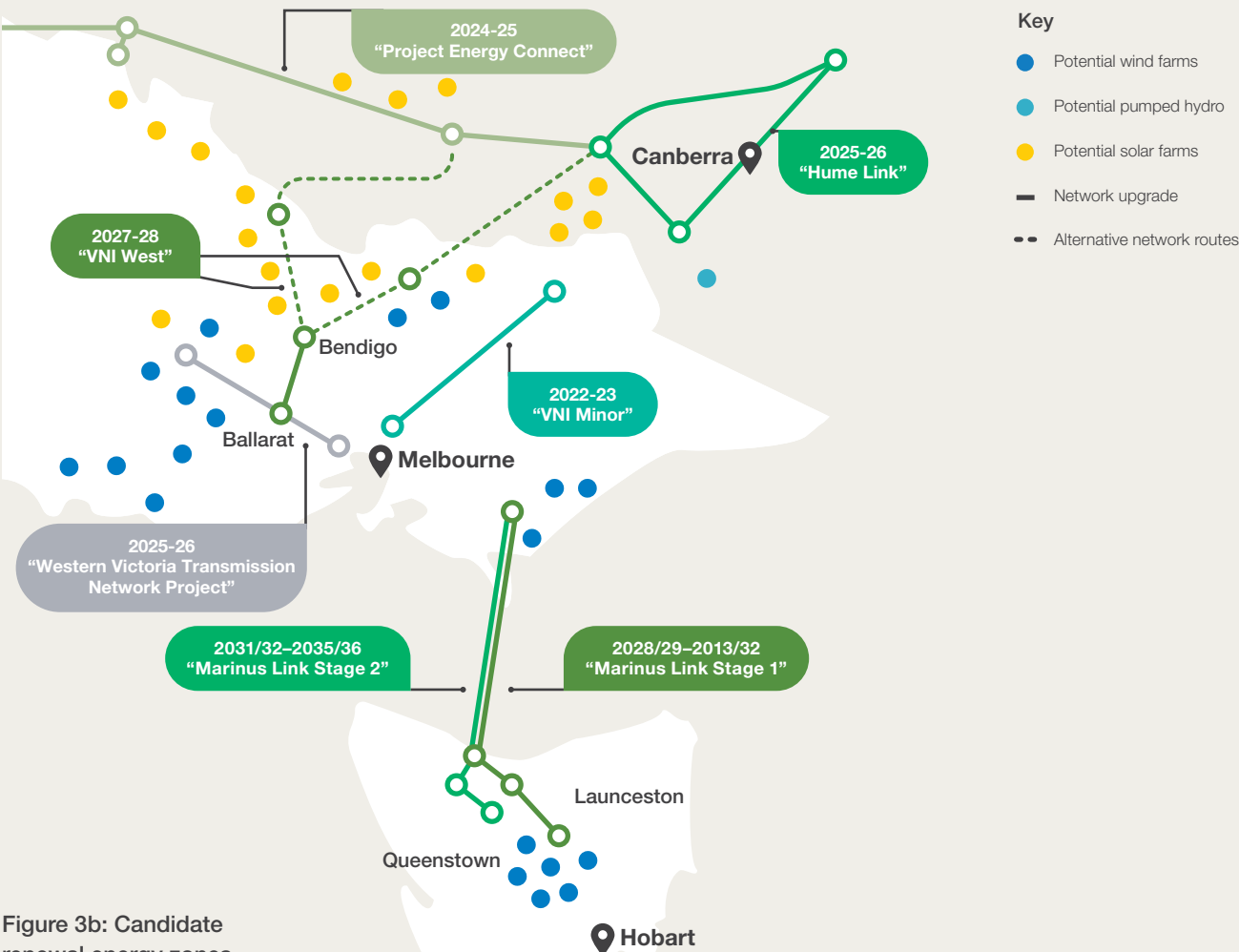
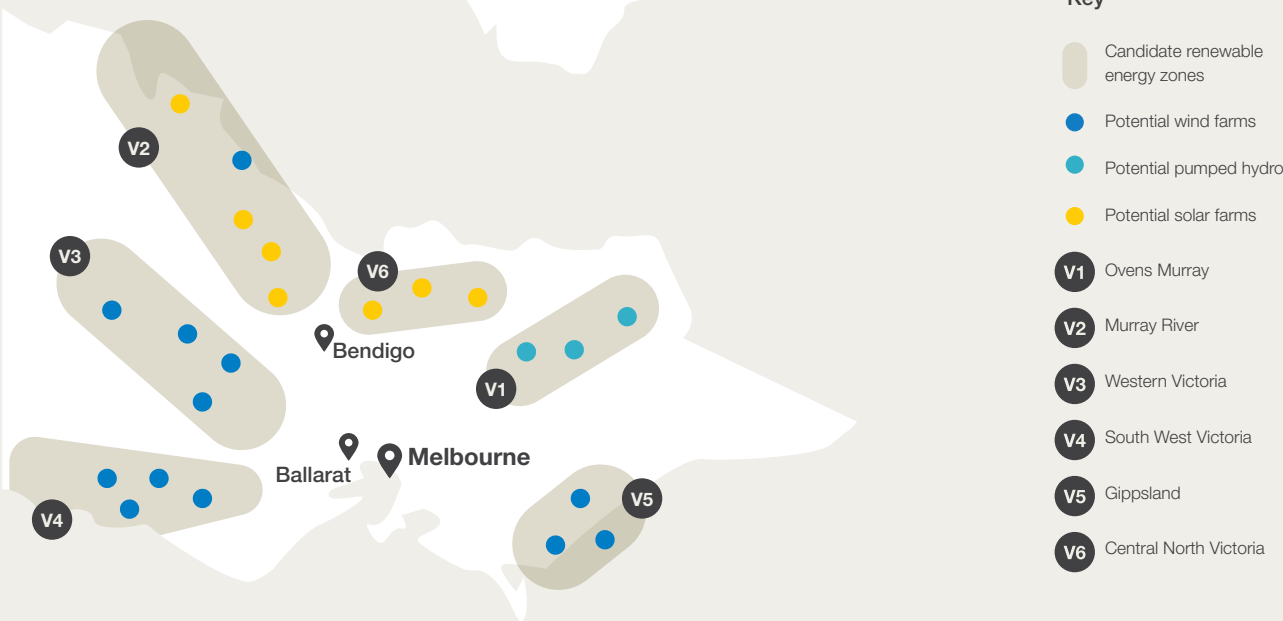


Figure 3b: Candidate renewal energy zones



Source: Australian Energy Market Operator, 2020.

1.1 Navigate the energy transition

Identify and coordinate priority Renewable Energy Zones

Draft recommendation 03

Immediately identify and coordinate the development of priority Renewable Energy Zones, especially in the state's northwest.

Coal-fired power will need to be replaced by renewable electricity for Victoria to meet its legislated goal of net zero greenhouse gas emissions by 2050. Victoria has about 4.4 gigawatts (GW) of renewable generation capacity, with another 2.4GW of projects committed and 8GW proposed.⁶⁶ The geographically disparate nature of renewable investment makes it difficult to benefit from economies of scale without some coordination.⁶⁷ Some parts of the electricity transmission network are already experiencing significant congestion,⁶⁸ limiting the amount of renewable energy that can be transmitted, and preventing new generators connecting. This will worsen without new transmission investment (see draft recommendation 2).

Renewable Energy Zones are identified areas where groups of large-scale renewable energy can be efficiently developed. The Australian Energy Market Operator (AEMO) supports Renewable Energy Zones because they reduce the need to build transmission into new areas, cut project connection costs and risks, optimise the mix of generation, storage and transmission investment, realise benefits of scale, and promote regional expertise and employment.⁶⁹ New South Wales is

currently running Australia's first pilot Renewable Energy Zone, overseen by a dedicated agency.⁷⁰

The Victorian Government is providing significant funding to develop Victoria's Renewable Energy Zones, and should support the development of priority Renewable Energy Zones by dedicating a body to support transmission development, coordinate investments and support community engagement. Of the six zones AEMO has identified for Victoria,⁷¹ the Murray River zone in the northwest has particular merit. It is forecast to see significant new generation by 2040⁷² and can be aligned with proposed new transmission infrastructure that will better interconnect Victoria and New South Wales (see draft recommendation 2).⁷³

An immediate priority is building on AEMO's high level analysis by assessing strategic land use to identify the most appropriate locations, taking into consideration other land uses such as agriculture and irrigation. This helps streamline land use planning and environmental approvals to encourage timely investment and align the priority Renewable Energy Zones with transmission development. Once land is identified, the coordinating body can facilitate and coordinate development, which could

include approaching the market for registration of interest and engaging with communities and land holders. New South Wales is piloting an approach in a greenfield location⁷⁴ which Victoria can look to adapt for local conditions. Decisions on the final location of priority Renewable Energy Zones should only proceed or be sequenced on credible signals that investment is likely.

1.1 Navigate the energy transition

Require 7-star energy-rated new homes in 2022, increasing towards 8 stars by 2025

Draft recommendation 04

Require all new homes to achieve a minimum 7.0 star NatHERS rating (or equivalent) by 2022, increasing towards 8.0 stars by 2025, either through the National Construction Code or Victorian regulations.

Minimising energy demand will make the energy transition easier to achieve. Energy efficient homes have multiple benefits. They lower energy bills, improve health, reduce greenhouse gas emissions, increase home values, and save money on energy infrastructure. Building more energy efficient homes today provides benefits long into the future.

Peak energy demand determines the size of Victoria's energy infrastructure. Extra peak energy demand on the network requires extra infrastructure. For example, running an air conditioner at peak times could add between \$1,200 and \$1,550 to the cost of the electricity network.⁷⁵ In the last decade, electricity prices have more than doubled.⁷⁶ More energy efficient homes reduce heating and cooling requirements, and air conditioners and heaters do not need to work as hard. This reduces the need for more infrastructure, improves buildings' climate readiness, and reduces household electricity bills.

Inefficient new homes lock in extra energy use, produce higher greenhouse gas emissions, and require building extra infrastructure in the future. Retrofitting homes is generally more expensive than building to higher standards in the first place.

Energy efficiency standards work. Using the National House Energy Rating Scheme (NatHERS), the average Victorian home built before 1990 achieved around 1.6 stars, while those built after introducing mandatory standards achieved an average 3.1 stars between 1990 and 2005.⁷⁷ Currently, new homes in Melbourne achieve an average 6.2 star rating, but few 7.0 star homes are built.⁷⁸ Achieving a 7.0 star NatHERS rating does not add significantly to the cost of residential construction with smart design.⁷⁹ It can reduce energy bills by 30%,⁸⁰ and based on the ACT's experience, each 1.0 star improvement adds around \$9000 to a home's value.⁸¹

The Australian Building Codes Board is consulting on proposals to raise energy efficiency standards for new homes to a minimum 7.0 star NatHERS standard (or equivalent), to incorporate in the National Construction Code. If agreed nationally, this will be incorporated in the National Construction Code in 2022. The Victorian Government should support this or incorporate a 7.0 star rating into Victorian building standards if it does not proceed nationally. A three-year delay in raising energy efficiency standards could add \$2 billion to electricity bills and cost \$720 million in extra infrastructure for Australia.⁸²

Melbourne homes can achieve a higher rating of up to 8.1 stars in their climate zone.⁸³ In some circumstances this requires using new technology and passive design to change a home's orientation and layout.⁸⁴ The Victorian Government should continue working on the national Trajectory for Low Energy Buildings to increase the mandatory energy efficiency standard further towards 8.0 stars (or equivalent) in the next round of National Construction Code changes taking effect in 2025, or independently move to incorporate higher requirements in Victorian building standards. Work should begin on a regulatory impact statement from 2022.

1.1 Navigate the energy transition

Mandate a home energy rating disclosure scheme

Draft recommendation 05

In the next five years, develop an energy efficiency disclosure scheme for the sale or rental of homes, to overcome information barriers and encourage energy efficiency improvements to existing homes.

By 2050, an estimated 7 million already existing Australian homes⁸⁵ will still be standing, most built at a time before strong mandatory energy efficiency building standards. They provide substantial opportunities for lower bills, more comfortable homes, emissions reductions and infrastructure cost savings. Infrastructure costs are the largest component of Victorians' electricity bills.⁸⁶ If a family can reduce peak energy use by 1kW – about enough to run a small oil heater – almost \$1,000 in electricity infrastructure costs can be saved.⁸⁷

Existing homes in Victoria have an average energy rating of 2.1 stars, compared to newer homes which have a much higher average rating of 6.2 stars.⁸⁸ Currently, owners of existing homes have few incentives to invest in energy efficiency, as the value of these improvements cannot be easily conveyed to buyers or renters. Similarly, buyers and renters cannot readily identify which homes have low energy running costs.⁸⁹ If owners, buyers and renters are provided with information on the energy efficiency of a home, it can influence their decision on whether to upgrade, buy or rent a house.

All homes sold in the ACT must carry an energy rating, and those advertised for rent must disclose any existing energy rating.⁹⁰ It is the only state or territory with a mandatory disclosure scheme, helping home prices and rents reflect the benefits of energy efficient homes.⁹¹ The ACT is also the only Australian jurisdiction where the average star rating for dwellings increased between 2016 and 2019, from 6.5 stars to 6.9 stars.⁹² An American study found mandatory audit and disclosure encourage home energy efficiency investments.⁹³

The Victorian Government should develop a mandatory disclosure scheme at the point of sale and lease of residential properties. This could build upon the existing Victorian Residential Efficiency Scorecard and the Victorian Energy Upgrades Program, and leverage the new energy efficiency programs announced in the 2020-21 Victorian Budget. A disclosure scheme can inform and incentivise better housing market performance. An education program could accompany the scheme so people understand the energy ratings and can act on them.

Further Victoria-specific analysis of costs and benefits could help refine the exact

design of the scheme, but the potential benefits of a mandatory disclosure scheme can be substantial. National modelling to 2050 estimated an economic benefit of \$1.2 billion from a disclosure scheme for detached houses alone, saving the equivalent of 6.2 million homes, annual energy use with 106.7 petajoules of energy saved.⁹⁴ This also saves energy infrastructure costs. Any scheme would have administrative and compliance costs to be effective. Such a scheme does not force homeowners to undertake upgrades, but they can do so where cost-effective, including by increasing the value of their homes. A review of international studies suggests homes with a higher energy efficiency rating have a 5% to 10% higher sale price,⁹⁵ but this requires a mandatory energy efficiency disclosure scheme for homeowners to realise this value.

1.1 Navigate the energy transition

Make Victorian Government buildings more energy efficient

Draft recommendation 06

Immediately mandate stronger minimum energy efficiency standards in both owned and leased Victorian Government buildings, and set and report against retrofitting targets.

Buildings account for around 20% of Australia's energy use⁹⁶ and 18% of Australia's greenhouse gas emissions.⁹⁷ Given their high energy use, making existing non-residential buildings more energy efficient can also significantly reduce energy demand, in addition to savings from new and existing homes. Energy savings from more efficient appliances and dwelling improvements saved 0.8 terawatt hours in 2018-19 across the national electricity market.⁹⁸

Victorian Government agencies own or operate many buildings. Past programs and targets have produced limited results in reducing energy use. Victoria has a Greener Government Buildings program⁹⁹ and a 2020 target to reduce its office emissions by 30% below 2015 levels.¹⁰⁰ However, total energy use in Victorian Government buildings has increased by 36% since 2009-10, with energy use per unit of office area up by 30%.¹⁰¹ The Victorian Government should continue to generate more energy savings in its buildings. This would reduce building running costs and avoid extra energy infrastructure investment, making the energy transition task easier.

The Victorian Government should update relevant guidelines and asset management plans to strengthen mandatory minimum energy efficiency standards in government buildings. It should mandate a minimum 5.5 star NABERS (National Australian Built Environment Rating System) standard in both new and existing government buildings, and higher if possible. A phased approach could be considered as not many buildings in Victoria currently meet this requirement, but government can lead by example. Current outdated guidelines require a rating of 4-5 stars,¹⁰² which is below current new building standards. By embedding the policy across government, existing buildings benefit from energy efficiency upgrades to buildings, fittings and appliances, and new leases can consider more energy efficient premises. One estimate suggests Victoria could generate a net economic benefit of nearly \$200 million by increasing energy efficiency for government owned or leased buildings.¹⁰³

The Victorian Government has announced extra funding in the 2020-21 State Budget for energy efficiency upgrades in government buildings.¹⁰⁴

Projects that deliver multiple benefits should be prioritised for this funding, such as improving thermal comfort for residents in social housing (see draft recommendation 95).

Under the *Climate Change Act 2017*, the Minister for Climate Change is developing the whole-of-government pledge to reduce government emissions, including building energy use.¹⁰⁵ The government should report annually on progress in completing energy retrofits as part of these targets.

1.1 Navigate the energy transition

Reduce peak electricity use with demand management pricing

Draft recommendation 07

In the next 10 years, optimise use of existing electricity infrastructure by encouraging demand management pricing.

Electricity infrastructure is built to service peaks, with generation, transmission and distribution networks designed to meet surges in demand occurring only a few days a year.¹⁰⁶ Peak demand has been growing faster than average electricity consumption for several years.¹⁰⁷ This drives investment in more electricity infrastructure, which is not needed most of the time.

Homes with flat-tariff electricity bills pay the same rate for electricity infrastructure to service the demand peaks, regardless of their electricity use pattern. This means people who do not contribute high peak electricity use subsidise those who do,¹⁰⁸ with little incentive for peak users to moderate their use. These settings drive up costs for everyone.

To manage electricity demand and better use existing infrastructure, the Victorian Government should encourage pricing reform to better signal the costs of using the infrastructure. Our research shows that people respond to electricity prices, when they are altered to influence behaviour.¹⁰⁹ Demand management pricing, sometimes known as 'cost reflective pricing', encourages people to shift their energy use to off-peak periods, or reduce their peak energy use altogether. Demand management pricing can also encourage consumers to improve the energy efficiency

of their homes, such as by installing home insulation, upgrading to more efficient appliances, or making greater use of 'smart' home appliances to reduce their use of electricity during price peaks.

Encouraging more demand management pricing helps reduce off-peak users subsidising peak users, so people only pay for the infrastructure they use. It avoids extra infrastructure costs in the longer term, which everyone pays for through their bills. Demand management pricing will also help manage the extra energy demand from widespread adoption of electric vehicles (see draft recommendation 1) and provide signals to optimise deployment of new technologies such as solar paired with battery storage.

The infrastructure savings associated with demand management pricing are significant. For example, research for Infrastructure Victoria's *Automated and Zero Emissions Vehicles Infrastructure Advice* estimated encouraging electric vehicles to charge off-peak could save \$2.5 billion in new infrastructure costs.¹¹⁰ Improving existing tariffs nationwide to better manage demand could generate over \$16 billion in network savings.¹¹¹

Victoria's smart meter installation allows energy firms to experiment with different pricing structures. Some have begun to

develop pilot programs¹¹² and opt-in plans for demand management pricing. Despite this, only 17% of Victorian households are currently signed up to variable tariff electricity plans.¹¹³ Most people previously had to specifically choose to opt into an electricity plan which includes demand management pricing.¹¹⁴ The Victorian Government's electricity tariff policy position has recently become more supportive of demand management pricing settings, particularly for customers with an electric vehicle charger at their premises.¹¹⁵

To create the conditions for more comprehensive demand management pricing, the Victorian Government should support continued tariff reform and encourage demand management pricing uptake for existing customers. Working with energy distributors and retailers, the government should help monitor and address any equity issues arising, including through concession arrangements.

1.1 Navigate the energy transition

Allow new gas-free housing estates and review current gas policies

Draft recommendation 08

Allow new developments to proceed without mandatory gas connection and review all gas policies to consider options for future mitigation or transition strategies.

Direct combustion and fugitive emissions (those due to leaks and other unintended or irregular releases, mostly from industrial activities) make up 19% of Victoria's greenhouse gas emissions, largely as a result of the use of natural gas.¹¹⁶ Expanding the use of natural gas does not align with the Victorian Government's net zero emissions goal, as it embeds fossil fuel use.

The gas transition will not be easy for Victoria, with Australia's largest natural gas infrastructure network.¹¹⁷ Uniquely in Victoria, demand for network supplied gas is largely from residential and small commercial customers, rather than industry.¹¹⁸ In the near term, total natural gas use is forecast to decrease,¹¹⁹ but residential consumption is projected to increase slightly as new homes in Melbourne's growth corridors are connected.¹²⁰

We cannot be certain now whether it will be viable or necessary for Victoria to maintain a gas distribution network in the long term. Ultimately, a net zero emissions goal means the gas network will be largely retired, or used for transporting an alternative fuel, such as hydrogen. Though a hydrogen-natural gas blend could produce slightly fewer emissions without significant network modification,¹²¹ it is unlikely to be commercially viable for some time. Many

trials are underway across Australia. We do not yet know whether a complete transition to hydrogen is technically possible or economically feasible. It requires modification for replacement of all gas appliances for homes, businesses and industry. Hydrogen technologies do not necessarily require a distribution network, as hydrogen can also be transported by road and rail or stored on site.

Expanding existing natural gas networks is counterproductive to emissions reduction targets and could contribute to a larger potentially stranded asset. To help reduce network expansion, the government should amend the Victoria Planning Provisions (VPP) to clarify that gas distribution infrastructure is not required in new greenfield housing estates. Currently, VPP Clause 56.09-2 states residential developments should be connected to gas infrastructure 'where available'.¹²² This requirement has likely caused land development projects, like the Quandong Precinct Structure Plan in Wyndham,¹²³ to build an expensive gas network as a requirement of their planning permit.

Beyond planning reform to halt unnecessary expansion of the network, the government should begin a public review of the future of natural gas in Victoria. This review should consider the existing policies which embed gas use, while considering future mitigation

or adaptation. In the near term, gas is a lower emissions fuel than coal for generating electricity and can assist a broader energy transition. Its viability in the longer term will need to be considered against the backdrop of long-term emissions reduction trajectories. The review should seek public input to begin a broader public debate about future trade-offs, while signalling to developers and consumers that change is coming.

While conducting the review, the government should keep its options open. The Victorian Government announced it will develop a gas roadmap in its 2020-21 State Budget, but we do not have enough evidence to suggest the Victorian Government should make an immediate decision on the future of the gas network. Allowing time to examine the viability of hydrogen will reduce the risk of making pivotal decisions too early to retire or repurpose the network. It may also help to solve more practical concerns of locations and timing to begin implementing changes.

Preventing further gas network expansion and developing a public strategy for its future will help Victoria meet its emissions reductions targets without making significant and risky additional infrastructure investments.



Discussion questions

Infrastructure Victoria welcomes feedback on these proposed draft recommendations. We are particularly interested in answering:

?

How should the Government support Victorians to move away from using diesel and petrol to power their vehicles?

?

What other actions should be taken to improve energy efficiency in existing buildings?

?

What other action should the Victorian Government take to coordinate priority Renewable Energy Zones?

?

How can households be better supported to transition to demand management electricity pricing?



To answer these
questions and more, visit
infrastructurevictoria.com.au

1.2

Respond to a changing climate

Climate change is a long-term challenge for Victoria and will result in more frequent and intense bushfires, heatwaves, droughts, extreme rainfall events and coastal inundation in coming decades.¹ Victorians are already seeing climate change affect society, the economy and the environment, most recently in extreme droughts and the catastrophic summer bushfires of 2019-20.

Infrastructure contributes to climate change by generating greenhouse gas emissions from its direct operations, the materials used in its construction, and the activities it enables.² The infrastructure Victoria builds today can lock in future emissions,³ especially without a plan to convert it to zero emissions technology later.

New infrastructure must also function in a warmer, drier climate and be resilient to more extreme weather. These changes affect both infrastructure's performance under extreme conditions, and the demand for it.⁴ Changing operating conditions may require changes to the location, design, operation, maintenance and upgrade of infrastructure, and in some cases the reassessment of assets' continued viability. The infrastructure decisions Victoria makes now will affect its climate change response in coming decades and constrain future choices.

The last comprehensive assessment of climate change risk to Victoria's infrastructure was produced in 2007.⁵ Evidence produced since means the climate consequences for infrastructure are now better understood and can be better incorporated into infrastructure and built environment frameworks. For example, using the most up to date information available on the likely future climate⁶ would support homes to be built accordingly. Shorter infrastructure life or planning major future retrofits may need to be considered if Victoria is to achieve its net zero emissions goal.



Climate change introduces new risks

Victorian average temperatures have increased 1°C since official records began in 1910.⁷ Summer rainfall has increased in the north, but winter rainfall has declined statewide,⁸ with average annual rainfall declining overall. The mean sea level for Melbourne has risen 2 millimetres each year

since 1966.⁹ Victoria has experienced an increase in both dangerous fire weather and length of fire seasons since the 1950s.¹⁰

Temperatures are tracking toward the upper limit of projections and winter rainfall is tracking toward the drier end of projections.¹¹

By the 2050s, under a high emissions scenario and compared to the period 1985-2005, Victoria could experience:¹²



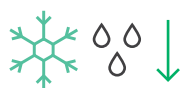
Double the number of **very hot days**



Average annual **temperature increases** of up to 2.4°C



Longer fire seasons with up to 60% more 'very high' fire danger days



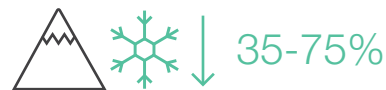
Declines in winter rainfall



Sea levels rising by around 24 centimetres



More **intense downpours**



Declines in alpine snowfall of 35-75%

Even with strong global emission reductions, the impacts of this warmer, drier future climate will vary across regions. For instance, projected changes in temperature are higher inland compared to coastal areas.¹³ By the 2030s, the Ovens Murray region could have daily maximum temperature increases of 1.0°C to 1.9°C, compared to Barwon's lower increases of 0.8°C to 1.5°C.¹⁴ Average annual rainfall is

projected to decline around 9% for Gippsland by the 2050s and by 14% for the Loddon Campaspe region.¹⁵ While these average changes might seem small, they reflect significant extremes of heat and rainfall that can be very challenging for people, infrastructure and the environment. At the time of writing, 32 out of 79 Victorian councils have recognised, acknowledged or declared a climate emergency.¹⁶

Climate change means less water

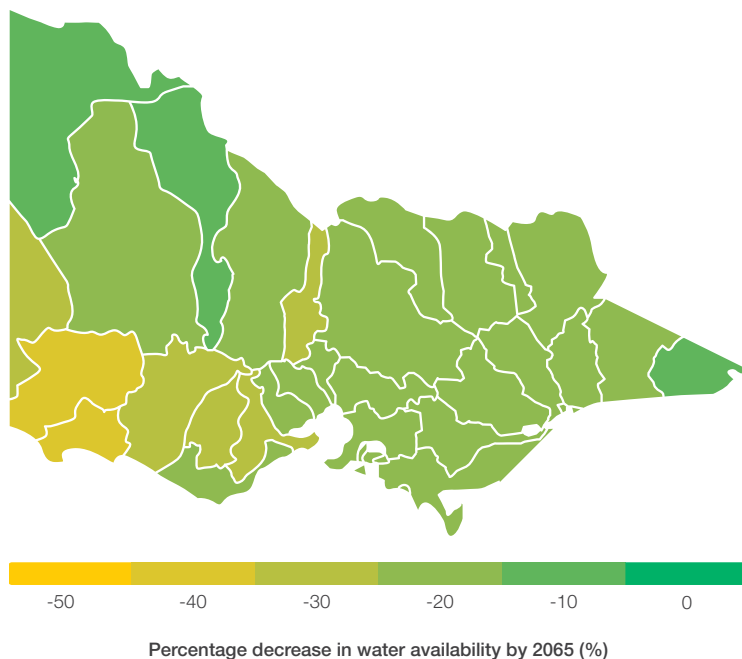
Water infrastructure and supply are acutely vulnerable to climate change impacts. A warmer, drier climate means less rainfall flowing into Victoria's rivers and dams, putting more pressure on agricultural and urban water supplies. Water infrastructure will also be affected by more frequent extreme rainfall events, movement and changes in groundwater, and higher average temperatures with lower average rainfall. This suggests high risks of water shortages, bushfire damage to catchments and water storages, and stormwater, drainage and sewerage damage from flooding.¹⁷ Water resource and supply planning incorporates climate change projections and scenarios, and increased

monitoring, to better understand potential future water availability.¹⁸ Combined with a growing population, water shortages could emerge in Melbourne as soon as 2028 under a high climate change scenario, with even a mid-range scenario seeing shortages by 2043.¹⁹ Shortfalls may occur earlier in some regional areas, as early as 2025 in areas serviced by Coliban Water which includes Bendigo²⁰ and 2031 in areas serviced by Western Water which includes Bacchus Marsh, Melton, Sunbury and parts of the Macedon Ranges.²¹

Drought will continue to be a feature of Victoria's climate and is acutely felt by regional Victorians and the agricultural

sector. Agriculture is Victoria's largest water user,²² and a significant regional employer. Climate change poses a risk to agriculture in every Victorian region.²³ It is increasing the intensity and frequency of hot days and heatwaves, exacerbating any drought conditions. The severity of the millennium drought has been linked to human induced climate change²⁴ and time spent in drought is projected to increase in the future across southern Australia.²⁵ During droughts, the warmer, drier weather increases water demand and reduces water storages. Victoria will need to increase resilience and prepare for longer, more intense, future droughts.

Figure 4: Victoria will get drier as rainfall decreases



This map shows the projected percentage change in water runoff into Victoria's basins under a medium-impact scenario by 2065, relative to 1986-2005. Future runoff and streamflow in Victoria is likely to decline, driven by projected declines in future rainfall, particularly cool season rainfall which is important for water storage filling, and higher potential evapotranspiration.

This map shows the median projection for this scenario, but individual years could be wetter or drier. This is only one of many scenarios, with projections ranging from no to small decrease in runoff to high decreases in runoff.

Victoria will be at higher risk of more frequent, more intense bushfires

Victoria is one of the most fire prone places on Earth.²⁶ The 2009 Black Saturday bushfires and the recent 2019-20 summer bushfires in East Gippsland and the state's north-east resulted in significant loss of life, property, wildlife and natural environments. More intense fire behaviour, increased fire activity, longer and earlier fire seasons, and droughts are clearly linked to climate change.²⁷

In the 2019-20 Victorian summer bushfires, more than 300 homes were destroyed, and 1.2 million hectares of land was burnt – making it the largest bushfire since 1939.²⁸ It affected at least 60% of the state's national parks and nature reserves,²⁹

impacting significant environmental assets and biodiversity. The bushfires revealed the region's vulnerabilities, with communities and visitors cut off and in direct danger, including more than a thousand evacuated by sea from Mallacoota.

Bushfires highlight risks to electricity, telecommunications, water supply and transport infrastructure, among other vulnerabilities. Without access to critical phone and internet connections and emergency management information, people are at greater risk,³⁰ including local residents, and holidaymakers who are less likely to have a bushfire plan.



Victoria's coasts risk flooding and erosion

Victoria's coasts are home to nearly 14% of the state's population³¹ and receive around 70 million recreational visits each year.³² Coastal infrastructure supports residents and industries, including tourism and fishing, and caters for part-time populations, such as tourists and those who own holiday homes. For instance, Lorne welcomes an extra 20,000 people

during the annual Pier to Pub swim which represents a 20-fold increase on its normal population.³³

Rising sea levels and increasing heavy rainfall are projected to increase coastal erosion and flooding, damaging many low lying ecosystems, infrastructure, and homes.³⁴ More frequent storm surges can make this worse.

2009 building and transport system assessments found Victoria is heavily exposed to rising sea levels, including estimated replace costs:³⁵



31,000 to
48,000 homes
valued at \$8-11 billion



1,500 to 2,000
commercial buildings
valued at \$8-12 billion



3,000 to 4,000
kilometres of roads
valued at \$7 billion

Valuable infrastructure is close to the coast, such as buildings, hospitals, roads, rail, electricity, telecommunications, stormwater, drainage and sewerage assets. Rising sea levels have social and economic impacts beyond the infrastructure itself. Erosion is visibly threatening the Great Ocean Road's \$1.1 billion visitor economy.³⁶

Phillip Island³⁷ and Inverloch³⁸ are also witnessing the loss of popular beaches. Coastal ecosystems could also change, affecting biodiversity. For example, mangroves usually found in coastal saline water have begun appearing in the Gippsland Lakes.³⁹

Draft recommendations to respond to climate change

Infrastructure Victoria is considering the following draft recommendations to help respond to a changing climate. These are further complemented by draft recommendations to navigate the energy transition (see section 1.1), improve urban open space and tree canopy (see draft recommendations 37 and 71), build

resilience to emergencies (see draft recommendations 59, 60, and 61), and respond to climate risks in regional areas (see section 4.4). Many more of our draft recommendations in other sections have positive climate benefits, including improvements to land use planning and transport networks.

1.2 Respond to a changing climate

Specify climate scenarios and carbon value in assessing infrastructure

Draft recommendation 09

Immediately update and expand practical instructions on integrating climate-related risks into infrastructure assessment, including on future climate scenarios and valuing emission reductions.

Current Victorian Government infrastructure investment guidance observes the *Climate Change Act 2017* requirement to consider climate risk, but has not provided detailed advice on doing so, and includes some outdated information.⁴⁰ At a minimum, the Victorian Government should update this advice to explicitly determine climate scenarios for assessing infrastructure resilience, such as a future with 1.5°C of warming, and more extreme potential scenarios. It should also explicitly advise on the appropriate method of calculating the value of avoided carbon emissions, for use in calculating emission reduction benefits.

The infrastructure Victoria builds now will exist long into the future and must keep performing in a changing climate. But the Victorian Government has no infrastructure performance benchmark for future climate conditions. This creates difficulties for infrastructure planners, developers and operators in assessing and responding to climate change. It also means climate risk assessments use different assumptions and methodologies in Victorian Government infrastructure assessments, making comparisons difficult.

Producing new, specific guidance on assessing climate risk can complement existing infrastructure investment guidelines, including on future climate scenarios, assumptions, and the value of emission reductions.

Carbon valuation is a well-established tool to measure the value of emission reductions in economic assessments of proposals. Current Victorian carbon valuation guidance was prepared in 2013, relies on the since-repealed national carbon pricing mechanism,⁴¹ and does not consider Victoria's goal to achieve net zero emissions by 2050.⁴² It does not clarify appropriate emissions to count, such as whether to include emissions embodied in materials, those generated by lifetime operation of the infrastructure, or indirect emissions from energy use or emissions enabled by the proposal. In updating guidance, the Victorian Government can draw on growing national and international literature on using scenarios to assess climate-related risks,⁴³ and guidance on emissions measurement and carbon valuation.⁴⁴

Specific guidance can encourage and make it easier for strategic planners and project developers to assess their climate risks. It

fosters greater consistency, improving comparability across sectors and projects and contributing to a more efficient climate response. Better assessments support better decisions, reducing the risk of stranded assets or avoidable future refurbishment and retrofit, and helping agencies meet their obligations under the *Climate Change Act 2017*.

1.2 Respond to a changing climate

Strategically review climate consequences for infrastructure

Draft recommendation 10

Strategically review the climate change consequences for Victoria's infrastructure needs and priorities, commencing in November 2021 after delivering the first set of targets, pledges and plans under the *Climate Change Act 2017*.

Victoria needs a strategic approach to enhancing the climate resilience of its infrastructure, informed by a clear understanding of climate risks across regions and infrastructure sectors, with options to reduce those risks. This can help ensure Victoria's infrastructure is designed, operated and maintained in ways that reduce the vulnerability to adverse impacts, build economic and social resilience, and reduce emissions.

No current and comprehensive assessment catalogues climate risks for Victoria's infrastructure.⁴⁵ This makes identifying and assessing material risks to infrastructure harder, leading to inconsistent or incomparable assessments. This means Victoria's future infrastructure may not perform as predicted in the future climate, and infrastructure planning could miss cost-effective opportunities to reduce emissions.

Victoria's evidence base and policy environment for climate action is evolving rapidly. The government has published the first science report under the *Climate Change Act 2017*,⁴⁶ and recently released

local-scale climate projections that will enable detailed analysis of potential future climate impacts across the state.⁴⁷ Work is underway to set emission reduction targets to 2030,⁴⁸ and develop emission reduction pledges and adaptation action plans for all key sectors and systems. The first full set of pledges for the 2021-2025 period are expected to be completed in 2020 and the adaptation action plans are expected to be completed by October 2021.⁴⁹ This system will continue, with new targets, pledges and plans set at five-year intervals.

The right time for a strategic review is following the delivery of the first set of targets, pledges and plans. Starting earlier would likely duplicate the efforts already underway across the Victorian Government. Instead, by commencing afterwards, from November 2021, all evidence generated could provide a contemporary, comprehensive basis to assess Victoria's infrastructure needs and priorities to support the transition to a net zero emissions, climate resilient state. The strategic review could consolidate the evidence, identify any remaining gaps, and provide strong evidence-based needs and

priorities for infrastructure investment. This could then inform the review of the 2030 interim emissions target, due in 2023; the next round of sector pledges, due in 2025; and subsequent adaptation plans, due in 2026.⁵⁰

Responses may include identifying investment priorities, revising land use planning policies, strengthening building codes and standards, updating regional and sectoral strategies, or undertaking further research and analysis to improve understanding of risks and potential responses.

1.2 Respond to a changing climate

Consider all water supply sources

Draft recommendation 11

Consider all water sources for supply augmentation, including identifying and addressing barriers to recycled drinking water within the next 10 years. When planning for future water supply, investigate all options including, but not limited to, recycled water, seawater desalination, stormwater harvesting and using water pipelines to move water between regions.

Climate change pressures and risks are already affecting Victoria's water supplies and infrastructure. Along with population growth, this will become more critical in the future for water security.

The Victorian Government should consider all alternative water sources, such as recycled water, stormwater and seawater,⁵¹ which unlike water from rivers and aquifers, are less affected by climate change. Currently, the use of recycled water is constrained by the policy ban on drinking it and the requirement for dedicated distribution infrastructure which dramatically increases the cost of use. Allowing all viable technologies and options to be equally considered helps decision-makers choose water options that are efficient, fit for purpose and affordable.

Considering all options would allow better assessment of risks and benefits, particularly under different climate scenarios. For instance, recycled and desalinated water do not rely on rain, so are more reliable in a more extreme climate with less predictable rainfall. Restrictions on technologies limit innovation by deterring investigation, development and trials. Recycled water and stormwater can be

made safe for drinking and can be major water supply augmentation options,⁵² noting that recycled water's quality and quantity are more predictable than treated stormwater. Recycled water can be cheaper to produce than desalination and could be a more flexible part of water networks than decentralised schemes.⁵³ Recycled water for drinking occurs in Western Australia, and internationally in Singapore, California and Namibia.⁵⁴ Many Victorians already drink treated recycled water, via treated water mixing with river water before it enters reservoirs downstream.

Stormwater harvesting and reuse projects can be viable where there is clear policy supporting the use of stormwater for drinking.^{55,56} Removing untreated stormwater from receiving waterways improves water quality and flow while also improving water security.⁵⁷ In some cases, bulk use of stormwater for other purposes, such as watering sporting fields, can reduce pressure on drinking water supplies.

The Victorian Government should remove current policy restrictions to allow evaluation of all water augmentation options based on their economic merit, health and environmental impacts.⁵⁸

This includes removing the current ban on recycled drinking water and restrictions on moving water between regions using the water grid. Better use of the water grid can delay investment in water plants or using more expensive supply options.⁵⁹

The health risks of recycled water must be carefully managed, with proper monitoring, oversight, and adherence to Australian guidelines and standards.⁶⁰ Taking steps toward drinking recycled water would likely include community education to improve water literacy, better regulatory frameworks to manage health risks, and capacity and capability building for regulators. Victorian households appear supportive of recycled drinking water when it secures supply and doesn't materially increase their water bill.⁶¹

The Victorian Government should build further community acceptance by openly exploring barriers and unknowns, and commission health studies and investigations into achieving safe recycled drinking water. It should also consider ways for economically viable infrastructure to be piloted and monitored, such as Western Australia's Groundwater Replenishment Trial.⁶²

1.2 Respond to a changing climate

Progress integrated water cycle management

Draft recommendation 12

Accelerate progress toward an integrated model of water cycle management, starting by clarifying policy settings to allow the better use of stormwater and recycled water within five years.

While climate change is making parts of Victoria drier, population growth places pressure on water supplies from increasing consumption and sewage volumes. Urban expansion is causing more runoff from impervious surfaces such as roads, paths and buildings. The environment is absorbing less stormwater in these places, with more untreated and potentially polluted water flowing into waterways.⁶³

These challenges and impacts from a changing climate mean the way Victoria plans, manages, and delivers water must evolve to use water more wisely. For example, non-conventional water sources such as stormwater and recycled water offer significant potential to augment existing supply, recharge aquifers and enhance stream flows.⁶⁴ In 2016, 337 gigalitres of stormwater was 'lost' to waterways and 276 gigalitres of treated wastewater ended up in bays and in the ocean. That same year, Melbourne's total water consumption was about 416 gigalitres.⁶⁵ Greater recycled water and stormwater use would support system resilience, as climate has less effect on available quantities.⁶⁶

Current policy arrangements make it complex and difficult to integrate innovative uses of water across the water cycle. Reflecting historical development, different entities share responsibilities for water supply, wastewater,

stormwater and waterway health.⁶⁷ Victorian Government stormwater policies are implemented almost exclusively through land use planning policy and building codes which focus on mitigating the risk of floods through drainage,⁶⁸ with local governments responsible for most drainage infrastructure to mitigate flood risks. Public water corporations manage wastewater, mainly sewage, almost entirely as a disposal system, with treatment plants regulated under the *Environment Protection Act*. Despite the best efforts of water corporations and the EPA, where wastewater is discharged into streams, lakes and bays it may still pose some residual risk to environmental and human health.

A more integrated model of water cycle management promotes the appropriate use of all water resources. Diversifying supply, it reduces the need for expensive upgrades,⁶⁹ allows stormwater to be used for recreational lakes and wetland habitats,⁷⁰ enables greater flows to habitat corridors,⁷¹ reduces the discharge of pollutants into waterways, and supports environmental, health and amenity improvements to public spaces.⁷² The Victorian Government supports an integrated approach⁷³ but implementation is challenging for different policy, planning and regulatory reasons. Continued effort is needed to promote water-sensitive city ideas into non-water sectors, including in the design of new precincts, buildings and infrastructure such as roads.

Within five years, the Victorian Government should accelerate progress toward integrated water cycle management, bringing stormwater and recycled water into existing frameworks. Addressing current barriers may require multiple initiatives to be examined, including:

- \ earlier engagement between land and water planners on the stormwater and recycled water use in developments, particularly in estates in Melbourne's new growth areas⁷⁴
- \ identification of priority opportunities to improve health and sustainability by recycling wastewater
- \ reviewing land use and water planning frameworks to identify and address barriers to integration
- \ clarifying objectives, roles and responsibilities for stormwater management
- \ bringing stormwater and recycled water into long-term assessments, water planning, cost-sharing and entitlement frameworks,⁷⁵ and
- \ better integrating local and system-wide water planning.

Direct Victorian Government costs of removing structural barriers are small but could defer or scale down infrastructure investments and produce better local amenity and environmental outcomes.

1.2 Respond to a changing climate

Improve decision-making for urban water investment

Draft recommendation 13

In the next five years, clearly allocate the roles and responsibilities for urban water systems and major supply augmentation planning.

Securing Victoria's water supplies in the next thirty years in a climate-constrained future will require investment.

Ambiguous responsibilities can impede responsive and considered investment decisions, causing investment delays when there is ample water supply, or rushed and potentially unwise decisions when water is scarce.

After the millennium drought, the Productivity Commission concluded some state governments' decisions to invest in new water infrastructure were potentially unnecessary or ill-timed.⁷⁶ Similarly, the Commission questioned decisions to intervene in specific investment decisions, which it concluded should be determined through clear planning processes, following arms length vetting by an appropriate independent regulator.⁷⁷ The major investments taken to secure water during that drought revealed the vulnerabilities of traditional approaches to water planning.⁷⁸

While the water authorities have made some improvements to water planning since the millennium drought, the ultimate authority to make decisions on water infrastructure remains unclear. The Victorian Government has provided guidance on the governance and legislative framework that regulates the Victorian water industry,⁷⁹ but it does not specify who can decide to invest

in future major water supply projects. Public water corporations provide many water services,⁸⁰ including investing in infrastructure to support those functions. At present, Victoria uses a mix of central and delegated investment decisions with no clear thresholds between them. There is no clear mechanism for coordinated water supply planning to identify and escalate major investment needs with system-wide benefits.

Governments should ensure roles and responsibilities for urban water systems and major supply augmentation planning are clearly allocated, recognising that ultimate responsibility rests with the government.⁸¹

The Victorian Government should clearly allocate roles and responsibilities including four key elements:

- \ Assign responsibility for strategic urban water planning to a body, such as the Department, Melbourne Water or an independent entity, to coordinate existing planning, clarify the sequence of actions and to identify the need and timing for major system augmentation.
- \ Assign responsibility to a body to take ownership of major system augmentations and to transparently assess the investment options.

\ Create an appropriate, independent and transparent oversight mechanism to provide independent technical and economic regulation review.⁸²

\ Clearly specify and delegate investment decisions within the normal operating scope of public water corporations, and allow them to be made independently, subject only to the approval of the regulator.

Where water service provision has been separated from government policy-making functions, it has delivered more cost-efficient water services in Australia.⁸³ There is a role for a government body in coordinating major system augmentations that affect multiple public water corporations.

Our research suggests delegating investment decisions, within the normal operating scope of those entities, would be appropriate and support more efficient long-term planning and investment.⁸⁴ It could also allow public water corporations to better prioritise the interests of water customers, as around 60% of Victorian households want to be more engaged in long-term water infrastructure planning.⁸⁵

1.2 Respond to a changing climate

Strengthen agricultural water security by modernising irrigation

Draft recommendation 14

During the next 30 years, contribute funding toward planning and delivery of irrigation modernisation projects across regional Victoria.

Agriculture needs a secure water supply to grow fresh produce and raise livestock. Water is used for irrigation, applying pesticide and fertiliser, cooling crops and controlling frost.⁸⁶ Scarce water supplies can interrupt agricultural production, threatening regional incomes and jobs. Regional Victoria's rainfall patterns are already changing, affecting farming operations and disrupting traditional growing patterns.⁸⁷ Climate projections indicate these trends will continue. For example, the future climates of Hamilton and Warrnambool could be hotter and drier by 2050, more like the current climate of Benalla today.⁸⁸

Protecting and adapting farming for the future means securing reliable, sustainable water supplies. Victoria is Australia's largest agriculture producer, producing \$14.9 billion worth of agricultural product from only 11 million hectares of land.⁸⁹ Better water infrastructure can support agriculture's long-term future. Victorian agriculture's growth prospects rely on this infrastructure, particularly highly water-dependent sectors like dairy and horticulture. When coupled with adaptation planning, modern water infrastructure can also support agriculture business to make changes that allow for continued profitability in the face of rapidly changing climate conditions.

Water infrastructure is generally paid for by water users. However, governments can fund district scale projects generating broader community and environmental benefits, and the planning and research that demonstrates their potential. Better infrastructure planning and delivering upgrades can reduce water wastage and safeguard agricultural water. It can also deliver broader benefits, such as reducing farm run-off into waterways and securing supply chains in the retail, processing and transport industries.

The Victorian Government already supports district-scale irrigation projects, such as the Macalister Irrigation District Modernisation Project in East Gippsland. It can also support early planning and development for potential water infrastructure projects. This can help find new sources of water and assess their technical and economic merits.

For example, the Victorian Government could investigate the development of the Great South Coast's Dilwyn Formation, a naturally occurring underground aquifer system.⁹⁰ Recent technical studies suggest it has an untapped 15 gigalitres of available water.⁹¹ With no other uncommitted water resources in the area, water scarcity is limiting further agricultural expansion.

Other such projects should be investigated to build on regional Victoria's agricultural strengths, including fertile soils in some areas and existing access to markets. In the context of climate change, water infrastructure, such as irrigation, needs a continuous and long-term focus.



1.2 Respond to a changing climate

Upgrade Victoria's emergency water network

Draft recommendation 15

Immediately assess the condition, capacity and security of Victoria's emergency water supply point network, and upgrade or replace inadequate supply points. Clarify ongoing responsibility for maintenance and funding to secure a resilient network.

Longer, more intense droughts and increased bushfire risk increases the need for resilience and preparedness. Agriculture is particularly at risk from these events and is an important Victorian industry. Agriculture supports one in 16 Victorian jobs, with 87% located in Victoria's regions.⁹² Meat, dairy and animal fibre, such as wool, comprise the majority of Victoria's food and fibre export earnings.⁹³ This income, these jobs and the communities they support are threatened by climate change.

Emergency water supply points are a network of 300 places where farmers can get water for stock watering and domestic use during dry conditions. They can also supply water to bushfire-affected livestock, and some sites can be used by firefighters during bushfires. This occurred most recently with the 2019-20 bushfires.⁹⁴ The water is free for stock and domestic use, but farmers must arrange to transport the water (water carting) at their own cost.⁹⁵ They draw from groundwater through bores, access water channels or reservoirs, or are connected to urban water systems. Emergency water supply points are one mechanism to help farmers to maintain

base stock levels through droughts, allowing re-stocking in future, protecting future production after the drought has passed.

No current comprehensive audit or assessment of emergency water supply points exists. Recent drought conditions in some regions revealed the poor condition of some supply points, meaning drought assistance funding was needed to rapidly improve them, including establishing replacement points and upgrading existing sites for better access and water flow.⁹⁶ Some supply points elsewhere are also likely to be in poor condition, difficult to use, or their water source may be unreliable during droughts.

The Victorian Government can make sure it has a fit for purpose network of emergency water supply points, optimised for future climatic conditions, to be better prepared for a future with less rainfall and increased bushfire risk. This requires a full assessment of the whole emergency water supply point network across Victoria, matched with future climate projections, to identify places where emergency water supplies may be insufficient. This assessment can audit the existing supply points, and determine their

condition, capacity and the security of their water source during drought. This can be matched with projections of likely drought conditions under future climatic conditions, helping determine the performance required. The infrastructure response can be replacement supply points connected to more reliable water sources, new tanks connected to existing supply points, upgrades such as installing meters, or road improvements so trucks can gain better access.⁹⁷ The assessment should identify ongoing maintenance responsibilities and funding so that the network remains available when it is needed.

1.2 Respond to a changing climate

Invest in protecting Victoria's coasts

Draft recommendation 16

In the next eight years, invest in coastal protection upgrades and maintenance, including beach and dune protection and rehabilitation, and storm surge protection, particularly for coastal tourism assets in Barwon, Great South Coast and Gippsland regions.

Victoria's coasts are vulnerable to climate change, erosion, storm surges of increasing severity, rising sea levels and population growth.⁹⁸ Left unchecked, these changes will threaten infrastructure located near the shore.⁹⁹ However, Victoria's culture is indelibly influenced by the coast. With 2000 kilometres of Victorian coastline,¹⁰⁰ almost one in five Victorians live near the coast, with four in five visiting coastal areas each year.¹⁰¹ Coastal areas drive regional economies, with economic contributions from ports, trade, fisheries and tourism. Tourism alone is worth billions to the regional economies of the Great Ocean Road,¹⁰² Geelong and the Bellarine Peninsula,¹⁰³ Gippsland,¹⁰⁴ and Phillip Island.¹⁰⁵

A mix of natural and built infrastructure, including sea walls, artificial headlands, dunes management and beach nourishment, are used to protect against coastal inundation and erosion. However, a recent Victorian Auditor-General's report found 20-30% of coastal assets are in poor condition, and 30-50% have fewer than 10 years of useful life remaining.¹⁰⁶

Asset maintenance has been reactive and not wholly effective,¹⁰⁷ due to precarious funding sources. Maintenance focusses on assets in the worst condition, and often simply repeats the previous year's activities, instead of taking a preventative approach.¹⁰⁸ Victorian Government agencies tasked with coastal protection have unstable and unreliable funding, with most funding requiring annual reapplication. This causes more coastal infrastructure degradation and extensive maintenance backlogs.¹⁰⁹ For example, Parks Victoria costed its backlog at over \$5 million for each of the last three years.¹¹⁰

The Victorian Government has recently released a Marine Spatial Planning Framework as part of its Marine and Coastal Policy,¹¹¹ to help guide integrated and coordinated long-term planning of Victoria's marine environment. An accompanying strategy is being developed, which can help inform a longer-term funding program.

To safeguard Victoria's coasts, the Victorian Government should commit at least an extra \$30 million for coastal infrastructure maintenance and upgrades in the coming eight years, with a focus on the Barwon, Great South Coast and Gippsland regions. This initiative would help safeguard coasts, homes, tourism and infrastructure from some of the adverse impacts of climate change, while addressing the Victorian Auditor-General's recommendations. It would provide funding certainty for agencies involved in coastal protection, building on one-off funding commitments announced in the Building Works Stimulus Package and the 2020-21 Victorian Budget.¹¹² The long-term viability of new and upgraded coastal infrastructure will need to be monitored, as the extent and likely impact of climate change on coastal regions become clearer.



Discussion questions

Infrastructure Victoria welcomes feedback on the draft recommendations. We are particularly interested in:

?

How should the Victorian Government build community understanding of alternative water sources, such as recycled water for drinking?

?

What would improve demand management of agricultural water?

?

What should be done to make infrastructure more resilient to climate change?

?

When is it appropriate to retreat from coastal erosion, rather than invest in coastal strengthening infrastructure?



To answer these questions and more, visit
infrastructurevictoria.com.au

1.3

Embrace technological opportunities

Technology is increasingly important for everyday life, from the ubiquitous mobile phone to the latest apps and smart home appliances. Technology has unleashed new ways of communicating, working, moving, accessing services and connecting socially.

While the ways technology will change lives in 30 years is unknown, our draft recommendations support Victoria to embrace technological opportunities, enhancing efficiency and productivity, allowing new industries to flourish, providing better access to services, and improving people's quality of life.

Technology has allowed Victorians to adapt during the COVID-19 pandemic in ways previously not thought possible.

Key

- ABS Internet Activity Survey
- ACCC Internet Activity Record Keeping

* The biannual data collection of internet data changed from the ABS (Internet Activity Survey) to the ACCC (Internet Activity Record Keeping Rule) from December 2018. The ACCC data is illustrative, however is not directly comparable to the ABS data.

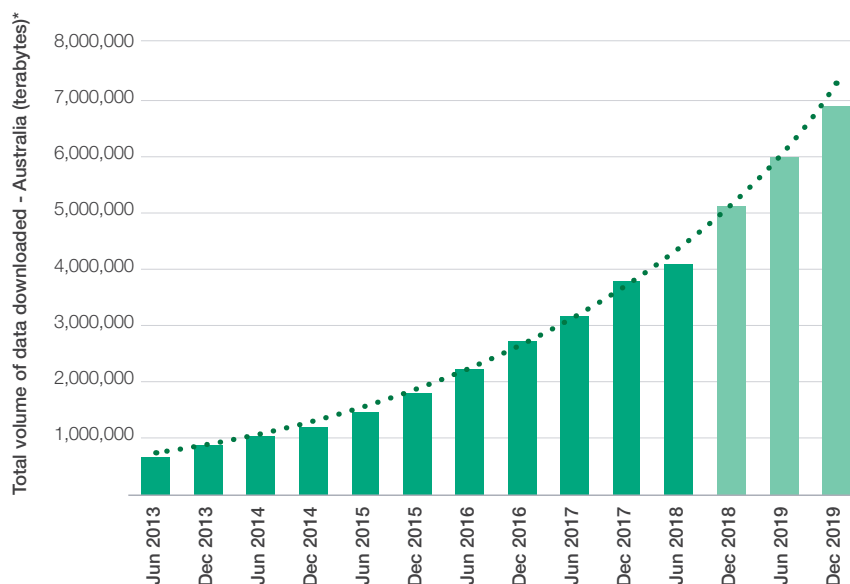
Rapid technological change accelerates innovation

The COVID-19 pandemic changed many facets of people's lives, and its impacts will continue to be felt for many years. The 2020-21 Victorian Budget estimates Gross State Product will decline by 4% in the 2020-21 financial year,¹ and unemployment will rise to 7.75%.² The Victorian and Australian Governments have mounted an unprecedented economic response, but once stimulus spending is past, government budgets are likely to be constrained for some time.

Technology has allowed Victorians to adapt during the COVID-19 pandemic in ways previously not thought possible. In 2018, a quarter of Australians were unfamiliar with technologies such as digital education, telehealth and on-demand transport.³ But technology use was hyper-charged during the pandemic. Many businesses moved online, causing e-commerce to explode by 111% in the year to April 2020, compared with 20% the year before.⁴ This shows both that technology can facilitate rapid change, and that people can swiftly adapt to it.

Figure 5: Australians have rapidly increased their internet usage

This graph shows the rapid increase in data downloaded.





We can learn from and keep many of the technological adaptations made during the pandemic. The growing use of telehealth services can promote better access to health services, particularly in areas of regional Victoria where access to skilled health professionals is more challenging. Digital access can sometimes substitute for many face-to-face interactions including remote working, videoconferencing, and remote service delivery. It can potentially overcome many disparities, including limited transport access or distance.

Globally, technology is rapidly changing, driven by rising internet use, smart technologies and automation. Many new technologies with potential implications for infrastructure are developing swiftly, such as 5G mobile, artificial intelligence, automated and connected vehicles, drones, virtual and augmented reality, the 'Internet of Things', and digital health and education.⁵ They have immense potential benefits, with some estimating that digital innovation could deliver \$315 billion in gross economic value to Australia during the next decade.⁶

Technology can change the infrastructure that Victoria needs. For example, automated vehicles could lead to significant network efficiency improvements that will mitigate congestion and boost economic growth.⁷ This could mean redesigning road layouts and avoiding or delaying major infrastructure investments.⁸

New technology and applications are also increasing productivity, enhancing services, and promoting innovation. Sometimes allowing new technology to flourish requires regulatory changes.

Regulatory shortcomings can impose costs on business and the community.⁹ During rapid technological evolution, prescriptive regulation can stifle innovation. Instead, regulation focusing on outcomes, such as safety, can protect consumers while allowing innovation to flourish.¹⁰ Technology can underpin new business models, such as using reverse osmosis to create drinking water, or using algorithms to closely match users and providers, such as in ride sharing. Technology can help integrate transport services, with public and private transport services combining to deliver affordable and sustainable choices and a seamless customer experience.

But widespread adoption of rapidly advancing technology also has risks. Digital technologies need strong privacy safeguards and robust cyber security, so information is non-identifiable and stored securely. Cyber-breaches can erode community trust, and potentially discourage use or thwart innovation. Governments must also consider the fairness and ethics of automating public functions and ensure the benefits of technology are equitably distributed and do not undermine labour standards. In a hyper-connected world, individuals and families who cannot afford or access personal technology are at risk of deepening disadvantage.

Technology can provide alternative service delivery methods

Just as business models can change, so too can government services. Many government services rapidly adapted during the COVID-19 pandemic, including telehealth, online learning and virtual courts.

Technology can transform government services, which in turn alters their infrastructure requirements. Digital technology can substitute for buildings. Health services have demonstrated and expanded different ways of providing health care during the COVID-19 pandemic, without necessarily requiring more dedicated infrastructure, including by evolving telehealth, outreach services, and 'hospital in the home'.¹¹ Telehealth services during the COVID-19 restrictions

complemented in-person care by providing millions of telephone and online health services, allowing easier and potentially earlier interventions. An NBN Co survey found 48% of respondents who have needed to access a health service during the crisis have done so using a telehealth service, and 63% are open to considering telehealth in the future.¹²

Similarly, the COVID-19 pandemic drastically transformed the administration of courts and tribunals, which rapidly changed their traditional protocol and procedures.¹³ Virtual courtrooms allowed many cases to progress without the participants needing to attend in person.¹⁴

Technology and data analytics can help infrastructure perform better

Technology provides new ways of collecting and disseminating information about infrastructure and the services it supports. Technologies can create, collect and analyse data, supporting more targeted interventions, superior service delivery models and better asset management.

Victorians are increasingly adopting technology to help manage their daily lives. Apps can show how much electricity is being used, count steps and kilometres, and support home budgeting goals. An Australian survey identified that 75% of respondents used the internet to download an app in the 12 months to July 2018 and that 35% used one or more smart-home activated tools in the same period.¹⁵ Smart homes with Wi-Fi connected devices create an 'Internet of Things', allow people to turn

on televisions, lights and appliances by voice command, set timers, answer questions about the weather or even remotely check visitors at their door.¹⁶

Intelligent transport systems can communicate between private and public transport vehicles, and between vehicles and infrastructure, reducing manual processes for managing traffic flows and responding more quickly to manage congestion and reduce queuing. Victoria already has some limited dedicated traffic signals that prioritise movements of buses and trams. Overseas, traffic light synchronisation in Orange County, California, reduced overall travel times by 11%, the number of stops by 75% and greenhouse gas emissions by 7%, saving 4.1 million litres of fuel over three years.¹⁷





Incorporating uncertainty into infrastructure planning

Planning for infrastructure in uncertain times is challenging. The exact evolution of technology is unpredictable, along with its impact on long-lived assets. Challenging assumptions can have a profound impact on future predictions for infrastructure investment.

Scenario planning involves constructing several different future projections under different assumptions. It improves understanding of the value of infrastructure investments in different possible futures. It also helps identify the value in keeping options open under different possible circumstances, and situations where infrastructure could possibly become redundant.

Infrastructure sectors that undertake scenario planning are likely better prepared. For instance, the electricity sector is experiencing considerable disruption from renewable and storage technologies, but the pace of growth is uncertain, with national consensus still to be reached on greenhouse gas emission reduction aspirations. To help plan for the nation's electricity and gas needs, the Australian Energy Market Operator has developed an

Integrated System Plan, using several scenarios that represent plausible futures to assess future risks, opportunities and development needs.¹⁸ This identifies the infrastructure investments that hold the most value in different circumstances, and the potential impact of not investing. Similarly, in preparing our *Advice on Automated and Zero Emissions Vehicles*, Infrastructure Victoria modelled several future scenarios based on different assumptions about the availability and use of transport technologies.¹⁹ We have similarly prepared multiple modelling scenarios to examine for the development of this strategy.

Having staged, incremental planning for infrastructure projects also helps to manage uncertainty. For instance, designing infrastructure to adapt as technologies mature keeps infrastructure resilient and investments productive. New and significantly upgraded infrastructure can consider its capability to be connected, including by embedding smart technology.²⁰ It can also assist infrastructure maintenance, recording its condition to support continuing safe and effective operation over its useful life.



Draft recommendations to embrace technological opportunities

Infrastructure Victoria is considering the following draft recommendations to better position the Victorian Government to capitalise on technological opportunities. These are further complemented by draft recommendations to unlock regional

economic growth opportunities (see section 4.2) and keep regional Victorians connected (see section 4.3). Many other draft recommendations incorporate developments in new technology.

1.3 Embrace technological opportunities

Prepare for increasingly automated vehicle fleets

Draft recommendation 17

Immediately begin updating transport regulations to allow automated vehicle operation on the road network. In the next 10 years, upgrade roads and communications infrastructure to help facilitate increasingly connected and automated vehicles, particularly for corporate and government fleets. Develop policy, business case and land use planning guidance to maximise the benefits of automated vehicles.

Automated vehicle technology could change transport systems globally. It could radically change the operation of Victoria's transport system and alter transport demand patterns. It could deliver considerable benefits, including reducing road deaths and improving people's access to education, services, and social connections. But its transformative potential relies on private sector innovation and government preparedness to facilitate its use.

Many benefits of automated vehicles may be realised without government intervention. But the Victorian Government should take immediate actions to enable their use.²¹ The current regulatory framework for automated vehicles needs to be updated. The National Transport and Infrastructure Council agreed in June 2020 to a single, national approach to regulating automated vehicles on Australian roads. This approach will include a national regulator and a national law, supported by a general safety duty. This includes changing driving laws to support automated vehicles and developing a safety assurance system. Victoria's current permit scheme for automated vehicle trials could be

expanded, consistent with the National Transport Commission's approach to regulating connected and automated vehicles.²² The Victorian Government will also need to change road maintenance and management practices and integrate automated vehicles into transport pricing.

As this regulatory change occurs, the Victorian Government should develop specific guidance for transport project business cases, accounting for the risks, opportunities and uncertainties posed by automated vehicles, including new ways to use and manage road space. This is consistent with the intent of the Department of Treasury and Finance's real options analysis methodology.²³ For example, our *Advice on Automated and Zero Emission Vehicles* outlined scenarios where vehicle to vehicle communications mean vehicles can safely travel faster, and more closely together, meaning existing road lanes could carry more traffic and delay the need for more investment.

The Victorian Government should also create planning flexibility to support property owners and local authorities to adapt to automated vehicles. Immediate priorities include flexibility in statutory

planning for car parking infrastructure and design standards to allow for retrofits. They also include introducing flexible kerb space in high density areas so spaces better meet changing demand and future ways we use our vehicles, as well as local transport and land use goals.²⁴

New vehicle owners are already benefitting from increasingly automated features, including new safety features. Fleet operators are likely to adopt automated features earlier than individual car owners, due to their scale, fleet-wide efficiency gains and operating cost savings. This includes truck and delivery van fleet operators, bus and coach companies, rideshare and taxi companies, and corporate vehicle fleets – including those of the Victorian Government. These potential savings, and the opportunity to accelerate adoption of the technologies, means the Victorian Government should actively seek out opportunities for early deployment of automated vehicles in Melbourne and regional Victoria. Areas with lower traffic volumes and fewer safety risks may be good locations for the testing and early deployment of more advanced automated vehicles.

1.3 Embrace technological opportunities

Facilitate integration of public transport with new mobility services

Draft recommendation 18

In the next five years, develop open access ticketing platforms to facilitate integration of public transport modes with new mobility services, incorporating better data sharing and collection. Remove public transport contract barriers to integration.

New businesses are using technology to disrupt traditional transport models. They are creating new ways for people to manage how they get around, reducing the need to own a car, consult a map or check a timetable. Online platforms use artificial intelligence to match, schedule, dispatch, plan and buy transport trips – all through the one app.

New mobility services can improve the efficiency and ease of using transport, providing a cheaper, seamless, and more attractive alternative to traditional car ownership.²⁵ They streamline payment systems and data analysis,²⁶ and unlock opportunities for innovative transport service design and delivery.²⁷ New mobility services can also help people to get from transport hubs to their individual destinations more cheaply and efficiently than traditional public transport services. They may also be a prerequisite for maximising the benefits of automated vehicles, especially to facilitate efficient use of shared fleets.^{28,29} This could especially improve mobility for people who cannot drive, or cannot afford to, including some people with disability and older Victorians.³⁰

As these technologies develop, people will increasingly want to compare services offered by multiple independent providers

across public transport, taxis, ride-share, bike-share, and even automated vehicles. Ideally, people could plan and pay for their journeys through a single portal. They could select one of multiple combinations of different transport services, at varying prices.³¹ For example, instead of using myki to pay for a train trip and then requesting a connecting rideshare service through an app, a person can plan, book and pay for the whole journey in one transaction. This mechanism encourages commuters to monitor different transport prices, and respond by changing their behaviour, including if transport prices are changed to help manage demand (see draft recommendation 55).

To successfully integrate mobility apps into the transport system, the Victorian Government should develop a roadmap to achieve open integrated payment across third-party purchasing platforms, ticketing, validation, and barrier systems for public transport. This should be incorporated into the myki re-tender due in 2023. This will need to overcome the commercial issues of revenue allocation, such as from public transport ticket sales. Third-party access to public transport ticketing means new mobility service providers can include public transport in their journey planning, booking and billing systems. As part of collaborative

arrangements for third-party access, providers should also be required to share useful, unidentifiable data and information.

The Victorian Government should also ensure new contracts for public transport operators allow for changes to accommodate new mobility services. This includes an option for new mobility service providers to bid for the provision of local transport services currently provided by buses in metropolitan and regional areas. Current public transport contracts prevent new transport business from operating public transport-style services, stopping these options from being developed. Better data collection and sharing (see draft recommendation 40) will also assist the development of new mobility services. The Victorian Government could consider the further use of a third-party firm for sourcing and collecting data.

These reforms to accommodate new mobility service providers are low or zero cost, as the required changes can be incorporated into processes already underway.

Case study

New mobility services are operating around the world

Whim, Helsinki, Finland³²

Whim is a Finnish mobile app designed to improve transport route system efficiency and the transparency of transport information. It allows users to book and pay for transport in one transaction. It operates across all transport modes, including local public transport, bike-sharing, share-cars,

long distance trains and taxi services. It has helped create a more user-friendly and engaging platform and centralises transport information for the entire transport system.³³ Whim was the world's first mobility service to offer multi-transport ticketing across different services in one app.

polygoCard, Stuttgart, Germany³⁴

The polygoCard is the primary online mobility service in Stuttgart, Germany. It aims to provide a multimodal and intermodal booking platform that crosses all types of public and private transport. It works for public transport, different car and bicycle-sharing services, including for electric vehicles. It also functions as a library card and allows access to many city services.

The polygoCard was developed collaboratively between the government and private sector, with over 23 partners involved in the initial design stage, including with traffic, science, consulting and software expertise. These partnerships increased knowledge of public transport options like Stuttgart's light rail, bus, S-Bahn and regional train services.³⁵

arevo, Victoria, Australia³⁶

The RACV has developed arevo, a free app. It allows people to schedule their journeys in one place, including public transport, ride-share, car, car-share, cycling and walking. It also provides public transport timetable and car parking information, can be

used to top up myki cards, and provides public transport disruption notifications. Booking are currently redirected to partner apps to finalise payment, but developers are looking to consolidate bookings into the platform.

1.3 Embrace technological opportunities

Incorporate personal mobility devices in regulation

Draft recommendation 19

In the next two years, incorporate nationally consistent rules for personal mobility devices in Victorian legislation, develop a standard and statewide regulatory framework for shared mobility schemes, and update existing active transport design standards to better accommodate devices.

Beyond automated vehicles, personal mobility technologies – like electric bikes and scooters – are emerging. Alongside walking and cycling, personal mobility devices can improve options for the many transport journeys that are short, local trips. Over half of Melbourne's car trips are less than six kilometres long,³⁷ so using personal mobility devices could also help reduce road congestion. Shared personal mobility devices schemes currently only have coverage in certain places, with electric bicycles focussed in inner Melbourne and near public transport interchanges and stops.

Different cities have had different experiences with shared mobility schemes. Conventional bike share schemes have flourished in some cities, and floundered in others, including Melbourne. In the United States, trips taken annually via shared mobility schemes are estimated to have more than doubled in 2018, with 84 million trips taken, driven by expansion and greater use.³⁸ But this activity is highly concentrated, with six US cities accounting for 84% of all trips on station-based bike share schemes, and only three cities accounting for 40% of all e-scooter trips.³⁹ Beyond shared schemes, costs have fallen, and private purchases may have increased

for these devices, including reports of an increase in electric bicycles during the COVID-19 pandemic.⁴⁰

As these new transport modes and devices have emerged providers have become familiar with consumer preferences, but regulation has been slow to keep pace. Current legislation for personal mobility devices varies in different states and territories, often subject to ministerial exemption, potentially creating a confusing patchwork of regulatory systems nationwide. The National Transport Commission is reviewing barriers to the safe use of personal mobility devices and proposing national model legislation.⁴¹ As with automated vehicles, the Victorian Government should support a national regulatory approach and incorporate these rules for personal mobility devices into Victorian legislation in the next two years.

Similarly, shared device schemes have no standard regulatory framework, and no consistent way of deciding their placement or design. Individual operators must strike unique agreements with different local governments, leading to different practices in each place, and no agreed process for new operators to enter the market. It also places the regulatory burden on local

government, which has the least resources, and effort is duplicated across councils. New facility design standards can consider the best way to incorporate personal mobility devices and their users into urban environments safely.

The Victorian Government should develop a standard, statewide regulatory framework for shared mobility schemes. This would create more consistent outcomes in public spaces. The framework should include a consistent enforcement approach to help reduce clutter and manage vandalism. It should also manage safety and crash risks, potentially requiring shared mobility schemes to make contributions to the Transport Accident Commission. The Department of Transport's Movement and Place Framework could be developed to help identify good locations for shared mobility scheme infrastructure.

1.3 Embrace technological opportunities

Transform road network operations for all current and future modes

Draft recommendation 20

In the next five years, integrate management systems for different road-based transport modes. Allow for real-time management and communication, and prepare roads for emerging transport technologies.

Technology and data analytics can help transport infrastructure perform better, making road operations more agile and responsive. The Victorian Government maintains an extensive and ageing transport asset base catering for most transport modes, including 25,000km of major roads. However, Victoria's road network operations management system is decades old and underperforming. Outdated, manually intensive and time-consuming systems mean the operation of many key routes are only considered once each decade. Separate systems manage trams, buses and the road network. Without intervention, network performance will decline as traffic and transport movement grows, and future mobility options will require more sophisticated network management.

Victoria's road network operations management system needs updating,⁴² especially to cope with future pressure on motorways and the arterial road network. The Victorian Government has begun funding better data collection and traffic light timing, but will need to do more to fulfill these goals.⁴³

Victoria has several opportunities to help create a modern, integrated, multi-modal road operations system that can maximise

existing and future infrastructure efficiency, while allowing for scalable upgrades. More efficient road management improves safety, travel times and reliability. It complements road space allocation initiatives (see draft recommendation 41). Victoria can learn from successful national and international examples, such as the network wide transformation projects underway in Sydney⁴⁴ and the United Kingdom⁴⁵ that are upgrading operating systems to manage road networks in real time. To progress, in the next five years the Victorian Government should:

- \ use the Public Transport Victoria and VicRoads amalgamation to integrate transport management, operation and delivery across all modes and networks
- \ develop and apply modern technology so transport management systems can better coordinate all modes in real time, such as using 'managed motorway' technology and broadening it across the network for all modes
- \ apply technology to improve operational practices, such as better road rule enforcement, faster disruption responses and quicker road crash clearing, and
- \ use technology for better real-time communication with drivers.

New transport services will need to be integrated into the network, like autonomous vehicles and new mobility services (see draft recommendations 17 and 18). This also requires modernising Victoria's road network operations management systems.⁴⁶ Other cities are significantly more advanced than Melbourne in updating their systems to maximise the benefits of new transport technologies. The Victorian Government can support introduction in the next five years by:

- \ boosting ICT infrastructure for safety and automated vehicle optimisation
- \ making open, real-time transport system data information more available and being ready to receive and use more vehicle-generated real-time data, and
- \ establishing data sharing principles with commercial transport service providers.

In future, automated and connected vehicles will need to be connected to a management system to deliver maximum benefits. It could communicate directly with them and provide updates on unexpected changes in traffic conditions and natural disasters, for example, in the event of a road accident, new pothole, flooding or a tree falling across the road.⁴⁷

To progress, in the next five years the Victorian Government should:



Use the Public Transport Victoria and VicRoads amalgamation to integrate transport management, operation and delivery across all modes and networks



Develop and apply modern technology so transport management systems can better coordinate all modes in real time, such as using 'managed motorway' technology and broadening it across the network for all modes



Apply technology to improve operational practices, such as better road rule enforcement, faster disruption responses and quicker road crash clearing



Use technology for better real-time communication with drivers



1.3 Embrace technological opportunities

Use innovation to deliver better models of health care

Draft recommendation 21

Within five years, help slow the growth in demand for hospital infrastructure by funding a comprehensive statewide health innovation strategy to promote better models of health care.

The response to the COVID-19 pandemic has shown that innovation is possible for the health care sector by expanding technology use. Victoria can retain many of these adaptations in the future, particularly as existing health infrastructure will be stretched to deliver timely, appropriate services as the population continues to grow and age.⁴⁸ Many patients already travel outside their local area to access health care.⁴⁹ Projections suggest that even assuming current hospital efficiency improvement rates from health innovations continue, Victoria may need hundreds of new hospital beds each year to meet demand.⁵⁰ These not only have high infrastructure costs, but even higher operational costs to staff with skilled health professionals.

In the lead up to the COVID-19 pandemic, hospital services were already under pressure, especially for emergency and mental health services. Many had a mismatch between facilities, funding and demand, causing inefficiencies.⁵¹ About 30% of emergency department patients were not treated within recommended timeframes, nor were 13.2% of elective surgery patients.^{52,53} One in 10 experienced a health care complication, with half of these being avoidable.⁵⁴

In the period to 2050, public hospital demand will continue to increase faster

than funding capacity driven by population growth, an ageing population and changing health care needs.⁵⁵ Responding only by building new hospitals (draft recommendation 74) or upgrading existing facilities (draft recommendation 58) will not be enough to meet future demand on the hospital system. Victoria needs to prioritise innovative approaches based on prevention, early intervention, self-care, outcome-driven approaches and community-based treatment. Service planning and projections of demand already build in assumptions of innovation, but progress needs to accelerate and be more systematic. More innovative, integrated health care models would provide Victorians, especially older people, those living in remote areas and people with disabilities, better access to quality care delivered in their community and their own homes,⁵⁶ leaving hospital beds for the most complex and demanding cases. Recent commitments to provide more care at home, improve telehealth services, and build community hospitals are examples of ways some pressure can be diverted from acute care.

The Victorian Government should develop a clear, comprehensive statewide health innovation strategy within five years, helping slow hospital expansion. It should promote adoption of better models of care, with

clear pathways from local community care to more advanced care, focussing on early intervention and community-based health services.⁵⁷ The strategy should promote innovations that improve the service quality and capacity across the entire health system.^{58,59} Best practice health care models will be dynamic, and the hospital system will need to be flexible enough to adapt to change with rapidly evolving technology, research and innovation. Some new technologies have implications for the design and upgrade of hospital buildings.

The new strategy should be supported with a five-year dedicated health innovation fund that supports the acceleration of promising innovations and research, including digital health solutions.^{60,61,62} Existing health innovation funds have been drip-fed small, \$10 to \$15 million allocations each year or two,⁶³ without a unifying strategy. Funding should be contingent on addressing demand early, slowing hospital demand growth, generating better treatment access and efficacy, and reducing risk of complications. This fund would support trials of new models of care, emerging technologies and other innovative practices that can be deployed system-wide. While the Victorian Government already has several funds for health innovation, these support applications for individual projects and are not of the scale required for wider implementation.⁶⁴

1.3 Embrace technological opportunities

Modernise courts through digitisation and contemporary shared facilities

Draft recommendation 22

Immediately increase court efficiency and meet demand by digitising suitable court systems and procedures. Invest in new contemporary, adaptable, multi-jurisdictional court facilities during the next 10 years.

Increasing demand is putting pressure on Victoria's courts. Some courts are now under significant demand pressure,⁶⁵ especially in Melbourne. This growing demand is complicated by policy changes, such as for bail,⁶⁶ sentencing⁶⁷ and family violence, resulting in court cases that are more complex, time consuming, and harder to resolve.⁶⁸ The Victorian Government has announced new investments in court technology, but demand will continue to challenge existing court processes and facilities and cause delays. Victims will experience longer periods of stress and uncertainty, accused people will spend longer on remand, and remand facilities will be more overcrowded.

Demand pressures have been exacerbated by the COVID-19 pandemic. In response, the Victorian Government has funded court technology upgrades to keep them operating wherever possible, increase access to digital hearing services, and protect the health and safety of court users.⁶⁹ Remote testimony was used to reduce court attendances for filing hearings,^{70,71} and document management has been increasingly digitised. Virtual courtrooms and remote testimony can be more convenient for participants and can reduce costly and complex prisoner transport operations.

In the five years to 2013-14, prisoner transport cost the state \$42 million.⁷²

The courts can build on this transformation to deliver a more efficient administration of justice, requiring less physical presence in courtrooms (such as by police to give evidence), and helping minimise infrastructure needs.

The Victorian Government should expand online dispute resolution, which currently allows disputes to be adjudicated by the Victorian Civil and Administrative Tribunal without in-person tribunal meetings.⁷³ Online dispute resolution has saved time and money while receiving positive feedback from users.⁷⁴ Though currently applied primarily to minor civil cases, it can be expanded to larger civil cases, and possibly some criminal matters.⁷⁵

The Victorian Government should expand the integrated case management system to all Victorian Courts. Set to be introduced in the Magistrates and Children's Courts in 2022, a unified system allows information to be shared between court jurisdictions and users, enabling digital document lodgement and digital record management, and improving the accuracy of files.⁷⁶ An integrated case management system improves court efficiency by allowing analysis of case types, length and delays,⁷⁷ while improving judicial decision-making.⁷⁸

Using technology does not completely negate the need for more court infrastructure. Courts are constrained by inflexible, outdated buildings and systems – particularly in the Melbourne CBD legal precinct.⁷⁹ In 2016, only 16% of Court Services Victoria's asset portfolio met or exceeded the minimum condition benchmark.⁸⁰ New infrastructure works should focus on replacing ageing infrastructure with contemporary, flexible, shared facilities, that can accommodate demand across court jurisdictions and retire out of date buildings. For example, the new Bendigo Law Court Redevelopment is designed to serve all court jurisdictions and specialist courts, and is enabled for digital evidence, video conferencing, Wi-Fi, and digital recording.⁸¹ Future courts infrastructure can follow this model, using contemporary infrastructure and technology to become adaptable for different courts and used flexibly to meet demand. This can also support a modern integrated courts organisation. To increase court efficiency and meet demand, the Victorian Government should roll out a suite of digital services followed by targeted infrastructure investment in new contemporary, adaptable, multi-jurisdictional court facilities in the next 10 years.

1.3 Embrace technological opportunities

Improve technology and infrastructure for a responsive police service

Draft recommendation 23

In the next 10 years, invest in technological capacity to better support a responsive police service, and deliver infrastructure to enable a contemporary hub-and-spoke policing model, co-located with health and human services where appropriate.

Victoria Police face increasingly complex crime and changes in social values and expectations from the public.⁸² Police increasingly interact with other agencies, for instance, to address family violence, alcohol and drug use, and mental illness.⁸³ Other jurisdictions show that improving police technological capability can be implemented in an efficient and effective way.⁸⁴ Victoria Police is embarking on a Service Delivery Reform program, which provides an opportunity to improve technology and infrastructure for a responsive, visible and modern police service.

Investing in new technology can assist more complex investigations, such as using analytics to identify lines of enquiry that can accelerate and enhance investigations. New technologies can enhance situational awareness and proactively detect needs for police services through remote sensors. Moving to better policing requires skills, visualisation and analytical tools to pull together disparate pieces of information to support intelligence activities, receive and access sensor data, identifying hotspots, connecting crimes and linking offenders.⁸⁵ The Victorian Government recently announced budget commitments of \$300 million for system enhancements and reforms.

Victoria Police can become more agile in response to changing circumstances and threats by developing more flexible and dynamic business processes. These can better manage, structure and store information, and maintain a central, reliable record. This includes receiving digital data and evidence from the public, and the capability to organise and assess it. A priority opportunity is receiving information through web interfaces and social media, for example, to connect with family violence victims who may feel unsafe speaking on a telephone. Information needs to be reliably accessed by officers, in a relevant and useful format for the officer relying or acting on it.⁸⁶ Better technology, such as continuing and increasing mobile device use, helps keep officers visible in their communities and provided with the information and insights needed to do their jobs effectively.⁸⁷ This allows officers to focus on policing in the community, rather than processing and receiving information in stations.

On the ground, a visible police street presence in the community helps improve feelings of safety. For instance, road safety operations such as speeding blitzes and road-side drug and alcohol testing influence good behaviour and can prevent crime and harm before they happen.⁸⁸ A hub-and-spoke police model supports more police officers in the field.⁸⁹ For example, the \$45 million Wyndham Police complex can

accommodate 550 police and staff, and links with the broader Wyndham Justice Precinct integrating policing, court services, corrections, health and council services. This model of infrastructure differs from Victoria's many dispersed and infrequently visited police stations. Evidence indicates no link between the number of police stations and low crime levels.⁹⁰

Infrastructure investment can support a contemporary hub-and-spoke policing model. This includes delivering centralised hub stations in metropolitan Melbourne, enabling police to respond to areas of greatest demand. Many current police stations are clustered in older suburbs, away from places with high demand.⁹¹ The centralised hubs could be co-located with health and human services, as highlighted by the Victoria Police Blue Paper⁹² and building on the Multi-Disciplinary Centres considered by the Family Violence Royal Commission.⁹³ They can support police services running from smaller contact points in mobile facilities, shopping centres, and community centres, also saving infrastructure costs.⁹⁴ Improving and sustaining technology, while progressively delivering police hubs, supports a major change to make Victoria Police more visible, agile and responsive. These can be refined and delivered by the Service Delivery Reform program in the next decade.



Discussion questions

Infrastructure Victoria welcomes feedback on our draft recommendations on embracing new technologies. We are particularly interested in answering:

?

What funds or policy frameworks have been used successfully to promote systematic innovation in infrastructure?

?

What are the risks of adopting these new technologies?

?

What changes can assist people to keep using telehealth services?

?

How should the Victorian Government assist adoption of these new technologies?

?

What other regulatory or policy changes can enable the operation of new infrastructure-related technologies?



To answer these questions and more, visit infrastructurevictoria.com.au

1.4

Stay connected to global markets

Victoria's prosperity is supported by exporting billions of dollars in goods every month and importing many items for everyday use.¹ While global markets have always been dynamic, they have recently been significantly impacted by the COVID-19 pandemic. Restrictions on travel have impacted international students, affecting international education - Victoria's largest service export. Many supply chains have been fractured, and international trade disrupted. In the years ahead, businesses will need strong connections to international markets, including through freight terminals and ports, to adapt to changed global markets and nimbly respond to future changes. Industry must be able to find new customers and export products efficiently to remain competitive.

Industrial and transport technology changes can affect the operation of the freight industry, demand for production and consumption of goods. Economic transition and structural adjustment in the global, national and state economies can affect production, exports and imports. In the face of these developments, keeping Victoria's freight moving as efficiently as possible helps keep costs down, maximises trade and creates the environment for businesses to grasp new export opportunities.²

Freight volumes will continue to grow and place pressure on road networks

In all our modelled scenarios prepared for this draft strategy, freight movements on the road network grew by at least 80% between 2018 and 2051. Growing freight volumes for both rail and road place pressure on the transport networks they use. However, this task has not been evenly distributed between road and rail. Most of Victoria's freight is moved on the road network, with the fleet of freight trucks increasing by 35% in the decade to 2017.³ During recent decades, the rail freight share has seen no significant changes, with some markets in decline.⁴

Manufacturing remains a major contributor to the economy, with over 280,000 Victorians employed in manufacturing in 2018.⁵ Many industrial and logistics precincts are in Melbourne's outer suburbs, where they generate demand for transport and logistics services, industrial land and ports. The road networks in and near these places will need to be able to move freight reliably and efficiently around the city, to and from regional and interstate producers, and to and from international ports. But Melbourne's outer suburbs have underdeveloped motorways and freeways compared with established areas, limiting their capacity to accommodate extra freight. As these areas grow and develop, their land values rise, making further road expansion more expensive. Retrofitting road

networks can also be expensive. Early protection and purchase of land for future freight terminals and transport corridors can reduce this risk, keeping more freight options affordable in the future.

A strong and efficient freight rail system can be safer, more reliable and less polluting than road freight. It can help reduce demand on freeways from road freight.⁶ Replacing trucks with rail can assist in relieving road congestion, pollution and maintenance costs in metropolitan areas.⁷

Impacts on international education markets will have immediate consequences for the Australian Government's management of airports, migration arrangements and universities.



Ports and freight terminals are critical for economic development and productivity

Ports are crucial international gateways for exporting goods to international markets and allow Victoria to access goods from around the world. Ports allow exporters, such as agricultural and natural resource producers and manufacturers, to access international markets⁸ and for importers to keep costs low.⁹ While efficient ports benefit all Victorians, nearby communities and ecosystems can experience negative amenity impacts from freight movements, including increased transport network congestion, habitat loss, reduced air quality, noise and other amenity impacts. These must be considered and managed, so port operations are acceptable to the local community.¹⁰ Our *Advice on Securing Victoria's Ports Capacity* found the most efficient approach to expanding port capacity – namely optimising the Port of

Melbourne to realise its maximum capacity by the middle of the century – is simply not possible without community support.¹¹

Freight terminals maintain a central position in supply chains. Terminals act as a connecting point between the network and customer. Intermodal terminals occupy a critical position in supply chains and enable the transfer of freight from one transport mode to another, for example, between road and rail. Effective terminal operations and sufficient capacity are essential building blocks for the overall efficiency of supply chains. Intermodal hubs are important in easing the transport burden for ports and neighbouring areas and are essential for increasing the role of rail in freight transport and distribution.¹²

Protecting land gives Victoria more options in the future

Freight terminals and port capacity are necessary to meet the growing freight demand and support the arrival of the Inland Rail project.

The price of land in Australia's larger capital cities has grown faster than the rate of inflation, with previous analysis by Infrastructure Australia finding that, in the 20 years to 2012, underlying land values in Melbourne, Sydney and Brisbane grew around 3% per year faster than the rate of inflation. In such circumstances, any delay in acquiring land for a corridor can add

materially to the cost of a project.¹³

Protecting future options by reserving land and corridors will yield substantial cost savings. These savings could be further increased if land is acquired early.¹⁴

Acquiring entire corridors usually requires large, upfront outlays by governments, using funds that may be required for more pressing infrastructure priorities. However, substantial funds can be saved through reserving a corridor and then progressively acquiring the properties.¹⁵



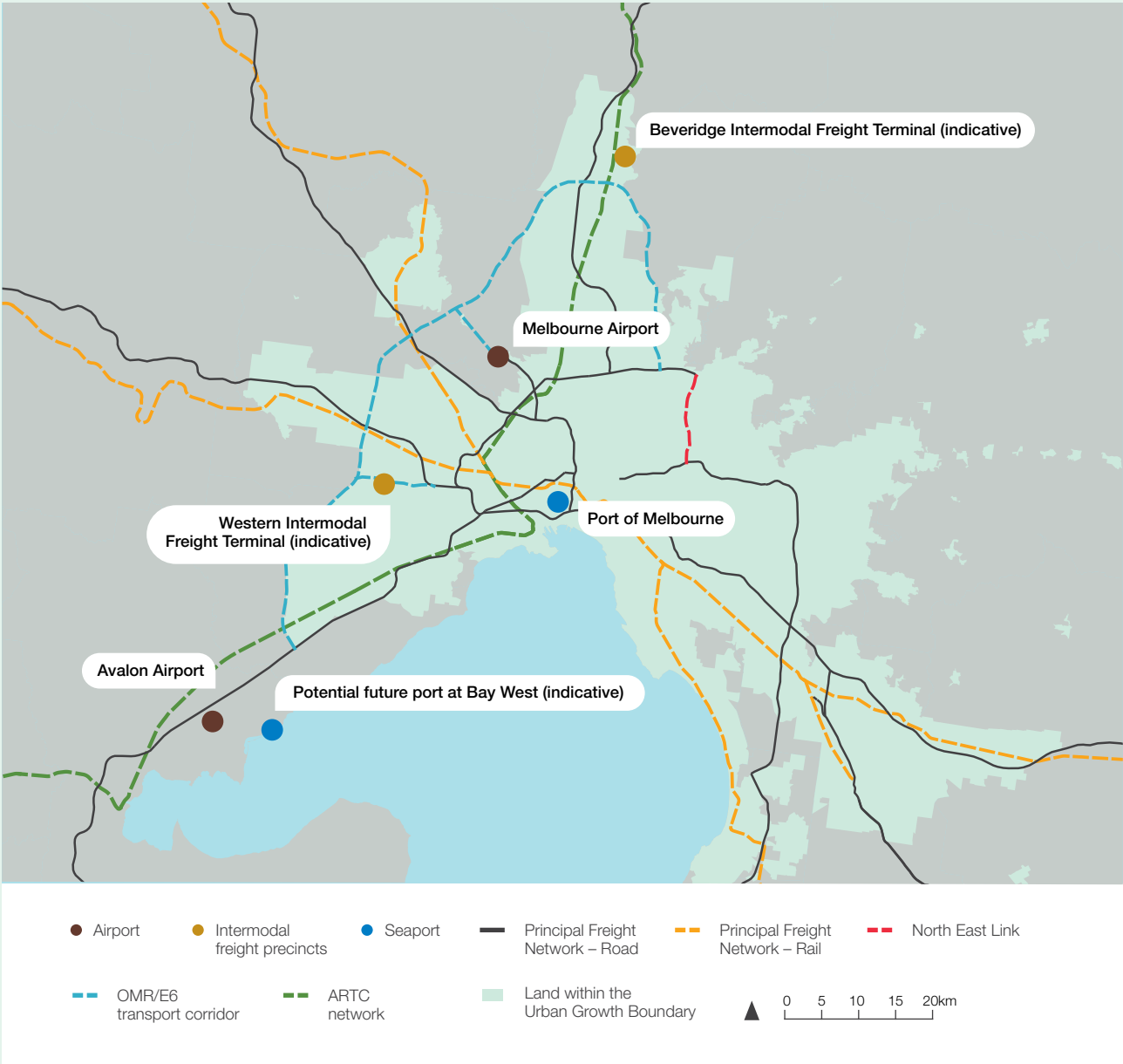
Draft recommendations to keep Victoria connected to global trade

Infrastructure Victoria makes the following draft recommendations to help keep Victoria's freight network efficient. We also make draft recommendations relevant to freight transport about steering changes in

travel behaviour (see section 2.3), reshaping the transport network (see section 3.1), and enhancing market access and productivity in regional Victoria (see section 4.1).

Figure 6: Proposed freight infrastructure connects freight terminals and ports

This map shows the proposed future investments in freight infrastructure



1.4 Stay connected to global markets

Optimise capacity at the Port of Melbourne

Draft recommendation 24

Support efforts to progressively optimise the Port of Melbourne's capacity, and actively take steps to manage amenity implications for community acceptance, as identified in our *Advice on Securing Victoria's Ports Capacity*.

The Port of Melbourne is Victoria's only container port and the busiest in Australia, handling around 36% of national container trade.¹⁶ It handles over 3 million 20 foot equivalent units (TEU) in goods each year, and over 8,250 shipping containers and 850 motor vehicles each day.¹⁷ The port's capacity to process containers needs to grow with our population and economy if we are to provide exporters reliable, cost-effective access to markets and keep costs low for importers.^{18,19} Port trade volumes increased by 2.1% a year during the decade to 2018-19²⁰ and will continue to grow, though the rate depends on technology and other changes.²¹ We anticipate demand will grow to between 4.2 and 5.5 million TEU by 2031, and 6.2 million and 8.8 million TEU by 2051.²²

The Port of Melbourne has so far expanded to meet increasing demand, but future development may be constrained. The port borders residential areas and four municipal governments, leaving it little space to increase its footprint.²³ Internationally, container ships are being built larger than the port's current ability to service them.²⁴

In May 2017, Infrastructure Victoria advised the Victorian Government on the state's

container port capacity. We found optimising capacity at the Port of Melbourne is the most cost-effective way to meet future demand of up to 8 million TEU each year. Increasing the port to this size from its current capacity of 4.4 million requires an estimated \$6.8 billion in capital and operating costs.²⁵ Demand is unlikely to exceed 8 million TEU before around 2055,²⁶ after which building a second container port at Bay West becomes economically competitive with further expansion.²⁷ The Port of Hastings may have potential as a future port location to relocate trade from the Port of Melbourne.²⁸

Consistent with our previous advice,²⁹ the Victorian Government should continue to support efforts to optimise the capacity of the Port of Melbourne. Investments in channels, terminals and transport networks, and in better operating procedures, can progressively increase capacity. Upgrade timing and sequencing will depend on trade growth, future vessel sizes, transport network development and congestion levels,³⁰ and our advice sets out recommendations and pathways in detail. As planning, design, approvals and construction have long lead-times, the Victorian Government should closely monitor relevant indicators and be ready to hasten or delay current plans.³¹

Capacity enhancements can be simple and relatively cheap initially, but become more complex as the port's capacity approaches 8 million TEU.³² Some costs will be borne by the port operator or funded by road tolls or stevedore rents. The Victorian Government may need to fund interventions with wider community benefits, such as new transport links which improve network performance.³³

Community opposition could be a significant barrier to the port's future growth. Increasing port activity risks more transport congestion, maritime habitat loss, reduced air quality and noise pollution in nearby communities.³⁴ The Victorian Government will need to actively build and maintain community acceptance as the port grows and gets busier. The Victorian Government is currently developing a ports strategy. Measures the government should take include: regulating noise and emission standards for trucks, which carry the vast majority of containers to and from the port; moving more freight by rail; maintaining suitable buffers between the port and other land uses; and transitioning transport companies from congested sites in residential areas to industrial land with good road and rail transport access.³⁵

1.4 Stay connected to global markets

Act now to protect the future Bay West Port option

Draft recommendation 25

Immediately identify and secure land and apply planning protection for transport corridors and buffers for a future Bay West Port, particularly future road and rail connections within the Urban Growth Boundary, and commence and continue environmental monitoring. Around 2040, begin detailed planning for the port.

Our Advice on Securing Victoria's Ports Capacity found Victoria will not need a second major container port until around 2055.³⁶ Detailed planning for a new port should start around 2040,³⁷ or when triggered by other changes such as accelerated demand, congestion, amenity impacts or cost changes.³⁸ The Victorian Government should act on Infrastructure Victoria's immediate recommendations, including identifying land for the port, applying planning protection overlays for associated road and rail transport corridors and buffer zones, and beginning baseline environmental monitoring. Action is needed immediately to secure road and rail access corridors within the existing Urban Growth Boundary south and west of Werribee, which are subject to significant land development pressure.

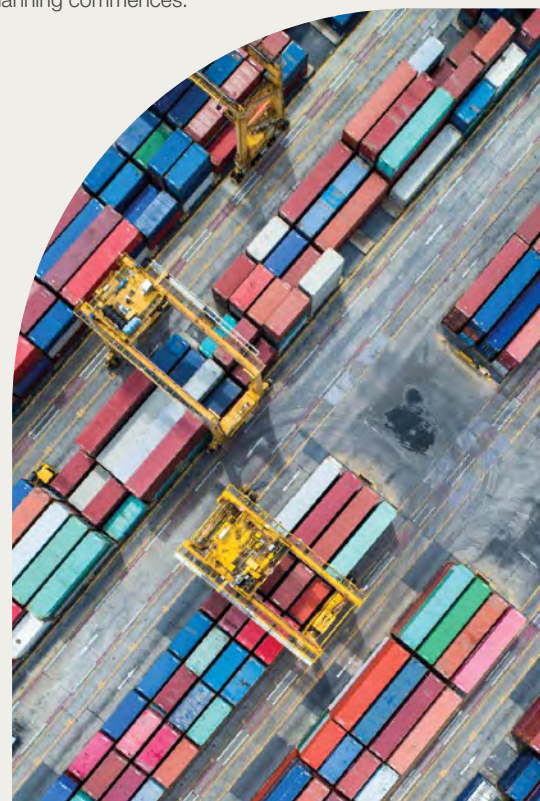
The Terms of Reference for our advice specifically requested we prepare an assessment of the potential suitability of sites at Bay West and the Port of Hastings.³⁹ We determined Bay West to be a superior container port location on nearly every criterion examined.⁴⁰ It is more cost effective, flexible, scalable, and closer to existing and planned freight networks. This makes it far more economically efficient by

making freight costs much cheaper. It has fewer and more easily managed environmental impacts and is further from existing homes.

The Bay West Port site interacts with other nearby land uses, including the Western Water Treatment Plant, sensitive coastal and marine habitats, and Melbourne's growing south-western suburbs. The Victorian Government should place planning protection overlays on land for the port, associated road and rail transport corridors, and for buffer zones. This prevents urban encroachment, which could limit the port's operational hours or reduce residential amenity. It also helps manage environmental impacts, and helps stop land price inflation, reducing future land acquisition costs. To minimise impacts, planning work should be undertaken in consultation with relevant stakeholders such as Melbourne Water and Wyndham City Council.

The Bay West site involves interaction with sensitive coastal habitat, including the Western Port Phillip Bay and Bellarine Peninsula Ramsar wetland. This is likely to lead to an extended and complex approvals phase during the future development of the Bay West port. The Victorian Government

should create a transparent, long-run environmental evidence base by gathering baseline evidence and commence relevant environmental monitoring, including for water quality, hydrodynamics, coastal and seabed morphology, coastal and marine habitats, and flora and fauna.⁴¹ This can inform a 'working with nature'⁴² approach to the port's development, aiming to improve environmental outcomes, and speed up approvals once detailed planning commences.



1.4 Stay connected to global markets

Purchase land for Melbourne's future freight terminals

Draft recommendation 26

In the next five years, buy the land and develop business cases for new intermodal freight terminals and precincts at Truganina and Beveridge to deliver a terminal in time for the completion of the Inland Rail project.

With freight volumes set to soar in coming decades, and a sizeable share of the freight task falling to road transport, Melbourne's motorway network will be important for moving freight.⁴³ It will also require developing an intermodal freight network, well integrated with compatible land uses but kept separate from incompatible land uses to maximise freight transport efficiency. Establishing strategically located terminals with good transport connections facilitates efficient freight movement and keeps supply chain costs down by addressing inefficiencies and capacity constraints.⁴⁴ The Department of Transport has identified these as strategic future precincts, essential for freight network development.

Intermodal terminals maintain a central position in supply chains, acting as a connecting interface between the network and customer-facing operations. Additional freight terminals are required both to meet the growing freight task, and to avoid operating time restrictions from incompatible land uses. Two terminals in Melbourne's north and west are critical to the future of the network. The Western Intermodal Freight Terminal at Truganina, in Melbourne's west, and the Beveridge Intermodal Freight Terminal in Melbourne's

north, have been identified as State Significant Transport Gateways in *Plan Melbourne*,⁴⁵ and as a priority in the *Victorian Freight Plan*.⁴⁶

Both proposed terminals are strategically located, with access to major roads. The Beveridge terminal would be next to the Australian Government's Inland Rail project, the interstate rail network and the proposed outer metropolitan road and rail corridor (see draft recommendation 27). The Western Intermodal Freight Terminal could connect to the interstate rail network with a proposed new rail connection as part of the proposed outer metropolitan road and rail, which would also connect it to the proposed Bay West Port (see draft recommendation 25).

Inland Rail is a \$9.3 billion freight rail project, taking 24 hours to travel the 1,700 kilometres from Acacia Ridge in Queensland to Tottenham in Victoria.⁴⁷ Construction of Inland Rail began in 2018, with a scheduled completion date of 2025.⁴⁸ Victoria has no freight terminals which can currently handle the double stacked, 1.8 kilometre trains the project will enable. Accommodating these larger freight trains requires extensive and costly modification of the bridges, overpasses and other infrastructure in Melbourne's outer

north and west to reach existing freight terminals. Furthermore, Melbourne's current major freight hub at Dynon might not have the capacity to cope with extra trains brought in on Inland Rail. The two new freight terminals could be designed to accommodate each of these considerations.

The Victorian Government should purchase land within the next five years for these future freight terminals and develop business cases to prepare for their development, including potential delivery arrangements. These terminals are necessary for meeting the state's growing freight task, and for Victoria to access the benefits of Inland Rail, and a terminal would ideally be delivered before the conclusion of that project. Delays could result in land value appreciation driving up acquisition costs, and not provide investors with enough certainty to guide their planning. Delays may also allow surrounding land to be developed in a way which is incompatible with the operation of a significant freight terminal.

1.4 Stay connected to global markets

Construct an outer metropolitan road and rail corridor

Draft recommendation 27

Within two years, determine staging for the outer metropolitan rail and road corridor. Construct the E6 motorway in the next 20 years, and progressively construct the outer metropolitan road and rail corridor in the next 30 years, including integrating a rail freight line, subject to detailed feasibility studies and business cases.

While the road network carries most of Victoria's freight movements, rail serves some markets, such as interstate rail movements. This growing freight task will see truck movements balloon, with freight truck numbers having already increased by more than a third in the 10 years to 2017.⁴⁹ Rail freight movements are also expected to grow, especially on interstate rail corridors.

The proposed outer metropolitan ring road/E6 transport corridor aims to support economic development and population growth in Melbourne's outer western and northern suburbs, which could become home to over 650,000 extra residents between 2018 and 2051.⁵⁰ Project business case development is currently underway to investigate land acquisition for the project, including the timing and cost implications of this process. These parts of Melbourne have an underdeveloped road network, without equivalent road options to the well-developed system of motorways and freeways in the city's established areas. As a motorway, the corridor would provide unhindered traffic flow, allowing fast movement of people and freight, helping keep supply chains efficient.

The outer metropolitan road and rail corridor also seeks to support economic and jobs growth in the outer north and west by helping link current and future industrial and logistics precincts with international transport terminals. A clear plan outlining the staged development of this corridor will help support industry development and job creation in these areas. This includes supporting the proposed Western and Beveridge intermodal freight terminals (see draft recommendation 26), Melbourne and Avalon Airports, and the Port of Geelong. It would also provide freight access to the proposed Bay West Port (see draft recommendation 25).

Initial planning work for the outer metropolitan road and rail corridor is complete, with a public acquisition overlay in place since 2010. The corridor runs from the Metropolitan Ring Road at Thomastown, up to Beveridge (the E6), near to the proposed Beveridge Intermodal Freight Terminal. From there, it runs south west through Mickleham, Diggers Rest and Rockbank, to West Werribee. The project also involves constructing a road link to connect the outer ring road with Melbourne Airport. Since the planning overlay was put

in place, significant planning developments have occurred, including for the Bay West port, and significant government commitments to major projects such as North East Link and Inland Rail. The Victorian Government should update the corridor planning and acquisition overlay to reflect infrastructure delivery commitments and determine its staging.

The outer metropolitan road and rail corridor is planned to have railway tracks along its length to connect the Western intermodal freight terminal to the interstate rail freight network, along with high quality road links. Combined with the Inland Rail project and the new rail corridor, both the Western and Beveridge freight terminals can accommodate double-stacked 1800-metre trains, which are required to support the interstate rail freight growth, including inland rail movements to Brisbane. The Victorian Government should construct the E6 motorway within the next 20 years, after the opening of North East Link, which terminates at the Metropolitan Ring Road. Following this, it should progressively construct the outer metropolitan road and rail corridor in stages over a period of up to 30 years.



Discussion questions

Infrastructure Victoria welcomes
feedback on the draft recommendations.
In particular:

?

How can we temporarily
use land reserved for future
transport and infrastructure
projects?

?

What other evidence exists
on the benefits of greater
freight connectivity?

?

How does a lack of certainty
on freight infrastructure and
planning affect private
investment decisions?



To answer these
questions and more, visit
infrastructurevictoria.com.au

1.5

Build a circular economy

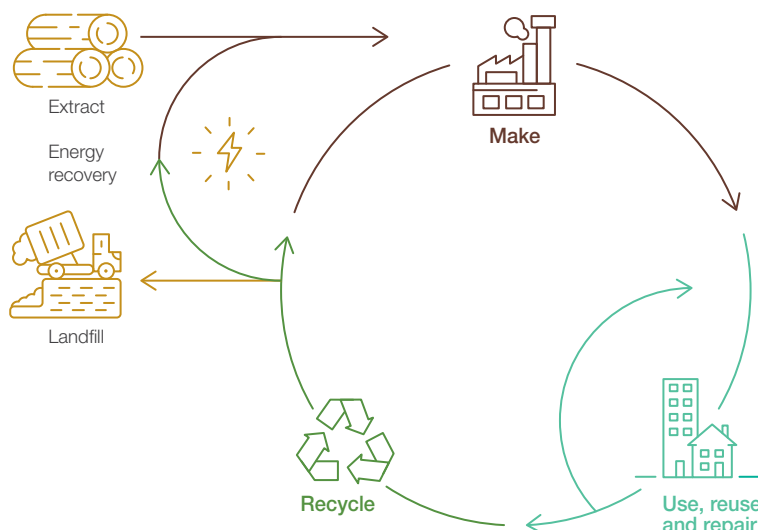
Reducing waste, reusing materials and recycling resources conserves valuable virgin materials, increases economic productivity and reduces pollution. With targeted infrastructure initiatives and the right policy settings, Victoria can meet growing demand for resource recovery and accelerate the transition to a circular economy. Also known as a 'closed loop' system, a circular economy aims to reduce the environmental impacts of production and consumption by avoiding waste and reusing or recycling materials.¹ In early 2020, the Victorian Government publicly committed to

transitioning to a circular economy in its new policy framework *Recycling Victoria: A new economy*.² This policy was funded in the recent 2020-21 Victorian Budget.

A circular economy creates commercial opportunities by improving the quality and quantity of valuable materials recovered from waste, reducing extraction requirements, increasing demand for recovered materials, and generating new jobs and skills. We estimate materials worth about \$1.21 billion were recovered in Victoria in the 2018-19 financial year.³

While the value of recovered materials will vary with commodity prices, this figure demonstrates the economic potential of higher rates of resource recovery, particularly if materials are processed and used locally. For every 10,000 tonnes of waste recycled, 9.2 jobs are generated, compared to 2.8 jobs for landfill.⁴ Increasing Victoria's recovery rate from 69% to 90% could support as many as 5,000 more jobs⁵ in the development and production of high quality recovered materials for use in major infrastructure projects, manufacturing and agriculture.⁶ Many of these jobs would be in regional Victoria.⁷

Figure 7: Resource flows in a circular economy⁸



A circular economy creates economic opportunities by improving the quality and quantity of valuable materials from waste, reducing extraction requirements, increasing demand for recovered materials, and generating new jobs and skills.

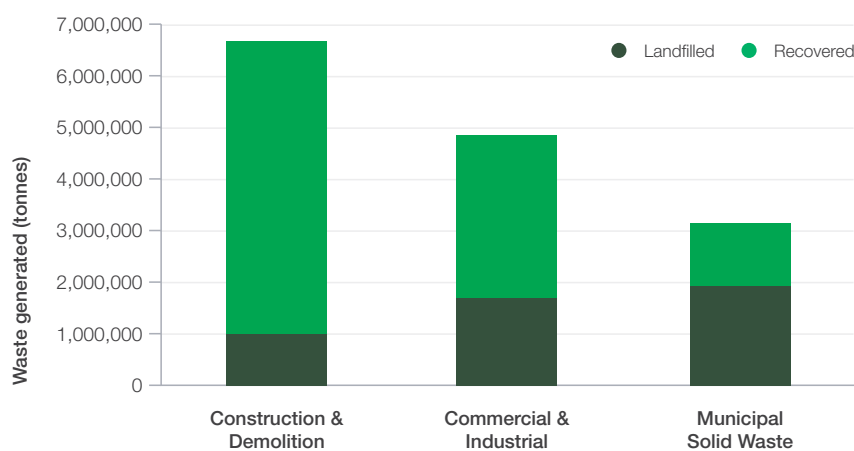


Victoria's waste has untapped potential

Despite past objectives to transition to a circular economy and recognition of the waste hierarchy,⁹ Victoria is producing more waste today than ever before. Between 2000 and 2018, waste generation doubled from 7.4 million to 14.4 million tonnes each year. About 30% was buried in landfill. Resource recovery rates have stagnated at just under 70% of total waste, with international market changes and weak local recyclable material markets causing significant stockpiling and landfilling. The

actual recycling rate may be significantly lower than this, because the ultimate fate of recovered materials is often unclear.¹⁰ The recovery rate is higher for some materials, such as 90% for metals, and lower for others, such as organics at 43%, and plastics at 23%.¹¹ Recovery rates are relatively high in the construction and demolition sector, but lower for municipal waste and in the commercial and industrial sectors.

Figure 8: Municipal resource recovery rates are the lowest¹²



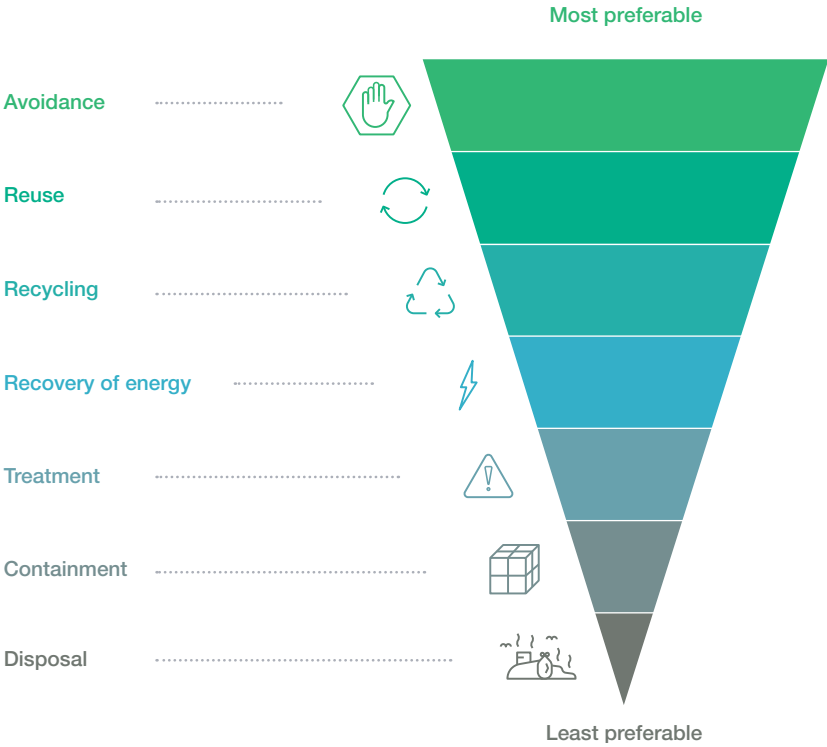
Meeting the ambitious new targets in the Victorian Government's new waste and recycling plan¹³ will require significantly

more waste reduction and increasing recycling in accordance with the waste hierarchy.



Figure 9: Avoiding waste and reusing material are the most preferable approaches¹⁴







This diagram shows the waste hierarchy, with avoiding waste the most preferable, and disposing of waste the least preferable.



In 2017-18, 12% of material recovered in Victoria was exported for recycling,¹⁵ but many destination countries are no longer accepting it without meeting strict standards. These changes caused global prices to plummet, particularly for paper, card and plastics. Without enough local processing capacity, some facilities closed or stockpiled material, and several councils were forced to send their recycling to landfill. Sending potentially reusable materials to landfill, waste stockpiling and illegal dumping all pose environmental and public health risks, such as recent stockpile fires in Melbourne, which caused damage to the sites and surrounding areas.¹⁶

The Council of Australian Governments (COAG) agreed to progressively ban waste exports from 1 January 2021. Without immediate planning for and investing in local infrastructure that can recycle more materials to local and global market standards, Victoria will have significant capacity and capability shortfalls for paper and cardboard by 2024, followed by a shortfall for plastics in 2025. Similarly, Victoria's capacity to manage recovered organics and e-waste will be exceeded by 2025 and 2030 respectively.¹⁷

Figure 10: Current processing facilities cannot meet future COAG targets for all materials

Priority material		2025 (COAG ban & 70% recovery rate)	2030 (80% recovery rate)	2090 (90% recovery rate)
Paper and cardboard		✗	✗	✗
Plastic		✗	✗	✗
Organics		✗	✗	✗
E-waste		✓	✗	✗
Glass		✓	✓	✓
Tyres		✓	✓	✓

In 2019, the Victorian Government asked Infrastructure Victoria to advise on the infrastructure required for, and the role of government in, supporting a more sustainable resource recovery and recycling sector. This advice complemented government action, and the release of a new plan for waste and recycling. We delivered our advice in April 2020,¹⁸ following 12 months of gathering and developing evidence, and significant stakeholder and community engagement.

We found \$1 billion in infrastructure investment from both government and the private sector could transform our resource and recycling sector to recover up to 90% of our waste by 2039, cutting emissions, reducing our reliance on virgin materials, and limiting impacts on the environment. This would require 3.1 million more tonnes of processing capacity. Supporting actions including governance change, market development and changes to community and business behaviour for the infrastructure investment to be successful.

Waste-to-energy has a role in managing non-recoverable or non-recyclable waste. Energy recovery is a better outcome than disposal to landfill, but Victoria should still prioritise waste reduction, reuse and recycling first. Waste-to-energy solutions higher on the waste hierarchy, such as anaerobic digestion of organic materials, are higher priority than incinerating mixed residual waste. Waste-to-energy solutions will require careful management to avoid risks, such as from demand for feedstock creating perverse incentives to generate more waste, or undermining improvements to reuse and recycling options.

Governance can reshape investment opportunities

The Victorian Government sets objectives, makes policies, regulates the recycling and resource recovery sector, monitors performance, and makes infrastructure plans. The Victorian Government can also facilitate and leverage private investment to achieve its objectives.¹⁹ It can also help develop the new markets recycling industries need for long-term sustainability.²⁰ Local government manages household waste collection, disposal and recycling.

All governments should encourage a sustainable recycling and recovery industry, but their often overlapping roles are not always clearly defined. Legislative and regulatory gaps, uncertain funding, and unclear roles and responsibilities

can make long-term planning difficult and prevent the sector functioning efficiently.^{21,22} Different recycling services in different local government areas, driven by processors' varied waste management approaches, have contributed to confusion and material contamination.

A few private firms own, operate and fund most of Victoria's recovery and reprocessing infrastructure. This has limited competition, innovation and investment, and made the sector slow to respond to local and global market changes.

Harmonising Victoria's policy and strategy to improve recycling and resource recovery with applicable legislation and regulation

could provide significant benefit.²³ Our research into jurisdictions with high performing recycling and resource recovery systems, such as Wales, Germany, South Korea and South Australia, indicated the foundation of success is an overarching policy framework for waste, recycling and resource recovery. It includes long-term commitments and multiple interventions across the material value cycle. Policies, planning and performance monitoring need to be appropriately funded, adapted over time and supported by targets that incentivise performance.²⁴

Victorians are willing to change their behaviour

Victorians are passionate about recycling. In late 2019, we surveyed 1000 people about household waste. We found most want to do the right thing. The vast majority feel it is important to reduce landfill waste, consistently recycle when provided with a kerbside recycling bin, and almost all are willing to change the way they sort rubbish.²⁵ But about a quarter thought the content of recycling bins ended up in landfill, and a similar proportion were unsure of the correct bin to use.²⁶ Victorians told us

they want a simple, consistent system which supports recycling's benefits.²⁷

In the long term, a genuinely sustainable approach will require changing behaviour.²⁸ In 2018, only 39% of household waste was recovered, with the rest sent to landfill.²⁹ Victorians can make a real difference if supported to reduce waste and improve household waste recovery rates through separation of different materials. Food waste is a particularly big opportunity.³⁰

Over one-third of household waste is food, almost all of which can be reprocessed,³¹ but instead most goes to landfill. The commercial and industrial sector also sends significant food waste to landfill. Food waste comprises 19% of all material buried in landfill each year, creating significant greenhouse gas emissions and pollution.³² A well-promoted, carefully designed system could capture as much as 70% of food waste.³³



Draft recommendations for a circular economy

Building on our previous advice and considering progress since then, Infrastructure Victoria is considering the following draft recommendations to help Victoria transition to a circular economy.



1.5 Build a circular economy

Facilitate improved recycling infrastructure for priority materials

Draft recommendation 28

Immediately focus efforts to increase and upgrade waste processing infrastructure on six priority materials. Facilitate increased recovery and reprocessing capacity and capability for paper and card, plastics and organics by 2025. Revisit funding mechanisms and align recycling infrastructure with land use planning.

Victoria's recycling and resource recovery system currently lacks the capacity and capability to process recovered materials to a standard that would allow them to be reused locally or exported for reuse overseas.³⁴ There is a particular need to improve the recovery and reprocessing of plastics, paper and cardboard, glass, organic materials, tyres and electronic waste.³⁵ These six materials are priorities because they are generated in large volumes, have relatively low recovery rates, pose significant environmental risks if improperly managed, and present significant economic opportunities for both metropolitan and regional areas if their sorting and processing is improved.³⁶

The Victorian Government should facilitate the development of new and upgraded recovery and reprocessing infrastructure focussed on these six priority materials.³⁷ Our *Advice on Recycling and Resource Recovery Infrastructure* sets out the specific infrastructure requirements,³⁸ based on current and projected waste generation, existing infrastructure capacity and capability, and recent regulatory and policy changes by the Victorian and Australian Governments. Our research determined approximately 87 new or upgraded

recovery and reprocessing facilities will be needed by 2039, 52 of which should be located outside of metropolitan Melbourne.³⁹ Greater capacity to reprocess organic material, paper and card, and plastics is particularly urgent, as Victoria does not have the capacity to meet the 2025 targets for these materials agreed by the Council of Australian Governments in the *National Waste Policy Action Plan*.⁴⁰

While processing facilities are owned by the private sector, the Victorian Government can assist by establishing objectives, identifying emerging infrastructure gaps, facilitating investment, leveraging private investments and providing funding to the sector to achieve targets and improve environmental performance.⁴¹ The *Statewide Waste and Resource Recovery Infrastructure Plan* was developed to guide infrastructure provision, but capacity and capability gaps remain.⁴²

Long distances between waste sources and end markets add transport costs that make recycling economically unviable in some instances, particularly in regional Victoria.⁴³

Locating a significant proportion of new and upgraded processing infrastructure in regional areas would allow those areas to process materials generated locally and

from Melbourne and provide products, such as compost for agriculture, to local users with lower transport costs.⁴⁴ The 2020-21 Victorian Budget allocated funding to accelerate construction of recycling infrastructure in Victoria's regions.

The Victorian Government should update the *Victorian Recycling Infrastructure Plan*, formerly known as the *Statewide Waste and Resource Recovery Infrastructure Plan*, to support integrated implementation with land use planning, economic development initiatives and resource strategies. It should strengthen the status of the *Victorian Recycling Infrastructure Plan* in the Victorian Planning Provisions to ensure cohesion of waste management and planning decisions across multiple levels of government. The Victorian Government should also look to leverage the Australian Government's \$190 million Recycling Modernisation Fund.

The Victorian Government should review the effectiveness of its existing funding mechanisms for co-investment in recovery and reprocessing infrastructure, such as grants, and trial new approaches. Improved approaches could include the use of auctions, bid schedule tenders, rebates, subsidies and low interest loans.⁴⁵

1.5 Build a circular economy

Strengthen end markets for recycled materials

Draft recommendation 29

Immediately accelerate market development for recycled materials by updating standards and specifications, and explicitly require the Victorian public sector to use recycled products where feasible. In the next five years, support research, development and demonstrations to build confidence and demand for recycled products.

The supply of recyclable materials has not been matched by demand for them.⁴⁶ More reliable markets for priority materials – recyclable glass, plastic, paper and card, organics, tyres and e-waste – would support economic development, help address the stockpiling of recovered materials, and reduce Victoria's reliance on landfill. Markets for these materials vary greatly, presenting different challenges for each material. Ongoing research and development can help to identify new potential uses for recycled materials, either as direct substitutes for virgin materials or for new uses.

The Victorian Government can remove several other barriers to strengthen markets for recycled materials. Other than facilitating infrastructure (see draft recommendation 28), the Victorian Government should also improve the safety, environmental value, confidence in, and authorisation to use recycled products. The Victorian Government should work with industry to develop clear, standardised approaches to communicate recycled content information in products. Existing industry approaches for product disclosure could be facilitated and promoted.

The Victorian Government should update its *Social Procurement Framework*⁴⁷ to more explicitly require public sector agencies to use recycled materials. It should collaborate with local councils and the Australian Government to jointly promote public sector use of recycled materials. The Victorian Government's *Recycled First* policy requires contractors to preference recycled materials and to justify using virgin resources. This should be expanded beyond its current limited scope that only covers major infrastructure projects.

The Victorian Government and responsible agencies should embrace performance-based specifications for materials, such as specifying levels of fatigue or cracking. This prescribes the outcome required, and allows industry to determine compliant inputs, including recycled products.

In collaboration with the Australian Government, the Victorian Government should continue targeted research and demonstration activities for each priority material to alleviate product-specific challenges, such as applying organic materials to land and using recycled plastic in packaging. Previous collaborations have increased the use of recycled materials in roads and railways.⁴⁸



1.5 Build a circular economy

Address barriers to recycling and reducing waste

Draft recommendation 30

In the next year, reduce recyclable material contamination by supporting greater consistency in kerbside and commercial collection and separation of glass, paper, cardboard and organic materials. Immediately define and implement behaviour change programs to reduce contamination, and consistently maintain further behaviour change programs in the next 30 years.

Over 90% of Victorians are open to putting more effort towards managing their waste.⁴⁹ A simple, consistent sorting and collection system can reduce contamination and improve recycling quality, helping the community and businesses to understand recycling's benefits.⁵⁰

Contamination occurs when people dispose of items in the wrong bin. Contaminated recycled materials have lower market value, in turn reducing investment incentives in reprocessing and recycling infrastructure.⁵¹ Improving source separation and consistency in waste collection is essential for reducing contamination. Contamination rates in Victorian municipal solid waste averaged 10.4% in 2017-18, with different council areas ranging from 3% to 27%.⁵² Not all councils accept the same materials in recycling collections, due to differences in what local processors will accept, and bin lids differ in colour and meaning across the state.⁵³ These differences confuse people and contribute to contamination. Infrastructure Victoria commissioned polling suggesting a quarter of people with co-mingled kerbside collection are unsure which bin to use.⁵⁴

The Victorian Government should deliver on Recycling Victoria's commitment to implement a clear, consistent, statewide approach to kerbside collections, supported by greater separation of materials – including organics, glass, paper and cardboard. This should include requiring local governments to standardise bins for household collections, advocating for and supporting the review of the *Australian Standard for Mobile Waste Containers*, delivering the announced container deposit scheme, and establishing a minimum service standard for local government waste services for greater collection consistency.⁵⁵

The Victorian Government should consistently invest in behaviour change programs to encourage waste minimisation, contamination reduction, and purchase of more recycled, reusable or compostable products. Current waste education focuses on handling waste after generation, rather than avoiding producing it. It is generally only provided in short bursts, and underfunded compared to other government campaigns, limiting behaviour change effects.⁵⁶ Making recycling simpler, easier and more consistent also supports more effective behaviour change programs.⁵⁷

Limited coordination and sharing of behaviour change campaign materials between the Victorian Government, local governments and industry makes disseminating simple, consistent messages complicated. These messages should be developed through partnerships between governments and industry, supported by Victorian Government management and funding, and produce statewide messaging that allows for nuance where needed, such as in culturally and linguistically diverse communities. Program monitoring, evaluation and consumer research should inform continuous program improvements.⁵⁸ To the maximum extent possible, programs should be integrated with relevant industry and national packaging and labelling initiatives, such as the Australasian Recycling Label and National Packaging Targets, and leverage consumer behaviour research from the private sector.⁵⁹

1.5 Build a circular economy

Minimise waste and improve residual waste infrastructure planning

Draft recommendation 31

In the next two years, improve infrastructure planning for managing residual waste, and further clarify the role of waste-to-energy facilities. Over the next thirty years, consistently invest in waste avoidance through behaviour change programs, pricing, regulation and incentives.

A circular economy means using materials for as long as possible. Residual waste is material that cannot be viably recycled or reused. Currently almost all residual waste is buried in landfill. This is the least preferable outcome on the waste hierarchy, as all remaining value of these materials is lost. Some energy can be extracted from materials that are no longer useful, using thermal waste-to-energy facilities as an alternative to landfill. This recovers some value, reduces greenhouse gas emissions from organic waste and reduces landfill's long-term environmental impact.

The Victorian Government should increase and accelerate efforts to minimise waste production across all sectors through behaviour change programs, pricing (including the landfill levy), rules and regulations (including planning or operational permits) and other incentives. Waste avoidance is the best way to manage waste. If Victoria continues its current trajectory, residual waste is projected to increase from 4.4 million tonnes in 2017-18 to 5.7 million tonnes in 2037-38.⁶⁰

The Victorian Government should improve monitoring of the production, composition and destiny of residual waste with better data collection, analysis and reporting. Victoria needs enough planned landfill and thermal waste-to-energy capacity to manage its residual waste. Landfill will always be a part of waste management systems and is especially important for contingency planning, as has been demonstrated in the last two years. The *Statewide Waste and Resource Recovery Infrastructure Plan*, formerly known as the *Victorian Recycling Infrastructure Plan*, aims to minimise waste going to landfill and planned for no new metropolitan landfill sites. Waste-to-energy can support this goal by keeping existing landfill capacity for future unrecoverable materials.

The Victorian Government should strengthen infrastructure planning to manage residual waste through the *Victorian Recycling Infrastructure Plan*. Residual waste planning should account for the changing generation and composition of residual waste. Infrastructure planning for residual waste should explicitly consider both landfill and thermal waste-to-energy facilities. Waste-to-energy processes generate residual materials which,

unless used elsewhere, will go to landfill. Landfill planning should include the potential need to manage these materials.

The Victorian Government should deliver on *Recycling Victoria's* commitment to develop a waste-to-energy framework. Clear policy is necessary to achieve desired outcomes and mitigate against risks, such as feedstock demand creating perverse incentives for more waste generation, undermining reuse and recycling improvements. *Recycling Victoria's* stated thermal waste-to-energy capacity cap of one million tonnes per year should be regularly reviewed. If efforts to reduce waste and recycle more are not highly successful, significant amounts of residual waste above the one million tonne cap will go to landfill.

The Victorian Government should implement changes to the landfill levy, as previously announced. This can ensure regulations and prices support options that are higher on the waste hierarchy.



Discussion questions

Infrastructure Victoria welcomes
feedback on these draft recommendations.
We are also interested in:

?

What other cost-effective actions
can the Victorian Government take
towards a circular economy?

?

What more can the Victorian
Government do to enable more private
investment in recycling facilities?



To answer these
questions and more, visit
infrastructurevictoria.com.au


Manage urban change

Section 02

Victoria's population and economy have grown quickly in recent years, putting pressure on land use and infrastructure. The COVID-19 pandemic has temporarily slowed this growth, and Victoria's pathway to recovery is only beginning. But eventually, population and economic growth will likely resume in the next 30 years.

Our modelling considered different future Victorian population scenarios ranging between 9.5 and 11.5 million people in 2051. The Victorian Government can make decisions now that prepare Victoria to better manage future growth and avoid the problems of the past.





Victoria's cities and regions must reflect that residents, and their aspirations, are different than in the past. People have more diverse family structures, cultural heritage, career options, service needs and housing choices.

Building new infrastructure alone will not solve Victoria's challenges. Indeed, most of Victoria's future infrastructure already exists. Better using, integrating, pricing and managing existing infrastructure can often help meet demand faster, more cheaply and more equitably, with fewer environmental impacts.

Government decision-making alone does not determine the shape of urban environments. Individuals, families and businesses make housing and location choices, considering affordability, safety and location, neighbourhood characteristics, and access to education and employment.^{1,2} Business needs determine desirable locations, including market access, land costs, worker availability and transport infrastructure.^{3,4,5} Effective government interventions consider these decisions.

Victoria's cities and regions must reflect that residents, and their aspirations, are different than in the past. People have more diverse family structures, cultural heritage, career options, service needs and housing choices. A changing economy and society also alter people's options and preferences. These features are likely to continue

evolving, including as a result of the effects of the COVID-19 pandemic.

Land use planning and regulation, together with infrastructure planning and provision, can affect the location choices of people and businesses. Our modelling adds to evidence that both planning reform and transport infrastructure can affect people's location choices. These, in turn, affect patterns of economic and social activity and movement that affect people's daily lives. For example, they influence the economy's productivity, job creation, congestion on our roads and public transport, and the location of new homes. Integrating land use and infrastructure planning can combine these forces to create better urban environments, deliver superior economic performance, support more inclusive communities, and minimise ecological impacts.

Better integration can encourage better use of existing infrastructure in established areas. Many established suburbs of Melbourne can accommodate more homes in better locations, with plentiful access to jobs, services and good transport connections. By understanding current and likely future community needs, and carefully

investing in supporting infrastructure, these places can add more homes, as well as being sustainable, liveable and inclusive communities.

Similarly, Victorians can better use existing infrastructure if demand on it is managed. People can be encouraged to use infrastructure more when it has spare capacity and be rewarded for curtailing unnecessary use when it is under strain. Prices can send strong signals that influence behaviour and help manage demand. This can vastly reduce the need to build new infrastructure.

As Victoria grows and changes, land for building infrastructure will become scarcer and more expensive. It will increase the cost and complexity of infrastructure projects and multi-unit housing developments. The noise and disruption of these projects will affect more residents. Better managing existing infrastructure by investing in strong asset management capabilities – the cycle of procurement, construction, maintenance, repair, renewal and disposal – means Victoria can use infrastructure more effectively for longer, and ultimately at lower cost.

2.1

Integrate land use and infrastructure planning

Before the COVID-19 pandemic, Victoria's population and economy had been growing rapidly. We don't yet know when or how quickly Victoria will recover from the pandemic, although we have used a diversity of scenarios in preparing modelling for this draft strategy. Victoria will almost certainly resume its growth, with the intervening pause allowing time to prepare Victoria for a better future.

Land use and infrastructure decisions are both powerful forces which influence the shape and structure of cities. They also impact a city's economic, social and environmental performance. Population growth creates demand for more homes, in turn requiring more roads and public transport, shopping and entertainment opportunities, and services to support health, education and wellbeing. Similarly, building more infrastructure makes places more attractive for businesses and drives more home-building. Aligning these forces can more strongly shape Victoria's urban development trajectory.

Integration means collaborating to achieve common objectives for urban efficiency, sustainability and amenity.



Insight

The location of homes and infrastructure investment affects congestion levels

Our modelling suggests that the amount of transport infrastructure investment and people's location choices can influence the levels of public transport crowding and road congestion.

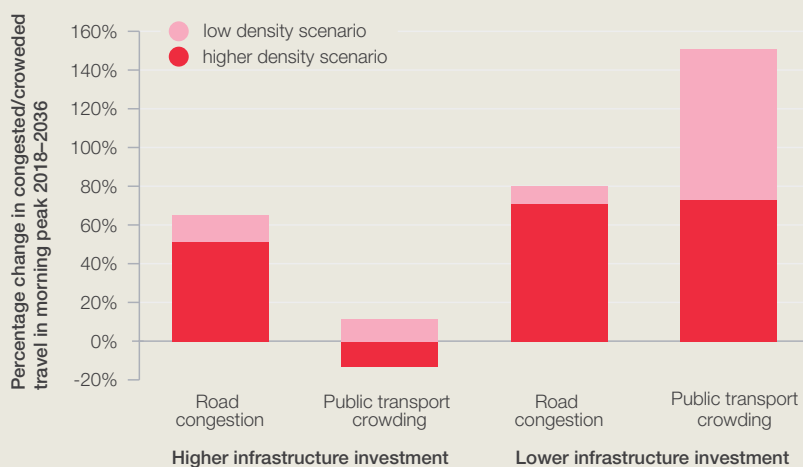
With higher infrastructure investment, levels of crowding and congestion are lower. Denser population distribution

scenarios also produced lower levels of crowding and congestion.

Our modelling suggested public transport crowding was more responsive to higher investment levels and higher population density. Road congestion was less responsive, and remained significant in all the scenarios we modelled.

Figure 11: Higher infrastructure investment and higher population density reduces congestion

This graph compares scenarios with higher infrastructure investment to those with lower infrastructure investment levels. It also compares how these investment levels perform in situations where Melbourne's population is higher or lower density (but the same population size). It shows the projected percentage increase in road congestion and public transport crowding in each situation, between 2018 and 2036.



Source: Arup, *Strategy Update: Problem Definition Modelling Outcomes*, Report for Infrastructure Victoria, November 2020.

Integration means planning together

Integrated land use and infrastructure planning can better manage change in communities and unlock greater benefits. It can deliver a shared aspiration for a city or region and help coordinate investments and policy reforms to achieve that vision.¹ It can support broader benefits such as higher productivity, greater social interaction and capital, and a more sustainable urban footprint.

Integration means collaborating to achieve common objectives for urban efficiency, sustainability and amenity.² It requires different government agencies to understand the multiple objectives each are trying to achieve and to transparently observe, understand, contribute to and support one another's plans. This knowledge can be incorporated in revisions to each organisation's plan, better aligning their efforts.

In the past, governments have been reluctant to publish plans which commit them to infrastructure projects. However, the benefits of publishing these plans outweigh the risks. Being transparent about the planning process will build community, business and local government confidence, allowing them to make investments that align with and bolster government plans. Publication increases opportunities for partnership between agencies, with other governments, and with the private and not-for-profit sectors. Planning land use and infrastructure together means development is encouraged in places that can accommodate growth, and the required infrastructure and services are delivered sequentially to encourage and support it.

As Victoria grows and changes, building and modernising infrastructure will become more complex. Land in large cities is scarce and expensive, and development and construction become more complicated

over time. Integrated planning can identify underused infrastructure, reveal opportunities to co-locate it, or combine infrastructure upgrades to lower costs and disruption.

The Victorian Government's infrastructure development pipeline provides many opportunities for better integration with land use and between infrastructure sectors. The Level Crossing Removal Project has integrated open space and delivered supporting transport solutions. The Caulfield to Dandenong rail project is adding 17 kilometres of continuous pedestrian and cycling paths along with open and community spaces.³ The Suburban Rail Loop project seeks to change the pattern of Melbourne's development, requiring inter-agency and inter-governmental coordination to plan for the land use changes and different future infrastructure demands.



Insight

Revitalising Dandenong using land use and infrastructure together

Revitalising Central Dandenong is a long-term initiative seeking to transform central Dandenong into a vibrant and thriving economic hub.⁴ It uses land use and infrastructure together to seek better outcomes in the precinct.

Dandenong was part of the Transit City Program which sought to restructure parts of Melbourne by focussing higher density mixed use development around key transport nodes. In 2005, the Victorian Government invested \$290 million and the City of Greater Dandenong approximately \$100 million over 10 years in revitalising central Dandenong.⁵

Alongside changes in land use planning controls and the transfer of some planning powers to the Minister for Planning, Places Victoria (now Development Victoria) and the City of Greater Dandenong made many significant investments to support the revitalisation of Dandenong.⁶ They included:

- \ redevelopment of the Dandenong Market
- \ acquisition of land adjacent to the Dandenong station for redevelopment into homes⁷
- \ street widening and extension of a bridge improving access to the Dandenong CBD
- \ major east-west arterial realignment to remove traffic from nearby streets and encourage pedestrian use

- \ new government offices, including the Australian Tax Office and the State Government Services Hub
- \ new municipal offices with an integrated library, civic plaza, green space, and a giant screen
- \ transformation of the city's main street to a green, pedestrian-friendly boulevard
- \ improved links for pedestrians and cyclists between Dandenong station and the city centre
- \ new multi-sports court stadium.

Place-making can take a long time and requires a sustained effort. However, positive changes in the Dandenong area in the same time period as the revitalisation project include that:

- \ 30,000 people called Dandenong home by 2016, nearly doubling from 17,000 people in 2002⁸
- \ unemployment fell, from 15.3% in 2001 to 13.4% in 2016⁹
- \ units and terraces increased as a proportion of all homes, from 52% in 2001 to 58% by 2016.¹⁰

The revitalisation has produced more government office space, infrastructure upgrades, facilitation of private sector investment, and significant improvements to community infrastructure and the public realm.

Victoria can learn from examples elsewhere

Victoria is not alone in grappling with integrated land use and infrastructure planning. Around the world, governments face challenges in planning infrastructure for populations that will grow, change and move over time. Leading examples of better integrated planning use similar processes and practices, even in places with radically different institutions. Common governance arrangements include strong laws that mandate collaboration, transparent decision-making and published plans, strong community consultation and engagement, and having a coordinating institution that facilitates inter-agency cooperation.

For example, Metro Vancouver is a federation of 21 municipalities, one Electoral Area and one Treaty First Nation that collaboratively plans for and delivers regional-scale services.¹¹ *Metro Vancouver 2040* is the region's growth strategy, pursuing land use policies for regional

development and efficiently providing transport, regional infrastructure and community services. It is legally required to "promote human settlement that is socially, economically and environmentally healthy and makes efficient use of public facilities and services, land and other resources."¹²

Similarly, the Mayor of London is legally required to develop a spatial development strategy, known as the London Plan, alongside a transport strategy, a housing strategy and an environmental strategy. All strategies are publicly available and are required to be consistent. The London Plan details how "the housing, social, economic, cultural, environmental and transport policies tie together to achieve maximum impact."¹³

The New South Wales Government established the Greater Sydney Commission to coordinate and align

planning to shape Greater Sydney's future. The Greater Sydney Region Plan¹⁴ identifies three integrated and connected cities to rebalance Greater Sydney and place houses, jobs, infrastructure and services within easier reach of more residents. It was prepared alongside the NSW Future Transport Plan¹⁵ and the NSW State Infrastructure Strategy.¹⁶

Victoria can learn from these examples, and others, to improve the integration of its land use and infrastructure planning and delivery. It could mean changing current practices, including establishing an infrastructure monitoring body (see draft recommendation 68), changing how different government agencies interact, deepening community engagement and consultation in land use and infrastructure planning, providing greater transparency of infrastructure plans and delivering stronger guidance on desired growth patterns.



A new approach can overcome current challenges

Fragmented decision-making, ambiguous responsibilities and undisclosed plans hinder integrated planning. Taking an isolated, sector by sector approach "can lead to siloed planning and infrastructure decision-making, inconsistent outcomes, and unintended consequences for places and communities."¹⁷ The absence of effective collaboration arrangements and transparency can mean plans often only achieve narrow agency goals, and miss opportunities to deliver broader outcomes. It can also duplicate effort, cause extra disruption and generate unexpected changes in communities.

Integrated land use and infrastructure planning has been a Victorian Government goal for some time. For example, it is specifically mentioned in the *Transport Integration Act 2010*¹⁸ and Victorian planning policies such as *Plan Melbourne*. However, it is not always evident in practice. For instance, *Plan Melbourne* was developed without a corresponding transport plan. The Victorian Auditor-

General's Office has identified many other examples where better integration could have delivered better results. These include delivering better transport infrastructure in growth areas,¹⁹ better delivery of maternity care, maternal and child health, funded kindergarten services and related infrastructure,²⁰ and fewer delays, frustrations and risks in achieving urban revitalisation.²¹

Poorly integrated planning can also mean revenue is not available to fund infrastructure construction and maintenance. Victorian infrastructure is funded from different sources, including user charges, such as in energy and water, infrastructure developer contributions, and from Australian, Victorian and local government budgets.

If infrastructure construction, operation and maintenance is not properly costed and revenue sources identified, it can cause unplanned and unexpected imposts on the Victorian Budget, and potentially conflict

with the Victorian Government's fiscal policies and objectives. Good integrated planning also means identifying funding and revenue sources, so enough funding is available when it is needed.

New technologies and software can also assist in streamlining planning processes and integrating land use planning and infrastructure. For example, 'Digital twins' combine datasets from transport, utilities, property, planning and the environment, and can help foresee potential infrastructure barriers to development, or forecast future impacts of development proposals.

Infrastructure Victoria has conducted detailed research into better ways to improve infrastructure and land use planning in established areas. More detail on this research is available in the technical paper *Growing together: The case for better infrastructure planning in urban areas*.



Draft recommendations to support integrated land use and infrastructure planning

Infrastructure Victoria makes the following draft recommendations to help integrate land use and infrastructure planning. We also make specific draft recommendations

about integrating land use and infrastructure planning in established suburbs (see section 2.2) and growth areas (see section 3.2).

2.1 Integrate land use and infrastructure planning

Produce public plans for priority infrastructure sectors

Draft recommendation 32

In the next five years, develop and publish long-term infrastructure plans for priority infrastructure sectors for which the Victorian Government maintains substantial responsibilities, including sequencing and timelines for investment.

Current infrastructure planning approaches are inconsistent, lack mechanisms to actively coordinate investments and services, hamper local government planning and investment, and frustrate private and not-for-profit investments.²² Existing infrastructure planning is compartmentalised, and does not support or encourage agencies and departments to find synergies, combine funding and synchronise infrastructure delivery.

The Victorian Government established six metropolitan partnerships, tasked with producing five-year plans for jobs, services and infrastructure in six Melbourne sub-regions.²³ These ostensibly ensure coordination of forward infrastructure plans for departments and agencies.²⁴ In practice, the plans simply list the Victorian Government's election commitments and past Budget decisions.²⁵ Similarly, *Plan Melbourne* foreshadows Land Use Framework Plans for each region, with drafts due to be completed in 2020²⁶ (see draft recommendation 35). The regional partnerships provide forums to influence investment in local priorities but have no formal coordination role.²⁷

Integrated land use and infrastructure planning requires a willingness to openly

and transparently discuss future options, long before final commitments or budget decisions are made. Only when agencies make their ideas transparent to others can the process of integrating decisions begin. If agencies do not know what others are planning, they cannot work together to align their decisions. Nor can other governments, or the private and not-for-profit sectors align their decisions and investment to help support government objectives.

The Victorian Government should prepare and publish long-term plans for priority infrastructure sectors in the next five years so land use and infrastructure planning can be integrated. At a minimum, these should include the following sectors, for which the Victorian Government maintains substantial responsibilities:

- \ transport infrastructure, including all transport modes (see draft recommendation 33)
- \ health infrastructure, including hospitals and other health facilities
- \ social housing and social services facilities
- \ education, including schools, TAFE and early childhood facilities
- \ justice and emergency services infrastructure

- \ water and sewerage infrastructure
- \ recycling and resource recovery infrastructure.

Informed by current land use policies, these plans should include sequencing and timelines for infrastructure decision-making and investment. This would require the Victorian Government to develop greater comfort with sharing ideas before final commitments are made. Clear plans allow other agencies, local government and the private sector to align their decisions. For example, they can help identify the best locations for land use zone changes (see draft recommendation 35), acquisition of land for infrastructure, and inform development contributions (see draft recommendation 34). The delivery of infrastructure plans could be overseen by an infrastructure monitoring body (see draft recommendation 68).

2.1 Integrate land use and infrastructure planning

Publish Victoria's transport plan

Draft recommendation 33

Immediately develop and publish Victoria's integrated transport plan. Require transport and land use plans to align with each other.

Victoria does not have a publicly available integrated transport plan. The *Transport Integration Act 2010* requires the Victorian Government to prepare a transport plan and indicates the Minister may publish it,²⁸ but publication is not required. Infrastructure Victoria is unaware of a single, integrated document fulfilling the transport plan requirements of the *Transport Integration Act 2010*.

Because Victoria does not have a transparent transport plan, transport planning intentions are not clear, and the land use response can be ill-timed, haphazard, or miss opportunities. Other agencies, local government and the private sector cannot use it to coordinate their investments. For example, local governments cannot deliver significant local transport infrastructure properly without knowing its connection to the wider transport network, such as in delivering local streets, and walking and cycling infrastructure. A transport plan also helps government agencies determine the best locations for facilities, such as schools, hospitals and community centres, and indicates possible locations for more intensive development.

Victoria needs a coordinated transport and land use response to effectively shape its cities, and to prepare for growth and

change. Transport planning can influence access disparities, carbon emissions and pollution, anticipate future transport technologies,²⁹ and create a common blueprint for future transport investment against which to assess potential investments and policy changes. Publishing the transport plan is good public sector governance, including being transparent and accountable, which supports effective performance and builds community confidence.³⁰

The Victorian Government should immediately develop and publish a transport plan that meets *Transport Integration Act 2010* requirements. Concurrently, it should require transport and land use plans, including *Plan Melbourne*, to align with each other. The transport plan should include:

- \ all transport modes, including motor vehicles, freight, public transport, walking and cycling, and emerging transport services
- \ planning and asset management of the enabling infrastructure, including roads and rail, buses, trams and trains; ticketing, data, network management, and ICT capacity and capability
- \ major service and policy changes, including initiatives that manage demand, and sequencing and timing for delivering new transport infrastructure

- \ alignment with endorsed land use plans, including adopting the same time horizon (currently *Plan Melbourne* considers the period to 2050³¹)
- \ the approach and consequent changes required to support emerging transport technologies, and how they fit into the wider transport network
- \ how current and proposed policies, reforms and projects combine to achieve the plan's vision and objectives, and broader Victorian Government objectives, including economic growth, social inclusion and intergenerational equity
- \ achieving net zero emissions and climate adaptation, under the *Climate Change Act 2017*.³²

Transport planning must be agile. The COVID-19 pandemic demonstrates changing conditions create uncertainty, making long-term planning commitments challenging, including by changing demand for transport and placing pressure on long-term infrastructure budgets. The transport plan could show how transport network changes already underway combine to achieve better outcomes. The transport plan should also fully respond to accepted transport recommendations in *Victoria's 30-Year Infrastructure Strategy*, and be regularly reviewed and updated, to respond to changing needs.

2.1 Integrate land use and infrastructure planning

Review Victoria's infrastructure contribution system to cover gaps

Draft recommendation 34

In the next two years, review Victoria's many infrastructure contribution schemes to create a consistent and efficient system that contributes to local and Victorian Government infrastructure costs. A revised infrastructure contribution system can apply more broadly, including in established suburbs, growth areas, peri-urban areas, and regional cities.

Most of Melbourne's new homes are built in established suburbs, up to 80% in recent years.³³ Other areas also encounter high housing growth, including peri-urban areas and regional centres. Established areas still need investment to support more people living there or greater commercial development, particularly if infrastructure needs to be upgraded, augmented or land acquired for infrastructure expansion.³⁴ For example, in rapidly growing established suburbs, Victorian and local governments must buy land for new schools, open space and community facilities when existing facilities can no longer accommodate the extra demand.³⁵ Depending on the extent of growth in peri-urban areas, they may require upgrades similar to new growth areas.

Developer contribution schemes are widely used in new growth areas but are less common in established Melbourne suburbs, regional centres and peri-urban areas. Developer contribution schemes can be complex, time consuming, inflexible and inconsistent.³⁶ The New South Wales Productivity Commission is currently reviewing its infrastructure contributions

system.³⁷ Stakeholders have told us that the patchwork of inconsistent developer contribution schemes can create inefficient boundary effects, where developers avoid the areas with a scheme, instead building in other areas, avoiding the charges. This means these schemes could suppress development precisely in the places where it is encouraged.

Outside new growth areas, developer contribution schemes are managed by local governments and are largely used for local government infrastructure. Unlike the Growth Areas Infrastructure Contribution, which has had mixed success as a tool to contribute to funding state infrastructure,³⁸ developer contribution schemes usually do not fund Victorian Government infrastructure.³⁹ This means infrastructure costs outside new growth areas fall more heavily on the Victorian Budget.

The Victorian Government should immediately review Victoria's infrastructure contributions schemes. The review should determine the best model for a consistent, efficient contributions system, and the level of infrastructure costs to be collected by developer contributions. The system should consistently apply to areas with significant

housing growth or new commercial development. It can help fund local and Victorian Government infrastructure required to support population and commercial growth. Broad scheme coverage reduces perverse outcomes from inefficient boundary effects and means charges will be relatively low and predictable. The revenue can fund infrastructure priorities to support and manage growth.

The system could impose a charge on sites building extra dwellings or commercial floorspace and need not be limited to individual precincts. For example, it could extend to all subdivisions which create extra dwellings. Any revised scheme should be able to be readily implemented, have strong monitoring, oversight and evaluation mechanisms, including set review timeframes. If the system generated contributions at similar per home rates as the Growth Areas Infrastructure Contribution, a new scheme could raise many hundreds of millions of dollars each year.⁴⁰



Discussion questions

Infrastructure Victoria welcomes feedback on our draft recommendations to help integrate land use and infrastructure planning. In particular, we welcome answers to:

?

How can the Victorian Government make the proposed contributions schemes consistent and efficient?

?

How does a lack of certainty in Victorian Government infrastructure planning affect private investment decisions?



To answer these questions and more, visit
infrastructurevictoria.com.au

2.2

Create thriving urban places

Building more homes in established suburbs can bring substantial benefits, if matched with the right land use settings and infrastructure. It can reduce public infrastructure costs,¹ and limit urban sprawl, reducing the use of valuable agricultural and environmental land for development. Building more homes near public transport and employment centres can improve physical activity levels by encouraging walking and cycling.² Neighbourhoods catering to people of all ages and abilities can help create a sense of safety and belonging. They can also increase housing options for different people and families.

Building more homes in well-located areas can also generate broader productivity effects, connecting people and businesses more readily. Closer connections mean

businesses can more easily find customers, access more workers and share more knowledge and resources.³ Concentrated, specialised and diverse businesses compete more fiercely, adapt more quickly to economic shocks, and generate fertile ground for innovation in ideas and technologies.⁴ These drivers create more jobs and businesses, improve productivity, and give people more chances to find jobs using their talents.⁵

Our modelling used multiple scenarios, which showed different population levels in Melbourne's inner and middle suburbs. Inner Melbourne suburbs added about 500,000 to 800,000 residents between 2018 and 2051, and middle Melbourne suburbs added between 600,000 and 1.3 million extra people, ranging across the different scenarios.

Growth rates were generally higher in inner suburbs than in middle suburbs. Inner suburbs ranged between 1.3% – 2.0% population growth, on average each year to 2051. Middle suburbs' growth ranged between 0.9% and 1.8%, on average, in the same period. Even with lower overall population growth, Melbourne's inner and middle suburbs will still likely need to accommodate more than a million extra people in the next three decades. In some scenarios, it could be more than 2 million. Scenarios with more people living in the inner and middle suburbs have lower levels of congestion and crowding throughout the city, compared with the official population distribution projection that expects more people will live in the growth areas of outer Melbourne.



Better infrastructure and land use planning can produce better outcomes

Plan Melbourne, and its preceding metropolitan strategies, aim to build more homes in places with good infrastructure and amenity. Yet only a quarter of new homes are built in identified activity centres,⁶ the exact places with good access to jobs, services and public transport. Beyond identifying six priority development precincts,⁷ no Victorian Government document clearly specifies the established suburbs where extra new homes might be built, or how many might be built there. Home-building in established areas can occur in a haphazard and disparate fashion, with new homes built wherever possible, including places with mediocre access and services, or only adding small numbers of extra homes.

Our modelling investigated the effect of relaxing land use planning restrictions on a number of carefully selected locations in Melbourne, around train stations and along transport corridors. It found that reducing planning restrictions could allow over 9% extra population growth in the inner suburbs of Melbourne than would otherwise occur in 2036. This also meant the overall number of motorised transport trips was lower than comparable scenarios, as residents in these areas are more likely to walk or cycle to destinations. It similarly produced even more public transport use

than other scenarios, as more residents would live in areas with good public transport services. Public transport was also less crowded, as the trips are shorter and the tram network plays a slightly larger role in moving people.

Building extra homes in less well-connected places, or without the right infrastructure, can cause problems. Inflexible or less attractive land use settings can encourage building fewer homes in places where existing infrastructure can accommodate much more housing. The changes in communities can also cause anxiety among existing residents, leading to local disputes. Between 2011 to 2017, more than half of projects with six or more dwellings were referred to the Victorian Civil Administrative Tribunal for decision.⁸

Building more homes with limited public transport access can increase local traffic congestion. Short trips by private vehicles contribute significantly to localised congestion that can have cumulative and flow-on effects across the transport network.⁹ For instance, trams can be delayed, and pedestrian crossings can become more difficult, with consequences for people's quality of life. Pollution and noise can also negatively impact on social interaction, air quality, health,

and greenhouse gas emissions. Careful consideration of local transport needs in densifying communities can reduce these impacts, including by examining walking, cycling and public transport options.

Our community research on density done well¹⁰ (see page 110) reveals that it is not necessarily the construction of extra homes that causes community anxiety. Rather, people want to maintain and improve the quality of their local area, and ensure that the extra infrastructure needed to accommodate more residents will be delivered. If done well, more homes can be paired with quality urban design, diverse commercial opportunities and community services, walkable, safe and cooling open spaces, good public transport, and choice of affordable housing options.

Insight

The community's view of density done well

Infrastructure Victoria has worked with community members around Melbourne to understand “what does density done well look like?”. We sought to gain insight into the values and principles important to community attitudes around increasing urban density and leveraging existing infrastructure. This occurred through two stages of consultative workshops with a diverse group of participants from three established Melbourne suburbs with mixed density levels and good public transport (Heidelberg, Camberwell and Footscray). Some participants were randomly selected, and others self-selected, to ensure a mix of experiences and views.

The first stage focussed on small group discussions for each suburb, to workshop questions like: “what is density done well?”, “what makes a great place?” and exploring how the community perceives density in the local urban environment. The second stage brought the three groups together for a half-day community workshop to identify the common values and principles when considering ‘density done well’ across the three inner Melbourne suburbs.

While there were different views among the participants, the main message was that people are willing to embrace greater density under the right conditions. The feedback from the focus groups was delivered with nine agreed themes for areas to live with ‘density done well’.

The nine themes, in order of relative importance are:

01. Quality urban design



02. Public transport



03. Housing affordability and choice



04. A good public environment



05. Pedestrian friendly access



06. Accessible places



07. Community safety



08. Inclusion



09. A mix of uses and diversity of things to do



The engagement report is available at infrastructurevictoria.com.au.





Infrastructure can help create liveable communities for all

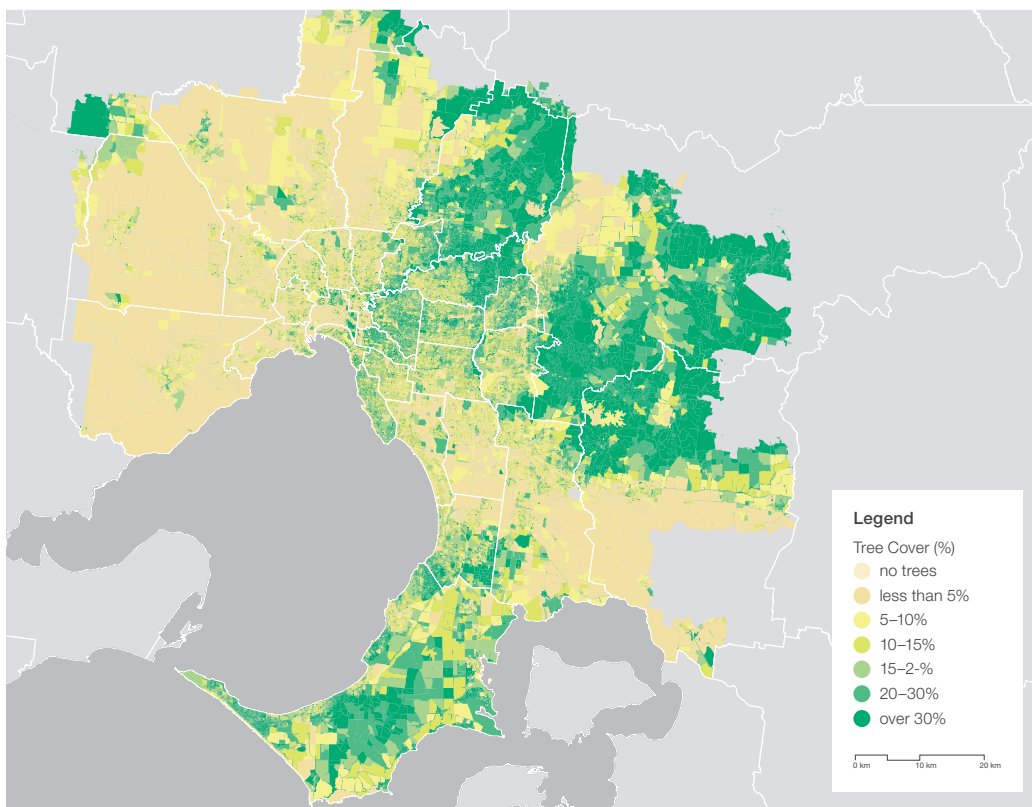
Places need to cater for the people who live there, and evolve with those communities as they change over time. This includes meeting the needs of people at different life stages – for children, young people, adults, families, and older Victorians. It involves providing for diverse communities, including people with low and high incomes, of different genders, with different abilities and skills, and with different cultural needs. Rapidly changing communities, including established areas constructing many more new homes, need to cater for this changing diversity, and ensure the future community can welcome many different new people as they move.

How communities are designed can physically limit people's participation in education, work, community, cultural and civic life. Building and modifying infrastructure for accessibility and creating easy to navigate environments can make a significant difference to many people. This includes supporting Victorians as they age, people with disabilities, and their families,

friends and carers. It also makes urban environments easier to navigate for everyone, including parents with prams and strollers, people using shopping trolleys, or travellers carrying luggage.

Places with good access and amenity are often highly valued by potential home buyers and investors. This means these places often have higher land prices. Similarly, construction of higher density housing often requires high land values so developers can deliver a reasonable return on their investment.¹¹ However, these factors often mean that rapidly densifying established suburbs do not produce much housing affordable to people on low incomes. At the same time, many Victorians cannot find housing they can afford, with more than 140,000 Victorian households experiencing rental stress in 2017-18,¹² and potentially more resulting from the COVID-19 pandemic. It is these same households who can most benefit from better access to jobs and services.

Figure 12: Tree canopy cover is lower in Melbourne's northern and western suburbs



Source: J. Hurley et al., *Urban Vegetation Cover Analysis Melbourne Metropolitan Region*, Melbourne, Department of Environment, Land, Water and Planning, 2018, p.3

Community infrastructure is not only 'built' infrastructure, but also includes environmental infrastructure, like open space. Open space takes different forms, from bushland, water courses and parklands to sports fields, racetracks and utility reservations.¹³ But population growth and development activity is causing private open space to decline in some places,¹⁴ leading to more reliance on public open spaces. The COVID-19 pandemic has emphasised that easy access to green and public open spaces contributes to physical and mental health and wellbeing.

Green space will retain its importance after the pandemic, because adequate tree canopy cover helps cool urban areas, making them more resilient to climate change and more extreme heat days. However, tree cover is unequal across Melbourne's suburbs (see Figure 12). With increasing density, efforts to improve Melbourne's urban forest and public open spaces need to be well-coordinated to create connections across suburbs and areas to enhance environmental, recreational, cultural and social values.





Thriving urban places can be delivered through change

Some areas that once served industrial purposes are prime locations for redeveloping into liveable suburbs. These urban renewal precincts are often close to jobs but may have poor transport connections or lack the amenity and services that support thriving communities. Redevelopment with the right type of infrastructure at the right time could unlock their potential.

Thinking beyond usual solutions can support change and create liveable urban places. This includes reimagining how spaces are used in urban areas and investing in local solutions. For instance, roads take up a significant proportion of land in established areas of Melbourne. Active transport investment can deliver many benefits, such as reduced congestion, improved health, vehicle operating savings, environmental benefits and infrastructure savings.¹⁵ For each person who cycles 20 minutes to work and back, Victoria could benefit by \$14.30; and each person who walks 20 minutes to work and back could benefit Victoria by \$8.48.

These savings are attributed to increased physical activity, reduced morbidity and mortality.¹⁶

Places with good access to public transport can attract other amenities to locate nearby. Melbourne's iconic trams complement the train network, providing for a 'metro-style' network. They support a wide range of trips at different times on any given day, linking modes together to service a wider range of journeys. As some areas grow faster than others, delivering tram services differently can help keep pace with demand where it is needed, support ongoing mobility and reducing trips by car.

Ways to create more inclusive local places include improving public transport, protecting and enhancing open space, providing enough housing diversity, accessibility and affordability, and ensuring infrastructure is accessible to diverse people. Working with local governments where there are shared responsibilities can improve urban environments for residents and enhance the performance of Victoria's cities.

Draft recommendations to create thriving urban places

Infrastructure Victoria is considering the following draft recommendations to create thriving and more inclusive urban environments. We also make specific draft recommendations to help integrate land use and infrastructure planning (see section 2.1), and to improve planning for growth areas (see section 3.2).

2.2 Create thriving urban places

Support more homes in priority established places

Draft recommendation 35

In the next year, identify new priority locations in established suburbs for residential intensification to better use existing infrastructure. Following this, review planning settings in partnership with local government to allow increased housing density and establish design panel reviews for development applications.

Prioritising home building in established suburbs ultimately costs Victorians less than expanding in new growth areas and can generate broader benefits.

Infrastructure costs in established suburbs with the capacity to support growth can be two to four times cheaper than in new growth suburbs.¹⁷ At the same time, Melburnians' housing preferences are changing, with as few as half wanting standalone homes.¹⁸ Markets are responding to these changing tastes, with new apartments and townhouses outpacing new standalone housing.¹⁹ Participants in our Density Done Well research strongly value the urban characteristics of many activity centres including quality urban design, access to services, open spaces, good public transport and diverse, affordable housing options.²⁰

Plan Melbourne identifies over 130 metropolitan and major activity centres outside the central city, but only 21% of new housing was built in these locations in the decade to 2018.²¹ In established middle and outer suburbs, most new homes are scattered across the suburban landscape, far from the amenity, opportunities, and better transport choices of activity centres. Our modelling shows allowing more people to live closer to jobs and services can grow Victoria's economy and make more efficient use of transport networks. *Plan Melbourne*

generally supports building new homes in good locations and delivering more housing closer to jobs and transport, stating the benefits of a more compact, sustainable city.²² Indeed, it recognises "it will be necessary to define locations best able to support increased densities,"²³ but does not specify how.

Further to *Plan Melbourne*, the Victorian Government has identified six initial priority precincts – Arden, Fishermans Bend, Footscray, Parkville, Richmond to Docklands, and Sunshine.²⁴ The Victorian Government should clearly identify more priority places in established areas for residential intensification, while ensuring sufficient capacity for future commercial and industrial growth for economic development. This could be achieved through different possible mechanisms, such as in the Metropolitan Regional Land Use Framework Plans,²⁵ or through other planning reform processes. Identification should explicitly account for their growth potential, market readiness, existing and planned transport infrastructure and open space.

The Victorian Government should partner with relevant local governments to develop or update structure plans for these priority areas and support amendments of planning schemes. In addition, it should also develop clear criteria to identify priority places for where the Victorian Government leads

integrated land use and infrastructure planning. Plans should detail the community's aspirations for these precincts, the infrastructure, cost and funding mechanisms required to achieve it, and review impediments to this change. This could include reviewing current land use zones to ensure they support increased housing, making zoning more permissive where required. Land use rezoning can potentially remove barriers and improve certainty to residential development and support extra housing construction.²⁶

Our community research determined good urban design was one of the top three principles for accepting greater density.²⁷ To recognise these values, and contribute to quality urban places, the Victorian Government should couple land use zoning changes with a new design review process for significant developments, a process already used internationally.²⁸ This could be developed with the Victorian Government Architect and incorporate features of the City of Melbourne's pioneering prototype.²⁹ Combined with other planning reforms that help manage development risks,³⁰ the process formally incorporates design considerations through a design review panel's early engagement with project proponents to reduce the likelihood of contested development applications.

2.2 Create thriving urban places

Deliver very low income housing with inclusionary zoning

Draft recommendation 36

Immediately change and actively apply planning rules to provide affordable rental housing for Victorians on very low incomes in places re-zoned for more intensive residential use.

Places with good transport access and amenity are often highly valued by potential home buyers and investors. Private housing markets are not producing enough affordable rental housing for people on very low incomes, with an absolute shortage in Melbourne of over 50,000 affordable private rental dwellings for people in the bottom 20% of incomes.³¹ This is broadly similar to the income levels attached to the ‘very low income households’ category of affordable housing in the *Planning and Environment Act 1987*.³²

Changes to zoning can mean significant windfalls for landowners not captured by current taxes and charges.³³ Inclusionary zoning uses planning rules to either mandate or create incentives for residential developments to include a proportion of affordable housing dwellings.³⁴ Placing extra conditions on land use during re-zoning, such as inclusionary zoning, is one way to capture some of this value to fund infrastructure.

Inclusionary re-zoning can meet the twin objectives of building extra homes in good locations and providing affordable homes to people on very low incomes. However, universal application of inclusionary re-zoning could, in some places, make the

cost of compliance greater than the value generated, meaning no extra homes, affordable or otherwise, are built at all. Instead, its use should be targeted to places generating significant value uplift, with the proportion of affordable rental housing for very low income tenants varying depending on the site.

In Melbourne, the most pressing housing affordability problem is for people renting on very low incomes. Nearly all (90%) of Melbourne’s private renters with incomes in the bottom 20% experience housing stress,³⁵ while the majority of private renters in the next 20% of incomes can secure affordable rental homes in the private market (64%).³⁶ In absolute terms, Melbourne technically has enough affordable rental housing for this latter group, although some may be occupied by higher income households or not in desirable locations.³⁷ This means providing affordable rental housing for people on incomes higher than the bottom 20% is not well targeted, and potentially uses the value-capture opportunity for lower priority groups.

Some affordable rental housing schemes, such as the National Rental Affordability Scheme,³⁸ produce discounted rent – typically 20% lower than the market rate.

This would usually still not be affordable for households on the lowest incomes. Similarly, other categories in the *Planning and Environment Act*, of low and moderate income affordable housing, would not reach those most in need, nor reduce the largest deficit of affordable housing. In contrast, targeting affordable rental housing to very low income households provides support to the people who most need it.³⁹ For this reason, inclusionary zoning should be primarily used to generate ‘very low income’ affordable rental housing in Victoria. Together with setting growth targets for social housing (see draft recommendation 73), this reform can reduce levels of housing stress and homelessness in Victoria as well as help create more inclusive communities.

2.2 Create thriving urban places

Develop an interconnected open space network

Draft recommendation 37

Immediately provide direct funding, and reform the developer open space contribution scheme, to create an interconnected open space network and extend Melbourne's urban tree canopy.

Greater residential densities, smaller household sizes and changing job markets are increasing the need for easily accessible local open space in communities.⁴⁰ People have heavily used public open spaces during the COVID-19 pandemic, demonstrating its health and resilience value. Public open space, including parks and local streets, provides land to plant more trees and vegetation, developing a canopy, helping reduce urban temperatures⁴¹ and reduce local flooding impacts.⁴² From our consultation with local communities in densifying suburbs, safe, adaptable multi-functional spaces and green space are essential in managing the impacts of greater residential densities.⁴³

Population growth and development are reducing private open space, gardens and tree canopy cover in established suburbs.⁴⁴ Utilities' engineering standards, road safety concerns and bushfire risk are barriers to planting more trees in our streets. More well-designed, accessible public open space can help compensate for this loss.⁴⁵ Connected patches and corridors of open space provide opportunities for recreation and active travel,⁴⁶ and provide habitat connectivity, reducing the risk of genetic diversity loss in isolated wildlife populations.⁴⁷ The Fishermans Bend approach is a good example of open space network planning, which focusses open

space along connected corridors, serving multiple functions, including active transport.⁴⁸ Placing and designing for street trees can also increase canopy cover and provide cooler, shaded corridors to support active transport.⁴⁹

Despite interconnection being a long-standing Victorian Government policy goal, open space is currently fragmented and often occurs in isolated patches. Existing local council open space strategies typically focus on increasing the area of open space, and its ease of access for residents.⁵⁰ Land use and infrastructure planners rarely measure the *connectivity* of open space,⁵¹ and instead usually measure its size and proximity to residents.

An interconnected open space network emphasises connections between open spaces and draws extra attention to neglected areas or convertible land, such as surface car parks, or school grounds, which may be closed to the public. Tree coverage on many streets can be improved, and in some cases, road space reallocated to tree planting. The Victorian Government should work with local councils to fund and explicitly target connectivity and tree planting in open space planning and delivery. It should also work with utility providers to address and remove barriers to achieve greener outcomes.

Currently, planning laws allow local councils to specify open space contributions when

developers subdivide land,⁵² to compensate for reduced private open space in subsequent residential densification. These contribution laws were adopted in 1966,⁵³ but have never been reviewed. Local government efforts to use open space contributions to improve Melbourne's urban forest are not unified to enhance the urban forest at the metropolitan scale.⁵⁴ A previous Victorian Parliamentary inquiry recommended developing more effective, enforceable and transparent developer open space contributions, and ensuring cash-in-lieu contributions are used to buy and improve open space.⁵⁵

The Victorian Government should immediately reform local government developer open space contribution schemes to explicitly state an objective of connectivity and mandate financial contributions are used for open space connectivity improvements and tree planting. This provides a stronger legislative basis for local government to prioritise connectivity and tree cover when purchasing or managing public open space. The Victorian Government can also preference connections when purchasing extra parkland,⁵⁶ evaluate developer open space contributions for connectivity and monitor the connectivity and expansion of the urban tree canopy over time.

2.2 Create thriving urban places

Partner with local governments to fund pedestrian infrastructure

Draft recommendation 38

Partner with local government to fund pedestrian infrastructure upgrades to connect people to priority places, including central Melbourne, the Monash National Employment and Innovation Cluster, other activity centres and railway stations.

Walkable cities and suburbs deliver many benefits. Providing access to open spaces and other local amenities, footpaths take up less land and cost less than roads and public transport. People walking more often helps reduce road congestion and public transport crowding, improves air quality and reduces greenhouse gas emissions.⁵⁷ Walking also supports overall health and social inclusion.⁵⁸ A daily 20-minute daily brisk walk can reduce the chance of early death by between 16% and 30%,⁵⁹ increase life expectancy by up to three years⁶⁰ and help prevent chronic diseases.⁶¹ One study estimates a kilometre walked every day represents a health benefit with a value of \$1.68.⁶²

Local communities identify pedestrian-friendly environments as necessary to maintain community acceptance of intensifying residential land use in good locations⁶³ (see draft recommendation 35). Already, walking is the most common way people travel for short trips less than one kilometre long.⁶⁴ But people still use cars for many short trips. These trips contribute to congestion in local streets and can have flow-on effects across the transport network.⁶⁵

Studies show that by investing in pedestrian infrastructure and programs that support active and public transport use, Victoria can increase the amount people choose to walk.^{66,67} Infrastructure Victoria estimates more than 200,000 daily motorised trips to key centres have potential to be walked or cycled, with around two-thirds of these trips destined for central Melbourne or the Monash National Employment and Innovation Cluster.⁶⁸ Good walking infrastructure can also assist with activating urban renewal precincts, like Fishermans Bend. Consequently, trips to central Melbourne and the Monash NEIC should be among the priority activity centres for pedestrian infrastructure investment.

Good design, delivery and funding of pedestrian infrastructure helps the Victorian Government manage congestion, improve health, and reduce greenhouse gas emissions. This means it has a legitimate leadership role in coordinating pedestrian infrastructure investments, data collection and accountability for state funding. It will need to work across different agencies and partner with local governments to achieve results in priority locations in the next five years. This will require some funding towards pedestrian infrastructure

improvements, including new footpaths, pavement improvements, and better timing at traffic lights. Broader improvements can also encourage walking by making the trip feel safer and more enjoyable. This includes measures such as lighting, wayfinding, shade trees, vegetation, street furniture, water fountains and toilets.⁶⁹

The Victorian Government recently announced the Breakthrough Victoria Fund, which targets innovation investment in Melbourne's National Employment and Innovation Clusters. Improving walkability to these centres could further enhance their attractiveness for investment.

2.2 Create thriving urban places

Transform cycling in Melbourne, Ballarat, Bendigo and Geelong

Draft recommendation 39

In the next five years, deliver separated cycle ways and invest in train station bicycle parking facilities to expand the cycling network in Melbourne, Ballarat, Bendigo and Geelong. Immediate priorities include connections within and between Melbourne CBD and surrounding suburbs, and connections to the Monash, Latrobe and Sunshine National Employment and Innovation Centres.

More than half of vehicle trips in Melbourne are short trips of less than six kilometres.⁷⁰ Converting even a small proportion of trips to cycling can help reduce localised congestion,⁷¹ improve air quality and cut carbon emissions. Cycling is one of the cleanest and most space efficient modes of transport.⁷² Cycling for 30 minutes a day, five days a week, can reduce the physical inactivity disease burden by 26%.⁷³ Cycling infrastructure has low costs compared to other transport modes.

The COVID-19 pandemic has generated increased interest in cycling. About 60% of Victorians are curious about cycling,⁷⁴ but many feel unsafe cycling.⁷⁵ Investment in infrastructure and programs that improve the urban environment are associated with increases in walking and cycling (see page 119).^{76,77} Cycling's share of transport trips has changed little in the last five years.⁷⁸ Victorian Government cycling investment has been small compared to roads and public transport. Although the Victorian Government has been investing in bicycle infrastructure alongside major projects and the St Kilda Road bicycle network, dedicated investment across the broader cycling network has been small at \$100 million over five years in the Victorian Cycling Strategy 2018-2028.⁷⁹

Not all trips on Victoria's network can be practically cycled, and not all Victorians can or want to cycle. But in Melbourne alone, around 204,000 daily car and public transport peak hour trips could be cycled or walked to National Employment and Innovation Clusters (NEICs) and central Melbourne.⁸⁰ This could strengthen the investment attractiveness of NEICs, supporting initiatives such as the Victorian Government's Breakthrough Investment Fund. Connections with high potential for cycling include trips from Richmond, Carlton, North Melbourne and South Yarra to the CBD,⁸¹ including allowing access through and around the CBD. Better cycling connections can help activate urban renewal precincts, like Fishermans Bend. Connections to Monash, Latrobe and Sunshine NEICs also have potential, with many trips to Monash from Clayton, Springvale, Oakleigh and Huntingdale potentially convertible.⁸² Rapid population growth in Ballarat, Bendigo and Geelong is likely to present significant opportunities to encourage locals to switch to cycling.

The Victorian Government should increase direct funding to cycling infrastructure given cycling can help manage demand on the road network and improve urban environments. It should expand the cycle network, starting by investing in safe, high quality, separated cycle ways for these priority places in the next five

years, including along Strategic Cycling Corridors.⁸³

Beyond conventional bicycles, separated cycle ways can be used by e-bikes and other personal mobility devices, expanding the distance and diversity of people who can use them. Cycling expansions should incorporate new personal mobility design standards (see draft recommendation 19).

The Victorian Government should also incorporate long-term cycling infrastructure into the Victorian transport plan (see draft recommendation 33). Using tools like the Movement and Place Framework⁸⁴ and reallocating road space towards preferred transport modes (see draft recommendation 41), cycling corridors should include connections to train stations, National Employment and Innovation Centres and CBDs. At train stations with car park pressures, the Victorian Government should invest in bicycle storage facilities and support development of the surrounding bicycle network. This encourages behaviour change and helps relieve parking pressure.

Planning work should begin immediately with identified priority investments delivered within five years. More investment will be required once further opportunities are identified through better network planning using improved modelling tools (see draft recommendation 40).



Case study

Cycling investments pay off internationally

Copenhagen, London and Seville demonstrate that sustained investment in cycling infrastructure can lead to more cycling trips, outpacing growth in other transport modes.

Copenhagen has invested in 150 kilometres of high quality cycle superhighways since 2012, with plans for further expansion in the next 25 years. Since the network has been installed, cycling has increased by 23%, with cyclists covering 400,000 kilometres each day. 121,000 fewer sick leave days are taken each year due to better health from cycling.⁸⁵

London's Cycle Superhighways, a fully separated cycle lane through central London, and Quietways have supported increased cycling with a doubling in cycling as a mode share from 1.2% in 2000 to 2.5% in 2018.⁸⁶

Between 2006 and 2007, Seville, Spain delivered 80 kilometres of fully separated bicycle lanes.⁸⁷ The lanes re-purposed car parking space, built on the same level as footpaths and in both directions. The network has been expanded since, creating a 180-kilometre cycle network in the city, with a resulting significant increase in cycling.⁸⁸

2.2 Create thriving urban places

Improve walking and cycling data to better estimate travel impacts and benefits

Draft recommendation 40

Immediately begin developing better walking and cycling information and data. In the next three years, incorporate this data and information into Victorian Government transport models used for strategic and project planning, and project appraisal.

Maintaining amenity of growing urban areas requires thinking differently about transport options and considering the value of walking and cycling. Properly incorporating walking and cycling into evidence-based planning, investment and reform requires being able to assess these modes on an equal basis with motorised transport.

The Victorian Government uses three main transport models to assess how travel behaviour might change in response to different interventions. The models forecast network performance and generate evidence of how infrastructure investment, significant reform, or other changes likely affect network use and performance, and their economic, social and environmental impacts. They are the Victorian Integrated Transport Model, maintained by the Department of Transport;⁸⁹ the Melbourne Activity Based Model, originally developed for Infrastructure Victoria;^{90,91} and the Detailed Operational Model for Intersection and Network Optimisation, maintained by VicRoads.⁹² Each model uses a different methodology. The best one for a particular analysis depends on the nature and scale of interventions being assessed, the stage of a project's development and the detail required.⁹³

While useful tools, transport models focus on motorised travel modes and ignore active modes such as walking and cycling, which can be good solutions in densifying areas. This is primarily due to a lack of data, with insufficient active transport information available to provide insights over time, or in the detail required for the systematic modelling of travel behaviour patterns. Not adequately reflecting active modes in transport models makes it difficult to develop strong funding cases for active transport infrastructure, even though targeted walking and cycling projects would help manage demand on the transport system,⁹⁴ support travellers' health, promote neighbourhood vibrancy, and reduce greenhouse gas emissions.⁹⁵ The COVID-19 pandemic also demonstrates the resilience value of walking and cycling for local transport.

The Victorian Government should generate and incorporate better information and data on active modes into transport models. It should invest in collecting better time series data on active travel to use for systematic forecasting and impact modelling. Modelled networks should also better reflect walking and cycling network attributes and assign users to these networks. This will improve modelling of route decisions by capturing

speed effects associated with cycling-relevant factors such as slopes and traffic. Certain walking and cycling projects, such as those funded under the Summer Streets and School and Community Safety programs in the 2020-21 Victorian Budget, can be used to collect the type of walking and cycling data required. Customised data collection may be required to better understand pedestrian and cycling infrastructure and preferences that affect route and mode choice beyond speed, such as perceived safety and convenience. Beyond its application to modelling, better walking and cycling data has multiple uses for decision-makers at all levels of government and in the private and not-for-profit sectors.

Generating this data and integrating it into existing models should begin immediately. The Victorian Government should determine whether it wants to be the primary collector of these data or arrange this through a third party. While full integration will take time, and require iterative updates, improved models should be finalised within three years to better support growing and changing suburbs.

2.2 Create thriving urban places

Reallocate road space to priority transport modes

Draft recommendation 41

Immediately begin delivering road space reallocation initiatives to assist with COVID-19 recovery, including projects to better support and enforce priority movement through streets and places. Adopt a five-year target for delivery of further road space reallocation initiatives. Legislate for faster, simpler, and more consultative road space reallocation in government decision-making.

Roads take up significant space in urban environments. Over time, more people and more freight move along roads that stay the same size. Overcrowded streetscapes can degrade the vibrancy, character and inclusivity of local communities. Different transport modes, like walking, cycling, public transport, electric scooters, or cars, differently affect places and segments of the transport network. For example, too many cars cause congestion, and some mode combinations cause conflicts in conventional street layouts. Resolving this requires a more deliberate approach to designing and using roads, beyond simply funnelling maximum traffic along them. Instead, roads should prioritise space for better movement or place functions. This approach concedes road space is finite and must be managed for all – not only vehicles. It means collaboratively managing all space on a street, from the buildings on one side to those on the other, and not only specific pieces managed by individual agencies, such as footpaths or tram tracks.

The Victorian Government should identify priority transport modes in different locations and begin delivering priority road space reallocation initiatives there, using the Department of Transport's Movement and Place Framework.⁹⁶ This should consider

interactions with places, as the street layout and priority modes can affect their vibrancy and amenity. Data from the Summer Streets and School and Community Safety programs, funded in the 2020-21 Victorian Budget, can provide further insights into selecting priority modes and locations. Initiatives could include giving motorists more prominent cues, like more visible street markings to better communicate priority movements. Infrastructure changes could follow, such as gradually installing tramway barriers, protecting cycleways, widening footpaths, or replacing parking with better bus and tram stops or 'pocket parks'. Infrastructure Victoria has previously identified streets in the Cities of Stonnington and Yarra as containing possible priority places.⁹⁷

On some roads, transport movements with the capacity to carry the most people and highest volume of goods are the most important consideration, meaning alternative options for parking during busy times may be the best use of road space. Improved enforcement could also better support priority movements, such as preventing vehicles queuing across intersections or on lanes intended for other modes. Parts of the network could be designated for quieter, lower impact, zero emissions freight vehicles, particularly at night, or for cycling (see draft recommendations 1 and 39).

Engaging and consulting local communities can promote faster, more acceptable change, such as foreshadowing road space changes ahead of time, strengthening evidence, better communicating different options and consequences, and piloting changes. Research finds that gradual, local initiatives have been most successful in reallocating road space. Alternatively, the Victorian Government could identify places for faster road space changes, such as parts of the networking benefitting major project sites like the West Gate Tunnel or North East Link. Finally, along a major corridor, a specific consultation and review process can be designed, as occurred for Punt Road.⁹⁸

Complex and time-consuming decision-making is a barrier to reallocating road space. In Victoria, unlike other states, Ministers directly determine which modes are to have priority on specific roads by legislative instrument.⁹⁹ This allocation process can be slow to respond to transport demand changes and tends to preserve the status quo long after it is appropriate. More agility is required for changing urban areas. The Victorian Government should also amend the *Road Management Act 2004* to allow for faster, simpler decisions.

2.2 Create thriving urban places

Redesign tram routes

Draft recommendation 42

In the next 10 years, redesign tram routes, including short shuttle routes, and reserve land for future tram depots, for more capacity in fast growing inner Melbourne areas.

Melbourne's trams generally provide an all day, turn up and go service, highly useful in established areas. These services not only transport people to work, but carry many people to meetings, services, shopping and entertainment throughout the day and evening.¹⁰⁰ Trams also currently link 32 major activity centres across Melbourne, moving people to and from homes, jobs, businesses and recreation. Many areas of inner Melbourne are growing faster than others, leading to overcrowding on some parts of the tram network, while services are under-utilised in other parts of the city. Across our modelled scenarios, daily tram boardings increased by around 30% to 50% between 2018 and 2036.

To provide attractive and cost-effective tram services in areas experiencing high demand, many parts of the tram network require changes to their operating patterns in the next five years. The Victorian Government has funded an order of 100 new trams in the 2020-21 State Budget, and redesigned routes will use this expanded tram fleet more efficiently. To help relieve overcrowding in busy and growing sections, the Victorian Government should introduce short 'shuttle services', especially at peak periods. For example, currently Victoria Street in Richmond is served by the route 109 tram to Box Hill, but also the shorter route 12 service, which originates at Victoria Gardens shopping centre.

This combination helps accommodate large passenger loads along the growing Victoria Street precinct while providing a quality service all the way to Box Hill.

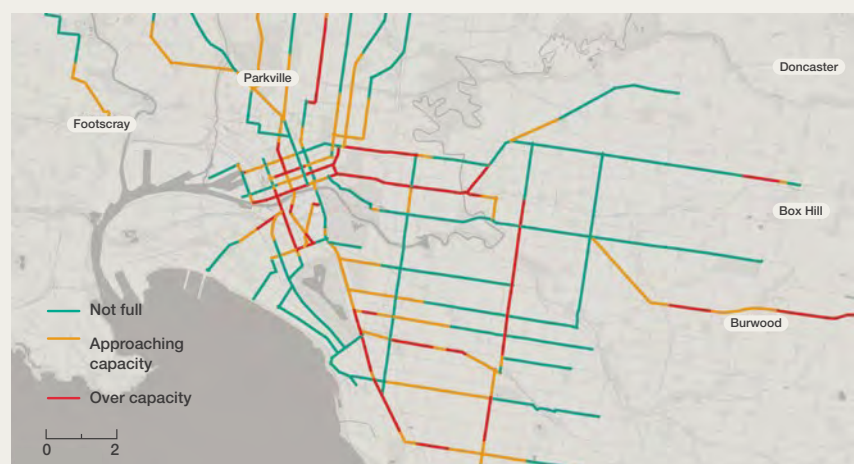
Tram overcrowding is most pronounced in and close to Melbourne's CBD, exacerbated by the free tram zone¹⁰¹ (see draft recommendation 47). Populations and destinations have grown in Southbank, north of Park Street, and in the western parts of inner Melbourne. With the arrival of the Melbourne Metro tunnel and Anzac Station rail-tram interchange, some St Kilda

Road trams should be diverted to the western side of the CBD. Within five years, the Victorian Government should build infrastructure to enable trams to integrate with the opening of Melbourne Metro.

As the tram fleet grows, Melbourne will require more tram depots. Land in inner Melbourne is very expensive, and the longer the delay in purchasing land for tram depots, the more expensive they become. To minimise costs, the Victorian Government should identify and reserve land for future tram depots.

Figure 13: The tram network is projected to become crowded without change

The following diagram shows the tram network in 2051 is likely to be heavily congested in the mornings without further investment, especially in the inner parts of Melbourne.



Source: Arup, *Strategy Update: Problem Definition Modelling Outcomes*, Report for Infrastructure Victoria, November 2020.

2.2 Create thriving urban places

Activate urban renewal with new tram links

Draft recommendation 43

Immediately fund the northern Fishermans Bend tram connection for delivery by 2026. Within two to five years, commit to delivering a tram extension to Arden, and to the former defence site at Maribyrnong, if required.

Bringing jobs and people closer together can create benefits. Our modelling suggests 35% to 43% of Melbourne's net job creation will be concentrated in the inner suburbs between 2018 and 2036. With several locations suitable for redevelopment, inner Melbourne can accommodate many more new homes and businesses. These inner Melbourne urban renewal precincts include Fishermans Bend and the Arden precinct around the proposed new train station.¹⁰² The former defence site at Maribyrnong may also become an urban renewal area.

Public transport can move large passenger numbers efficiently. Tram network expansions can act as a catalyst for more efficient and sustainable transport in inner city urban renewal precincts, particularly with their own right of way. Early investment in public transport connections is often followed by large private sector development investment, such as in Melbourne's Docklands¹⁰³ or London's Canary Wharf.¹⁰⁴ They encourage people to drive less, support better amenity, and invite diverse, dense development along the transport corridor and the centres it serves.

Fishermans Bend is planned to host both major residential urban renewal precincts

and a National Employment and Innovation Cluster.¹⁰⁵ A University of Melbourne campus is planned to open by 2024,¹⁰⁶ and the precinct aims to attract 80,000 jobs and housing for 80,000 people by 2051.¹⁰⁷ Residential development alone is projected to create an extra 260,000 daily transport trips,¹⁰⁸ with a target of 80% of movements to be by public or active transport.¹⁰⁹ Today, Fishermans Bend is geographically isolated with limited Yarra River crossings and movement impeded by the freeway.

Delaying new Fishermans Bend transport links risks stalling the precinct's development by failing to attract the university and the commercial investment essential for success. Two tram routes are proposed, north and south of the Westgate Freeway.¹¹⁰ The development sequence forecasts southern residential areas will be developed later.¹¹¹ This makes the northern tram route an early priority to ensure that workers have easy access, and students can reach the proposed campus. The Victorian Government should deliver this tram link by 2026, probably the earliest feasible date.

Similarly, the land use intensity between the western parts of the CBD and the Arden precinct are projected to grow significantly by 2036, catalysed by the new

train station. At present, the *Arden Precinct Development Plan* proposes a transport interchange for easy passenger arrival from bus, car or taxi drop off, along with accommodation for trams within a dedicated right of way.¹¹²

The former defence site at Maribyrnong is potentially a new urban renewal site and currently has limited public transport options.¹¹³ The tram extension won't fix this. Early commitment to a new tram extension will improve transport options, stimulate development and reduce car dependence in the potential new precinct.

The Victorian Government should commit in the next two to five years to constructing a tram extension to the Arden urban renewal precinct, and to the former Maribyrnong defence if required. This means the corresponding precinct structure plans and infrastructure contribution plans can anticipate this investment. This helps provide funding and avoids the serious challenges – and often higher than anticipated costs – of retrofitting tram routes after initial planning work is complete.¹¹⁴ In the longer term, the Victorian Government should retain the option for a future tram connection to Footscray along Dynon Road, dependent on future land use and demand changes.

2.2 Create thriving urban places

Plan for public transport accessibility, including tram stop upgrades

Draft recommendation 44

Release a new Accessible Public Transport Action Plan within one year and fund public transport accessibility upgrades, including for priority tram stops, to achieve the legislated 2032 accessibility targets.

Infrastructure needs to cater for the diversity of needs from a changing population. More accessible public transport is easier to use for many people, including people with disability, older Victorians, people with injuries or chronic health conditions, or people using prams, walking frames or carrying luggage. Inaccessible public transport can be a barrier for many to fully participate in the community, including preventing people from reaching jobs, services or participating in community life. It can also constrain the mobility and participation of their carers. One in five Victorians has a disability,¹¹⁵ and nearly one in six is aged over 65,¹¹⁶ increasing to more than one in five in the next 30 years.¹¹⁷ More accessible public transport removes discrimination against people with disability. Under Australian law, public transport networks are required to be fully accessible by 2032.¹¹⁸

Many of Victoria's public transport networks need to be upgraded to comply with accessibility standards. New, modern vehicles, like low floor trams and buses, are more accessible. But they only realise their full benefits when combined with stop upgrades, so people can get on and off trams. The Victorian Government prefers to

combine accessibility works with asset upgrades,¹¹⁹ but so far this has not occurred at a pace that will reach the 2032 target on time. The Victorian Government's *Accessible Public Transport Plan* expired in 2017 and has not yet been replaced.¹²⁰

Many train stations and bus stops remain inaccessible, and do not meet accessibility standards. Some public transport infrastructure is difficult to modify due to age or heritage listing. But tram stops have some of the worst performance. Yarra Trams, in its *Accessibility Action Plan*, projects that 100% of trams will be low floor by 2031,¹²¹ including legacy low floor trams. However, only around 400 of over 1700 tram stops are currently accessible.¹²² Unlike trains and buses, drivers cannot manually deploy ramps to assist passengers to board the tram.

Building more accessible tram stops should be a high priority for better accessibility. Better tram stops not only improve accessibility, but also assist growing areas with trams running efficiently and catering for more passengers. New stops allow more people to board faster and reduce boarding delays, improving reliability. The Victorian Government is working in partnership with Yarra Trams to upgrade tram stops on the network.¹²³ However, the

Victorian Government has underperformed against its tram stop upgrade targets for several years, often by a large margin.¹²⁴ In the 2019-20 Budget, the Victorian Government funded development of a *Tram Stop Accessibility Strategy*.¹²⁵ The cost of stop upgrades varies, depending on tram stop design and the extent of road space changes required (see draft recommendation 41). Costs can be reduced by combining tram stop construction with scheduled maintenance or other road projects, and by reconsidering the number of stops required along a tram corridor.

The Victorian Government should develop a new Accessible Public Transport Action Plan within the next 12 months, which details a comprehensive strategy for public transport upgrades on the network, including funding a plan to upgrade priority tram stops in the period to 2032. The Tram Stop Prioritisation Program should include extra criteria, including future population growth nearby, relationship to other projects, and innovations in design. These actions will create better accessibility to public transport infrastructure and help all members of the Victorian community to fully participate in economic and social life.

Discussion questions

Infrastructure Victoria welcomes feedback on these draft recommendations. In particular, we are interested in answers to the following:

?

What types of locations should be prioritised for building more homes?

?

How can the Victorian Government encourage more short trips to be taken by walking or cycling?

?

Where should more rental housing for very low-income Victorians be created?

?

How can we meet the growing public transport needs of our ageing population?



To answer these questions and more, visit infrastructurevictoria.com.au



2.3

Steer changes in travel behaviour

Victoria's transport network is unbalanced, particularly in Melbourne. Prior to the COVID-19 pandemic, city roads were congested, especially during the morning rush hour, affecting both productivity and drivers' time for other activities. Victorian motorists travelled in congested conditions for an average 22% of their morning commute in 2018.¹ Public transport was stretched in peak periods, with some trains, trams and buses packed to the point of significant discomfort and resulting in passengers being unable to board at some stops. A morning peak hour public transport commuter experienced crowding, on average, for 20% of their journey in 2018.² At the same time, many roads and public transport services were underutilised outside of peak periods and on weekends.

Victoria can avoid returning to these circumstances as the COVID-19 pandemic recedes if Victorians change how they use the transport system. The Victorian Government has already announced a new distance-based charge for hybrid and electric vehicles. Further changes to transport pricing will encourage people to change their travel behaviour, such as traveling outside the peak period, which will reduce crowding and improve safety during the recovery from COVID-19. Better transport pricing has been a focus of Infrastructure Victoria's work program in the past four years, and our research has documented its considerable benefits using enhanced modelling, international case studies and direct consultations with the community.

We've published the research papers *Good Move: Fixing Transport Congestion* and *Fair Move: Reforming Melbourne's Public Transport Fares* to set out our findings in detail.³ The modelling done for these reports was conducted pre-COVID-19, but the outcomes will hold assuming Melbourne's transport patterns return to normal. In fact, changes to the structure and prices of fares are likely to make travel on public transport safer by reducing crowding and enabling social distancing. We are currently doing a range of extra modelling to investigate how COVID-19 might change the shape of Melbourne into the future, and how transport reforms and infrastructure may need to adapt.



Our transport network faces major challenges

Over coming decades, pressures on Victoria's transport system will only get worse as the population grows. Trips will become longer, less comfortable and more unreliable, costing people and businesses time and money. This pressure will be largest in Greater Melbourne, where an extra 4.0 to 6.8 million trips are projected to be made every day on roads and public transport by 2036, across our modelled scenarios. Road congestion could cost the state \$10.2 billion by 2031 as drivers face longer journeys with increasingly unpredictable travel times.⁴

Road congestion is exacerbated by Melbourne's large amount of free or cheap on-street parking, which encourages drivers to cruise for cheaper parking spaces and benefits only a small number of people.^{5,6} On average, congestion could cost Melburnians each an extra \$1,700 each year by 2030.⁷

Congestion and overcrowding on public transport mean longer and more variable travel times, resulting in frustration and lost productivity. Modelling indicates train lines improved by the Melbourne Metro Tunnel project could exceed crush capacity as early as 2031 and more than 30% of public transport trips could be undertaken in crowded conditions by 2046.⁸ Poor public transport performance could lead to more people choosing to travel by car, which, in turn, would create even more congestion.

Traditionally, Victoria has supported a growing population by building more transport infrastructure, and targeted investment will still be needed to support the efficient movement of people and freight. However, evidence⁹ shows that expanding roads and public transport only relieves congestion temporarily. This is because providing more transport capacity

creates extra demand. While extra capacity improves travel times at first, eventually travel times increase as more people use the new infrastructure and congestion increases again. This has been the experience in Melbourne, where each new major road has eventually become regularly congested during peak times.¹⁰ Extra public transport infrastructure has temporarily increased capacity at peak times and reduced crowding, but problems eventually return.

Building new infrastructure will not be enough to solve transport congestion problems unless we make other changes. Further complementary pricing changes can help ensure Victorians make the most of existing and new transport assets and services. More people could be motivated to change when or how they travel to prevent congestion from getting worse and provide a better travel experience. The Victorian Government has taken the first steps in road pricing by adopting distance base charges for zero and low emissions vehicles from July 2021, and temporarily reducing off-peak fares from 31 January 2021.

Most motorists pay a set of fixed charges (including registration, accident insurance, and stamp duty) regardless of how much they travel, and fuel excise levied by the Australian Government. Fixed charges mean drivers pay the same amount no matter how much they use the road network, and do not reflect all the costs of road infrastructure – including congestion, air and noise pollution, carbon emissions and road trauma. Low income and vulnerable people and families receive no discounts on fuel excise, unlike the discounts they receive for some other essential services.

An extra 4.0 to 6.8 million trips are projected to be made every day across roads and public transport by 2036

Similarly, while public transport operating costs vary by mode, distance travelled and time of day, these costs are not reflected in Melbourne's largely flat public transport fares. The common fare structure across most modes of public transport means that modes priced too high are underused, like buses. Those that are priced too low, like trains, are overused. The simplistic fare structure also means people making short trips on less expensive modes are cross-subsidising other travellers. While some concession fares are available, vulnerable Victorians who are less able to travel in crowded conditions, or people who need reliable travel (for example, those with caring commitments), are less able to use public transport to access jobs, services and amenities.¹¹

Parking and driving are complementary – one cannot be done without the other. Free and cheap parking encourages cruising for parking by drivers, contributing to congestion, and fails to recognise other, potentially better uses of valuable land – for instance, for bus, tram and bicycle lanes, wider footpaths or even green space.¹² Cheap parking also discourages people from walking or cycling to reach public transport. Parking at train stations and park-and-ride facilities is free and in high demand. This means parking is usually allocated on a first come, first served basis, making it inaccessible to people that cannot get to a parking lot early in the morning due to other commitments, such as having to drop children off at school.



Transport network pricing is one of the most effective ways to ease congestion

Our research shows that comprehensive reform to how we pay for roads, public transport and parking is the most effective way to reduce congestion and get the most from our transport system. This 'transport network pricing'¹³ would replace fixed upfront charges and uniform fares with flexible prices set to encourage travel at times, to places and by modes that provide the greatest benefits relative to costs. A comprehensive transport network pricing scheme can also consider other costs, such as air pollution and road trauma, and could incorporate measures to ensure fairness.

Transport network pricing is not a new concept. Victoria has already announced using it for hybrid and electric vehicles. Road pricing regimes have made a difference overseas, including in London, Stockholm, Milan and Singapore, where they have reduced congestion, improved average car speeds and decreased

emissions.¹⁴ The Melbourne inner city parking levy has taken about 3,900 vehicles out of the morning peak by reducing long-term, off-street parking spaces. By comparison, accommodating 3,900 vehicles with a new freeway would likely cost over \$1 billion.¹⁵

Transport network pricing will also require a shift away from traditional thinking. Encouragingly, the Victorian community is increasingly open to changing its behaviour, with one in four people saying they could change the time or mode of travel if conditions were right.¹⁶ More voices are calling for congestion charging and more use of transport network pricing, including from Infrastructure Australia,¹⁷ Infrastructure Partnerships Australia,¹⁸ the Grattan Institute,¹⁹ the NSW Review of Federal Financial Relations,²⁰ the City of Melbourne²¹ and the Committee for Melbourne.²²

Priority reforms work together for greatest effect

Planning for change now can reap the benefits of changed behaviour and avoid unnecessary costs. It also gives people greater certainty, so they can make choices about the most efficient and cost-effective ways to travel.

Implementing further transport network pricing is challenging and will take time. Through extensive research, modelling, consultation and community engagement, Infrastructure Victoria has identified several steps that can be taken soon to deliver

long-term, sustainable change. The following draft recommendations complement each other. They also complement the draft recommendations on improving services and transport infrastructure as the benefits from these investments will be even greater with pricing reforms.

Over time, these reforms can reduce crowding and congestion in hot spots. They are all steps in moving to comprehensive transport network pricing

across all travel modes, including parking, that encourages a more efficient and equitable transport system. Implementation of transport network pricing will need to be supported by governance reforms. The early introduction of an independent adviser to monitor, review and advise on pricing in the system can make the transition and proposed reforms better.



Draft recommendations to steer changes in travel behaviour

Infrastructure Victoria is considering the following draft recommendations. The table below summarises these draft recommendations and a suggested timeline for their implementation.

Priority transport network pricing reforms

Immediately	0-2 years	2-5 years	5-10 years
Adopt peak and off-peak public transport fares	Increase and extend the Melbourne Congestion Levy on parking	Incorporate congestion pricing into all new metropolitan freeways	Phase out fixed road user charges and introduce user pays pricing
Price each public transport mode differently	Introduce demand-responsive pricing on parking in inner Melbourne	Trial full-scale congestion pricing in inner Melbourne	
Abolish the free tram zone		Price parking at major public transport hubs, all train stations and park-and-rides	
Appoint an independent transport pricing adviser			
Remove annual charges while introducing distance-based pricing for electric vehicles			

2.3 Steer changes in travel behaviour

Adopt peak and off-peak public transport fares

Draft recommendation 45

Introduce permanent peak and off-peak fares on public transport and discontinue payment options that undermine their demand management effects.

Infrastructure Victoria has investigated the structure and pricing of public transport fares in *Fair Move: Reforming Melbourne's Public Transport Fares*. Prior to the COVID-19 pandemic, Victoria's public transport was overcrowded during peak periods and underused the rest of the day.

Overcrowding also makes public transport less resilient to vehicle malfunctions or infrastructure failures. If a peak hour service is interrupted, other services have no space to accommodate disrupted passengers, preventing them completing their journey without extensive delays. Other services remain underused outside peak periods. The Victorian Government's temporary 30% discount on off-peak fares from 31 January 2021 will help avoid a return to these circumstances during Melbourne's recovery period.

The Victorian Government should extend the use of off-peak fares beyond the COVID-19 recovery. Different peak and off-peak fares can reduce crowding on public transport during peak hours. By encouraging greater off-peak public transport use, it can also improve the safety of off-peak travel and increase the resilience of public transport to vehicle malfunctions or infrastructure failures. Other services

will have more space to accommodate disrupted passengers, allowing them to complete their journey without extensive delays.

The difference between peak and off-peak fares needs to be big enough to change people's behaviour – in our modelling, the off-peak discount was 50%. Peak fares should be higher to reflect the very high costs of providing extra public transport trips during peak periods, even after allowing for the benefits from reducing congestion, compared to the much lower costs of catering for extra passengers in off-peak periods.²⁴ Fares should reflect all costs of the services, including their congestion and environmental benefits.

Not every part of the public transport network needs peak and off-peak fares. For example, most suburban bus routes are not regularly full, even at peak periods, so differential fares provide little benefit. Bus services could retain low priced, all day flat fares, with the exception of express bus services, which are regularly crowded at peak periods.

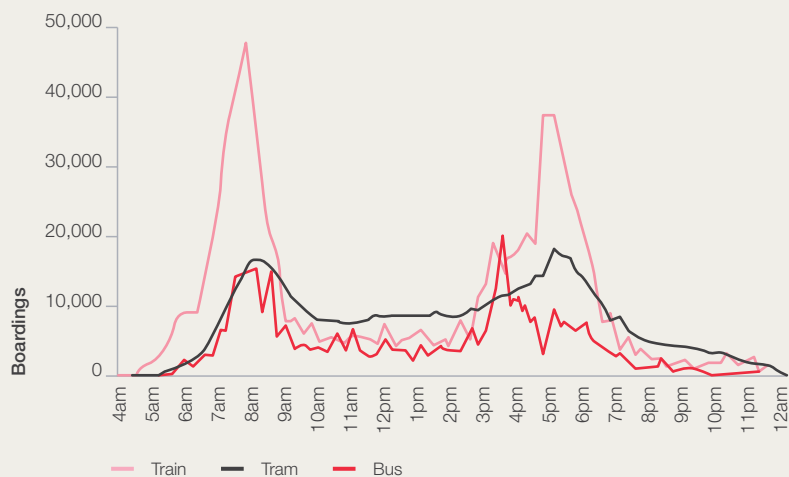
The current public transport fare system offers different payment options, including two-hour tickets and daily caps using 'myki money', or passengers can buy a myki

pass with different discounts based on the length and type selected.²³ When buying a pass, passengers pay a fixed fare for unlimited travel within a certain time period.

The Victorian Government should also abolish fixed fare myki passes so that all travellers face demand-managing fares on each journey. Daily fare caps should be increased to encourage better use of the network by travellers. These measures will increase the number of trips made where people must consider different fares when choosing travel options. Removing these types of tickets will also be fairer, as they currently require travellers to pay up front, which is challenging for low income Victorians. They will also simplify choices for Victorians, reducing the documented problems of Victorians choosing the wrong ticket for their journey.²⁵

Figure 14: Melbourne's public transport use is highest in peak periods

This diagram shows the pattern of public transport use throughout a typical day



Source: Department of Transport, 2018; Victorian Integrated Survey of Travel and Activity, 2018.



2.3 Steer changes in travel behaviour

Price each public transport mode differently

Draft recommendation 46

Immediately introduce different fares on each public transport mode to reflect their different costs and benefits and to encourage their best use.

Charging one fare for all public transport modes effectively reduces the choices available for Victorians, particularly for those on low incomes. All modes of Melbourne's public transport use the same fare structure, yet the cost of providing public transport services varies substantially by mode. The common fare across all modes of public transport means that modes that are priced too high are underused, like buses. Our modelling estimates that 70% of bus routes run at below a third of their capacity during the morning peak. Those that are priced too low, like trains, are overused. For instance, the average bus route is only a quarter full during the morning peak period, compared with over 80% for train and tram routes.²⁶

Making fares reflect the costs and benefits of carrying extra passengers encourages the best performance from the public transport system throughout the day. Mode-based fares ensure that each mode is best used, with the travel load spread more evenly and effectively across the network. This can help reduce crowding in public transport, which will be especially important to improve safety during the recovery from COVID-19. Infrastructure Victoria's modelling showed by making buses relatively cheaper,²⁷ buses

would carry almost 110,000 extra people each day.²⁸

Adding more frequent and direct bus services could increase patronage and shift demand from trains and trams by providing faster, more convenient and more attractive services (see draft recommendations 62 and 63). However, adding more services alone will not increase patronage enough to produce a high performing public transport system. If a bus trip to the local shops costs the same as a peak period train service to the city, local services will keep struggling to attract passengers. Setting the right fares for trams and buses will support more frequent services. As lower fares attract more passengers, frequent services become more viable.

The Victorian Government should replace the common fare for trips across all modes with different fares on each mode of public transport. The fare structure should be adjusted to not unnecessarily discourage multi-modal trips, such as ensuring people are not unduly penalised for catching a suburban bus to connect to a train service. Mode-based fares should reflect the widely different costs of each, such as operating and infrastructure, and benefits, such as reduced environmental impact and reduced congestion.²⁹

Our analysis suggests that fares for train travel should be priced highest, followed by trams, then buses. Many buses run largely empty and can provide extra journeys with low infrastructure costs and high social benefits.³⁰ Buses also do not provide the same level of service as trains, which travel much faster and stop less frequently. Conversely, many trains are full and extra services are expensive, especially during peak periods, and trams are in between. This reflects the relative costs of providing services on each of these modes, and their relative benefits.

Pricing by mode also improves equity and fairness while giving consumers greater choice.³¹ Introducing different fares across modes creates opportunities for Victorians to make decisions about service quality and cost, particularly for low income and vulnerable Victorians. Our research shows buses are overwhelmingly used by people on lower incomes, in comparison to other modes. Charging them the same fare is not just inefficient, but inequitable.³²



Figure 15: Melbourne's bus system is underused.

This map shows the performance of Melbourne's bus routes in 2016.



Source: Infrastructure Victoria analysis based on Transport for Victoria 2016 patronage data.

2.3 Steer changes in travel behaviour

Abolish the free tram zone

Draft recommendation 47

Immediately abolish the free tram zone to improve safety and access for those who need it most.

The free tram zone in Melbourne's CBD includes the busiest tram corridor on the largest tram network in the world. It is already full, running a tram in each direction every minute, for most of the day.³³ Many of these services are very crowded, which may prevent access for older Victorians, people with a disability, pregnant women and parents with prams and young children.³⁴ These same Victorians have the greatest need for better mobility from trams.

Most people travelling to CBD jobs and services live outside the free tram zone. People who drive to the CBD have above average incomes.³⁵ Similarly, residents of the Melbourne, Port Phillip, and Yarra local government areas have above average incomes.³⁶ People who live or stay in the free tram zone (or drive there) benefit most. The free tram zone may displace many walking and cycling trips, which have health benefits. In retail precincts, walking has particular economic benefits, with one estimate suggesting a 10% increase in walking could increase economic activity in the Central Business District by \$2.1 billion.³⁷

Some argue that the free tram zone benefits Melbourne's tourism, but there is no evidence of this, or even that general public transport performance substantially affects tourist satisfaction.³⁸

The free tram zone is funded entirely through taxes. Most Victorians pay these taxes, but many rarely, if ever, use the zone. After its introduction, the free tram zone increased passenger numbers by 30%, but reduced the average passenger fare by 18%, actually reducing total fares collected overall.³⁹ The free tram zone increased delays waiting at tram stops by 7% to 38%, requiring scheduling extra time into timetables. The free tram zone is not targeted to benefit people on low incomes and vulnerable Victorians.

Abolition of the free tram zone is also an appropriate response to the COVID-19 pandemic. Beyond the immediate policy response to the pandemic, this measure will encourage social distancing and enable commuters to adjust their travel habits as they return to Melbourne.

The Victorian Government should remove the free tram zone, charging for trips there like any similar part of the transport network. An exception should be the City Circle Tourist Tram, which serves a different purpose and is a genuine tourism facility. Reintroducing fares for travel within the free tram zone will reduce crowding and make trams more accessible and comfortable, and alleviate some peak congestion. It will also improve the performance of the tram network by reducing delays caused by the extra time taken by passengers getting on and off heavily crowded trams.

Removing the free tram zone will also encourage people to replace crowded tram trips with healthier modes, such as walking or cycling, or use buses and trains, which can provide a better service at a lower cost at certain times of the day.

2.3 Steer changes in travel behaviour

Remove annual charges while introducing distance-based pricing for electric vehicles

Draft recommendation 48

Remove annual up-front charges, such as registration fees, while introducing a distance-based road user charge for electric vehicles in the next year. Consider extending this to other types of vehicles on an opt-in basis, allowing for expansion over time.

Victoria can encourage the uptake of electric vehicles and shift towards road pricing by applying it only to new types of vehicles which are likely to have an increasing market share over time. This will help reduce congestion and raise revenue over time, without immediately affecting most current drivers. Zero and low emissions vehicles, like electric and hybrid cars, currently only comprise a small proportion of the total vehicle market. They are likely to rapidly increase their market share in the next 30 years. The Victorian Government has announced a new distance-based charge for electric and plug-in hybrid vehicles from July 2021, taking a substantial step towards road pricing. It can further encourage the uptake of electric vehicles by removing annual up-front charges, such as registration fees, as distance-based charges are introduced.⁴⁰

The Victorian Government sets or regulates several payments for travel in private vehicles. Most of these payments are not explicitly linked with using a service – they are effectively taxes (such as stamp duty) or tax-like fees (registration and licence fees, compulsory Transport Accident Commission charges). Aside from concession rates in some cases, everyone pays the same amount, regardless of

whether they use the roads very often over long distances or make infrequent short trips. Other Australian Government charges, such as fuel excise, are also standardised, but do not apply to electric vehicles. Removing these upfront charges would mean motorists driving zero and low emissions vehicles would pay prices that better reflect the costs of the roads they use. It would also strengthen the incentives for people to switch to these vehicles, with subsequent emission reduction benefits. A fleet made up entirely of zero emissions vehicles could reduce greenhouse gas emissions by around 27 million tons in 2046.⁴¹ Extending concessions on the distance-based charge to low-income and vulnerable Victorians can reduce equity impacts, much like existing concessions for registration fees and public transport fares.

Removing the upfront charges may serve as an incentive for people to choose electric vehicles.

The distance-based charge, in combination with eliminating the fixed road user charges, could be extended on an opt-in basis for owners of non-plug-in hybrid vehicles, subject to either an arrangement being made with the Australian Government around fuel excise or the Victorian Government providing a fuel excise rebate at the pump.

More generally, making participation voluntary for other vehicles can assist with social acceptance by, at least initially, limiting participation to those that benefit. This can pave the way for longer-term change by starting with opt-in participation and then switching to opt-out later.

Distance-based charges can discourage unnecessary road use, and provide a growing revenue source over time to help pay for infrastructure. But more immediately, this reform can help reduce transport emissions. Removing or reducing up-front charges can assist in promoting the uptake of electric vehicles, and thereby help reduce transport emissions.⁴² Finally, introducing a distance-based charge on electric and hybrid vehicles can also pave the way for congestion tolling with fewer technological and equity complexities, helping fine tune tolling systems and technologies that can eventually be extended to all vehicles across Victoria.

2.3 Steer changes in travel behaviour

Appoint an independent transport pricing adviser

Draft recommendation 49

Immediately appoint an independent body to advise on and monitor transport prices.

Transport fares in Melbourne largely do not vary by mode, time of day or distance travelled. They are not designed to encourage the most efficient use of the transport network, nor do they support fairness.

Establishing an independent body to advise the Victorian Government on transport pricing can help achieve better outcomes from pricing decisions, including ensuring prices align with reducing congestion. It can help establish the evidence required to justify changes and provides for ongoing institutional capacity, similar to other jurisdictions. This certainty helps support the government to introduce better pricing structures, such as those we are proposing. It can also encourage prices to be adjusted regularly, so they can respond to changes in transport demand.

An independent body can advise on changes to transport prices. This could include the prices of public transport fares, tolls, congestion charges, and even parking fees. The independent adviser could encourage agencies to explain how their pricing proposals achieve the outcomes sought, making the process transparent, and potentially allowing public consultation.

An independent body can also provide advice on prices to support best use of the transport system and embed fairness. For example, the independent body may advise on how to incorporate the social benefits associated with lower pollution and reduced road trauma into public transport pricing. In New South Wales, maximum fare increases are set by the Independent Pricing and Regulatory Tribunal. The Essential Services Commission in Victoria already approves changes to taxi fares, and so may be well positioned to take such a role.

The suite of transport network pricing reforms we are proposing do not necessarily rely on having an independent transport pricing adviser in place before beginning work. But the reform process will go more smoothly with such an entity. A community panel convened by Infrastructure Victoria said that there should be an independent body for pricing to ensure government accountability, transparency and adequate community consultation when proposing a change to transport pricing.⁴³

As soon as is feasible, the Victorian Government should appoint an independent body to advise on transport prices, as is the case in New South Wales.

This could be done either by expanding the responsibilities of the Essential Services Commission or creating a sector-specific body. The advisory body should also be consulted when designing research to develop sector-specific expertise in these areas, such as a trial of full-scale congestion pricing in inner Melbourne (see draft recommendation 52) or supporting local governments to trial demand-responsive pricing of parking (see draft recommendation 53).

2.3 Steer changes in travel behaviour

Increase and extend the Melbourne Congestion Levy on parking

Draft recommendation 50

In the next two years, review the Melbourne Congestion Levy on parking to increase its value, expand the properties it applies to, and cover a wider area including Richmond, South Yarra, Windsor and Prahran. Consider applying a similar levy to other highly congested parts of Melbourne which have good public transport alternatives.

Introduced in 2005, the Melbourne Congestion Levy aims to reduce traffic congestion in central Melbourne by encouraging alternatives to driving and parking, including public transport, cycling and walking. The congestion levy is charged each calendar year to private and public car parking spaces in two specified areas.⁴⁴

But many parking spots are currently not subject to the Melbourne Congestion Levy. Some exemptions, such as parking used solely for shift workers working outside peak periods, are sensible. Others, such as those for emergency vehicles, provide significant social benefits. However, other exemptions, such as for parking at hotels and residential parking, do not have wider social benefits.

The congestion levy has reduced the quantity of long term parking; a further increase is likely to do so again.⁴⁵ This will reduce traffic congestion by encouraging more people to travel on public or active transport. If previously untaxed parking spots are now subject to the levy then motorists can decide whether they wish to continue to drive to and from inner Melbourne. Broadening the parking spots

affected could achieve the same congestion reduction as a much larger price increase.

Expanding the area covered by the congestion levy is likely to spread the congestion benefits further afield. For example, areas east of Hoddle St are also significantly congested and have extensive public transport links to the CBD and through inner Melbourne suburbs like Richmond, South Yarra, Windsor and Prahran.⁴⁶ These areas also have good public transport alternatives.

The Victorian Government should review the Melbourne Congestion Levy on some parking spots in and around the CBD with an aim to further encourage travellers to switch from driving to public transport around inner Melbourne. The specific changes include:

- \ increase the rate at which the levy is charged
- \ increase the range of properties to which it is applied
- \ increase the geographical area that is covered by the levy to include areas east of the CBD including Richmond, South Yarra, Windsor and Prahran

- \ apply the levy to other highly congested areas such as Melbourne Airport and large shopping centres
- \ consider whether on-street parking should also be subject to the congestion levy
- \ establish revenue sharing arrangements with each local council subject to the levy.

Like other measures designed to reduce the amount of driving during peak to the CBD, an increase in the levy is unlikely to have significant negative equity impacts because peak time drivers to the CBD tend to have above average incomes.⁴⁷

A further shift to public or active transport could be achieved by extending the congestion levy to on-street parking. This is likely to prompt local governments to either increase or apply charges for parking, or else prohibit parking at locations which would not return revenue to cover the levy or yield other benefits. This is likely to further reduce congestion, including that caused by cruising for cheap parking. Spaces withdrawn from parking can create more room for through traffic or be reallocated for cycling, walking or other uses.

2.3 Steer changes in travel behaviour

Incorporate congestion pricing for all new metropolitan freeways

Draft recommendation 51

Apply congestion reducing tolls to all new metropolitan freeways, including the North East Link.

Road congestion occurs on Melbourne's freeways and major arterial roads beyond the inner suburbs and will worsen as the city grows. Broader transport network pricing reform can help manage these problems. Victorians are used to making choices about other forms of travel – ride-sharing, airfares, hotel rooms, Airbnb – that involve balancing quality, convenience and price.⁴⁸

Applying congestion-reducing tolls to new metropolitan freeways means traffic will flow more freely and delivers travel time reductions during peak periods. Low off-peak tolls may also attract traffic from parallel arterial roads, improving amenity for nearby residents. The Victorian Government has already proposed congestion-managing tolls for the West Gate Tunnel project.

Vehicles exiting to the Central Business District in morning peak periods would be charged a higher price.⁴⁹

The Victorian Government should extend congestion pricing to other plans for new freeways in Melbourne. These charges should be designed to manage road congestion to optimise the use of this new infrastructure. Tolls should be higher during peak periods and lower during off-peak periods, possibly with intermediate tolls during the shoulder periods to avoid abrupt changes. Tolls would also need to consider traffic impacts on nearby roads. For example, an excessive toll charge on the North East Link could result in too much congestion remaining on Greensborough, Lower Heidelberg, Manningham and Bulleen Roads, which also connect the Western Ring Road and Eastern Freeway.

Introducing new road tolls has relatively low implementation costs. Tolls could be collected using a proven GPS-based system or licence plate recognition technology, as suggested by the Grattan Institute's review of potential technologies for implementing road pricing.⁵⁰

Significant negative equity impacts are unlikely as peak period traffic is mainly for driving to and from work.⁵¹ Road tolls could receive concession discounts, like public transport. Concessional road use should still face peak and off-peak prices – just at lower rates than other drivers. This would preserve incentives for low income Victorians to drive during off-peak rather than peak periods.



2.3 Steer changes in travel behaviour

Trial full-scale congestion pricing in inner Melbourne

Draft recommendation 52

In the next five years, trial full-scale congestion pricing in inner Melbourne.

Congestion on the roads means longer journeys with increasingly unpredictable travel times. International evidence shows that introducing congestion pricing in cities such as London, Stockholm and Milan had a sustained effect on reducing congestion.⁵² Inner Melbourne experiences the city's worst congestion, so easing it would yield considerable economic and social benefits.

The Victorian Government should conduct a full-scale congestion pricing trial in inner Melbourne within the next five years, in anticipation of broader application. Private vehicles entering a cordon during peak hours would be charged a toll. The toll should be set to achieve targeted minimum vehicle speeds, on average, on key roads within the cordon. These speeds should be monitored so if they are regularly exceeded, the tolls can be reduced. If speeds regularly fall below the target average speeds, the tolls should be raised. This could be done once a month or once a quarter to give motorists some certainty about the charges they are facing. For examples, tolls are likely to be lower during the summer holidays when traffic around inner Melbourne is lower. The peak hours to which tolls apply could be set in a similar way. For example, if average speeds become too low before when tolls are set, then the tolls should be applied at an earlier time.

This road congestion pricing trial would accompany pricing reforms in public transport (see draft recommendations 45, 46 and 47), and parking (see draft recommendations 50, 53 and 54). The trial could be supported with advice from the independent transport pricing adviser (see draft recommendation 49).

The area to which the tolls could apply will depend on the costs and benefits of managing demand in the relevant areas. The scenario we modelled examined a cordon bounded by CityLink, the Westgate Freeway, Punt Road and Alexandra Parade.⁵³ The cordon could be implemented at relatively low cost using a license plate recognition system, or a GPS-based system like that recently introduced in Singapore.⁵⁴ Our research suggests congestion pricing can increase vehicle speeds within the cordon by 25%, and mean motorists can reduce their time spent in congested traffic by around 8% each day, on average.⁵⁵

As was done in successful implementation of similar road pricing schemes in London and Stockholm, there should be an increase in public transport to provide alternatives for drivers considering switching modes,⁵⁶ for example, by expanding tram services (see draft recommendation 43).

Having demand-managing fares on public transport in place, along with or ahead of the trial of an inner cordon road price, would reduce the need for extra services by encouraging off-peak travel.

Trials also help develop community acceptance of transport pricing. This was evident in the Stockholm experience and with Infrastructure Victoria's transport network pricing community panel, which stipulated pricing schemes should be trialled before implementation.⁵⁷ It is also less likely to have significant negative equity impacts as drivers to inner Melbourne typically have above average incomes.⁵⁸

2.3 Steer changes in travel behaviour

Trial demand-responsive pricing on parking in inner Melbourne

Draft recommendation 53

Trial demand-responsive pricing on street and council-controlled parking in inner Melbourne in the next five years.

Currently, several factors combine to deliver inefficient outcomes in on- and off-street parking in Melbourne. Local government policies have kept the price of parking low or free, imposing time restrictions instead. At present, 96% of trips in Greater Melbourne end in free parking.⁵⁹ More than half (55%) of people who regularly drive during the weekday peak have access to free, time-unlimited parking and just 17% of those who regularly drive during the weekday peak pay for parking.⁶⁰ These figures show that the price of parking across the city – and especially in the inner city – does not reflect the cost of providing it.

Dynamic parking pricing varies prices over time and between locations to manage demand. This approach has been successfully trialled and implemented in San Francisco, where demand-responsive parking prices are set to achieve an occupancy target and eliminate cruising for parking. Generally, when more than 85% of on-street parking spaces are occupied, people will have difficulty finding a park, indicating that the price is too low. Rather than charging the same hourly rate all day, the San Francisco system adjusts prices on each city block to achieve occupancy rates of between 60% to 80% during defined pricing periods.

To provide certainty to drivers, prices are adjusted no more than once per month and announced ahead of time.

A pilot of the San Francisco scheme showed that prices went down more than they went up, reflecting that parking is underused for most of the day. The pilot also showed increased sales for local businesses, reduced cruising for parking spaces and fewer parking fines issued. Significant reductions in congestion were also observed during the trial.⁶¹

The City of Melbourne has expressed interest in a pilot study of dynamic parking pricing.⁶² The Victorian Government should support and encourage the City of Melbourne to conduct such a trial. Negative equity impacts from a trial are unlikely because, on average, people who drive to inner Melbourne tend to have above average incomes.⁶³ Other local governments around inner Melbourne, especially those containing major public transport hubs, should be similarly supported and encouraged. If the trial is successful, demand-responsive pricing could be extended to other locations, as occurred following the San Francisco trial.

The application of demand-responsive pricing to parking should contribute to reducing congestion in inner Melbourne. Such a scheme could also help councils identify parking spots that are rarely used at the minimum parking price. This would mean kerbside space could be better allocated to other uses, such as to increase the capacity of road space for walking, cycling or private vehicle traffic (see draft recommendation 41).

2.3 Steer changes in travel behaviour

Price parking at major public transport hubs, all train stations and park-and-rides

Draft recommendation 54

In the next five years, introduce pricing of parking at major public transport hubs, followed by all train stations and park-and-rides, to help encourage using public and active transport for access.

Parking at train stations and park-and-ride facilities is free. This means that parking is usually allocated on a first come, first served basis, making it inaccessible to people who value public transport but cannot get to a parking lot first thing in the morning due to other commitments, such as having to drop children off at school.

Free parking also discourages people from using walking, cycling or a local connecting bus to reach public transport. Using valuable land for free parking encourages overuse of land for parking. Putting a price on parking helps correct this.

To encourage the best use of, and investment in, parking at train stations and park-and-rides, the Victorian Government should introduce pricing for parking at these carparks in the next five years. This also complements our draft recommendation to introduce mode-based public transport fares (see draft recommendation 46), that adjust for multi-modal trips, helping encourage more people to catch connecting buses instead of parking at transport hubs. It is also supported by our recommendations to enhance walking, cycling and buses (see draft recommendations 38, 39, 62 and 63).

This should begin at large, well-connected and accessible public transport facilities, such as Footscray, which feature good local public and active transport connections. It should also be considered for other inner Melbourne train stations. This will allow transport planners to work out the best models to be eventually applied to all train stations and park-and-rides.

Parking should be priced so that some spots remain vacant for much of the morning peak, allowing better sharing across users with different schedules. The price required to achieve this will vary from location to location. A lower price should be charged for parking that only takes place during off-peak periods, such as after commuters have left in the evening. Pricing parking should consider the alternative costs of using other modes, such as connecting buses, and their capital costs, as well as the costs of congestion, greenhouse gas emissions, and the opportunity cost of land. Demand-responsive pricing, such as that recommended for on-street parking in inner Melbourne (see draft recommendation 53), could be made part of the trial and ultimately be adopted at all train stations and park-and-rides.

There may be negative impacts on equity. These can be reduced by applying the same concession card discounts used for public transport to parking at public transport hubs. Some free parking spots should continue to be reserved for vulnerable people, such as people with disability.

2.3 Steer changes in travel behaviour

Phase out fixed road user charges and introduce user pays charging

Draft recommendation 55

In the next 10 years, replace fixed road user charges with variable distance-based and congestion charges. Ensure user pays charging reflects the relative costs of providing roads, and encourages drivers to change their behaviour.

Victorian motorists currently pay a set of fixed charges (including registration, accident insurance via the Transport Accident Commission (TAC), and stamp duty) regardless of how much they travel. This means Victorian drivers pay the same amount no matter how much they use the road network – whether they drive hundreds of kilometres each week or make infrequent trips to the local shops. The current fixed charges don't reflect all the costs of providing roads infrastructure – including congestion, air and noise pollution, carbon emissions and road trauma.

Fixed road user charges provide little incentive for people to change their behaviour. Our current pricing system is simple, but it doesn't encourage people to make different choices about the time of day, destination, mode, route or quality of their trip. This means not enough people are strongly motivated to change when or how they travel to prevent congestion worsening. Infrastructure Victoria found that introducing user pays charges for roads and congestion charging could lead to up to 168,000 fewer car trips every day, and a 40% reduction in car trips in inner Melbourne.⁶⁴

In the next 10 years, the Victorian Government should phase out existing charges applied to vehicles and roads (registration, TAC and stamp duty) and, subject to agreement with the Australian Government, fuel excise. These should be replaced with a set of charges that provide incentives for drivers to make the best use of the road network. For example, after the introduction of a distance-based charge for electric and hybrid vehicles, future changes should extend this to other vehicles and add a congestion charging component. Once in place, drivers can expect less congestion and greater predictability of travel time. This will also likely reduce greenhouse gas emissions and improve road safety.

Charges should be set to reflect all costs, including the relative costs of building and maintaining roads, congestion, carbon emissions, air and noise pollution and road trauma. The charges should vary by time of day and by location. Because different types of vehicles contribute differently to each of these, charges should also vary by vehicle type. For example, vehicles contributing less air and noise pollution, like electric vehicles, should be charged less; vehicles that contribute more to road damage, such as large trucks, should be charged more.

To provide the best incentives to motivate people to change their behaviour, the new set of road user charges should ultimately combine a distance charge and a congestion charge (only applied at times and locations when congestion is a problem). Discounts for low income and vulnerable Victorians can be applied to road user charges, like those applied for public transport and other utilities. Once a package of road user charges has been defined, consideration would also need to be given to the implications for those living more remotely and the fairness of the system. To support this, an independent transport pricing adviser should review the road user charges (see draft recommendation 49).

The reforms suggested in other draft recommendations, such as applying distance charges to electric vehicles, are all good building blocks for broader reform of how we pay for roads. Some of these reforms will demonstrate how these benefits can be achieved on a smaller scale before being widely implemented and offer lessons for how to design future reforms. Reforming road pricing will also help get the most out of our existing transport network and help reap the greatest benefits from complementary reforms to how we pay for public transport and parking.



Discussion questions

Infrastructure Victoria welcomes feedback on the draft recommendations. We are particularly interested in answering the following:

?

How else should the Victorian Government support people to change their travel behaviour?

?

How can people be supported to understand a different public transport fare structure?



To answer these questions and more, visit
infrastructurevictoria.com.au

2.4

Adapt infrastructure for modern needs

Creating better communities does not always mean building new infrastructure. Even under projections for a growing population, Victoria already has most of the infrastructure it will need by 2051. Looking after, and using legacy infrastructure better can be much cheaper than building new infrastructure, especially in established areas where construction might be particularly complicated and expensive. Well-maintained assets can remain sustainable and effective as they age, demand grows, and technology continues to improve.

Infrastructure investment is at record highs in Victoria. The Victorian Government plans to spend an average of \$19.6 billion a year on infrastructure over the budget forward estimates¹ and local governments budgeted \$19.8 billion for capital works in the 2020-21 financial year.² All governments have made significant new commitments to infrastructure spending, including to mitigate the economic effects of the COVID-19 pandemic. Yet this is only a fraction of the value of public assets. In 2018, the Victorian Government managed non-financial assets valued at \$265 billion,³ not including \$14.2 billion of physical assets held by public hospital services.⁴ VicTrack and VicRoads alone managed more than \$92 billion in transport assets.⁵

Councils manage over \$100 billion of other assets including local roads, wastewater services and community, sports and recreation facilities.^{6,7}

Infrastructure should last a long time when it is well managed and maintained. This means many facilities, including major hospitals, much of our transport network, and public buildings used to deliver services, will still provide vital services to future generations. When infrastructure is not well managed and maintained, Victorians may experience reduced service quality. Waiting times to access non-urgent health care could increase due to bed unavailability, or transport services could be interrupted from worn train tracks. For some of Victoria's most vulnerable public housing residents, ageing facilities can mean a very hot home in summer and a cold home in winter.

Infrastructure should last a long time when it is well managed and maintained. Many facilities, including major hospitals, much of our transport network, and public buildings used to deliver services, will still provide vital services to future generations.



Managing assets well is cheaper than new infrastructure

Ensuring public assets are fit for purpose, efficient and effective helps meet growing demand pressures as technologies, demand and service delivery models evolve. Robust management practices support asset maintenance, upgrades, and the eventual replacement, consolidation or disposal of assets when they are no longer suitable.

Sound asset management requires effective planning, acquisition, operation and disposal of assets to meet current and likely future service delivery demands.⁸ It involves initial assessment of investment proposals, ongoing maintenance and renewal, and asset replacement or disposal decisions.⁹ Good asset management can optimise the use and lifespan of existing infrastructure, minimise or defer the need for new assets, reduce disruptions, and allow for rapid responses to changing demand or other circumstances.¹⁰ In contrast, inadequate attention to maintenance can accelerate the need for major repairs, shorten the operational life of facilities, and create worse outcomes for users.¹¹

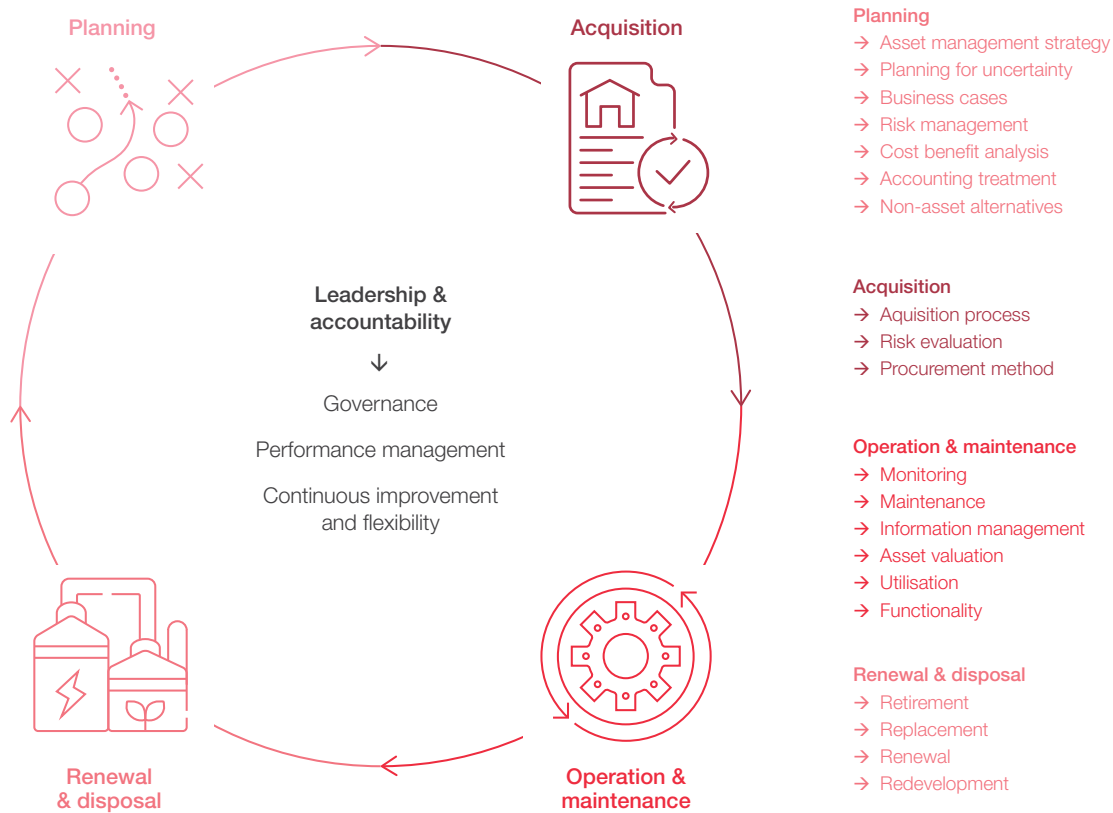
Despite major new infrastructure investments, the management of existing public sector assets is often neglected.¹² Victorian Government assets are managed under the *Asset Management Accountability Framework*, overseen by the Department of Treasury and Finance.¹³ It requires accountability for asset management, and many agencies have improved their approaches since its introduction.¹⁴ However, agencies inconsistently interpret their responsibilities and often focus on building or buying new assets, rather than managing existing assets strategically to maximise value.¹⁵

Poor and ad hoc asset management can incur higher maintenance costs, reduce financial sustainability and cause premature deterioration. In some sectors, buildings and fixtures are becoming more difficult to maintain in an acceptable condition as they grow old or are heavily used, and less able to support effective, safe and efficient services.^{16,17} Outdated buildings can be inaccessible and energy inefficient, unable to integrate modern technology, or unsafe.

In rural areas, some councils struggle to maintain many ageing assets that no longer meet community needs (see draft recommendation 90). A reluctance to dispose of facilities that no longer meet needs, particularly in the face of community opposition, can prevent the rationalisation or consolidation of facilities, even when it could enable a higher quality of service delivery.¹⁸

Victorian Government agencies often have limited or inaccurate data on the condition of their assets.¹⁹ Agencies need good asset condition data to make strategic decisions about maintenance and infrastructure spending. Better data can help them get the best value from investments, make good decisions about when to acquire, renew or divest assets, be responsive to changes in demand or use, and provide better services.²⁰

Figure 16: The asset management lifecycle



A more strategic and transparent approach to asset management is likely to involve a greater commitment to timely maintenance, asset renewal and retirement. More transparent and strategic asset management would make facilities and the services they provide more reliable, reduce interruptions, promote more integrated infrastructure planning and generate greater

efficiency. Ongoing monitoring of demand, innovations and asset condition helps infrastructure planning across the lifecycle and aligns upgrades, rebuilds, consolidations and divestments with needs. It also means building new infrastructure when it is necessary, and only then.



Today's infrastructure will need to meet evolving needs

Even well-maintained, upgraded and renewed infrastructure will need to adapt and evolve. The pace of change in technology and service innovation is rapid, and inflexible assets risk premature redundancy. Building facilities to be as flexible as possible would support simpler, less expensive and faster upgrades when required, often many times during assets' lives.²¹ New technology can help, such as 'Building Information Modelling', a model-based process that provides new insights and tools to more efficiently plan, design, construct and manage buildings and infrastructure. Planning for upgrades and rebuilds should consider the ease of future maintenance, upgrades and expansion. Some projects can be planned to allow for future expansion, including through design or site choices that preserve options for larger footprints later.

Public buildings and infrastructure need to adapt to match Victorians' changing needs. Many public buildings do not provide suitable access for those with impaired mobility. The need for dignified access to, and use of, commercial and public buildings will only become more pressing as Victoria's population continues to age. Evolving building standards and the impacts of climate change mean ageing properties may need upgrades to keep people safe, comfortable and healthy. As a service provider, major landowner, employer and tenant, the Victorian Government is uniquely placed to drive positive, long-term change.

Improving the resilience of Victoria's infrastructure

Infrastructure is essential for the community, economy and governments to withstand and respond to crises.²² The COVID-19 pandemic demonstrated that emergencies can cause dramatic shifts in demands on infrastructure. The 2019-20 summer bushfires demonstrated the vulnerabilities of communities when infrastructure fails due to an emergency. Similarly, a changing climate will alter the environmental conditions under which infrastructure must perform.

To ensure Victorian Government infrastructure can be relied upon during a crisis, or in different future scenarios,

it will need to become more resilient. Infrastructure resilience can be improved in different ways, including by building to different standards and designs, building in safer places, or having better plans to protect and rapidly repair it when damaged. Both the summer 2019-20 bushfires and the COVID-19 pandemic have spurred re-examination of infrastructure resilience, with many inquiries already underway. Infrastructure Victoria will monitor the findings of these reviews as they become available, and incorporate relevant recommendations in our final strategy.

Both the summer 2019-20 bushfires and the COVID-19 pandemic have spurred re-examination of infrastructure resilience.



Draft recommendations to create thriving urban places

Infrastructure Victoria is considering the following draft recommendations to adapt infrastructure for modern needs. We also make specific draft recommendations to help improve public transport accessibility (see draft recommendation 44), regional road maintenance (see draft recommendation 77), maintenance of the regional rail freight

network (see draft recommendation 79), the resilience of telecommunications infrastructure (see draft recommendation 86), supporting regional councils to update community infrastructure (see draft recommendation 90), and making social housing suitable for changing climates (see draft recommendation 95).

2.4 Adapt infrastructure for modern needs

Require accessible buildings for public services

Draft recommendation 56

Immediately establish an accessibility upgrade fund to contribute towards priority building upgrades to meet contemporary accessibility standards. By 2032, require all Victorian Government provided and funded services to be delivered from premises meeting contemporary accessibility standards.

Infrastructure supports delivery of many different public services to the people of Victoria. But not every Victorian can access the buildings used to deliver these services. One in five Victorians has a disability,²³ and nearly one in six is aged over 65.²⁴ Many older buildings used to deliver services were not built to contemporary accessibility standards. This includes schools, police stations, sporting and cultural facilities, and buildings used for community spaces and to deliver community services.

In May 2011, the Australian Government introduced the *Disability (Access to Premises – Buildings) Standards 2010*.²⁵ These standards provide references to technical specifications to ensure dignified access to, and use of, commercial and public buildings. They aim to provide older people and people with mobility, vision and hearing impairments with better access to places and services and more opportunities to connect with family, friends and the community.²⁶

These standards have largely been incorporated in legislation and building standards,²⁷ but only apply to new and refurbished buildings and premises.²⁸ This means many legacy buildings are not required to meet these standards

until they undergo a major renovation or refurbishment. Consequently, some public services are delivered from inaccessible buildings, and some people cannot gain entry to receive those services or have difficulty doing so. For all Victorians to have equal access to services provided and funded by the Victorian Government, everyone needs access to the premises delivering them. Similarly, to achieve the 12% target for employment of people with a disability in the Victorian Public Service by 2025,²⁹ those public sector workplaces must also be accessible.

The Victorian Government has committed to a universal design approach by incorporating universal design principles into areas such as infrastructure and public transport.³⁰ However, these tend to only apply to when designing new buildings or upgrades, and do not prompt changes to improve existing infrastructure. Because the standards and building regulations only apply to new buildings or significant upgrades, there is currently no requirement for buildings delivering Victorian Government provided or funded services to meet contemporary accessibility standards. The Victorian Government should adopt a policy requiring all buildings delivering public services to meet the *Disability (Access to*

Premises – Buildings) Standards 2010 by 2032, even if they were constructed before the standards came into effect. This aligns with the same timeline for achieving full accessibility on the public transport network (see draft recommendation 44).

The Victorian Government does not need to upgrade every building to achieve this goal. Over a 10-year period, the Victorian Government can relocate services from inaccessible buildings to accessible ones, especially if the buildings are leased. It may be more cost-effective to retire old government-owned buildings than retrofit them. When considering disposing of government buildings, inaccessible buildings should be a high priority, especially if they are expensive to retrofit. Simpler modifications can be incorporated into regular maintenance work. Appropriate exemptions should be included for heritage buildings where meeting the standards is not feasible. For larger, unavoidable and priority upgrades, the Victorian Government should establish a fund to contribute to upgrade costs to ensure the 2032 target is achieved.

2.4 Adapt infrastructure for modern needs

Rapidly renew old public housing

Draft recommendation 57

Rapidly renew dilapidated public housing properties, with a priority to renew at least half of all older low-rise apartments and older three-bedroom detached dwellings by 2031.

Victoria's public housing is deteriorating, with over 60% of dwellings more than 30 years old.³¹ Housing over 30 years old has higher maintenance costs than newer homes.³² Ageing homes mean rising maintenance costs and puts extra pressure on the system's financial sustainability.

The Victorian Government has recognised the need for improvement. Its \$5.3 billion Big Housing Build program, COVID-19 stimulus package, and other recent funding, have allocated over \$1 billion to improve maintenance and renewal of public housing.

Victoria's public housing portfolio does not meet the current needs of its tenants. Nearly half of Victorian social housing tenants live alone,³³ but nearly half of public housing dwellings have three bedrooms.³⁴ This problem is even more pronounced for new applicants, as around 80% are seeking one- or two-bedroom dwellings.³⁵ Many older properties are poorly designed, with poor accessibility and energy efficiency. Inaccessible homes, including low-rise apartments or 'walk-ups', can only be reached by flights of stairs and are inappropriate for growing numbers of older people and people with a disability. Poor energy efficiency means higher energy bills and lower health outcomes. These issues will worsen as climate change intensifies,

and smaller upgrades to existing properties can be a useful solution (see draft recommendation 95).

Renewing older low-rise apartment estates and detached three-bedroom dwellings should be an immediate priority. Low-rise apartment estates in good locations offer strong redevelopment and intensification opportunities, either to generate extra housing or leverage land value to lower redevelopment costs. Older three-bedroom detached dwellings have high maintenance costs. By creating smaller attached dwellings on these larger blocks, housing can better match tenant need. Some estates for renewal may not be in desirable locations. In these cases, rebuilding could occur in a better location.

Relocating tenants can present a challenge in renewing and disposing of old public housing stock. Increased targeting means social housing is now usually only offered to highly disadvantaged people, meaning they stay longer and create few natural vacancies. The Director of Housing has legal powers to relocate tenants,³⁶ but this can prove challenging if housing managers cannot offer attractive alternatives, such as modern one- or two-bedroom apartments. Social housing supply growth (see draft recommendation 73) can assist tenant relocation for faster retirement of old assets,

by providing new, fit for purpose homes for transfers.

Rapid renewal of old public housing stock needs extra resources, over and above that for new supply. However, in the longer term this will be at least partially offset by lower maintenance costs, better matching of tenants to housing, and better tenant health. In some cases, renewal costs can be reduced by leveraging land value, such as in the Olympia Housing Initiative.

Case study

Olympia Housing Initiative

The Olympia Housing Initiative is a 10-year program to incrementally replace and revitalise 600 public housing units in the suburbs of Heidelberg West, Heidelberg Heights and Bellfield in Melbourne. It is funded through the sale of some older properties, with the proceeds used to build new, more suitable homes in the same area. Over 220 new homes have been built, including a village-style, multi-unit development in Perth Street for single people, families and older people.³⁷

2.4 Adapt infrastructure for modern needs

Upgrade and rebuild public hospital infrastructure

Draft recommendation 58



In the next 10 years, complete the renewal of the Royal Melbourne Hospital and complete planning for upgrading and rebuilding the Alfred and Austin Hospitals to meet future healthcare demand.

Many of Victoria's public hospital facilities are close to, or past, their envisaged lifespans.³⁸ Spending on capital works has not kept pace with the need for maintenance and renewal at many metropolitan, regional and rural hospitals.³⁹ Growing demand pressures on the hospital system will require Victoria's existing facilities to operate as efficiently as possible even as innovative new models of care are explored (see draft recommendation 21) and new capacity is built (see draft recommendation 74).

Some of Victoria's most critical hospitals are ageing, and most in need of renewal. The Alfred, Royal Melbourne (City Campus) and Austin Hospitals are three of the state's largest public hospitals and provide a significant share of Victoria's specialist health services, including major trauma. These hospitals also serve the entire Victorian population and undertake world-leading medical research. In 2018-19, storms and faulty plumbing required the Alfred Hospital to close operating theatres and wards, relocate specialist clinics and radiology, move elective procedures to Epworth Private Hospital and at one point, relocate cardiac surgery to the hospital car park.⁴⁰ The Royal Melbourne Hospital's ageing facilities and systems restrict effective

delivery of care and research.⁴¹ Most operating theatres are close to 40 years old at the Austin Hospital and need urgent redevelopment.⁴² Critical works have been addressed at these facilities with emergency funding, but there are no public plans for the major capital works these hospitals need to provide modern services efficiently into the future.⁴³

The Victorian Government should work with public hospitals and health services to establish a more proactive, iterative, transparent and actionable approach to whole-of-life hospital asset management and renewal. The 2020-21 Victorian Budget committed to initial planning for redevelopment of the Royal Melbourne Hospital, including a new campus in the Arden precinct. In the next decade, the Victorian Government should complete that development, and plan for the rebuild or major refurbishment of the Alfred and Austin Hospitals. In the medium to long term, the Victorian Government should undertake regular condition assessments of hospital assets to inform planning and publish its renewal priorities – most likely in future iterations of the *Statewide Design, Service and Infrastructure Plan for Victoria's Health System*. This would provide greater transparency and certainty for government agencies, hospital managers, stakeholders and the public.

The full cost of renewing the Alfred, Royal Melbourne and Austin Hospitals is estimated at around \$6-7 billion.⁴⁴ These can be sequenced and staged over time, and can also have positive effects on their surrounding precincts. Updating the Royal Melbourne Hospital's City Campus as planned, for example, will promote the further development of Victoria's biomedical research capability in Parkville and the Arden precinct, benefiting both health research and industry. The cost of system-wide upgrades, refurbishment and rebuilds across the state over coming decades will be significant. It will depend on government decisions on how best to balance planned service need and asset condition, which should inform use of resources, including the Metropolitan and Regional Health Infrastructure Funds. The ongoing cost of improved asset management is harder to determine and may require investment in data collection and systems.

A more strategic approach to hospital asset management should also reflect a focus on proactive management and maintenance, which increases the reliability of facilities and the services they provide, resulting in fewer interruptions to patient care.⁴⁵

2.4 Adapt infrastructure for modern needs

Build back better after emergencies

Draft recommendation 59

In the next year, consider policy changes and funding mechanisms so high priority public infrastructure destroyed by emergencies is built to a more resilient standard or in less vulnerable locations.

Resilient infrastructure is critical to support communities in withstanding, responding to and recovering from the impacts of extreme weather events, emergencies and disasters. Nonetheless, public infrastructure is often destroyed by these events, highlighting its susceptibility to damage. Between 2002-03 and 2010-11, about 1.6% of Australia's total public infrastructure spending was on restoring critical infrastructure after extreme weather events. It is estimated that \$17 billion will be needed to directly replace Australia's critical infrastructure between 2015 and 2050 due to the impact of natural disasters. Most of this cost will be borne by governments, and ultimately taxpayers, as owners of these assets.⁴⁶

Bushfire Recovery Victoria is a dedicated agency working directly with affected communities to coordinate recovery. The 2020-21 Victorian Budget provides significant bushfire recovery resources, including funding to restore road networks, rebuild affected infrastructure and replace water equipment.

Community recovery and rebuilding after natural disasters provides the opportunity to reassess the resilience of the previous infrastructure, including its build quality and

location. The urgency to rebuild can overwhelm careful consideration of future needs, and insurance policies often only fund reconstruction of 'like-for-like'. Infrastructure damaged by emergencies is clearly vulnerable. Simply replacing it with the same infrastructure achieves no improvement in resilience to future events, and risks the same damage reoccurring.

The Productivity Commission observes that governments overinvest in post-disaster reconstruction and underinvest in measures that limit these impacts in the first place. As such, natural disaster costs have become a growing, unfunded government liability.⁴⁷ Carefully targeted investment in resilience measures now will reduce government expenditure on natural disaster relief and recovery by more than 50% by 2050.⁴⁸ Infrastructure Australia has called for a greater focus on resilience and improvements to infrastructure maintenance, noting the number and intensity of extreme weather events is increasingly likely to threaten certain assets.⁴⁹

The Victorian Government should consider future resilience when rebuilding infrastructure destroyed in emergencies and review agreements so insurance payments can be used to fund more resilient

infrastructure, and not only a 'like-for-like' rebuild. For example, roads could be rebuilt to be more resilient to flood or fire, or community and emergency services infrastructure could be consolidated in a safer place or built to a higher standard. This can help assure communities they will be less vulnerable in future, reduce future emergency disruptions, and save recovery and reconstruction costs. This process should consider both the standard and location of infrastructure and compare the costs of building to higher standards with the future risk of damage and repair or replacement costs.

Similarly, the Victorian Government should consider the most appropriate mechanism to fund the costs of 'building back better'. One option is a dedicated recovery betterment fund to supplement insurance payments so infrastructure can be rebuilt at a higher standard, or in a different place. This helps reduce the time it takes to source funding to cover the gap between replacement costs and more resilient, higher quality, better located infrastructure. For example, in response to the North Queensland floods in 2019, the Queensland and Australian Governments jointly established a \$100 million fund to build better, more resilient, essential public infrastructure.⁵⁰

2.4 Adapt infrastructure for modern needs

Expand the legislated definition of critical infrastructure and improve information flows

Draft recommendation 60

Immediately consider expanding the Victorian legislated definition of critical infrastructure beyond energy, water and transport. Expand information sharing capabilities across and beyond critical infrastructure sectors.

Critical infrastructure helps sustain human life and maintain community wellbeing. During emergencies and disasters, it is the highest priority to keep communities safe and functioning. Critical infrastructure resilience refers to its capacity to keep functioning, or be rapidly repaired, during emergencies, including in extreme conditions or when faced with major changes in demand. Critical infrastructure systems, networks and supply chains are increasingly complex and interconnected, with disruptions in one sector quickly affecting others, causing serious cascading failures. The 2019-20 summer bushfires and the COVID-19 pandemic demonstrate the adverse consequences of critical infrastructure failures and potential demand surges on critical facilities.

In Victoria, critical infrastructure is defined narrowly in the *Emergency Management Act 2013* to include the essential services of energy, water and transport.⁵¹ In these sectors, a Victorian Government minister is responsible for ensuring the infrastructure's resilience, and all critical infrastructure must be recorded on the Victorian Critical Infrastructure Register. However, recent emergencies indicate other kinds of infrastructure can also be crucial in emergencies. For instance, telecommunications outages and overloads

during the 2020 summer bushfires impeded emergency services' ability to distribute information quickly to communities at risk.^{52,53} Similarly, the COVID-19 pandemic has tested the 'surge' capacity of health and hospital services globally⁵⁴ and highlighted the crucial function of food and grocery supply and delivery chains.⁵⁵ Victoria's Critical Infrastructure Resilience Strategy reflects the broader range of infrastructure that is important in emergencies by establishing eight critical infrastructure sectors: banking and finance, communications, energy, food supply, government, health, transport and water. Not all of these sectors are currently included in the definition of an essential service in the *Emergency Management Act*.⁵⁶

One function of the Victorian Critical Infrastructure Register is to have a central record of all critical infrastructure, so everyone is using the same information for coordination. But some forms of infrastructure, like health and information and communications technology (ICT), are not on this register. Nor is information about local community assets, such as community gathering places where people are likely to go for information and support, especially in the event of an ICT failure. In many bushfire-affected communities, past critical venues for information and advice have included town halls, neighbourhood houses, and even local pubs.

Access to the Victorian Critical Infrastructure Register is currently restricted. Deeper consideration should be given to allowing other appropriate agencies to have access, the ease of their access, and the ICT systems and capabilities required to achieve this while still maintaining appropriate security. In addition, further non-sensitive information could be published regarding local critical infrastructure that will assist communities to make informed decisions in the case of an emergency.

The Victorian Government should review its definition and mechanisms for safeguarding critical infrastructure beyond the current limited definition. This should include expanding the legislative definition of an essential service in Part 7A of the *Emergency Management Act 2013*. Achieving this objective could also be supplemented by changes to existing policy, governance or decision-making mechanisms. Changes should also aim to improve information-sharing capabilities across critical infrastructure sectors, building upon the Sector Resilience Networks that currently exist. In future, all critical infrastructure sectors should have formal requirements to consider resilience when building and maintaining infrastructure, as is the case for those covered by the Act. Without this requirement, communities are vulnerable to more widespread disruption and higher recovery costs.⁵⁷

2.4 Adapt infrastructure for modern needs

Incorporate lessons of emergency reviews

Draft recommendation 61

Incorporate and act on emergency management and infrastructure resilience recommendations from current bushfire and pandemic inquiries and other reviews underway.

The 2019-20 summer bushfires and the COVID-19 pandemic have focussed attention on Victoria's preparedness for and resilience in the face of emergencies. As is usual after such major events, multiple inquiries, reviews and commissions will reflect on these events and generate extra evidence, insights and lessons on Victoria's emergency resilience and response, including on the condition and resilience of associated infrastructure.

Major reviews include:

- \ the Australian Government's Royal Commission into National Natural Disaster Arrangements
- \ the Victorian Inspector-General of Emergency Management's Inquiry into the 2019-20 Fire Season
- \ the Victorian Parliament's Inquiry into Tackling Climate Change in Victorian Communities
- \ the Australian Senate Standing Committee on Finance and Public Administration Inquiry into lessons to be learned in relation to the Australian bushfire season 2019-20
- \ the Commonwealth Scientific and Industrial Research Organisation's Report on Climate and Disaster Resilience

- \ the Victorian Parliamentary inquiry into the Victorian Government's response to the COVID-19 pandemic
- \ the Board of Inquiry into COVID-19 Hotel Quarantine
- \ the Senate Select Committee inquiry into the Australian Government's response to the COVID-19 pandemic
- \ the Joint Parliamentary inquiry into the implications of the COVID-19 pandemic for Australia's foreign affairs, defence and trade.

We expect further inquiries and reviews will investigate the response to the COVID-19 pandemic. These inquiries and reviews are ongoing, or have only recently reported – too recently for Infrastructure Victoria to fully incorporate their evidence and advice in this draft of *Victoria's 30-Year Infrastructure Strategy*.

We anticipate these inquiries will deliver findings on the required infrastructure to deliver appropriate emergency management services, including for emergency management organisations, health systems and emergency management communications.

We also expect they will report on ways to improve Victoria's infrastructure resilience more generally to emergency events, including for energy, telecommunications, transport and critical supply chains.

Infrastructure Victoria will incorporate available findings of reviews that have recently concluded, or which are underway into the final version of this strategy. In particular, we will review the evidence relating to design standards and building quality, the use of resilience assessments in infrastructure planning, and the incentives for government and private owners to sufficiently consider emergency risks in their maintenance and operation of infrastructure. This evidence may support future recommendations to the Victorian Government.



Discussion questions

Infrastructure Victoria welcomes feedback on the draft recommendations. We would particularly welcome information answering:

?

How should the Victorian Government better incentivise good asset management?

?

How can the private sector contribute its expertise to improve management of state assets?

?

How might resilience be better considered in managing assets?



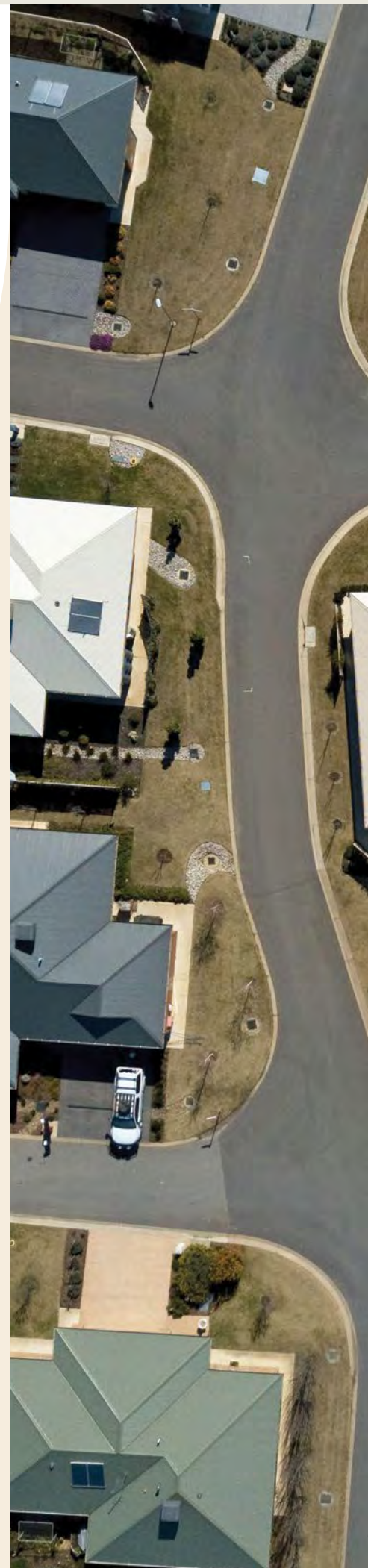
To answer these questions and more, visit infrastructurevictoria.com.au


Harness infrastructure for productivity and growth

Section 03

In the past decade, Victoria's population has grown rapidly. Victorians have celebrated the births of hundreds of thousands of new babies and welcomed many arrivals from interstate and overseas.

To provide homes for more residents, Melbourne has rapidly expanded outwards, with new growth suburbs under construction in the west, north and south-east. More homes have also been built in Melbourne's inner suburbs, with some previously commercial and industrial centres welcoming many new residents for the first time.





Concentrate investment where it can do the most good, enable services and infrastructure to meet future demand, and measurably improve the lives of every Victorian now and into the future.

The COVID-19 pandemic has suddenly slowed new arrivals and departures, reducing population growth in the short-term. The future trajectory of population growth is now less certain, but in the longer term this likely represents a pause, rather than an end, to population growth.

Victoria's population growth has posed challenges for the Victorian Government, putting pressure on infrastructure and service delivery. Other recommendations in this draft strategy have pointed to the many ways Victoria can better use its existing infrastructure to accommodate demand. The Victorian Government can use new technology, improve asset management and resilience, and use prices that influence behaviour to manage demand to better use existing infrastructure. In some cases, this will not be enough and new infrastructure must be built.

But government budgets will be constrained – especially once the time for recovery stimulus is past – and funding capacity is finite. The challenge for the Victorian Government is to carefully select

projects that produce the best outcomes, so that scarce funding can deliver maximum benefits.

How the Victorian Government decides to use existing infrastructure, and which new infrastructure projects to prioritise and deliver, will change depending on its objectives. New infrastructure should help prepare for Victoria's expected longer term growth, maximise the efficiency of the whole system, and be designed to deliver social, economic and environmental benefits. Major projects should carefully consider all available options, and decisions should be made on the basis of detailed feasibility studies and business cases completed ahead of final commitments.

Building new neighbourhoods on previously rural land means there is little existing infrastructure to support new residents. Developments in new growth suburbs have been successful at producing relatively affordable housing, compared with the rest of Melbourne. The proliferation of new estates has, however, caused environmental and transport issues. As plot sizes shrink, and house sizes grow, less

land is available for existing vegetation or new plantings. Public transport and roads in outer suburbs are less developed, meaning fewer options for people who need to commute to the city, inner or middle suburbs for work or education. Without good transport infrastructure, congestion will get worse, potentially compromising peoples' access to jobs and opportunities.

The Victorian Government also faces challenges in delivering suitable, sufficient and timely services. Demand is increasing for health, education, social housing, justice, and other social services. Social services need enough modern infrastructure to respond to growing demand, as well as the changing demographics and expectations of the community.

Selecting the best new infrastructure projects can help create a more prosperous, liveable and inclusive Victoria. This would concentrate investment where it can do the most good, enable services and infrastructure to meet future demand, and measurably improve the lives of every Victorian now and into the future.

3.1

Shape the transport network for better access

Victorians depend on transport infrastructure to support their economic, social and cultural connections.

Prosperity and productivity partially rely on public and private transport moving smoothly on road and rail networks, creating reliable and efficient movements of people and goods.

The Victorian Government has embarked on an expansive transport infrastructure program to cater for the recent population boom. The 'Big Build' initiative includes 165 road and rail projects, with approximately \$80 billion worth of transport infrastructure projects currently underway.¹ The program's flagship projects include the Metro Tunnel

Project, Level Crossing Removal Project, North East Link and early works for the Suburban Rail Loop. The transport system must continue to adapt as the city expands outwards, and more homes are built in established suburbs.

Transport infrastructure is costly and often disruptive to build, and infrastructure projects will become more expensive and complex as Melbourne develops. Many of our draft recommendations provide ways to better use existing infrastructure, minimising the need for more new construction. But if rapid economic and population growth returns in future, Victoria must build extra transport infrastructure to keep the

economy moving and underpin Victorians' quality of life. To maximise the long-term benefits of major projects, transport infrastructure planning and delivery must be strategic, integrated with land use planning, and select the best projects in the right order.

The Victorian Government must strike a balance between responding to existing demand and shaping future growth. It can create a financially, socially and environmentally sustainable transport system by combining efficiency improvements with carefully selected new construction projects.

Victoria's population has been growing

Before the COVID-19 pandemic, Victoria's population had been growing strongly for over a decade. Never had the state added so many new residents so quickly.² In 2019, Victoria added 122,200 extra people to its population – a 1.9% increase on the previous year, and the largest increase of all Australian states and territories.³ Migration was the largest single driver of population growth, with new births also contributing significantly.⁴ Greater Melbourne absorbed most of this increase – of the 148,000 extra residents in 2016-17, only 13% settled in the regions.⁵

Our modelling, prepared for this draft strategy, considers scenarios with a range of population growth rates. They consider situations where Victoria has an extra 1.8 to 3 million people from 2018 to 2036, and a further 1.2 to 2 million people between 2036 and 2051. Across all scenarios, Melbourne tends to accommodate most of this population growth, ranging from 82% – 86%. Even in our lowest population growth scenario, averaging 1.2% population growth, on average, to 2051, Victoria must still accommodate more than 3 million extra people.

Even in our lowest population growth scenario, Victoria must still accommodate more than 3 million people by 2051.

Growth occurs unevenly across Victoria

Population growth is far from uniform, and some places will grow faster than others. Our modelling shows a range of possibilities. Most striking is the variability in our scenarios for Melbourne's growth areas, which include parts of Cardinia,

Casey, Hume, Melton, Mitchell, Whittlesea and Wyndham local government areas. Under different scenarios, these growth areas may accommodate the largest, or the smallest share of Melbourne's population growth.

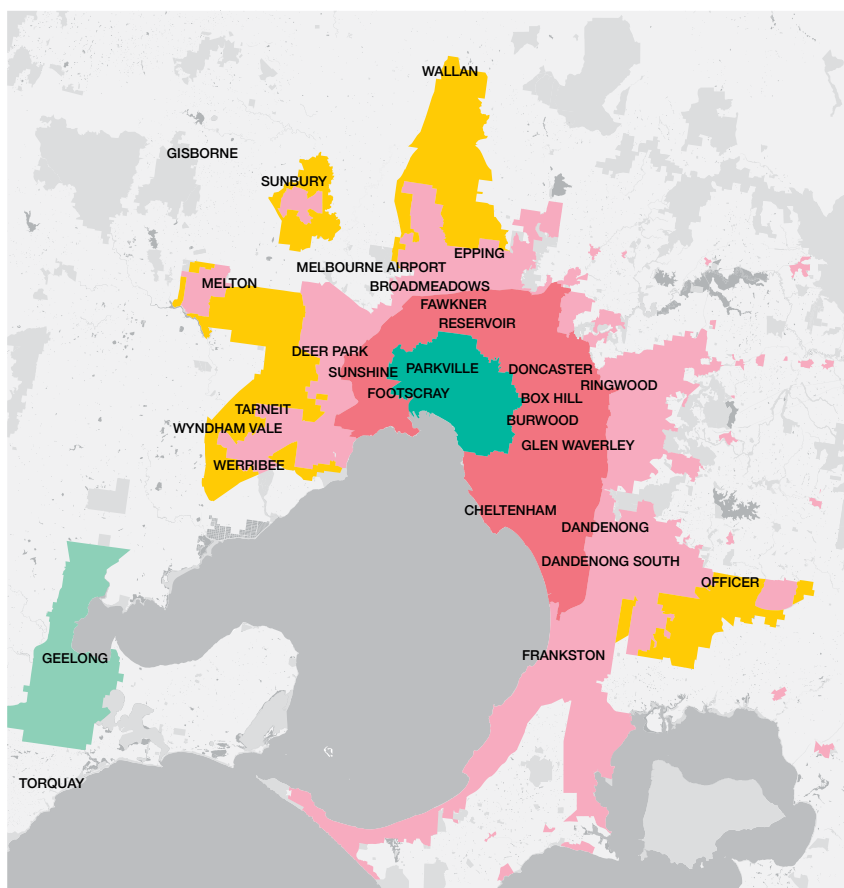
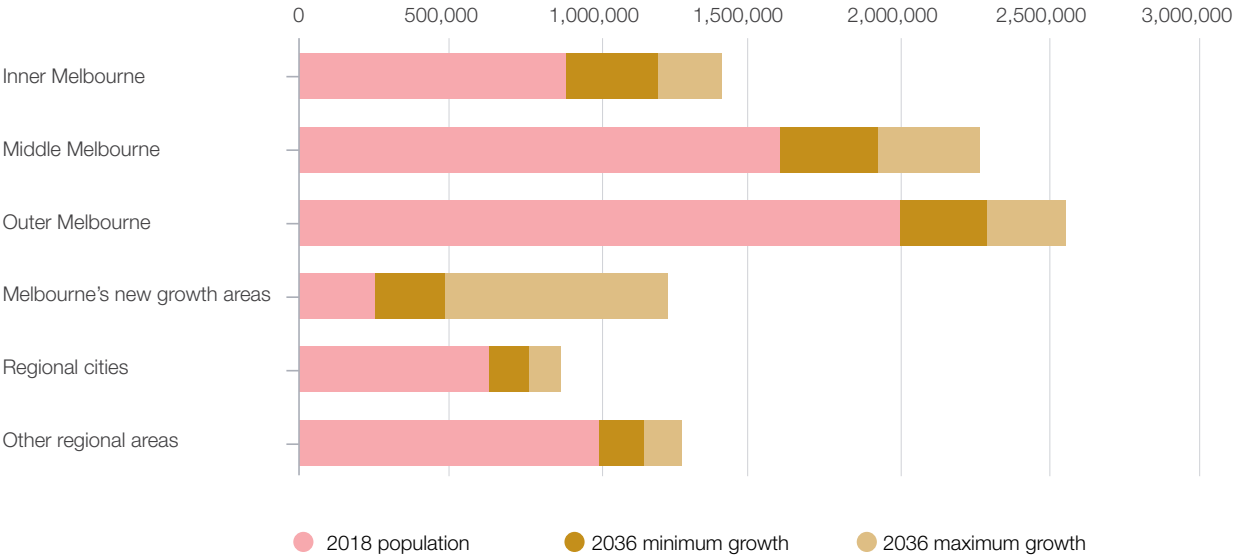


Figure 17: Melbourne's functional urban areas

This map shows the different functional urban areas in Victoria, used throughout this draft strategy. Melbourne's new growth areas are places covered by existing or planned Precinct Structure Plans. The regional cities in this classification are Ballarat, Bendigo, Geelong, Horsham, Mildura, Moe, Morwell, Shepparton, Traralgon, Wangaratta, Warrnambool and Wodonga.

Figure 18: Population change in Melbourne's new growth areas is highly variable across scenarios

This graph shows 2018 populations in different parts of Melbourne and regional Victoria, and the minimum and maximum populations in 2036 across the different scenarios modelled by Infrastructure Victoria.



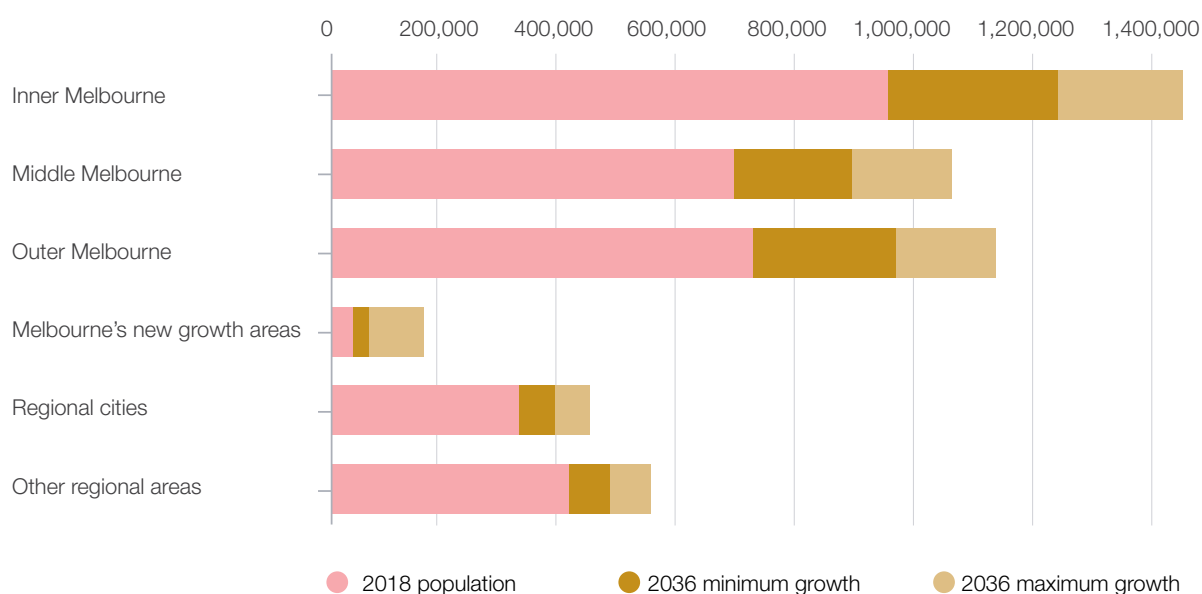
Employment and higher education are concentrated in inner and middle suburbs

In 2019, Melbourne's Central Business District (CBD) and inner suburbs had the city's highest concentration of jobs.⁶ Melbourne's inner and middle ring suburbs are also home to employment precincts and the job, research and education hubs identified as National Economic and Innovation Clusters (NEICs) by the Victorian Government. Our modelling considers scenarios in which Melbourne could have between 3.4 and 4 million jobs in 2036,

growing to between 4 and 4.8 million by 2051. In all scenarios, the vast majority of Victoria's extra jobs were created in the established areas of Melbourne, ranging from 78% to 81% of the total. Compared with the variability across the scenarios for population, the location of jobs appears much less variable in different scenarios, regardless of population growth or distribution, or the level of infrastructure investment.

Figure 19: Employment locations are similar in different scenarios

This graph shows 2018 employment levels in different parts of Melbourne and regional Victoria, and the minimum and maximum populations in 2036 across the different scenarios modelled by Infrastructure Victoria.



Melbourne's mobility challenge

Residents of Melbourne's established inner and middle ring suburbs have access to a comparatively large number of local job and education options. A well-developed motorway network serves these suburbs with high quality road links and interchanges, offering motorists many route options. Inner suburbs also enjoy plentiful public transport options, with trams, trains and buses offering good connectivity. The middle ring suburbs have good, regular train and bus services.

But Melbourne faces a significant transport challenge.⁷ Outer suburbs and new growth areas have fewer transport options. Motorists have access to fewer nearby

arterial roads or motorways, and fewer route choices. The radial nature of the train network means the distance between train lines, and often train stations, grows with distance from the CBD, making access to trains in outer suburbs and new growth areas difficult. Bus and train services are infrequent.

These factors mean people living in outer and new growth suburbs are heavily reliant on private vehicle trips, and on commuter trains to access the city. In these places, 81% of weekday trips are made by private vehicle, compared with 73% and 56% in the middle and inner suburbs respectively.⁸

Congestion will get worse

As Victoria's population grows, especially when growth occurs in car-dependent outer suburbs and new growth areas, roads will become more congested. Compared with today, total motorised trips will increase between 60% and 100% by 2051 across all tested scenarios. Private vehicle trips will increase by between 25% and 42% by 2036. Road congestion rises even faster, with the total distance driven in congested traffic increasing by 51% to 98% in the

same period. Road congestion during the middle of the day in 2051 is expected to be worse than the morning peak today. This means people spend more time on the road for each kilometre of travel, on average, in all our scenarios. But transport investment clearly helps reduce congestion, with scenarios with higher transport investment clearly outperforming those with lower levels of investment.

In the short-term, road congestion may worsen as COVID-19 restrictions are lifted. In Perth and Brisbane, after restrictions were lifted, traffic volumes increased by 15% and 10% respectively, above pre-pandemic levels.⁹

Figure 20: The train network is projected to become crowded without change



This map shows the train network in 2036 is likely to be heavily congested in the mornings without further investment, especially in the west, north and north-east corridors.

Source: Arup, *Strategy Update: Problem Definition Modelling Outcomes*, Report for Infrastructure Victoria, 2020.

Public transport use grows even faster than road trips. Our modelling scenarios estimated public transport daily trips would grow by about 38% to 62% between 2018 and 2036, with train trips growing the fastest in all our scenarios. Our results for public transport congestion are far more mixed, with scenarios representing a very wide range of results. They range from a 20% reduction in crowded public transport travel, to a 242% increase. This variability results from public transport use being more heavily affected by population growth, distribution and investment levels than road use.

Public transport comprised 9.8% of Melbourne's motorised transport trips in 2018. However, it accounts for over 60% of motorised journeys to the Central Business District, and over 50% for places such as Parkville, Docklands and Southbank.

Our modelling suggests these shares will continue to grow by 2051.

Growing congestion has predictable implications for Melbourne's liveability and productivity. Increasing congestion affects people's ability to access employment, education and other services. It also means the transport system becomes less resilient to network disruptions.

For outer suburbs and new growth areas, congestion causes longer travel times and reduces the predictability of travel times.¹⁰ In outer and new growth suburbs, which already have higher rates of unemployment and underemployment than the metropolitan average,¹¹ some people may settle for lower paid, lower skilled work.¹² Poorer access to employment and education in new growth areas could also exacerbate existing social disadvantage.¹³

Improving access to jobs, education and services can improve the quality of life for Victorians. Transport connections that link workers to the CBD, NEICs, and other job and education precincts can better match them to job opportunities and support a more productive, competitive economy.



Draft recommendations to improve transport access

Infrastructure Victoria makes the following draft recommendations to improve transport access. These build on draft recommendations elsewhere, including to adopt new transport technology (section 1.3), support freight movements (section 1.4), support more homes in existing suburbs (section 2.2), adopt transport network pricing (section 2.3), plan for growth areas (section 3.2) and support

regional Victoria's economic access (section 4.1) and social connectivity (section 4.2). These approaches need to be adopted and combined to get the most from major transport projects.

Transport investments should be based on strong evidence, including detailed feasibility studies and businesses cases.

3.1 Shape the transport network for better access

Reshape the metropolitan bus network

Draft recommendation 62

By 2025, reshape the metropolitan bus network in Melbourne's north-west and south-east in time for the opening of the Melbourne Metro tunnel, including by delivering premium bus services that offer increased frequency and faster travel times. In the next 10 years, continue these reforms elsewhere, including revising the coverage standard and using more flexible bus services in lower demand areas.

For most Melburnians, buses are the closest public transport option to home. Buses do not require large, expensive, immovable infrastructure investments and can operate on most roads. Buses' relatively low capital cost means they can respond quickly to changes in population, technology, policy and behaviour.¹⁴ Our modelling suggests bus travel will grow between 30% to 51% by 2036.

Melbourne's bus services do not maximise their potential to offer more useful, attractive trips for more people. They run long distances, making up 72% of public transport service kilometres in Melbourne, but only account for 21% of passengers.¹⁵ In 2016, only around 60% of the metropolitan bus routes averaged more than 20 boardings each hour.¹⁶ The remainder are infrequent, meandering services, many running in sparsely populated suburbs with high car ownership.¹⁷

The introduction of premium 'Smartbus' services on several corridors in the last decade delivered a higher bus service standard. This included more frequent services, longer operating hours, better on-road bus reliability, faster travel times

and better customer information.

Passengers increased by up to 70% in the first two years, and have continued to grow faster than other bus routes.¹⁸ Similarly, the redesigned bus network in Brimbank increased the proportion of residents close to a bus service operating every 20 minutes in peak times from 66% to 90%, and more people used buses.¹⁹

As people will often walk further to a high quality bus service, more frequent, premium bus services could justify a relaxation in the current requirement that 95% of households must be within 400 metres of a bus route. The Victorian Government should reform metropolitan bus services to better align with community needs. Bus routes can be designed for different purposes, with three types needed:

- \ **Premium bus services** on the Principal Public Transport Network that are frequent, direct, of a high quality (like the 'Smartbus' model or better), and coordinated with other public transport modes. These could include a combination of express services, and services operating in their own right of way, such as busways, and charge the same fares as other buses.

- \ **Connector bus services** providing direct, regular connections to the nearest activity centre and linking to higher quality premium bus services and other public transport modes.

- \ **Local bus services** that provide access to the nearest activity centre or public transport interchange for those unable to access a direct service, especially in low density, low demand areas, like industrial precincts. These can include greater use of flexible bus services, with some demand-responsive features, like the Woodend FlexiRide Service²⁰ or Telebus services.²¹

The time is right for reform. Changes to bus contracts have made it much easier to change bus routes.²² Expiry of the myki contract in 2023 may also make restructuring services easier and provides an opportunity to introduce more flexible service options. The opening of the Melbourne Metro tunnel in 2025 will require changes to the bus network. This is a particular priority in Melbourne's north-west and south-east, where the bus networks connect to the Sunbury and Dandenong lines proposed to use the tunnel. The Victorian Government should take this opportunity to reshape the bus network at the same time.

Bus routes can be designed for different purposes, with three types needed:



Premium bus services on the Principal Public Transport Network that are frequent, direct, of a high quality, and coordinated with other public transport modes



Connector bus services providing direct, regular connections to the nearest activity centre and linking to higher quality premium bus services and other public transport modes



Local bus services that provide access to the nearest activity centre or public transport interchange for those unable to access a direct service



3.1 Shape the transport network for better access

Connect suburban jobs through premium buses and road upgrades

Draft recommendation 63

In the next five years, create new premium bus services and better roads to connect outer and new growth suburbs to National Employment and Innovation Clusters and major employment centres. Consider using a better premium bus service instead of trams on the Wellington Road corridor to Rowville.

Public transport works more effectively in places where significant numbers of jobs cluster together. In the next five years, the Victorian Government should design and deliver premium bus services between the NEICs, surrounding suburbs and other nearby employment precincts. This should begin with the Monash, Latrobe and Sunshine NEICs, before being extended to others. High frequency, high quality premium bus services should be prioritised (see draft recommendation 62), which:

- Improve service levels on existing routes and introduce new routes that mirror the entire Suburban Rail Loop (SRL) project, to start building demand in advance of that project. The bus network should then be modified to complement SRL when completed.
- Connect northern growth areas to Latrobe NEIC, including potentially using some tram or road reservations to achieve better bus travel times.
- Improve the quality and on-road priority for bus services to and within Sunshine NEIC, including surrounding connections to Highpoint and Footscray. Complementary road improvements timed with the opening of West Gate Tunnel could help enable this.

A tram connection between Rowville, Monash NEIC, Caulfield employment precinct and Huntingdale Station is unlikely to attract enough extra passengers or new development along the corridor to justify such a large public investment when compared to other, more cost-effective options. Instead, the Victorian Government should consider a premium, high frequency bus service. Combined with building the Wellington Road upgrades and bus priority lanes, a premium bus service can provide better access to both the knowledge and industrial parts of Monash NEIC and deliver better coverage to lower density areas in the east towards Rowville and multiple destinations in the west.

Jobs in dispersed industrial precincts are difficult for public transport to serve efficiently. Instead, private vehicles can provide good access in these places. The Victorian Government should develop projects to improve the road network, to better connect nearby suburbs to industrial areas, such as the Dandenong NEIC and *Plan Melbourne's* designated State Significant Industrial Precincts. In addition to improving outer suburban arterial roads (see draft recommendation 70), the Victorian Government should:

- Continue to improve access into Dandenong South NEIC from Casey and Cardinia growth areas by developing east-west arterial road links.
- Upgrade the Calder and Western Freeways, continue to develop the Palmers Road and Calder Park Drive corridor.
- Upgrade the Hume Freeway, Mickleham Road and Somerton Road, and consider building the Bulla Bypass.

Delivering these changes will reinforce the investments delivered by the recently announced Breakthrough Victoria Fund, which seeks to catalyse investment in Melbourne's NEICs.

3.1 Shape the transport network for better access

Increase suburban rail corridor services and capacity

Draft recommendation 64

Develop and progressively deliver a prioritised, 15-year network service upgrade program for Melbourne's suburban train corridors, including track, signalling and train carriage projects that expand services and help encourage development in locations able to manage extra population growth. Continue to improve service frequency towards a turn up and go service for more of the day.

In all our modelling scenarios, train travel is the fastest growing mode of motorised transport, with the metropolitan train network expected to carry an extra 500,000 to 800,000 passengers each day by 2036. Network capacity and the service quality of each train line contribute to complex choices made by people on where to live and work, and inform developers, decisions to invest in new housing and mixed-use developments.^{22,24} Growing demand for rail services could gradually worsen overcrowding, eventually preventing passengers boarding in some places and dampening further development.

Major new projects, such as the Melbourne Metro Rail Tunnel, can provide more capacity on some train lines, though this new capacity is not shared evenly across the network.²⁵ Realising these potential capacity benefits across the network requires extra, currently unfunded, complementary corridor upgrades, such as relieving projected congestion on the Clifton Hill rail group. Many corridors face other constraints, such as very old signalling layouts, which restrict service frequencies. Without upgrades, many train corridors will experience overcrowding in coming years, particularly during peak periods.²⁶

The Victorian Government should develop, progressively deliver and regularly update a 15-year network service upgrade program to cater for growing demand along each suburban rail corridor. This program should prioritise upgrades to train lines that will soon reach their maximum capacity, especially those with high population and passenger growth. For each train corridor, the program should identify priority timetable improvements and infrastructure upgrades that would allow more trains to run on the network, more frequently, and more reliably. The upgrade program should address regional and freight train needs on relevant corridors, and also address the need to modernise the existing train control centre.

The Victorian Government should continue to revise metropolitan train timetables to run trains more frequently. The Victorian Government has announced improved frequencies for a longer time span on many train lines, encouraging people to travel slightly outside 'normal' peak periods and spread the load. The frequency of service can continue to be progressively increased to provide turn up and go services for more of the day.

Beyond this, corridor upgrades should realise capacity benefits enabled by Melbourne Metro and expand capacity on the Clifton Hill rail group. The program should consider all methods of delivering extra capacity, such as track, signalling, new trains and train carriage retrofit and station projects, and determine the sequencing and timelines for each corridor. There should be a continuous flow of projects to support a sustainable and competitive rail manufacturing and construction industry.

Developing and publishing the network service upgrade program would help identify places where more intensive land use will be supported by the public transport network, giving investors, residents and employers the confidence to take full advantage of future public transport investments. This will help inform priority areas for land use development. The program should also clarify rail service improvements needed to better respond to demand changes. The upgrade program could also provide opportunities to more efficiently fund and deliver rail upgrades by leveraging projects such as level crossing removals, realising delivery efficiencies, and helping reduce rail disruptions.

3.1 Shape the transport network for better access

Reconfigure the city loop for cross-city train services

Draft recommendation 65

Immediately after the Melbourne Metro opens in 2025, reconfigure the city loop to allow for more cross-city train services.

The current train network is nearing capacity and will not support many more trains to enter the city loop. Major rail projects are underway or planned that aim to allow more trains to reach an expanding CBD. These include the Melbourne Metro tunnel project, currently under construction and due for completion in 2025,²⁷ and the proposed Melbourne Metro Two (recommendation 66). Even with these projects enabling more services, our modelling suggests the Craigieburn and Upfield lines will soon reach capacity. Demand is increasing, driven by the expansion of the northern growth corridor beyond Craigieburn to Donnybrook, Beveridge and Wallan, as well as urban intensification along the two rail lines.²⁸

The city loop consists of four sets of tracks that circle the CBD. Redesigning two of the four tunnels will allow more trains to pass through the city and continue to the other side, rather than travelling around the city loop and returning. For example, several services on the Werribee and Frankston rail lines use this method to run more train services into the city and cross-city train lines are a feature of metro rail systems of many global cities. Once the Melbourne Metro tunnel is completed, the Craigieburn and Upfield lines will still share one city loop track, constraining the number of train services on each. At the same time, the

Glen Waverley line is proposed to terminate at Flinders Street Station, but the number of train services is limited by each service having to turn back afterwards.

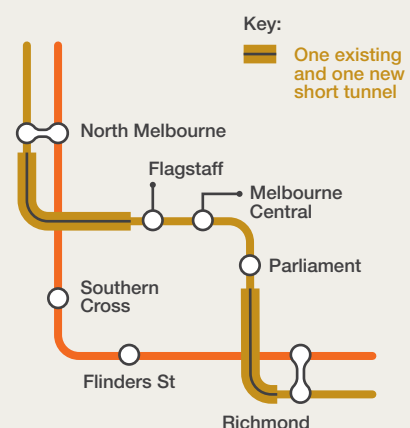
If Craigieburn and Upfield trains were separated to run through the city and continue to the other side, such as onto the Frankston or Glen Waverley lines, they would not need to share the same city loop track, and many more services could operate – increasing capacity and reliability. Separation would also have other benefits. It would enable new trains to be introduced on the Craigieburn and Upfield lines in future, using depot facilities to the north. Two cross-city lines would be a cost-effective way to run more trains to the CBD more often, providing more capacity across more lines on the rail network and providing better cross-city access to job precincts at Arden, Cremorne, and Caulfield, along with the sports and entertainment precinct east of the city centre. Separating the Craigieburn and Upfield lines would also enable the extension of suburban services beyond Craigieburn towards Wallan (see draft recommendation 69).

A redesigned city loop would create a pair of underground cross-city tracks from Richmond to North Melbourne. The Victorian Government should investigate the viability of constructing the two new short tunnels necessary for trains to

connect the Caulfield and Northern group city loop tunnels, and whether disruptions can be managed during delivery.

The project will likely need to be constructed immediately after the Melbourne Metro tunnel is opened. The window of opportunity to deliver the project will close as demand continues to increase, and the network may only temporarily have enough spare capacity to change train service patterns during construction to minimise passenger impacts. The Victorian Government must decide within five years whether to take advantage of this opportunity.

Figure 21: Reconfiguring the City Loop allows more trains to run through the city



3.1 Shape the transport network for better access

Prepare for Melbourne Metro Two

Draft recommendation 66



Within five years, complete the Melbourne Metro Two business case to protect the land required to construct it. To manage and grow demand along the proposed corridor, introduce premium bus services between Newport and Fishermans Bend, and between Victoria Park and Parkville, within five years.

As currently conceived, the proposed Melbourne Metro Two (MM2) includes two new rail lines from Clifton Hill, through the CBD and Fishermans Bend, to Newport. *Plan Melbourne* identifies the Melbourne CBD, Fishermans Bend, Parkville, East Werribee and Latrobe as NEIC and knowledge economy locations, needing high capacity transport connections to realise their potential.²⁹ For example, Fishermans Bend will require a heavy rail connection to achieve the 80,000 jobs and 80,000 residents anticipated for the precinct.³⁰ MM2 would connect Melbourne's CBD and Fishermans Bend with Parkville, East Werribee and Latrobe NEICs.

MM2 will also increase capacity on the train lines passing through Newport and Clifton Hill, helping relieve future pressure on the public transport network. Forecasts suggest that peak services will be operating at 142% capacity on the Clifton Hill group, and 118% on the Northern group (which includes the Werribee line),³¹ within five years of the Melbourne Metro tunnel opening.

Our previous assessment in 2016 noted MM2 had significant costs and a low preliminary cost benefit analysis.³² However, given the project contributes to resolving both network capacity issues, and the development of NEICs, the Victorian

Government should begin the work necessary to retain MM2 as a future option, refining this proposal and assessing any identified alternatives, including those that could reduce costs.

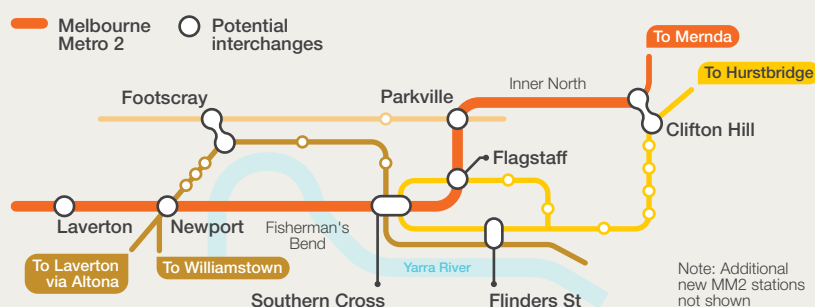
In the next five years, the Victorian Government should complete an MM2 business case, detailing potential staging of the project, and consider network and land use opportunities, including along existing rail corridors set to benefit from the project. MM2, or a similar project, may be required as soon as 15 years from now, and may take a decade to deliver.³³ Infrastructure Victoria is undertaking further modelling and assessment to refine the required timing of this recommendation for the final strategy.

The Victorian Government should identify and protect the preferred corridor and station sites, particularly where

development pressures threaten to inflate land prices or complicate construction. The business case should assess wider benefits for the metropolitan and regional networks.

In the next five years, the Victorian Government should introduce premium bus services to manage existing demand and develop future demand along the proposed MM2 corridor. These should link Victoria Park Station to Parkville, and Newport Station to Fishermans Bend to the CBD. This will also help reduce crowding on the Werribee and Clifton Hill train lines. The proposed new Fishermans Bend tram will provide better access to the CBD (see draft recommendation 43) in the short to medium term. However, modelling indicates that the Fishermans Bend tram will reach capacity in the longer term, which MM2 will help relieve.

Figure 22: Melbourne Metro 2 – Potential concept



3.1 Shape the transport network for better access

Protect a future option for a new cross-city motorway

Draft recommendation 67

Within five years, determine an updated future alignment and preserve the option for constructing, if required, a new motorway linking the Eastern Freeway and CityLink.

Despite making up only 7% of the state road network, Melbourne's motorways carry approximately 40% of arterial road traffic.³⁴ This means that each day, Melbourne's motorways support between 4 and 5 million trips.³⁵ Beyond commuter journeys, most of Victoria's freight is moved on roads. This means a safe, reliable and efficient motorway network, offering good traffic operations and better, reliable travel times, helps support the Victorian economy.³⁶

However, as population and freight movements grow, congestion and travel times increase. In 2036, private vehicles will comprise most motorised transport trips, consistently accounting for nearly 90% of transport trips in all our modelled scenarios. With congested car travel in Victoria rising by between 51% and 98% in 2036, those who rely on private vehicles will struggle to reach industrial, employment and other dispersed destinations.

In 2013, a business case was prepared for a new, 18-kilometre cross-city road connecting the Eastern Freeway at Hoddle Street, to CityLink, the Port of Melbourne Precinct and then the Western Ring Road, at Sunshine West. Whilst the eastern section of this project did not go ahead, following strategic modelling and evaluation,

Infrastructure Victoria previously recommended the Victorian Government plan for longer-term links connecting these roads.³⁷ The West Gate Tunnel, which is under construction, will provide a connection from the Western Ring Road to CityLink and the Port of Melbourne. The remaining eastern section between City Link and the Eastern Freeway can support access to major employment centres and can be an alternative to the M1 Monash Freeway and improve freight movement across Melbourne.

While introducing transport network pricing (see draft recommendation 52) would reduce congestion in inner Melbourne, future developments could increase or decrease the need for a cross-city connection, making it prudent to review potential alignments and protect the corridor. For example, other transport projects, or changes in population and economic growth or distribution, could change demand for east-west travel, as could changes in modal preferences.

The Victorian Government should retain the option of a longer-term link between the Eastern Freeway and CityLink by preserving an updated corridor for it to be delivered if future circumstances require. Planning for an updated corridor will need to consider

the implications of the construction of the West Gate Tunnel Project. It should also assess the likely impact of options such as transport network pricing and autonomous vehicles (see draft recommendation 17), both as potential alternatives and as complementary options. Any potential future business case should also consider opportunities to improve public and active transport. While there is no immediate need for a connection between the Eastern Freeway and CityLink, one may be necessary in 20 to 30 years.



Discussion questions

Infrastructure Victoria welcomes
feedback on the draft recommendations.
We are interested in:

?

How does the quality of public
transport services affect where
people choose to live and work?

?

What would make buses
more attractive to use?



To answer these
questions and more, visit
infrastructurevictoria.com.au

3.2

Plan for growth areas

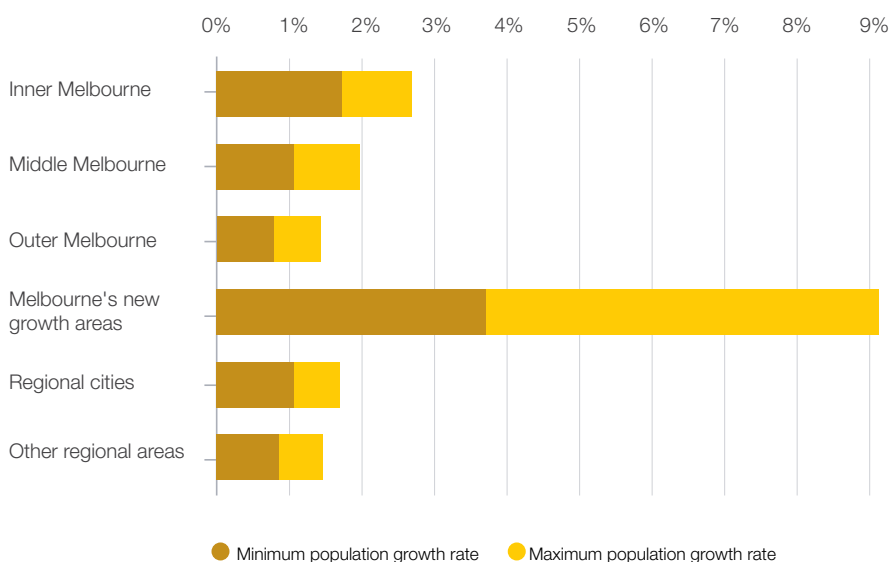
In the lead up to the COVID-19 pandemic, designated growth areas on the outskirts of Melbourne were experiencing rapid population growth, encouraged by relatively affordable housing¹ in new suburbs built under Precinct Structure Plans.

In all our modelling scenarios, Melbourne's new growth areas grow at a faster rate than anywhere else, albeit from a smaller base. Melbourne's new growth areas include parts of Cardinia, Casey, Hume, Melton, Mitchell, Whittlesea and Wyndham local government areas, which have all experienced rapid

population growth in the last decade. Inner Melbourne showed the next fastest growth, ranging between 1.7% and 2.6% annual growth, on average between 2018 and 2036. Though new growth areas showed a large potential growth range, between 3.6% and 9.0% each year, it was still relatively rapid, even in scenarios with low population growth. But the divergence between these growth rates reflects the different scales of the potential challenge facing Melbourne's new growth areas. Our modelling scenarios range from 235,000 to 975,00 extra people living in Melbourne's growth areas between 2018 and 2036.

Figure 23: New growth areas grow rapidly to between 2018 and 2036

This graph shows the minimum and maximum average annual population growth rates in different parts of Melbourne and regional Victoria between 2018 and 2036, across the different scenarios modelled by Infrastructure Victoria.



Source: Arup, *Strategy Update: Problem Definition Modelling Outcomes*, Report for Infrastructure Victoria, November 2020.

All these extra people accommodated in Melbourne's growth areas require new homes to be built. Unlike in established suburbs, almost all this construction is occurring in previously rural areas with little existing infrastructure and small starting populations.² This means new growth areas require considerable new infrastructure to provide residents with access to employment, services and amenities.³ They need many different types of infrastructure, from utility connections to new roads and public transport, along with access to schools, hospitals⁴ and modern telecommunications technology to participate in the contemporary economy and society.⁵

Governments are responsible for most of this infrastructure, and delivering it is expensive. In the next 30 years, all greenfield development infrastructure is estimated to cost \$36 billion to state and local governments – excluding asset

maintenance and renewal,⁶ although the exact quantum will depend on how quickly these areas are settled. Transport requirements account for over half this amount, or more than \$18 billion.⁷

On average, the Victorian Government spends about \$50,000 and local councils an extra \$38,000 on infrastructure to support each new home in Melbourne's growth areas.⁸ This is significantly more than the norm in established suburbs where up to 80% of new homes have been built in recent years.⁹ Building non-transport infrastructure for extra homes in new estates is typically around two to four times more expensive than in established areas, where existing infrastructure has the capacity to support development.¹⁰ Developer contributions in new growth areas of around \$23,000 per home assist, but neither level of government recovers the full cost of infrastructure provision.¹¹

Our modelling scenarios range from 235,000 to 975,00 extra people living in Melbourne's growth areas between 2018 and 2036.



Infrastructure sometimes does not meet the needs of growth area residents

While the need for infrastructure in new and developing communities is pressing, in some cases some types of infrastructure are arriving long after communities require it.^{12,13,14} Outer suburbs and new growth areas offer the most affordable homes, but are less connected to the rest of Melbourne and associated opportunities.¹⁵ These residents face more obstacles in finding jobs that suit their qualifications. The built form of new suburbs creates new problems for the environment and amenity.

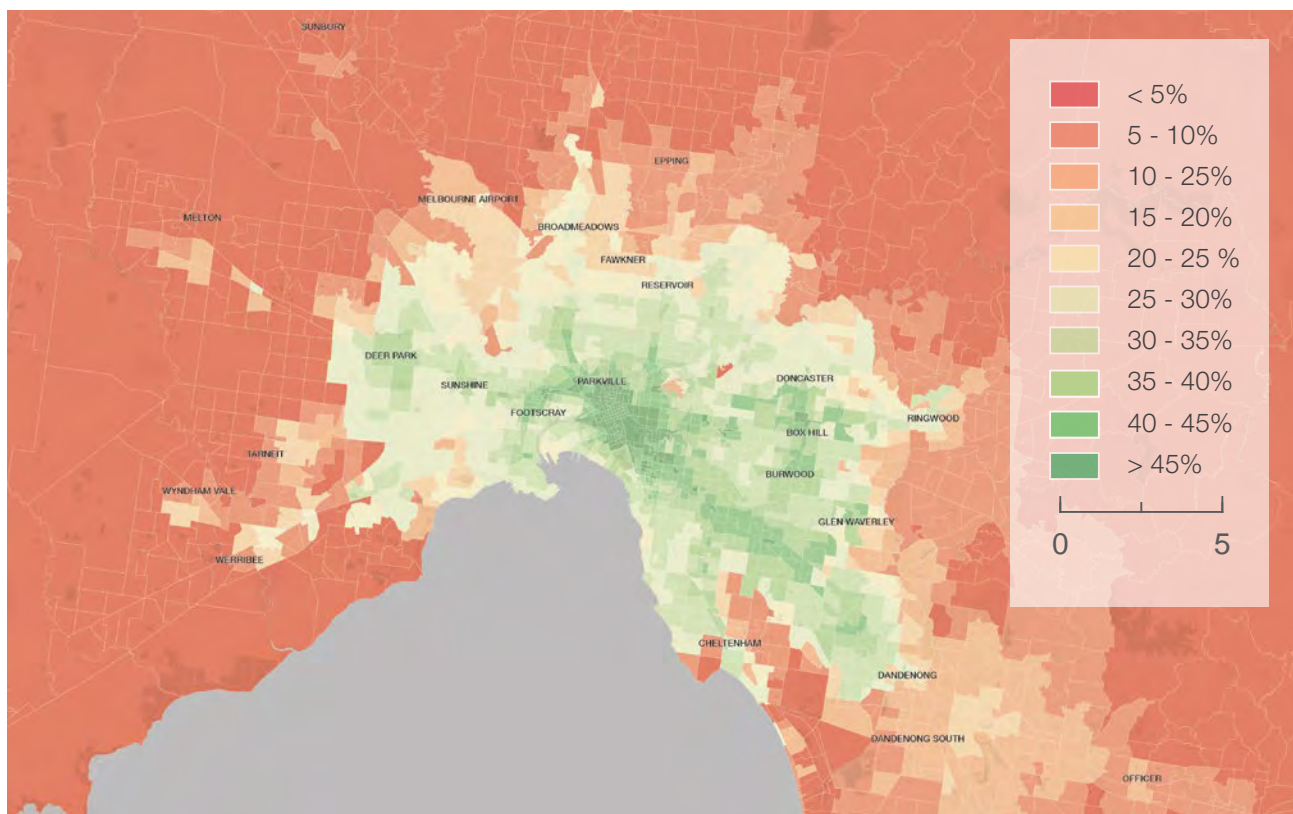
Without quick action, swelling populations will make these issues worse.

Transport connections within growth areas, and to the rest of Melbourne, are underdeveloped, leading to congestion, high car dependence and inefficient network use. Many outer suburbs do not have suitable, high capacity public transport options,^{16,17} with services less frequent the farther people live from the city centre,¹⁸ especially in the outer west and south-east.¹⁹

The available options are also often overcrowded.²⁰ With few public transport options, many commuters rely on their cars, increasing congestion on underdeveloped road networks that are already under pressure.²¹ Without enough arterial roads, more people use the city's motorway network for shorter trips, and this makes it less resilient to disruptions because motorists have few alternative routes.²²

Figure 24: Outer suburbs and new growth areas are projected to have poor access to jobs by public transport

People travel further on public transport compared to car. The following diagram shows the percentage of jobs that can be accessed within **60 minutes** using public transport in 2036, under a lower infrastructure investment scenario using the official population distribution projection.



Source: Arup, *Strategy Update: Problem Definition Modelling Outcomes*, Report for Infrastructure Victoria, November 2020.



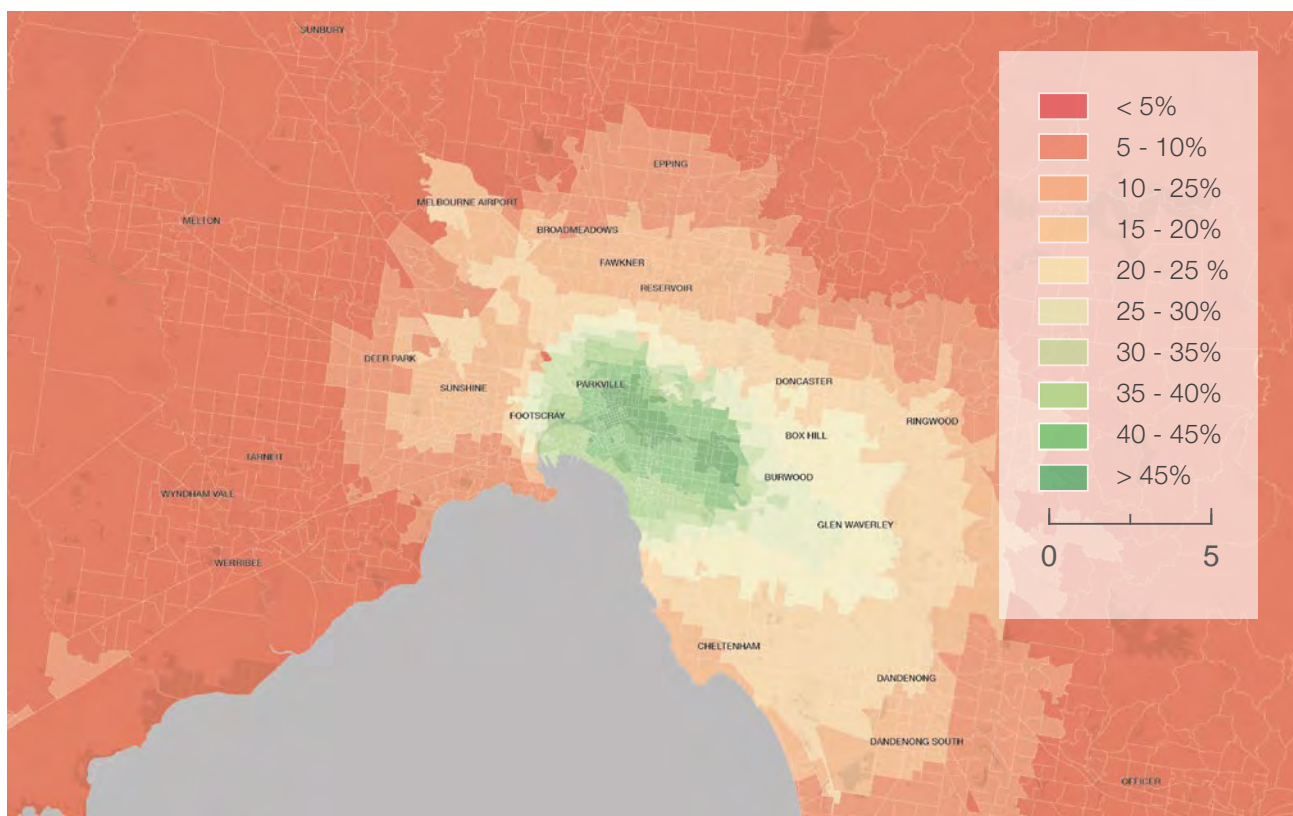
While the Victorian Government has committed to road projects in the growth corridors,²³ the growth in these areas means that they are unlikely to meet the scale of demand.

New growth areas offer fewer jobs than inner and middle suburbs. Our modelling shows in all scenarios, new growth areas gain a far larger proportion of extra population than extra jobs.

Rapid population growth in new growth areas can mean creating large communities with very few extra jobs, meaning they must commute further to access employment. Poor transport connections to the rest of the city exacerbate existing difficulties in accessing jobs and services.

Figure 25: Outer suburbs and new growth areas are projected to have poor access to jobs by private vehicles

The following diagram shows the percentage of jobs that can be accessed within **30 minutes** using private vehicles in 2036, under a lower infrastructure investment scenario using the official population distribution projection.



Source: Arup, *Strategy Update: Problem Definition Modelling Outcomes*, Report for Infrastructure Victoria, November 2020.

Many available jobs in growth areas are in industries primarily serving local needs, such as education, health care and retail,²⁴ rather than more highly paid, specialised roles.²⁵ While such jobs are more plentiful in other parts of Melbourne, limited transport options within and from growth areas make them difficult for many to access.²⁶ Poor job access contributes to lower labour force participation, higher unemployment and the underutilisation of workers,²⁷ especially as those working in outer suburbs are also more likely to be overqualified for their jobs than residents elsewhere in the city.²⁸

Converting land from agriculture and other uses can contribute to habitat loss and biodiversity decline, as paddocks and grassland are turned from natural environments into roads, buildings and

other development.²⁹ Relatively affordable smaller lot sizes are attractive for new residents,³⁰ without reducing people's desire for large houses. This covers much residential land in growth areas with detached houses, driveways and other manufactured surfaces – particularly in Melbourne's north and west.³¹ It leaves little space for vegetation on private property, reducing tree canopy coverage, and allows little capacity for future land use change.³² Melbourne's growth areas are particularly vulnerable to heat, but have fewer trees to provide shade and support evaporative cooling.^{33,34,35} More vegetation on both public and private land would help to reduce water run-off,³⁶ air pollution³⁷ and ultraviolet radiation,³⁸ as well as encourage biodiversity, active transport and neighbourhood amenity.



Better planning can help provide the right infrastructure, at the right time

Planning infrastructure for new suburbs on the urban fringe is complex. The Victorian Government, councils, landowners, private developers, service providers and other stakeholders must collaborate to promptly deliver the infrastructure communities need.³⁹ To guide the process, the Victorian Planning Authority (VPA) coordinates the development of Precinct Structure Plans (PSPs) for new growth area neighbourhoods. Each PSP covers an area expecting up to 30,000 residents and as many as 10,000 jobs, and considers infrastructure needs including roads, schools, shops, parks, transport and services.⁴⁰ In so doing, the PSP process aims to encourage more integrated decisions about land use patterns, transport, the environment and other investments.⁴¹

The PSP process encourages forward planning, but it is not flawless. While the VPA can encourage cooperation, no one entity is responsible for providing leadership, nor is accountable for the delivery of timely infrastructure and services.⁴² Individual government agencies

can choose the extent to which they include their own infrastructure and service planning in PSPs. This means the Victorian Government can find it difficult to ensure the timely, coordinated and sequenced delivery of infrastructure and services.⁴³

Future governance arrangements could provide greater clarity on stakeholder responsibilities and support monitoring that identifies gaps and systemic issues. Clearer policy direction would also support government agencies, councils, the private sector and local communities to make complementary investments. Overall, a more collaborative approach would better support people, businesses and service providers in growth areas, helping to drive productivity, greater social cohesion and improved environmental outcomes.

Transport is the single most expensive element of infrastructure provision in new growth areas. No single intervention will address all transport challenges faced by growth areas. Instead, investments will be required to better connect residents in new outer suburbs with jobs, education and

services. New road links and upgrades can help keep traffic moving and provide a foundation for high quality bus, cycling and walking networks.^{44,45} Buses can be rapidly deployed to provide flexible, inexpensive services to growing populations, helping prevent 'locked in' car travel patterns, and complementing the other public transport modes in the longer term.⁴⁶ Rail network upgrades can be prioritised in areas where population growth is greatest, road networks are underdeveloped and access to existing train service is difficult – as is the case in Melbourne's outer north and south-east.^{47,48}

Feasibility studies and business cases should continue to assess the economic, social and environmental impact of different options and an effective and efficient sequencing of investment. Transport modes, routes and infrastructure should continue to evolve with the communities they support. Reserving land for future transport corridors can also save time, complexity and money in the long-term, and support the development of more sustainable new communities.⁴⁹



Draft recommendations to improve planning for growth areas

Infrastructure Victoria makes the following draft recommendations to improve planning for growth areas. These build on draft recommendations elsewhere, and would be most effective if complemented by a more integrated approach to land use and infrastructure (Section 2.1).

3.2 Plan for growth areas

Prioritise and oversee infrastructure delivery in growing communities

Draft recommendation 68

Within two years, empower an appropriate government body to monitor infrastructure delivery in new growth areas and priority urban renewal precincts, and proactively advise on delivery sequencing and funding. In the next five years, develop program business cases for growth areas and precincts that consider the timing, sequencing and funding of necessary infrastructure.

Melbourne is accommodating significant population growth in new growth areas, and urban renewal precincts such as Fishermans Bend and Arden. Different precincts have unique infrastructure opportunities and challenges to accommodate growing populations. Melbourne's new growth areas need new infrastructure to support rapid creation of new communities. Urban renewal precincts need to change infrastructure that once supported large scale industry or low density housing to infrastructure supporting new residential uses.

Some infrastructure for new and developing communities is sometimes arriving after communities require it.^{50,51,52} Excluding transport, infrastructure capital costs in greenfield areas can be two to four times higher than in established areas when existing infrastructure in established areas has the capacity to support growth.⁵³ Service planning is also important to identify appropriate infrastructure responses in different areas (see section 3.3).

Plan Melbourne requires growth areas to be sequenced contiguously with previously approved precincts and staged to better link infrastructure delivery to land release.⁵⁴ This can help minimise infrastructure costs.

But there is not a clearly identified agency responsible for providing ongoing leadership, responsibility and accountability to ensure timely, coordinated and sequenced delivery of infrastructure and services.⁵⁵

The Victorian Government should empower an appropriate entity to monitor infrastructure delivery in greenfield growth areas and priority urban renewal precincts. The entity should initially monitor and report to the Victorian Government on delivery of infrastructure proposed in precinct plans, to identify infrastructure gaps for communities. This role can then be extended to identifying sequencing of investment and appropriate funding amounts. The selected entity should also advise on whether sequencing land release might result in better outcomes and reduce infrastructure pressures. This leadership can help manage the different growth fronts across Melbourne by better prioritising infrastructure, based on the Victorian Government's funding capacity. This approach could be adopted for regional cities and peri-urban areas in the future.

Lessons can be drawn from approaches applied in urban renewal and major infrastructure projects, such as New South

Wales' Place-based Infrastructure Compacts (see breakout box), Fishermans Bend and Arden. Other jurisdictions use program business cases that manage change with a strategic vision and a roadmap of how to get there that is regularly reviewed. Program business cases typically combine many related projects and activities, including across different sectors, that achieve a desired outcome together. They can help articulate the interdependency and coordination of investment decisions.^{56, 57}

Having a clearly identified and empowered body can prioritise network infrastructure that best meets both current and future demand. This supports people, employment and industries in their location choices, which can mean higher productivity, greater social cohesion and better environmental outcomes from better planning. By more clearly identifying priority places for investment, and the timing of infrastructure provision, the private sector, local government and the community can make complementary investments. An oversight entity can also help to reduce duplication of effort (and subsequent cost) across government by helping create shared priorities.

Case study

Learning from New South Wales' Place-based Infrastructure Compacts

New South Wales is piloting a new collaborative approach to place-based infrastructure planning and provision. Overseen by the Greater Sydney Commission, Place-based Infrastructure Compacts (PICs) bring together the many types of infrastructure needed to achieve better place-based outcomes. The pilot focuses on the Greater Parramatta and Olympic Precinct, one of the fastest growing areas in Greater Sydney.⁵⁸

The PIC sets out different scenarios for the precinct's future, from a 'business as usual' scenario with minimal change, to a 'visionary' scenario where the precinct experiences a step change and becomes a '30-minute city'. Crucially, short, medium and long-term projections of population, homes and jobs were completed for each scenario. The Commission worked collaboratively with relevant agencies to identify all the necessary infrastructure needed to support each scenario. This included documenting the most cost-effective timing and sequencing of growth, and the responsible agencies, costs and potential funding sources for the supporting infrastructure.

Infrastructure types included transport, justice, housing, education, cultural infrastructure and green infrastructure.

The PIC provides a blueprint to guide the future development of the precinct, and transparently sets out the costs associated with achieving different outcomes. It uses collaboration and rigorous evaluation to identify places where growth can be accommodated cost-effectively and provides greater certainty and better coordination. Building on the findings of the pilot, a draft Strategic Business Case was prepared, proposing 10-year service and infrastructure priorities to respond to current, emerging and future needs within budgetary limits.

Victoria can learn from the ideas in the Place-based Infrastructure Compacts and adapt them for use here. Service planning needs to be advanced to inform infrastructure requirements, and how growth occurs needs to be continuously monitored to inform service and infrastructure planning. Critically, they require a credible body who can facilitate collaboration across the many different stakeholders in a place.

3.2 Plan for growth areas

Expand rail access in outer suburbs

Draft recommendation 69

In the next five years, complete plans to progressively expand access to rail services in growth areas and purchase remaining land required for rail corridors and stations. Immediately introduce premium bus services toward Clyde, Wollert and the Mornington Peninsula. Develop business cases to improve the Melton, Wallan and Wyndham Vale corridors, and conduct a feasibility study for a Wollert public transport corridor.

Melbourne's outer suburbs have underdeveloped public transport networks. Service options are few,⁵⁹ often infrequent, overcrowded, and distant from many homes. Without good transport choices, commuters are forced to rely on cars, causing congestion and compromising access to jobs, education, services and social connections. Workers using public transport in Melbourne's new growth areas and outer suburbs are much less likely to be able to access jobs within reasonable travel times than counterparts in inner and middle suburbs.⁶⁰ Limited transport access to good jobs may force people into lower paid, lower skilled work.⁶¹

New growth areas in the west around Wyndham Vale and Melton, in the north around Wollert and Wallan, and in the south-east around Clyde, are projected to grow rapidly and accommodate tens of thousands of new residents by the mid-2030s.⁶² These areas have underdeveloped road networks.⁶³ V/Line services currently operate on the Wyndham Vale, Melton and Wallan lines, adding more demand and requiring solutions that work for regional services sharing the tracks.

The Victorian Government should increase passenger rail capacity in new growth areas and expand their access to the metropolitan rail network. Within five years, it should complete a detailed feasibility study to determine the best approach to progressively providing more capacity to Wallan and a new public transport corridor connecting Wollert to the Mernda line. A detailed investment pathway will be critical to achieve these objectives. While an immediate rail connection to Wollert is not required, the Victorian Government should examine a new line following the opening of the proposed Melbourne Metro Two (see draft recommendation 66).

The Victorian Government is currently investigating the feasibility of a Clyde rail extension and developing the Western Rail Plan, including options for the Wyndham Vale and Melton lines. It is making many large investments in rail projects, but investment in expanding the capacity of these lines has not been confirmed. To preserve these options, the Victorian Government should buy the remaining portions of land it would need for extra rail extensions and stations. An extension to Baxter-Langwarrin is also a future possibility.

These steps should be complemented by efforts to improve connections into Frankston activity centre and railway station, including the hospital and education precinct, from the Mornington Peninsula.

After demonstrating their viability, establishing new rail services takes time. The Victorian Government should immediately introduce premium bus services towards Clyde, Wollert and the Mornington Peninsula to provide for growing populations, encourage public transport patronage and establish behavioural patterns while rail projects are considered.

No single intervention can solve Melbourne's transport challenges. The transport network is interconnected, and a suite of solutions will be required to connect outer suburban growth areas with jobs, education and services. Growth area rail extensions combined with bus service reforms (see draft recommendation 62), rail line capacity upgrades (see draft recommendation 64) and new connections to suburban jobs (see draft recommendation 63) will also improve access to and from outer Melbourne.

3.2 Plan for growth areas

Expand and upgrade Melbourne's outer suburban road network

Draft recommendation 70

In the next five to 15 years, deliver a program of upgrades to Melbourne's arterial road and freeway network beyond what is currently funded, focusing on congested roads and corridors in outer metropolitan and growth suburbs council areas.

Melbourne's arterial road network forms the major connections to move people and goods between the city's major regions, activity centres, freight terminals, tourist areas and population centres. Arterial roads are high capacity two-way roads that support moderate vehicle speeds, with intersections to regulate traffic flow. Arterial roads help funnel traffic to Melbourne's motorways and are also movement corridors for modes, including buses, cyclists and pedestrians.

Melbourne's new growth areas includes the four fastest growing metropolitan municipalities of Wyndham, Casey, Melton and Whittlesea.⁶⁴ More people living in these places will strain an already congested, under-developed road network. The sparse road network in Melbourne's new growth areas and outer suburbs is causing congestion, and is less resilient to disruptions, making travel times more variable. New growth areas and outer suburbs already have fewer jobs, with both higher rates of unemployment and more workers in jobs they are overqualified to do; without intervention, this will likely continue.⁶⁵

Existing interstate and intrastate road corridors pass through growth areas, particularly the Western, Calder and Hume Highways. They are a mix of freeways and highways, with some sections having busy intersections, driveway access to properties and lower speed limits, reflecting previous highway standards when these roads served rural settings. These road corridors need to be upgraded to effectively serve regional Victoria and interstate travel, along with increasing travel demand generated by increasing populations in Melbourne's growth areas.

The Victorian Government has committed to deliver packages of upgrades in outer suburbs in the northern, south-eastern and western growth corridors, at various stages of delivery.⁶⁶ In the past five years the Victorian Government has invested \$28 billion in building and improving roads in Melbourne, including for outer suburbs roads. However, with more population growth, outer suburban arterial roads will become increasingly congested and will require further investment after the current program is completed.

New road links and upgrades in the outer areas of Melbourne where the network is underdeveloped will help keep traffic moving and provide a foundation for a high quality network for buses, cycling and walking.

It also helps users get to rail stations. Road improvements also help provide better access to industrial and freight precincts, where public transport does not work well. Consequently, people living in the outer suburbs can better reach jobs, services and social opportunities. Outer suburban road improvements are adaptable, 'no regrets' investments, due to the paucity of existing roads.

Road upgrades could include construction of new links, extra traffic lanes, widening and upgrades of bridges and structures, intersection upgrades, bus lanes and priority measures, better walking and cycling paths and technology improvements. We have previously highlighted the need to provide a program of upgrades to the arterial road network, focusing on congested roads in outer metropolitan areas. The current investment program costs \$4 billion.

3.2 Plan for growth areas

Target 30% tree canopy coverage in new growth areas

Draft recommendation 71

Achieve 30% tree canopy coverage in new growth areas by mandating coverage during precinct development. Fund relevant Victorian Government agencies and local government to plant, replace and maintain canopy trees.

Urban tree canopies and vegetation help ease the extra heat trapped in urban environments by absorbing heat, providing shade and supporting evaporative cooling.^{67,68} Vegetation also reduces water run-off,⁶⁹ air pollution⁷⁰ and ultraviolet radiation.⁷¹ Mature trees encourage more walking and cycling to improve human health,^{72,73,74} enhance safety perceptions, and support biodiversity.⁷⁵

The combination of public parks and private gardens in Melbourne's established suburbs creates a network of trees and vegetation, helping to cool these suburbs and enhance their liveability. But new suburbs in designated growth areas are increasingly unlikely to have enough room for trees to form a canopy. In 2006, residential lots smaller than 500 square metres comprised 30% of new land releases, but by 2018, they constituted 78%.⁷⁶ Coupled with Australia building some of the world's largest houses,⁷⁷ the land available for canopy trees has dramatically reduced in new suburbs. More houses per hectare also means more driveways and crossovers, which reduces space for trees.⁷⁸

Melbourne's growth areas are particularly vulnerable to heat, especially former grasslands in the city's north and west.⁷⁹ Despite having little natural tree cover, the urban development in these areas

introduces enormous land use change with significant environmental effects, requiring more trees than previously existed. Protecting existing vegetation, planting new trees, and supporting better tree maintenance will help make Melbourne's new suburbs safer and more liveable.

Currently, land developers must 'offset' the removal of native vegetation resulting from urban expansion to compensate for loss of native plant life.⁸⁰ Although this helps prevent a net loss of native vegetation overall,⁸¹ the replacement trees and shrubs are typically planted far from newly built communities.⁸² And Victoria is yet to deliver two grassland reserves to offset native vegetation loss from development in Melbourne's extended urban growth boundary.⁸³

The Victorian Government should mandate that new growth area precincts achieve a minimum 30% tree canopy cover, as proposed in new draft guidelines for greenfield precinct structure plans.⁸⁴ Permit requirements and developer contributions should be a key means by which this 30% tree canopy coverage is achieved. Public land should accommodate up to a maximum of 70% of that required canopy cover. Any existing trees retained during land development can be counted towards achieving the minimum of 30% canopy cover on private land, which also helps preserve existing biodiversity.

To ensure compliance, the Victorian Government should develop clear guidance materials that inform planning approvals and precinct structure plans, and undertake monitoring and enforcement activities. For example, guidelines could require planting trees of appropriate maturity, consider species diversity, and support maintenance of new trees on private land for at least two years after planting. Stakeholders have identified that some utility provider standards may prevent achieving tree canopy coverage.

For the contribution of public land to the tree canopy target, the Victorian Government should also deploy targeted funding for planting, maintenance and replacement. This funding can be provided to local governments to maintain canopy trees on local and connector streets, boulevards and parks, once developer maintenance periods conclude. For example, the NSW Government funds a grants program aiming to plant five million trees in Greater Sydney.⁸⁵

Many Victorian Government agencies manage trees on public land in these areas. For example, future funding can be allocated to three new growth area parks in Casey, Melton and Wyndham, managed by Parks Victoria. Funding could also support tree planting and maintenance on arterial roads managed by VicRoads and the Department of Transport.



Discussion questions

Infrastructure Victoria welcomes feedback on these draft recommendations. We are particularly interested in the following:

?

What else can the Victorian Government do to ensure the right infrastructure arrives at the right time in areas experiencing rapid growth?

?

How should the Victorian Government encourage more trees to be planted on private land in new growth areas?



To answer these questions and more, visit infrastructurevictoria.com.au

3.3

Align social infrastructure with better service delivery

All Victorians need education and health services during their lives, and many will need social housing, hospitals and emergency services. Efficient justice services help keep the community safe and ensure people are treated fairly. Largely funded by governments, Victoria's social services are especially important in helping to address disadvantage, and foster healthy, safe and inclusive communities.

Social services require infrastructure: buildings, spaces and other assets that connect people to service providers, both in person and increasingly online.^{1,2} This infrastructure helps Victorians attain better education, health, social identity, inclusion and community cohesion, directly impacting people's wellbeing.³ But insufficient, poorly targeted, or ageing infrastructure can hinder access to timely, quality services. Social infrastructure can also have overlapping functions and objectives. Aligning these can help achieve better outcomes, but doing so can also make planning and managing infrastructure more complex.⁴ The quality and accessibility of different types of social infrastructure varies, including in different places and for different groups of people.

The Victorian Government has the lead responsibility for planning, regulating, funding and operating Victoria's largest and most expensive social infrastructure assets, including schools, hospitals, social housing stock and correctional facilities. It shares funding responsibilities for social services and infrastructure with the Australian Government and local councils.

A growing and increasingly diverse Victoria needs more social infrastructure

Victoria's social infrastructure needs grow and change with its people. Drivers of demand differ across sectors,⁵ with the most significant long-term factors including population growth, changing demographics and evolving community expectations. In the short to medium term, the pandemic-driven economic downturn will continue to see increased demand for many services. Robust social infrastructure can help meet spikes in demand, support the most vulnerable and disadvantaged, and promote fairness and opportunity for all Victorians.

Over one million students will be enrolled in Victorian schools by 2023.⁶ Demand for hospital inpatient services could grow by over 80% by 2042.⁷ More people are seeking mental health assistance, with mental illness disproportionately affecting young people, people experiencing disadvantage, residents of remote areas, Aboriginal Victorians, people from non-English speaking backgrounds, and people who are lesbian, gay, bisexual, transsexual, queer and intersex.⁸ These groups have different and specific needs that social infrastructure will need to respond to. Research indicates Victoria will need many thousands of new social housing dwellings each year to meet demand.⁹

Managing demand on infrastructure and making the most from existing assets means building new infrastructure only when a genuine need exists. The sheer scale of projected demand for many social services means more infrastructure will be needed, combined with innovations in service delivery and upgrades to existing assets. This is particularly true in fast growing communities on the edges of cities.¹⁰ Melbourne's new growth areas have little social infrastructure today, particularly in the west and north, while outer suburban facilities are unlikely to meet long-term growth projections.



Short-term, reactive approaches are inefficient and unsustainable

Best practice social services often focus on prevention and early intervention that strengthens individual and community resilience and pre-empts people reaching crisis.^{11,12,13} This is usually more equitable, effective and cheaper than waiting for problems to get worse, requiring more complex and expensive services. Investing in infrastructure that supports early interventions can similarly reduce the complexity of new infrastructure, or delay the need for new facilities. In health, outreach programs, primary services, rehabilitation and day services can divert patients from expensive specialist and acute care. Community hospitals can meet some early intervention needs, reducing burdens on acute care. Good schools can improve students' chance of living productive, healthy lives. Social housing can reduce people's reliance on more costly services in the long run.¹⁴

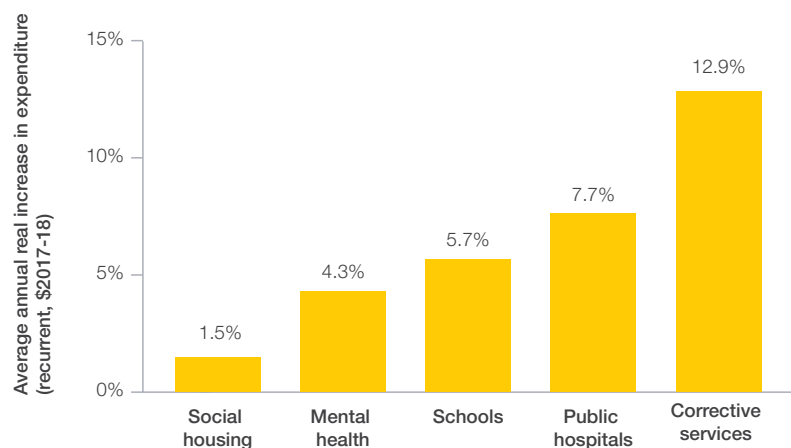
Victorian Government expenditure growth in social services has outpaced population growth, highlighting the pressure to keep spending sustainable and efficient.

But social infrastructure planning and funding approaches are often reactive and short-term. 'Just in time' approaches can generate a 'lumpy' investment profile, and make long-term infrastructure planning difficult. Service providers often respond by adopting short-term responses, focusing on crisis management and meeting acute need. This can lead to reactive, expensive infrastructure projects, which are often unable to meet long-term service needs.

Investing in infrastructure that supports early interventions can reduce the complexity required of new infrastructure, or delay the need for new facilities.

Figure 26: Funding for services has not grown evenly

Average annual growth rate of Victorian Government expenditure in select social services, 2013-14 to 2017-18



Source: Infrastructure Victoria analysis of Productivity Commission, *Report on Government Services 2019, 2020*.



Aligning service planning and infrastructure supports early intervention

New infrastructure can take years to plan, design, pass regulatory approvals and be built. This renders infrastructure relatively slow to react to rapid changes in demand. It means infrastructure planning should aim to keep capacity at or better than accepted benchmarks, including to provide appropriate 'surge' capacity that can manage spikes in demand, including from social or legislative changes or from natural disasters, economic recession or pandemics. Decision-makers need to plan now for future needs, not only those experienced today, informed by quality service planning.

Identifying long-term service needs, and then aligning infrastructure planning – and funding – with those identified needs, can generate better value for taxpayers and better services. Priority investments should be informed by evidence-based service planning, including projections of infrastructure demand, and aim to address people's needs as early, quickly and

inexpensively as possible. Both demand projections and service planning should be regularly reviewed to reflect the best current data, including recent research, project evaluations and developments in best practice. Critically, service planning should be done before infrastructure planning.

Social infrastructure usually has a long lifespan, meaning it can struggle to keep pace with technological change and service delivery developments. Inflexible facilities risk becoming prematurely redundant, unable to provide modern, safe services. Victoria needs social infrastructure that can be easily maintained, upgraded and expanded over time. Building new social infrastructure to be modular and with technological backbones that are easily updated will enable faster, less expensive upgrades. Where possible, new infrastructure should be built to enable future expansion or additional use, including by complementary social services.

Case study

Planning school infrastructure for growing communities

The Department of Education and Training (DET) uses projections of demand to better understand future service need. Service planning helps to identify the most appropriate infrastructure responses for different areas, the amount of funding required, and the efficient sequencing of investment. This approach informed \$3 billion in new funding in 2020 for school upgrades and new schools, plus the earlier commitment of \$1.8 billion in 2019 to build 100 new schools by 2026.¹⁵

DET's projections, service planning and relatively consistent funding allow it to use a mixture of measures to manage and respond to increasing demand for schools. These measures go beyond building new infrastructure, and include expansions, upgrades and modernisations – sometimes using relocatable or modular buildings – and policy approaches to manage demand, such as the application or amendment of school zones.¹⁶

Of the 38 new schools due to open by 2022, most will be in greenfield areas on Melbourne's outskirts¹⁷ subject to Precinct Structure Plans (PSPs). DET uses PSP processes to confirm service needs and appropriate sites for new schools, as well as to secure more funding from Growth Area Infrastructure Contributions levied from developers through the PSP process.^{18,19}

Importantly, DET provides transparency of its project pipeline via a website.²⁰ This provides parents, school managers, government agencies and the broader public with better, more timely information relevant to their decisions and greater awareness of how their taxes are spent. It also provides the opportunity for more collaborative planning with local government to deliver education and community hubs on school sites.



Effective social infrastructure is adaptable and targeted to communities

Successful new social infrastructure works for the people it supports, and few 'one size fits all' approaches work effectively in all of Victoria's diverse communities. Infrastructure planning and delivery should account for current and likely future local community needs, including its demographics, existing infrastructure capabilities, and the community's capacity to use and operate new infrastructure.

Place-based approaches can help communities deliver local solutions to community needs by bringing government, service delivery organisations, local people, community organisations, and businesses together.²¹ Where appropriate, government agencies can benefit from working with service users to co-design and deliver infrastructure that delivers real outcomes for local residents. Local knowledge, community engagement and cooperation

with service users can also make infrastructure more fit for purpose and reduce risks of potential problems later.^{22,23}

The *National Agreement on Closing the Gap* recognises the importance of place-based partnerships between government and Aboriginal representatives to improve the provision of essential services to Aboriginal communities.²⁴ Aboriginal community ownership and control of social infrastructure already helps to deliver quality services, and demonstrates better outcomes are achieved when Aboriginal people have a genuine say in the design and delivery of services that affect them.²⁵ Aboriginal self-determination should be embedded in service planning,^{26,27} with communities empowered to plan, own and operate infrastructure that delivers culturally appropriate services.^{28,29}

Local knowledge, community engagement and cooperation with service users can also make infrastructure more fit for purpose and reduce risks of potential problems later.



Priorities should be transparent and reflect the best possible evidence

Clear priorities and targets can help drive long-term planning and funding beyond annual budget cycles. They can also promote innovative and more efficient approaches to service delivery, in some cases reducing the quantity of infrastructure required or deferring the need for new assets. Using demand projections and best practice service planning to shape planning will help Victoria transition from a 'just in time' approach of one-off investments to a long-term social infrastructure pipeline that provides required services in an appropriate, systematic and sustainable way. This pipeline should show the sequencing and location of priority projects.

These priorities and targets, along with detail on the supporting infrastructure pipeline, should be as transparent as possible. Transparency supports better

planning, certainty and efficiency across the government, non-government, private sector and other stakeholders in Victoria's social service systems. Better visibility across government agencies can help identify opportunities to share infrastructure that delivers better outcomes for service users, and promote more integrated land use and infrastructure planning. Public, long-term infrastructure planning would also promote more robust procurement practices, saving taxpayers' money and delivering projects with fewer disruptions to service quality.

Victorians' needs will continue to evolve, driven by changing demographics, social expectations, technology, and developments in best practice service and infrastructure delivery. Social infrastructure must continue to evolve too.



Draft recommendations to support better services

Infrastructure Victoria is considering the following draft recommendations to support better long-term alignment between service and infrastructure planning. These recommendations reflect the need to adopt a more proactive, long-term and transparent approach to new social infrastructure to support Victorians with timely, modern and high quality services. Having long-term infrastructure plans in

priority sectors (see draft recommendation 32), embracing innovative ways to connect people to services (section 1.3) and upgrading and renewing existing assets to meet changing needs (section 2.4) will help to meet this goal. Infrastructure Victoria has also made relevant social infrastructure draft recommendations for Victoria's regions (see sections 4.3 and 4.4).

3.3 Align social infrastructure with better service delivery

Co-design an Aboriginal Community-Controlled Infrastructure Plan

Draft recommendation 72

Immediately commence a co-design process with Aboriginal Victorians to develop a plan to guide investment in Aboriginal community-controlled infrastructure to meet current and future social, economic and cultural needs.

Victoria's Aboriginal population is projected to grow more than twice as fast as the general population in the decade to 2028.^{30,31} The Aboriginal population's age and geographic distribution is different from other Victorians,^{32,33} and Aboriginal people experience disadvantage at a higher rate on almost all indicators.³⁴ This means Aboriginal Victorians' service needs will likely expand rapidly, in different places, and require a similarly rapid expansion of supporting infrastructure.

The Victorian Government has made self-determination the cornerstone of its Aboriginal policy.³⁵ It has formally legislated a Treaty process between the Victorian Government and Victoria's First Peoples,³⁶ and committed to supporting self-determination in decision-making in the *National Agreement on Closing the Gap*.³⁷ Applied to infrastructure, self-determination should empower Aboriginal communities to own, design and control infrastructure for their social, economic and cultural needs. Aboriginal community-controlled organisations adopt holistic approaches to delivering services and infrastructure, incorporating cultural safety, flexibility, diverse services, prevention, promotion, advocacy and the empowerment of individuals, families and community.³⁸ However, historical dispossession and a lack of recognition means they have

had limited opportunities to acquire infrastructure, which has left many existing facilities insufficient and not fit for purpose.

The Victorian Government has recently taken steps to bolster Aboriginal community-controlled organisations' ownership of infrastructure. It has transferred ownership of 1448 social housing properties to Aboriginal Housing Victoria,³⁹ allowed the removal of restrictive 'first mortgages' on property owned by Aboriginal organisations,⁴⁰ established a \$21.7 million Aboriginal Community Infrastructure Fund⁴¹ and committed \$3.3 million to the community-controlled sector.⁴² There is, however, currently no overarching needs analysis or strategy to guide investment. Current funding supports individual Aboriginal organisations to develop business cases on a project-by-project basis.⁴³

The Victorian Government should immediately start developing an Aboriginal Infrastructure Plan collaboratively with Aboriginal Victorians, including include peak bodies, Traditional Owner Groups, and Aboriginal community representatives. This plan should reflect self-determination principles and priorities in the *National Agreement on Closing the Gap*, including an initial focus on infrastructure to support improved early childhood care and development, housing, health and disability services.⁴⁴ The plan should identify current

and future infrastructure needs, appropriate facility locations, and suitable funding, design and procurement approaches (potentially informed by Infrastructure Victoria's regional and metropolitan profiles).⁴⁵ Over time, the plan's scope can be progressively expanded to include diverse infrastructure such as integrated facilities, sporting infrastructure, and facilities that protect the heritage, learning and practising of traditional language and culture. It could also recognise economic and cultural tourism opportunities in regional areas (draft recommendation 83).

Case study

Murray Valley Aboriginal Cooperative

The Murray Valley Aboriginal Cooperative operates an integrated facility providing diverse programs for Aboriginal people in Robinvale including childcare, kindergarten, health and medical services, wellbeing services, housing and aged care. Focusing on self-determination, empowerment and resilience, the Cooperative encourages the involvement of the Aboriginal and wider community to promote understanding of the challenges facing indigenous people in the region.⁴⁶

3.3 Align social infrastructure with better service delivery

Set targets to grow social housing

Draft recommendation 73

Immediately set a transparent social housing growth target to reach at least the national average of 4.5 social housing dwellings for every 100 households by 2031.

Social housing infrastructure meets a basic need of low income Victorians for secure, affordable and appropriate housing. The private market is not supplying such housing.⁴⁷ Homelessness in Victoria increased by more than 40% in the decade to 2016, reaching about 25,000 on any given night.⁴⁸ Low income households in rental stress has grown by nearly 60% in the decade to 2018, to more than 140,000.⁴⁹ Few private rental properties are affordable to people on low incomes. Only 5.6% of new Victorian rentals are affordable to someone receiving Centrelink benefits.⁵⁰

Social housing is effective at preventing homelessness⁵¹ and its income-linked rents prevent housing stress. Social housing, like other infrastructure, needs long lead times for careful design, planning, regulatory approvals and procurement. Delivering social housing at scale requires a rolling construction program planned over several years. Like other infrastructure spending, social housing can have stimulatory economic effects, especially for the residential construction sector.

We estimate Victoria had 3.3 social housing dwellings for every 100 households in June 2019,⁵² compared with the national average of 4.5.⁵³ The Victorian Government made a significant investment in social housing as

part of its \$5.3 billion Big Housing Build program, including more than 9,300 new social housing dwellings.⁵⁴ It has also committed to developing a 10-year strategy for social and affordable housing and introducing reforms to deliver the strategy.⁵⁵ In the past, Victorian capital expenditure on social housing was less than 60% of the national average.⁵⁶ The Australian Government has compounded the problem by steadily reducing real funding per capita over time.⁵⁷ Extra Australian Government investment would be welcome, especially now Victoria has addressed its capital funding levels, which were historically lower than other states and territories.⁵⁸

All estimates, including our own,⁵⁹ indicate Victoria requires much more social housing to meet the needs of all Victorians. Estimates vary from 1,700 each year – just to keep pace with population growth⁶⁰ – to 8,300 annually to cover all evident need.⁶¹ Reaching a provision rate of 4.5 social housing properties for every 100 households by 2031 would require around 4,900 extra properties each year, or as little as 3,900 with lower population growth.^{62,63}

The Victorian Government should publicly set targets for social housing growth so it can plan and fund a project pipeline to achieve them, especially after the initial allocation in the Big Housing Build program

is exhausted. Targets can clearly define Victorian Government expectations, drive longer-term planning and funding beyond annual budget cycles, and help maintain accountability for results.

Public debate has often been distracted by complex financing mechanisms for social housing, which merely change the funding profile, or at best achieve marginal cost reductions. However, one study suggests direct government capital investment could reduce social housing costs by up to 24% compared with operating subsidies.⁶⁴ The cost of this draft recommendation depends on the target, location and timing, the funding or financing mechanism, and population growth. For example, the Australian Housing and Urban Research Institute estimates that a new dwelling in Melbourne costs between \$220,000 to \$442,000.⁶⁵

Investing in new social housing can also assist with renewal of existing social housing assets (see draft recommendation 57). Well-designed housing can provide new, accessible and energy efficient premises for tenants, allowing easier retirement of old stock and better configuration to match tenant needs. It can also free up sites for extra social housing.

3.3 Align social infrastructure with better service delivery

Build new hospital capacity

Draft recommendation 74

In the next five years, reserve land for future hospital sites. Over 30 years, build new public hospital capacity to meet Victoria's future needs, especially demand increases from Melbourne's rapidly growing outer northern and western suburbs.

Victorians trust that they will receive high quality and timely care from public hospitals when they need it. Hospital services include acute emergency and critical care, outpatient services and longer stay support. Victorians enjoy one of the highest average life expectancies in the world,^{66,67} thanks in part to the public hospital system.

With a growing and ageing population, health care needs will change. Better treatments will become available for illnesses, but demand for treatment of chronic disease is increasing.^{68,69,70} Prevalence and types of illness will also change and people have high expectations of the health system.⁷¹ In the 2017-18 financial year, Victorian public hospitals saw over 1.8 million inpatients and managed almost 1.8 million presentations to emergency departments.⁷² This demand will continue to grow, with the greatest share of new demand coming from Melbourne and its outer suburbs (Figure 26).⁷³

To maintain world class health care into the future, the Victorian Government will need to expand hospital capacity and build new hospitals as part of its demand management strategy. Department of Health projections indicate that demand for

hospital inpatient services could grow by over 80% by 2042.⁷⁴ Without managing some hospital demand, Melbourne may require more capacity equivalent to hundreds of extra beds every year over this time.⁷⁵ An increased focus on prevention, early intervention and better models of care will moderate some of this demand, but it remains likely that significant hospital infrastructure investment will be required.

The Victorian Government will need to expand hospital capacity across much of the state, and will need a long-term plan showing the sequencing and location of expansions. This will require expanding some existing hospital sites as well as planning for new hospitals to be built with transport access for those areas most in need of more services. The Victorian has announced funding for the first stage of the new Melton hospital, and is planning for an expansion of the Werribee Mercy Hospital. These announcements can be built upon in a longer term plan.

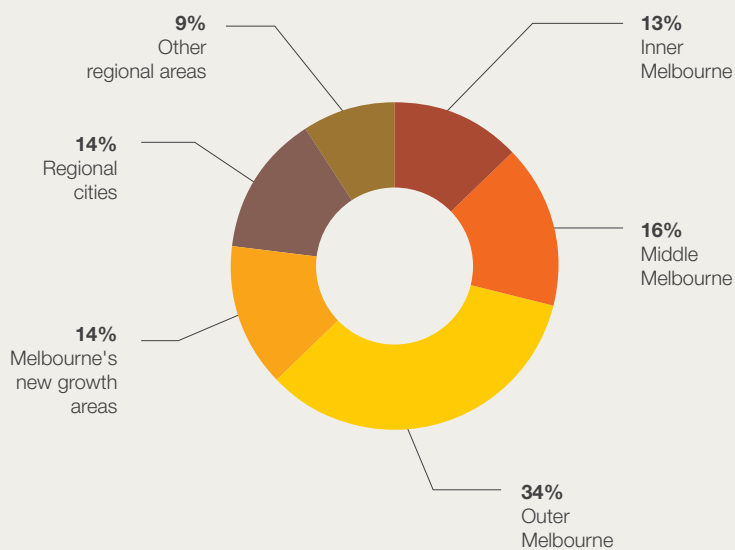
In building new hospitals, the Victorian Government should continue to plan for and deliver infrastructure that can be easily maintained, upgraded and expanded over time. This would allow facilities to be readily adapted to changing need, technology and

best practice to deliver modern, safe and improved care. Upgrade and renewal of ageing facilities (see draft recommendation 58) will also support a hospital's intended capacity across its life, delaying the need for new hospitals. Preserving options such as larger footprints or the ability to build extra wings or storeys could also support future upgrades and result in fewer interruptions to services.

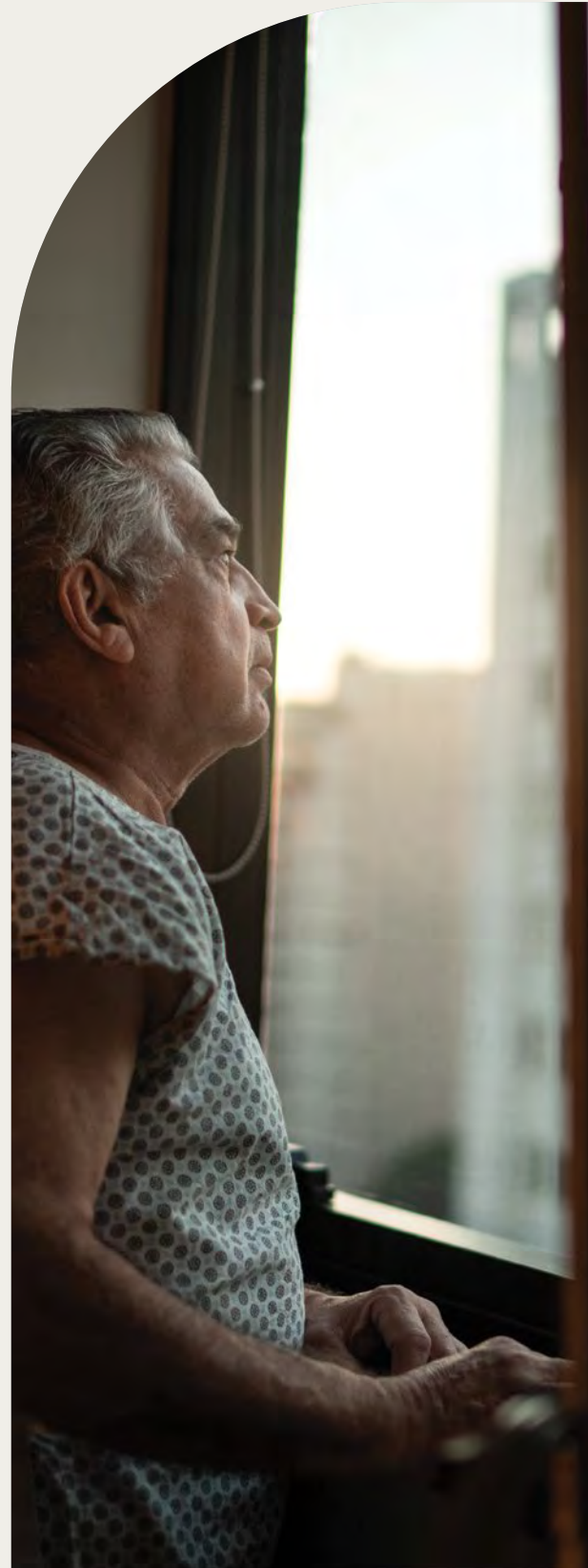
Upgrading and expanding facilities at existing hospital sites offers a cost effective and fast way to deliver more capacity.⁷⁶ Such upgrades and expansions will not be enough to meet all future demand. New hospitals will be necessary, despite their cost. For instance, the new 504-bed hospital in Footscray is expected to cost \$1.5 billion.⁷⁷ To cater for half the projected demand with extra hospital capacity in the next 30 years, at least \$10 billion will be required, mostly to expand capacity in Melbourne. Forward planning can secure land early, potentially reducing costs.

Figure 27: Demand for hospital services will grow fastest in Melbourne's outer suburbs and growth areas

The diagram shows the share of projected new hospital inpatient service demand growth by functional urban area between 2018-19 and 2041-42. Projections reflect where patients live, not where they receive treatment.



Source: Infrastructure Victoria analysis of Department of Health and Human Services, Inpatient Projection Model 2018.



3.3 Align social infrastructure with better service delivery

Deliver infrastructure for a better mental health system

Draft recommendation 75

Immediately establish a dedicated infrastructure fund to support a better mental health system, building on the recommendations of the Royal Commission into Victoria's Mental Health System.

The Royal Commission into Victoria's Mental Health System is a catalyst for a once in a generation reform of Victoria's mental health system. It provides the most up to date evidence, based on extensive research and wide public consultation.⁷⁸ The Royal Commission is not yet finished, but its early findings are that the current mental health system is "afflicted by systemic failings",⁷⁹ is "woefully unprepared for current and future mental health challenges",⁸⁰ and "does not provide those living with mental illness with what they deserve or what we as a community should demand".⁸¹ The Victorian Government has committed to implementing all of the Royal Commission's recommendations.⁸² It has allocated funding for, and begun to deliver, the Royal Commissions interim recommendations, including fast-tracking new mental health beds to cope with demand.⁸³

A reformed mental health system will need to provide increased services and capacity as demand has overtaken all levels of care.⁸⁴ The statistics are stark. Around 20% of Victorians will experience mental illness each year⁸⁵ and almost 50% during their lifetimes.⁸⁶ In 2018, more than three times as many Victorians died from suicide than

from the road toll.^{87,88} Improving mental health improves wellbeing for many Victorians and their families, reduces growing deaths from suicide and increases opportunities for many to engage with the community and work.

Infrastructure alone will not deliver better mental health, but it supports safe and effective services. Different types of fit for purpose infrastructure will be needed to provide the right settings for high quality care, including inpatient, acute and emergency facilities, residential rehabilitation and community care. Much existing mental health infrastructure is ageing and increasingly unsuitable for delivering modern treatment, care and support.⁸⁹ Future infrastructure will need to respond to demand, support emerging best practice and changing demographics.

To deliver the Royal Commission's recommendations, the Victorian Government should dedicate a fund for mental health infrastructure. This would provide funding certainty and enable the mental health system to sustainably improve over time. A dedicated fund would also build on the significant funding announced in 2020 to progress recommendations in the Royal Commission's interim report, including over

170 additional acute mental health beds, a residential mental health service designed and delivered by people with lived experience, design work for a new Victorian Collaborative Centre for Mental Health and Wellbeing, and better support for young people and Aboriginal Victorians.

A new statewide mental health service and infrastructure plan, expected by the Royal Commission to be delivered by the Victorian Government following its final report, should also consider future priorities across the spectrum of care, better connect and align services, including through improved information and communications technology, and be informed by further research and evaluations of new programs over time.

The Royal Commission's final report will provide more detail on the cost of system-wide reform. While it will be expensive, the cost of inaction is likely greater, both in human suffering and monetary terms. The estimated economic costs of poor mental health in Victoria was over \$14 billion in 2018-19.^{91,92} A reformed mental health system, supported by good infrastructure, can deliver better outcomes for those with mental illness, their carers, employers and loved ones.

3.3 Align social infrastructure with better service delivery

Plan and consistently deliver corrections and youth justice infrastructure while managing demand with policy settings

Draft recommendation 76

Plan and consistently deliver corrections and youth justice infrastructure while managing demand. By 2023, undertake long-term corrections and youth justice infrastructure planning, alongside policy measures that reduce short-term volatility and demand. In the next 15 years, consistently deliver a pipeline of corrections and youth justice infrastructure to meet long-term demand.

Victoria's prison population has grown rapidly, driving greater demand for corrections infrastructure. Prisoner numbers grew by 2000, or 33%, between 2014 and 2019.⁹³ More people on remand drove this growth,⁹⁴ along with population growth, and sentencing and parole reforms.⁹⁵ The COVID-19 pandemic has temporarily reduced demand, but it is unclear whether this trend will be sustained. Victoria's annual prison running costs have tripled since 2009 to more than \$1.6 billion.⁹⁶

Building infrastructure is not the only way to address demand for correctional and youth justice facilities. Any investment must be considered alongside policy changes that can reduce long-term demand from adult and youth offending, avoid short-term volatility, deliver treatment, harness audio-visual and other technology and apply best practice to minimise the likelihood of reoffending.

The Victorian Government announced \$1.4 billion to accommodate 1600 extra prisoners in 2019.⁹⁷ This will ease short-term infrastructure pressures but will be exhausted by 2023. This is an example of 'just in time' corrections infrastructure funding.

Funding fluctuates from year to year, making long-term planning difficult. The corrections and youth justice systems find it challenging to rapidly respond to capacity shortfalls, driven by changes in justice system policies and practices. When caught short, the system relies on adding extra permanent beds to existing facilities, or resorting to temporary beds and double bunks. These measures can be cheaper up-front, but their long-term use can contravene standards and risk health, safety and rehabilitation outcomes.⁹⁸

Prisons can only accommodate so many extra prisoners and remain effective.⁹⁹ In some cases, capacity has been pushed beyond the maximum utilisation rate of 95%. This results in overcrowding, an increase in serious prison incidents, a reduction in specialised services to vulnerable cohorts, less flexibility to move prisoners, and diversion of police resources to oversee prisoners in police cells.^{100,101} Irregular, unreliable capital funding also contributes to a growing maintenance burden,¹⁰² affecting the efficiency of prison services,¹⁰³ and contributing to high costs.¹⁰⁴ Between 2011 and 2017, the yearly cost of each Victorian prisoner rose from \$99,703 to \$127,092.¹⁰⁵

The Victorian Government should undertake careful long-term corrections and youth justice infrastructure planning, considered alongside policy measures that can reduce demand and short-term volatility in this demand. Long-term demand projections should include scenarios under alternative policy settings, allowing consideration of policy reform options alongside infrastructure responses. Infrastructure planning should align capacity investment with long-term demand under desired policy settings, aiming to maintain facility capacity below 95%. Consistent capital funding allows better planning for the long lead times required to construct new facilities and expand existing ones, if required.¹⁰⁶ It helps transition from 'just in time', one-off interventions to a project pipeline to meet long-term demand in a sustainable way, promoting more robust and cost-effective procurement and delivering projects with fewer disruptions. The long-term average capital cost of new corrections infrastructure is \$200-\$300 million a year. Funding consistency – rather than the amount of funding – is the challenge. Funding and priorities should be reviewed at regular intervals (three to five years) to stay aligned with projected demand and any changes in policy settings.

Discussion questions

Infrastructure Victoria welcomes
feedback on the draft recommendations.
We are particularly interested
in answering:

?

What is a reasonable target for
social housing growth in Victoria?

?

What other opportunities
are there to better align social
infrastructure with service
delivery?



To answer these
questions and more, visit
infrastructurevictoria.com.au



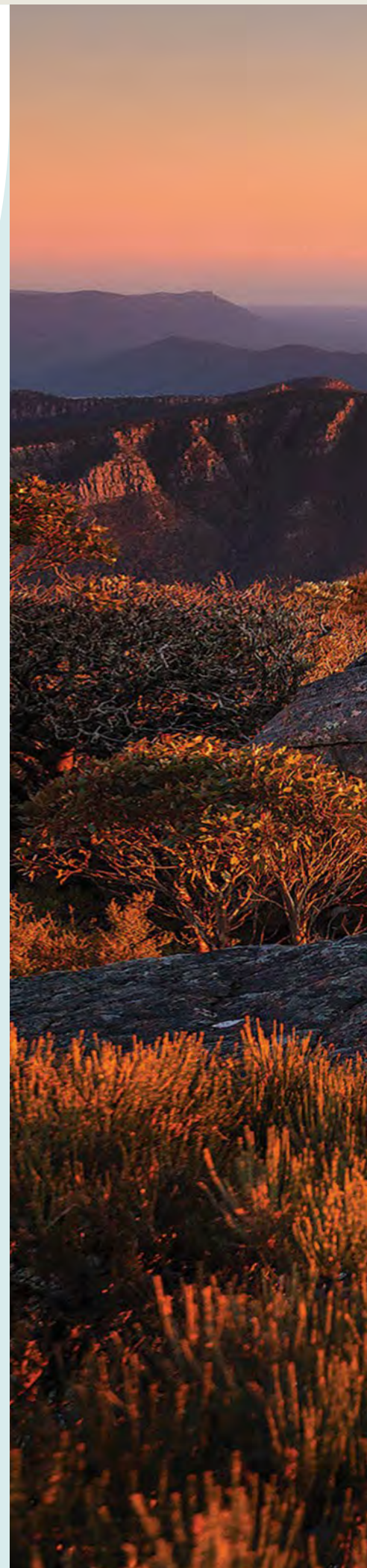



Develop regional Victoria

Section 04

Victoria's regions contain a diversity of experience, strengths, opportunities and challenges. From Gippsland to the Mallee, and Great South Coast to Ovens Murray, Victoria's regional communities are adapting to uncertainty and an accelerating pace of change.

Transitioning local economies, population fluctuation, demographic changes, increasing urbanisation and climate change affect diverse communities differently, both across and within regions. Drought, bushfires and the COVID-19 pandemic have caused major disruptions. Each region is responding to these shared drivers of change in unique ways.



A person wearing a red beanie and a brown jacket stands on a rocky cliff, looking out over a vast landscape. The sun is setting, creating a warm orange glow over the horizon. The landscape features rolling hills and a body of water in the distance.

Regional communities face complex, intertwined opportunities and challenges. Infrastructure Victoria has worked with regional stakeholders to determine ways to maintain, manage and develop infrastructure strategically.

In developing this draft strategy, Infrastructure Victoria has built a deeper understanding of regional infrastructure needs and their impacts. Our work demonstrates the unique character of each of Victoria's regions, and the diversity of their experiences, strengths, opportunities and challenges. We have found that many infrastructure needs are shared across the regions. Consistent and recurring themes include inadequate digital connectivity, improvements needed for freight and public transport, gaps in basic infrastructure, access to affordable housing, and the need for fit for purpose health and community facilities.

Regional Victoria's infrastructure needs are very different to Melbourne's. Solutions designed for Melbourne cannot simply be foisted on regional areas. Regional solutions must be flexible enough to cater for different communities within and across the regions, including fast growing regional cities, peri-urban areas, small towns and rural communities.

Regional development is more than simply generating construction activity. Infrastructure can catalyse regional economic development and strengthen the resilience of regional economies and communities. It can encourage economic growth by removing barriers to industry investment, supporting job creation and creating an accommodating environment for businesses to expand. Infrastructure can also support the needs of regional communities, helping people adapt to change, enhancing their quality of life, and alleviating the socio-economic disadvantage experienced by some of Victoria's most vulnerable communities.

Regional communities face complex, intertwined opportunities and challenges. Infrastructure Victoria has worked with regional stakeholders to determine ways to maintain, manage and develop infrastructure strategically. We have used an evidence-based approach to identify investments which can deliver better economic and social outcomes for regional Victorians.

We have focussed on infrastructure investments which build on a region's competitive strengths to help drive economic growth, or which improve local economic, human and social capital assets to reduce place-based disadvantage.

Regional Victoria is home to relatively dispersed populations with large distances between them. This means regional communities cannot always sustain the same range and diversity of services as metropolitan areas. This makes connectivity a priority for infrastructure – linking businesses to markets, transferring information and knowledge, and connecting people to services and opportunities.

Good infrastructure can support innovative solutions to connect people to jobs, goods and services, and each other. Equally, it can improve connections between businesses, producers and customers, lifting productivity and opening regional industries' access to domestic and global markets.

Insight

Building a better understanding of regional infrastructure

In developing this draft strategy, Infrastructure Victoria committed to examining regional infrastructure needs more closely to develop stronger evidence to make better regional infrastructure investments.

We undertook a year-long process of research, data gathering and broad consultation and engagement to produce our Regional Infrastructure Needs reports. These explored the detailed economic, social and environmental strengths and challenges of Victoria's nine regions: Barwon, Central Highlands, Gippsland, Goulburn, Great South Coast, Loddon Campaspe, Mallee, Ovens Murray and Wimmera Southern Mallee.

As part of our engagement we hosted stakeholder workshops in each region. We talked with over 200 regional representatives, including participants from regional partnerships, local councils, regional-based government agencies, regional and community organisations and representatives from business, health and education providers. We released an individual economic, social and environmental profile for each region. We also produced an inter-regional report presenting a large suite of data to form a comprehensive view of regional Victoria. This was the first time such an extensive regional perspective had been assembled, documenting in detail each region's economic, social and environmental strengths and challenges.

Following this, we analysed specific infrastructure investments that could benefit regional Victoria.

Our Infrastructure Priorities for the Regions research developed two frameworks specifically to identify and assess regional infrastructure priorities, one to build on regions' comparative strengths and one to address regional disadvantage. An expert panel and an advisory group informed the frameworks' development.

We used the frameworks to select infrastructure solutions to meet regional needs. We undertook research, data analysis, and drew upon local knowledge – calling for submissions for infrastructure solutions that addressed the comparative advantage or regional disadvantage in each region.

This extensive suite of resources is available at infrastructurevictoria.com.au, and includes:

- \ a detailed report on infrastructure priorities for Victoria's regions
- \ individual regional profiles identifying infrastructure needs
- \ an inter-regional assessment reflecting the common needs across regional Victoria
- \ individual industry profiles for each region
- \ regional disadvantage fact sheets for each region
- \ the complementary frameworks for assessing regional comparative advantage and addressing regional disadvantage
- \ a background paper on the role of infrastructure in addressing regional disadvantage.

4.1

Enhance market access and productivity

Regional Victoria's long distances mean infrastructure plays a critical role in improving physical and digital connections between businesses and markets, allowing regional industries to better compete locally and globally. Better connectivity can lift regional Victoria's productivity by making businesses more efficient or using technology to improve agricultural yield.

Regional Victoria produces a third of the state's exports.¹ Regional economies can only operate and grow if they can efficiently move goods between primary producers, manufacturers, wholesalers, importers and customers.² Victoria will need efficient and fit for purpose road and rail freight networks to help regional businesses to minimise transport costs and remain competitive.³

Digital connectivity also breaks down barriers of cost and distance, and opens up new markets and opportunities.⁴ Digital technology has connected businesses with customers during COVID-19, with e-commerce seeing growth of 80% year-on-year in the first eight weeks of the pandemic.⁵ Evidence from overseas indicates that digital skills and technology can further improve business efficiency, increase productivity and improve local economic performance, allowing regional businesses to adapt and thrive in a more competitive marketplace.⁶

More freight for the state will increase pressure on the network

Freight volumes in regional Victoria are forecast to grow at an average rate of 1.5% each year until 2051.⁷ As the freight task grows, demands on the regional road network are increasing. In the last two decades, people and freight travelling on Victoria's major country roads have increased by 20% and this growth is expected to continue.⁸ An increasing proportion of the regional road network is in very poor condition, presenting a growing risk to public safety and increasing the costs of travel through increased fuel use, vehicle maintenance costs and travel times.⁹ Accommodating growing road freight movements requires well-maintained roads, designed and managed to keep road freight safe, productive and efficient.

Rail freight moves many agricultural and mining exports from regional areas to ports,¹⁰ and can account for up to a third of overall production costs.¹¹ For these industries, rail freight can be more cost-effective than road freight when transporting bulk commodities over long distances,¹² and its efficiency can significantly affect their global competitiveness.¹³

Carrying more freight by rail can reduce the number of freight vehicles on regional roads. Rail freight also helps reduce road damage caused by heavy vehicles and congestion, traffic accident costs, greenhouse gas emissions and noise impacts.¹⁴ However, Victoria's share of freight on rail has not changed significantly for more than two decades and has gone backwards in some markets.¹⁵

The regional rail freight network's efficiency is hampered by many factors, including different rail gauges, axle load restrictions, permanent and temporary speed restrictions and maintenance backlogs.¹⁶ Its relatively poor condition and lack of investment¹⁷ further impedes rail freight uptake.

Reviews have criticised Victoria's road maintenance strategy, prioritisation processes and failure to optimise the maintenance program.^{18,19} Similarly, there is currently no transparent, sustainable maintenance plan for the state's rail network. Despite significant one-off funding allocations, particularly for regional roads, neither network has clear long-term funding for maintenance and upgrades, making strategic and efficient management difficult.²⁰

Digital technologies can also be better leveraged to improve productivity

High speed and reliable internet connections can create regional jobs through telework,²¹ allow businesses to expand beyond their local market,²² and prevent them having to move elsewhere. The COVID-19 pandemic clearly demonstrated quality internet can also help business resilience during times of crisis.

However, in some regional areas, poor digital connectivity can make it hard to do business, access information or even make mobile phone calls.²³ This is a barrier to growth and development for businesses that have inadequate broadband access – a longstanding issue for many regional communities.²⁴ The 'digital divide' is evident not just between metropolitan and regional areas, but also

within regional cities, towns and localities.²⁵ While gaps in the availability of digital services and skills vary across regions and within them,²⁶ the regions share digital barriers and opportunities. Agriculture, tourism, manufacturing and service industries across Victoria's regions have advised Infrastructure Victoria that better mobile and internet connectivity would provide potential business opportunities.²⁷

The Victorian Government can support targeted interventions to boost digital connectivity and help build business productivity and competitiveness. This is especially important in regional Victoria, where the digital divide is most pronounced and where the market is less responsive.²⁸

Further opportunities remain to provide more equitable access to high speed and reliable internet across regional Victoria, so regional businesses can reap the full benefits of digital technologies. The COVID-19 pandemic has made it clear that work and business opportunities need not centre on Melbourne.²⁹ The Victorian Government has recognised these opportunities through its \$465 million Digital Future Now initiative, which includes funding for faster broadband for regional towns and a program to eradicate mobile black spots in populated areas of regional Victoria, both in partnership with the Australian Government.³⁰



Draft recommendations to enhance market access and productivity

Infrastructure Victoria is considering the following draft recommendations to enhance market access and productivity in regional areas. These draft recommendations interact with other draft recommendations to keep Victoria connected to global markets (see section 1.4).



Case study

On-farm Internet of Things trial

The Victorian Government's \$12 million on-farm Internet of Things (IoT) trial is exploring the agricultural industry's digital needs. Agriculture is Australia's least digitised sector. Digital technology could lift agricultural production value by as much as \$20 billion³¹ by improving productivity, sustainability, profitability and resilience to weather and climate challenges.

IoT enables devices embedded with sensors to connect to and interact with each other via the internet. IoT devices can measure information such as soil moisture and livestock health, as well as monitor fences, vehicles and weather, to help farmers make more informed decisions and improve farm performance. The trial will establish up to 600 IoT-enabled farms across regional Victoria, partnering with farmers to evaluate the impact.³² Trials are still underway, and Infrastructure Victoria will continue to monitor the evidence being generated.

4.1 Enhance market access and productivity

Deliver funding certainty for regional road maintenance and upgrades

Draft recommendation 77

Within two years, specify clear levels of service for each type of regional road and bridge. Following this, dedicate an ongoing program to fund regional road and bridge maintenance and upgrades to meet these service levels. Funding should be prioritised based on improving safety, decreasing vehicle emissions, and lifting economic productivity.

Regional roads support workers and freight, transport regional goods and produce to market, and connect tourists and day trippers with regional attractions. Keeping roads and bridges in good condition keeps motorists safe, and reduces fuel consumption, tyre wear, and vehicle maintenance and repairs, in turn reducing vehicle greenhouse gas emissions and their environmental impact.³³

Maintaining the condition of regional roads and bridges is costly. Of the 23,000 kilometres of arterial road and freeway lanes in Victoria,³⁴ 19,000 are in the regions.³⁵ Victoria has more than 3,180 bridges, 3,500 other structures, and more than 3,400 sets of traffic signals and other electrical systems.³⁶ A large proportion of the road network is old and made from materials not intended for current truck loading and vehicle requirements.³⁷ Roads and supporting infrastructure are also vulnerable to extreme weather, a vulnerability exacerbated by the impacts of climate change.³⁸ The quality of regional roads is declining.³⁹ But keeping communities connected and their economies functioning means regional roads must be properly maintained and, if necessary, upgraded to stay safe, productive and efficient.

Road maintenance is most cost-efficient when undertaken on roads in a 'fair' condition. Roads worn beyond this point require more costly and disruptive rehabilitation work.⁴⁰ Current maintenance funding is volatile, declining in real terms in some years, and rising significantly in others.⁴¹ Unpredictable road upgrade and maintenance funding hinders road managers' ability to triage and target investment across the network from year to year, impedes good road network planning and focusses on roads and structures in the worst condition. This means maintenance is left until it is most expensive, and ultimately inflates costs.⁴²

The Victorian Government should specify the level of service, or desired condition, of each type of regional road and bridge in a clear hierarchy. This would provide a transparent framework, so every road is maintained in a condition suitable for its intended purpose. Not every road needs to be maintained to the same standard. For example, a regional freeway needs to be maintained at a much higher standard than a narrow backroad serving a few rural properties. The level of service could specify the desired speed, volume, safety and types of vehicles the road is intended to carry.

Assigning roads to these levels of service needs to match local and regional needs. Roads and bridges must cater for a region's local travel, freight, through traffic, industry, and emergency access needs. As they change, the quality and condition of roads may need to change too. Establishing the desired condition of regional roads, and maintaining roads and bridges to that standard, is also necessary to introduce more efficient freight vehicles, like high productivity and automated vehicles, because predictable conditions and clear markings will help make best use of their safety features.⁴³

The 2020-21 Victorian Budget allocated over \$800 million to upgrading and maintaining regional roads. Beyond this, it should dedicate an ongoing funding program to regional road maintenance and upgrades. Long-term funding certainty allows road managers to prioritise investments more efficiently, invest in upgrades to support economic and social outcomes and undertake maintenance before the need becomes critical and solutions more expensive. After specifying road service levels, funding should be allocated to priority maintenance and upgrades, determined by desired safety, vehicle emissions, productivity outcomes, and existing road condition.

4.1 Enhance market access and productivity

Revise the Murray Basin Rail project plan

Draft recommendation 78

Immediately revise the Murray Basin Rail project plan, informed by the project's business case review.

Victoria is Australia's largest food and fibre exporting state, with exports valued at \$14.2 billion in 2018-19.⁴⁴ The Murray Basin is a nationally significant region for food and fibre production, supplying approximately 70% of the state's biggest food export: grain.⁴⁵ The region also has a large, and growing, horticulture industry, particularly around grapes and citrus fruits.⁴⁶ Shipment is ideally suited to rail freight because much of the region's produce is large, bulky, and destined for distant processors and markets.⁴⁷

Freight and supply chain costs to transport these products to market constitute a large share of export costs. For example, supply chain costs are approximately 30% of the export costs for grain.⁴⁸ Better freight efficiency would help keep Victorian exports competitive.

To improve freight outcomes for Victoria's north and west, the Victorian Government invested \$220 million in the Murray Basin Rail project in 2014, with matched funding from the Australian Government provided in 2016.⁴⁹

The project planned to standardise and upgrade over 1000 kilometres of rail track along freight corridors in the north west, including lines from Mildura, Sea Lake, Manangatang and Hopetoun. It aimed to improve transport efficiency for the Murray Basin, boosting logistical flexibility with improved connectivity to ports, and sought private sector co-investment.⁵⁰

As of July 2020, V/Line and the Department of Transport have delivered about half of the approved project and spent over 85% of the approved budget.⁵¹ Later stages have been placed on hold since July 2019,⁵² and the business case has been reviewed.⁵³

The review found that further standardisation of the network cannot be justified as costs are significantly greater than forecast in the original business case, and benefits can be largely achieved by enhancing the existing standard and broad-gauge network. Future work should therefore focus on optimising the current network to improve capacity and provide additional network resilience.

The review proposes a package of works which require an additional \$244 million, taking overall investment in the project to \$814 million. Next steps include development of an updated project plan informed by the business case review.

Ultimately, the Murray Basin Rail project, along with better regional freight rail maintenance (see draft recommendation 79) helps keep Victoria's regional rail freight network efficient and competitive and supports significant regional exports. The Victorian Government, through Freight Victoria should develop and publish a revised plan to complete the project and provide certainty and confidence to investors and producers. Final funding sources for the project should be negotiated between the Victorian and Australian Governments.

4.1 Enhance market access and productivity

Fund an ongoing regional rail freight maintenance program

Draft recommendation 79

Immediately fund an ongoing periodic regional freight rail maintenance program, informed by a publicly available network asset management plan.

Transporting agricultural produce, mineral products, and manufactured goods from the regions to markets requires safe, reliable and efficient freight connections. An efficient, competitive freight market helps regional producers manage supply chain costs and remain viable in the face of fierce competition from low wage emerging economies. Businesses bear the costs of higher freight prices and reduced competitiveness, and these economic losses flow on to regional communities.⁵⁴

Rail freight has a basic cost advantage over road freight,⁵⁵ especially in transporting bulk commodities over long distances. A single freight train can carry as much freight as 110 trucks.⁵⁶ Rail freight provides other benefits over diesel-fuelled trucks, as it causes less road congestion, especially around ports, and reduces maintenance costs from road damage caused by heavy vehicles. Rail freight reduces the accident costs per kilometre by more than 90% and reduces greenhouse gas emissions by a similar amount.⁵⁷ But Victoria has not been reaping these benefits, with rail's share of freight movement stagnant or in decline,⁵⁸ meaning our freight rail network is under-utilised, especially on freight-only regional lines.

Compared to the regional passenger network, rail freight has significantly more assets in average, poor or end-of-life condition.⁵⁹ A badly maintained regional rail freight network reduces its performance and reliability, reduces the life of the assets, and increases the risk of catastrophic failures. Several Victorian freight trains have derailed in the last five years.⁶⁰ Despite recent funding boosts, routine and major periodic maintenance have historically not kept pace with the required investment.⁶¹ An asset management plan announced in 2018 is still underway, with no indication of its completion or publication date.⁶²

The 2020-21 Victorian Budget allocated a short-term maintenance funding boost of over \$100 million for regional passenger and freight rail. Beyond this, to improve rail freight's competitiveness, the Victorian Government should fund an ongoing periodic maintenance program, akin to the four-year, \$287.9 million program begun in 2017.⁶³ Rail freight benefits arise in the long term and need sustained maintenance investment to materialise. An ongoing fund of this scale, at approximately \$70 million each year, would provide the funding stability to maximise efficient maintenance. Industry also needs confidence in governments' long-term commitment

to maintaining quality freight infrastructure to make the complementary investments required for a growing rail freight industry. Stop-start funding programs and no visible long-term planning do not provide this certainty, and mean maintenance spending cannot be optimised in the longer term. A new ongoing program should include assessing the current state of the rail freight network and funding immediate and high priority works. The program, and the long-term asset management plan which informs it, should be publicly available, providing certainty to businesses and industry of the Victorian Government's commitment to rail freight.

4.1 Enhance market access and productivity

Continue to address regional Victoria's digital connectivity gaps

Draft recommendation 80

In the next five years, continue delivering regional digital connectivity improvements, and review the need for further government investment following the roll-out of the Digital Future Now initiative.

Digital access is increasingly an alternative to direct contact and the primary means of conducting business and delivering services, especially in rural areas. The COVID-19 pandemic has highlighted the importance of reliable, high speed internet in contemporary society, accelerating the use of digital substitutes for work, education, service delivery and social connections.

The communities that have the most to gain from reliable digital connectivity, because of their distance from Melbourne and major centres, currently have the worst connections. Mobile coverage is a significant problem throughout regional Victoria.⁶⁴ This affects community safety, liveability and business productivity.⁶⁵ All of Victoria's regional partnerships have identified poor mobile coverage in their regions.^{66,67,68}

Parts of many regional Victorian cities, towns and localities also cannot get effective business-grade broadband internet of at least 100 megabytes per second.⁶⁹ Businesses without access are disadvantaged and cannot offer as many online services as their competitors. Victorians living in regional areas identify poor digital services as a barrier to business growth.⁷⁰

International evidence indicates that high-speed internet can improve business efficiency, increase productivity, influence decisions on where businesses locate, and improve local economic performance.^{71,72}

NBNCo's Enterprise Ethernet service meets the requirements of business-grade broadband, but it is not uniformly supported by the predominance of fibre-to-the-node technology in the NBN rollout.⁷³ Upfront costs can be a disincentive for individual businesses to pay for extensions to high speed internet infrastructure, and being a local 'first mover' means these businesses bear the costs for surrounding businesses too.

In response, the Victorian Government has announced the \$626 Digital Future Now initiative, to improve mobile coverage and deliver upgrades in communities that currently only have access to satellite and fixed wireless service.⁷⁴ This includes \$250 million for business-grade broadband connectivity for Victorian suburbs and regional towns, in conjunction with industry partners, to address gaps in the availability of reliable high speed fibre optic and wireless broadband services for business users. The initiative also incorporates a six-year, \$300 million program to eradicate

mobile black spots in populated areas of regional Victoria. Other initiatives are to be co-funded by the Australian Government.

When Digital Future Now approaches completion, the Victorian Government should review the state of digital connectivity across regional Victoria, to determine whether continued government support is required. The review should consider broadband and mobile coverage, speed, and reliability, and whether these meet local business and community needs. It should evaluate the impact of service upgrades, and focus on those places which did not benefit.

A review is merited given the critical role of digital infrastructure in breaking down the barriers of cost and distance for regional businesses, and the vital need to keep communities safe in times of emergency (see draft recommendation 86).

Case study

Horsham's enhanced broadband project

The Victorian Government's Connecting Regional Communities Program funded a \$1.7 million pilot scheme in Horsham to demonstrate new ways of delivering high speed broadband in regional areas.

After a competitive tender process, Spirit Telecom was awarded the contract to deliver five towers across five districts in Horsham. Each tower transmits fixed wireless broadband at 5G standard with speeds up to one gigabit per second in both directions. Each tower covers a 10 kilometre radius throughout Horsham, including the Horsham Central Business District, Horsham Enterprise Park, aerodrome and freight terminal precincts.

These increased speeds will also be available to homes across Horsham, giving the entire community the opportunity to experience internet services on par with those in metropolitan Melbourne.

Horsham-based farm equipment machinery franchise Emmetts is one of the first businesses to sign up to Spirit's new broadband network, functioning as an 'anchor tenant' to help the project succeed. The business operates across Horsham, Swan Hill, Rupanyup, Warracknabeal and parts of South Australia, and now has dramatically faster broadband speeds with fewer dropouts, boosting their business across regional Victoria and beyond.^{75,76,77}



Discussion questions

Infrastructure Victoria welcomes feedback on these draft recommendations. In particular, we are interested in answers to the following:

?

Are there other cost-effective ways to enhance the market access and productivity of regional businesses and industry?

?

Are there specific locations where improving physical or digital connections would have a significant impact on regional economies?



To answer these questions and more, visit infrastructurevictoria.com.au

4.2

Unlock regional economic growth opportunities

Victoria's regional economies have been hit hard by drought, bushfire and the COVID-19 pandemic. More than ever, a focus on sustainable long-term economic growth is needed to benefit businesses and communities. Each region has unique attributes that can grow economies, create jobs and transform industries. Infrastructure investments that build on a region's existing industry strengths or advantages are most likely to effectively deliver future economic growth.¹

Across regional Victoria, agriculture, related manufacturing industries and tourism are economic strengths, capable of driving wider regional growth and development. Victoria is Australia's largest food and fibre exporting state, accounting for 27% of the nation's food and fibre exports. The sector supports over 200,000 jobs, with 87% of agricultural

employment concentrated in regional areas.² New opportunities are emerging in sectors such as mining and renewable energy,³ particularly in renewable energy zones (see draft recommendation 3).

Industry specialisations differ from region to region. For example, in agriculture, the Mallee specialises in broadacre cropping and irrigated agriculture,⁴ Gippsland⁵ and Great South Coast⁶ have strong dairy industries, and the Goulburn region is a major producer of processed and fresh fruit.⁷

But our investigations find the associated infrastructure opportunities and potential constraints are often shared across Victoria's regions. These common foundations mean infrastructure interventions can help unlock wider economic growth.

Victoria is Australia's largest food and fibre exporting state, accounting for 27% of the nation's food and fibre exports.



Infrastructure limitations can constrain economic growth

Businesses need solid access to basic infrastructure to operate,⁸ such as power, water, waste, transport and, increasingly, information and communications technology. Economic growth can be constrained by unreliable or expensive infrastructure access. For example, agriculture and manufacturing industries in the Ovens Murray, Loddon Campaspe, Central Highlands, Great South Coast and Barwon regions report outdated power supply infrastructure preventing business expansion. Manufacturing businesses in Barwon, Central Highlands, Loddon

Campaspe and Ovens Murray report needing better water and waste disposal infrastructure to expand. In every region, tourism businesses report problems with transport infrastructure or amenities at tourist sites.⁹

Victoria's regions can face extra barriers to secure basic infrastructure upgrades compared with Melbourne. For example, upgrade costs may be prohibitive in places with fewer businesses to share them.¹⁰ This can affect regional areas' ability to attract new business investments or facilitate business expansion.¹¹

Regional tourism has growth potential

Before 2020, global tourism had seen continuous growth during the past six decades, and was one of the largest and fastest growing economic sectors.¹² Tourism was worth \$9.4 billion to the economy of regional Victoria and generated around 110,000 jobs in 2018-19.¹³ For every \$1 spent by visitors to regional areas, an extra 92 cents was created through supporting sectors, such as local small businesses.¹⁴ Tourism helps create regional jobs and diversifies regional economies from their traditional agricultural base. It can also enhance environmental conservation, preserve cultural history and heritage and stimulate investment in transport and other infrastructure.¹⁵

Regional Victoria offers a diversity of natural assets such as alpine forests, deserts, coastal areas and rainforests. It contains

important Aboriginal cultural and heritage assets.¹⁶ Across Australia, nature-based tourism has been an area of particularly strong growth, emerging as an important motivator for travel.¹⁷ In 2019, nature-based experiences drew 22% of visitors to regional Victoria.¹⁸ These natural and cultural attractions combine with a wealth of food and wine experiences, cultural festivals, local museums and galleries, and make tourism a strong candidate for regional growth.¹⁹

Visitor expenditure in the regions trailed Melbourne in 2018. International visitors accounted for over 40% of tourism spending in Melbourne, compared with just 6% in the regions.²⁰ International tourists spent the most per person, but made up only 1% of visitors to regional areas, compared to 9% in Melbourne.²¹ Similarly,

regional Victoria received low numbers of interstate visitors compared to other states and territories.²² Day trippers comprised two-thirds of visitors to regional Victoria, but this group did not spend very much, accounting for less than one-third of visitor spending.²³ More than 75% of international visitors to the Great Ocean Road only visit for a day.²⁴

In the long term, regional tourism's challenge is to attract more overnight visitors from outside Victoria. Converting even a small proportion into overnight stays could have a significant impact.²⁵ To achieve this in a fiercely competitive industry, Victoria's regions need to develop the tourist experiences visitors increasingly expect.²⁶ Inadequate tourist infrastructure constrains development of this capacity.



Local tourism can help drive recovery

In the short term, regional tourism's heavy reliance on Victorians may be a strength, being less affected by international travel restrictions, and offering options for Victorians unable to travel interstate or overseas. Victorians accounted for around 80% of tourism spending in the regions in 2018. More than half of Victorians have not travelled for an overnight stay in regional areas in the past year, but half of these people would consider doing so.²⁷

This potential for further growth suggests local tourism can help the regions' economic recovery, acknowledged in the Victorian Government's \$465 million tourism recovery package.²⁸

Aboriginal cultural tourism, accessible tourism, nature-based tourist experiences and adventure tourism are all opportunities to develop regional tourism products to help increase visitation.²⁹

More than half of Victorians have not travelled for an overnight stay in regional areas in the past year, but half of these people would consider doing so.



Draft recommendations to unlock regional growth

Infrastructure Victoria is considering the following draft recommendations to unlock regional economic growth. Other regional growth opportunities include renewable energy generation (see draft recommendation 10) and regional recycling and resource recovery (see section 1.5).

4.2 Unlock regional economic growth opportunities

Upgrade power supply for agriculture and regional manufacturing

Draft recommendation 81

In the next five years, contribute toward strategic power supply infrastructure upgrades for agriculture and regional manufacturing, where an independent assessment demonstrates significant potential for increased productivity, competitiveness and growth.

Reliable and cost-effective energy supply helps agriculture and manufacturing in regional Victoria improve productivity.³⁰ In some areas, older electricity infrastructure from the 1970s is no longer fit for purpose,³¹ preventing potential business investment and expansion opportunities.³²

Changes in industry practice have caused different and escalating energy demands. For example, farm consolidation has created economies of scale in production, driving investment in more energy intensive farming equipment. But voltage problems and electricity supply outages are limiting production and damaging equipment. For example, modern milking equipment allows more cows to be milked but has much higher energy demands than older electricity networks can manage.³³ Challenges finding suitable manufacturing and food processing sites that meet modern energy requirements also limit regional agricultural and manufacturing growth.³⁴

In places with fewer customers sharing costs, electricity distribution networks are already more expensive and less reliable.³⁵ Upgrading power networks can provide solutions. These upgrades can be individual business power supply upgrades, or shared

infrastructure, like replacing single wire earth return lines with three phase power lines or installing grid utility-scale electricity storage. Upgrading power supply to regional manufacturing precincts can attract new businesses to share the costs of better infrastructure, but the risks mean private providers may be unwilling to invest.

The benefits of better power supply can be significant. For instance, a proposal to upgrade a single wire earth return backbone to three phase power in the Great South Coast is estimated to cost \$8.7 million and deliver benefits of over \$2 million each year in gross regional product.³⁶ Similarly, Burra Foods received a \$2.1 million grant from the Regional Electrical Access Program in 2010 to upgrade its power. The upgrade allowed for increased production and created 40 full-time jobs.³⁷

Regional businesses may be willing to share upgrade costs through higher distribution charges because of the productivity benefits provided. Benefits can include encouraging existing businesses to expand, attracting new investment, and supporting regional communities.³⁸ A financial incentive can overcome initial capital costs to allow existing businesses to work together to share part of the remaining cost and new

businesses could help repay in future. Previous Victorian Government programs, like the Regional Electrical Access Program³⁹ and On Farm Energy Grants Program,⁴⁰ subsidised upgrade costs that electricity distributors could not include as regulated returns.

The Victorian Government should help fund power supply infrastructure upgrades for agriculture and manufacturing in regional Victoria where an independent assessment demonstrates significant benefit to existing users and real potential to unlock future investment. Strategic power supply upgrades can support multiple beneficiaries and deliver wider benefits beyond a single sector or area. Investment can proceed with appropriate cost sharing arrangements between the Victorian Government, power distribution companies (representing all electricity users) and regional businesses. The Victorian Government should also explore options to recoup costs, such as through user charges, where it is making an investment on the expectation of future growth. Upgrading power supply will complement the existing Agriculture Energy Investment Plan, which helps agricultural businesses to improve energy efficiency and explore alternative energy options.⁴¹ The new fund should be allocated \$30 million over four years.

4.2 Unlock regional economic growth opportunities

Plan for future investments in regional nature-based tourism infrastructure

Draft recommendation 82

In the next five years, develop a Victorian nature-based tourism strategy to guide industry development and prioritise further investments.

Regional Victorian tourism has been acutely affected by the 2020 bushfires and COVID-19 pandemic.⁴² Compared with Melbourne, tourism supports a larger share of regional Victoria's jobs and gross regional product.⁴³ Rebuilding regional Victoria's tourism industry will be pivotal in helping the regions recover, with further room for growth in the longer term. However, despite greater visitor numbers, visitor spending in the regions trailed Melbourne in 2018.⁴⁴ One cause of this disparity is the current lack of compelling tourism products in regional Victoria that attract visitors for longer stays, despite its unique landscapes.^{45,46}

Regional Victoria has a competitive advantage in nature-based tourism.⁴⁷ Victoria's regions offer a multitude of natural experiences, including alpine mountains, rainforests, deserts, gardens, parks, beaches and waterways. To help secure regional economic recovery and capitalise on this potential, the Victorian Government has announced a \$465 million Victorian Tourism Recovery Package.⁴⁸

To guide longer-term industry development and growth, and prioritise future investments, the Victorian Government should develop a statewide nature-based tourism strategy within the next five years. Victoria is the only state without a nature-based tourism strategy. The strategy should take account of significant recent investments in nature-based tourism and provide a framework for infrastructure funding by both the Victorian and Australian Governments, re-examine existing policies, balance increased tourism with its environmental impacts, and consider place-based risks (like bushfires), accessibility and planning regulation. The strategy should be informed by the *Visitor Economy Strategy*⁴⁹ and *Victorian Marine and Coastal Policy*,⁵⁰ support and work with Traditional Owners,⁵¹ and incorporate requirements for accessible tourism.⁵²

4.2 Unlock regional economic growth opportunities

Develop a Victorian Aboriginal tourism strategy

Draft recommendation 83

Partner with Traditional Owners to develop a Victorian Aboriginal tourism strategy in the next five years to guide future Aboriginal tourism investments, including through Joint Management Plans.

Aboriginal people have lived here for more than a thousand generations, maintaining complex societies with many languages, kinship systems, laws, politics and spiritualities. Their millennia of cultural history, knowledge and traditions are unique cultural assets.

Aboriginal experiences are increasingly attracting tourist interest and can align with efforts to preserve and promote Aboriginal cultural histories and heritage sites.⁵³ The number of international tourists taking part in Aboriginal tourism activities, such as visiting an Aboriginal site or community, has increased by over 40% since 2013.⁵⁴ Regional Victoria has many significant Aboriginal sites, such as the World Heritage listed Budj Bim Cultural Landscape. Investing in these cultural heritage sites will create more diverse tourism offerings, could help Aboriginal Victorians build community-controlled assets, and may generate more jobs for Aboriginal people.

The Victorian Government guides the equal status partnerships with Traditional Owners through Joint Management Plans, which recognise and use traditional knowledge and culture to manage specific national parks and other protected areas. Existing Joint Management Plans include those for Dja Dja Wurrung Parks,⁵⁵ Gunaikurnai,⁵⁶

and Yorta Yorta (Barmah National Park).⁵⁷ The Victorian Government should continue to develop more plans with Traditional Owners, and provide funding support for tourism infrastructure identified within the plans.

The Victorian Government should further support and partner with Traditional Owners to develop an Aboriginal tourism strategy. This can drive sustainable economic activity and employment in regional areas, as well as preserving and promoting Aboriginal cultural histories and heritage sites. The strategy should align approved Joint Management Plans, with consideration and mitigation of the place-based risks, accessibility requirements to support tourists with disabilities, and potential reform of planning controls for appropriate regulation and streamlined approvals. The strategy can guide Victorian Government investment in Aboriginal tourism infrastructure to meet Aboriginal cultural and economic development needs, and improve regional tourism growth.

An Aboriginal tourism strategy would build on existing Victorian Government reforms towards improving social, cultural and economic outcomes for Aboriginal Victorians, such as the *Self-Determination Reform Framework*,⁵⁸ the *Victorian*

Aboriginal Affairs Framework,⁵⁹ and the *Victorian Government Aboriginal Affairs Report*.⁶⁰ Further, it would align with *Tharamba Bugheen: Victorian Aboriginal Business Strategy*⁶¹ and *Visitor Economy Strategy*,⁶² which aim to boost Aboriginal economic development and grow Victoria's tourism sector.

4.2 Unlock regional economic growth opportunities

Boost tourism infrastructure by allowing more national parks to grant long leases

Draft recommendation 84

Attract investment in Victoria's regional tourism industry by immediately allowing more national parks to grant leases for up to 49 years for infrastructure proposals that meet specific criteria and complement environmental and heritage values.

Tourism is one of regional Victoria's largest industries. While bushfires and COVID-19 have caused severe disruptions in 2020, tourism in regional Victoria still has potential for growth in the medium and longer term. Comparative figures show the regions capture only 36% of Victoria's tourism spend – the lowest proportion in Australia – meaning plenty of opportunities for a larger share.⁶³

Victoria has more than 40 national parks.⁶⁴ Previous tourism strategies have sought to leverage these natural assets by focussing on growing the range of nature-based tourism experiences available to visitors.⁶⁵ The private sector can help grow Victoria's nature-based tourism sector. Providing new tourism experiences helps guarantee longer-term success for the industry, including investment in better tourist facilities such as attractions, accommodation, recreational facilities, conference and convention centres and restaurants.⁶⁶ All of Victoria's regions identify the need for better facilities, amenities and other tourism infrastructure.⁶⁷

Investors seeking to establish a forest-based tourist experience on national park land are currently limited to a maximum

lease period of 21 years (with some exceptions).⁶⁸ This is shorter than lease periods offered in other states,⁶⁹ and investors say this period isn't long enough to realise a financial return.⁷⁰ A previous inquiry found allowing private tourist facilities in national parks where they complement environmental and heritage values can generate a net public benefit.⁷¹

To attract private sector investment and increase the range of regional tourist offerings, the Victorian Government should extend exemptions to allow more national parks to grant lease periods for up to 49 years. This can encourage the development of new tourist facilities in regional areas, potentially increasing visitor numbers and unlocking social and economic benefits. The Victorian Government can also investigate use of other public land near national parks for this purpose, such as forestry land.

To ensure only suitable developments are granted long leases, the Victorian Government should evaluate each proposal against specific criteria. Consistent with the *Crown Land (Reserves) Act 1978*, these should include whether proposed facilities are of sufficient significance to justify the longer lease and whether the development

of the land in the public interest, including assessing benefits to the community, economy and environment.⁷² Criteria should also include: that the proposal is supported by the community and Traditional Owners; that it meets the government's *Biodiversity 2037* guidelines;⁷³ that the proposal addresses place-based risks (e.g. bushfires); and that it is accessible and adheres to universal design principles.⁷⁴

Encouraging the private sector to invest in the regions could also assist Victoria's bushfire and COVID-19 recovery in the longer term, complementing recent Victorian Government investment in the tourism industry.

Discussion questions

Infrastructure Victoria welcomes feedback on these draft recommendations. In particular, we are interested in answers to the following questions:

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Are there other cost-effective infrastructure solutions that can unlock regional growth in industries of competitive strength?

?

Are there specific locations where implementing these recommendations would have a greater impact on regional economies?



To answer these questions and more, visit infrastructurevictoria.com.au

4.3

Connect the regions to help strengthen wellbeing

Regional Victoria's longer distances make it more difficult for people to access the services and supports that underpin their wellbeing, compared with people living in Melbourne. Different people and communities have different resources, experiences and opportunities, meaning the advantages and opportunities they face in life vary. Advantage and disadvantage are relative concepts, combining multiple factors, and existing on a continuum. In general, people with fewer advantages have fewer resources, and can access fewer services, influencing their life opportunities and outcomes.¹

Before the COVID-19 pandemic and 2020 summer bushfires, 15% of regional Victorians lived in poverty, rising to 23% in children, compared with 13% of people in Melbourne, and 17% of children.² Many other people were vulnerable or lacked access to services and resources because of distance.³ The impact of the bushfires and pandemic may cause these levels to rise.

Infrastructure interventions alone cannot remove the underlying causes of disadvantage. But infrastructure can reduce the impacts of disadvantage by improving access to jobs, education, health and social services, for example through transport and digital connectivity. It can also improve access to education, health and community services via new or better facilities or by supporting innovative service provision.⁴

Connecting people to essential resources at key life stages can have a more profound impact

People living in regional areas have less access to and use fewer education, health and community services, compounding the disadvantage they experience.⁵ For example, children and young people living in regional and remote areas have worse health and development outcomes than those in cities. More than one in four (27%) children outside metropolitan areas are developmentally vulnerable compared with one in five (21%) in cities.⁶

For some families, poverty or disadvantage can become entrenched. Some disadvantaged families may be unable to provide enriching early childhood experiences, contributing to children performing poorly at school, and in turn leading to difficulty finding work later in life.

Young people in regional areas are less likely to finish school, find work, or undertake tertiary study.⁷ By age 16, nearly one in six young people in regional Victoria have left full-time secondary education compared to one in eight in Melbourne. At age 24, a third of regional Victorians are not engaged in education, employment or training.⁸

Interventions which help break the cycle of persistent disadvantage can deliver enduring benefits for the individual, for local communities and Victoria.⁹ Infrastructure which connects people to services and supports at key life stages – including early years, the transition from school to work, family wellbeing and ageing – are likely to have bigger positive impacts.¹⁰



Limited transport connectivity affects opportunities and outcomes for regional Victorians

In regional Victoria, most people work and access services within their local area or nearby.¹¹ But local public transport often does not provide the connections required to do this easily. Around a third of residents in regional and remote areas have reported difficulty accessing services.¹² As services increasingly concentrate in regional hubs, this is only likely to continue. Fit for purpose transport solutions which allow regional Victorians to access essential services are therefore a priority.¹³

Transport costs can reduce the mobility of people experiencing disadvantage. Transport disadvantage – difficulty accessing public transport due to cost, availability or accessibility of services – is high in Victoria's regions, where owning a car is often the only means of transport. However, car ownership can lead to financial stress, particularly among low income households.¹⁴ The lowest 20% of income earners are much more likely to experience transport disadvantage than the highest (at rates of 9.9% and 1.3% respectively).¹⁵ Nearly one in three regional Victorian households rely on social security as their primary source of income, determining how much they can spend on transport.¹⁶

Transport disadvantage is linked to social exclusion, where some people cannot fully participate in social and economic life.¹⁷ The groups most likely to experience social exclusion include young people, single parents and families with young children, older people, Aboriginal communities and people with a disability.¹⁸ The regional Victorians who are most in need of public transport are being left with either poor quality transport services or none.

Traditional scheduled public transport services perform best when transporting large numbers of people to a shared destination. This makes it ideal in urban areas, but creates challenges in regional areas with dispersed populations, large distances and disparate travel patterns. Regional Victoria's diversity means transport accessibility challenges are not uniform, varying by regions, subregions and towns. Public transport is being stretched in areas of rapid population growth in regional hubs while in rural areas, smaller populations combined with longer travel distances mean that traditional public transport services can be infrequent, unreliable and potentially unviable.¹⁹

The local transport system in regional areas can be designed to better meet the needs of residents, including those experiencing disadvantage. Responding to the different access needs and challenges of diverse local communities requires a flexible and adaptable transport system, and different models of delivery to those in Melbourne.

The lowest 20% of income earners are much more likely to experience transport disadvantage.



Improving digital connectivity in the regions will help break down the barriers of distance

Digital connectivity is increasingly fundamental to people's lives.²⁰ The COVID-19 pandemic dramatically illustrates the importance of digital connectivity, which has allowed people to remain connected to work, education, family and community. Digital technologies are changing how people live, work and interact with each other, and opening up new opportunities to access previously unavailable information and services.²¹ However, these benefits are not being shared equally across Victoria.

People living in regional Victoria often have slower internet speeds, fewer connection choices, and worse mobile coverage from fewer providers, compared to those in Melbourne.²² In some regional areas, poor connectivity can make it harder to access information, make mobile phone calls, engage with remote services or use social media.²³ People who live furthest from Melbourne and major centres can benefit most from quality digital services due to long travel distances and limited transport options, but have the worst connections. This compounds the disadvantage experienced by regional Victorians, especially as more services shift online.²⁴

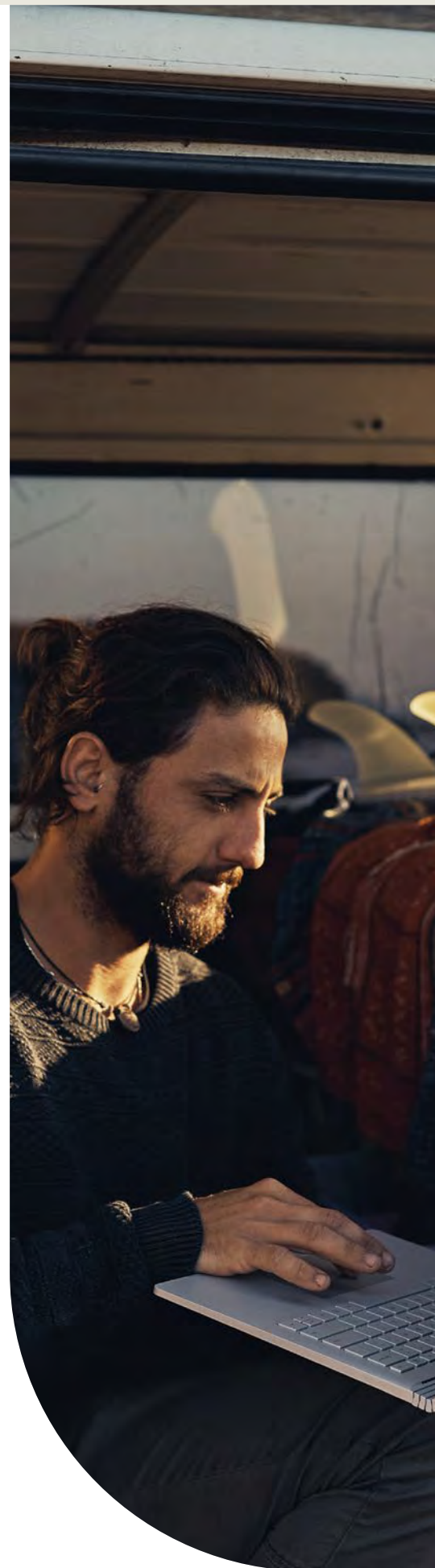
The 2019-20 summer bushfires highlighted the safety implications of gaps in digital connectivity and coverage. Victoria recorded a total of 159 communications outages during the bushfire period,²⁵ with some communities losing access to triple

zero emergency communications, mobile safety apps, text-based emergency alerts as well as contact with family and friends.²⁶

One in four regional Victorians live in a household without internet access compared to one in seven in Melbourne.²⁷ Internet access is even lower among disadvantaged communities – 24% of regional Victorians earning less than \$26,000 per annum are not connected to the internet at home, rising to 36% for those in social housing.²⁸

Regional Victoria's lower quality internet services are compounded by gaps in mobile coverage, or mobile 'black spots'. Regional Victoria contains more than 94% of Victoria's 2,609 identified mobile black spots.²⁹ The quality of regional mobile services is significantly and persistently worse than in Melbourne.³⁰ Without the full benefits of new technologies, regional Victoria is likely to experience further inequality and reduced quality of life,³¹ a risk the Victorian Government seeks to address through its Digital Future Now initiative.

Better quality, more reliable digital services can support innovative remote service delivery models and remote working, as well as reduce community vulnerability in emergencies. Better online access can help reduce the disadvantage experienced by people with lower digital access or skills.^{32,33}



Insight

Very Fast Rail for the regions

It is sometimes contended that Very Fast Rail services, operating over 200 kilometres per hour, will improve employment and education connections from regional centres to Melbourne, as well as from major regional centres to surrounding towns and the outer suburbs of Melbourne. Others have suggested that Very Fast Rail services will encourage people to move out of Melbourne to help reduce congestion. However, little evidence suggests Very Fast Rail can significantly induce large numbers of people to move to regional Victoria from Melbourne.³⁴

COVID-19 has demonstrated the importance of reliable internet connectivity in the regions, a potential substitute in some instances for fast, physical public transport access into the Melbourne CBD. Evidence on likely costs and future demand indicates Very Fast Rail will also not be an appropriate solution for addressing Melbourne's growth challenges.

The Victorian Government is already making significant rail investments under the Regional Network Development Plan³⁵ to improve service quality and capacity between Melbourne and large regional centres, including in the Geelong, Ballarat, Bendigo, Shepparton and Traralgon lines. The Regional Network Development Plan aims to deliver a modern commuter-style service for key centres and service improvements across the State, including through:

- ↳ a minimum frequency of a train every 20 minutes at peak times and every 40 minutes in off-peak periods for services to Geelong, Bendigo, Ballarat, Seymour and Traralgon

- ↳ five services every weekday on the outer regional train lines of Warrnambool, Bairnsdale, Albury-Wodonga, Echuca, Swan Hill and Shepparton.

However, the growth of Melbourne's outer suburbs is placing pressure on some regional services as residents of these areas also use regional services. The capacity of services, rather than their speed, is thus the biggest challenge.³⁶ Capacity improvements in the outer metropolitan rail corridors (see draft recommendation 69) will help address this issue.

Rather than investing in Very Fast Rail services, the Victorian Government can cater for more capacity by planning and monitoring how well current connections are being used, particularly between major regional centres and Melbourne, and improving services as required. The Regional Rail Link project is an example of this approach, as it responded to identified regional and suburban train capacity issues. Very Fast Rail is very expensive and does not necessarily result in a net benefit for regional areas. It may also lead to unintended consequences, such as further strengthening the ability of industry and education providers in Melbourne to compete with regional areas.³⁷

While Very Fast Rail would lead to faster travel times from regional centres to Melbourne, this would contrast to travel times for residents in outer metropolitan Melbourne, who have lower levels of access to employment than other parts of the city. Current travel times from regional Victoria are already similar to, and in some cases faster than, those in Melbourne's outer suburbs.³⁸

4.3 Connect the regions to help strengthen wellbeing

Reform regional public transport to meet local needs

Draft recommendation 85

In the next five years, gradually redirect some regional transport funding to redesigned, integrated local transport services, based on regional needs assessments, and incorporating flexible services that meet local needs.

Transport disadvantage – difficulty accessing public transport due to cost, availability or accessibility – is high in Victoria's regions. Around 30% of residents in outer regional and remote areas have reported difficulty accessing services.³⁹ Limited transport options reduce access to work, education, health care, shops, services and social connections.

Regional Victorians depend heavily on owning their own car for transport. Owning a car often leads to financial stress, especially amongst people with low incomes, who are also much more likely to experience transport difficulties than people with high incomes.⁴⁰ Better public transport access ensures everyone can stay connected to their communities and access services.

Regional Victoria's relatively low population density and long travel distances make regional public transport challenging and expensive to operate. Excluding fare recovery, the Victorian Government spent \$714 million operating regional public transport in 2018-19. This is a quarter of Victoria's public transport operating spend but supports only 6% of trips. Only around 20% of public transport funding goes to local bus services, despite these carrying nearly 40% of regional passengers.⁴¹

Therefore, there is an opportunity to redirect current and future regional public transport funding to modes and service models that best meet local needs.

Victoria's regions have multiple transport services, including local and regional scheduled public transport services, extensive school buses, local community transport services, subsidised taxis, and specialist transport funded by the National Disability Insurance Scheme⁴² and Commonwealth Home Support Program.⁴³

But these services are largely funded and delivered independently, without coordination, and often duplicate or leave gaps in coverage.

Regional public transport services must be designed for regional circumstances, and not simply replicate city-style models. The four-year Flexible Local Transport Solutions Program demonstrates some alternative possibilities. The program provides financial support to help seed small-scale initiatives that address transport disadvantage, integrate with other local transport options and improve transport access across regional Victoria.⁴⁴ However, funding is time-limited, and imposes a heavy burden on communities to demonstrate feasibility, innovation, and social, economic and sustainability benefits.

To respond, the Victorian Government should work collaboratively with local transport providers and communities to determine local transport needs, using regional needs assessments focussed on disadvantaged groups, including a common measure of access to key services. Collaborative governance and planning arrangements can promote better planning and delivery of transport services across agencies and service providers. They can also give local communities a voice.

Together, collaborative governance and planning arrangements can be used to help coordinate local transport options – including bus services, community transport, school buses, commercial passenger vehicles and car-sharing – and provide an integrated and flexible service mix that meets community needs. New flexible transport services ultimately need to move away from short-term trial funding to recognise the value of access to services for disadvantaged regional Victorians, with ongoing funding to be determined following a successful pilot. Integrated governance can also link with service planning for integrated facilities (see draft recommendation 89), so people can access local services.

Insight

Improving education access in Gippsland

When the Wonthaggi campus of Chisholm TAFE closed its building and construction program in 2017, Bass Coast and South Gippsland students needed to travel to Korumburra to enrol in the only regionally available course. The Flexible Local Transport Solutions Program funds charter buses so students can travel to vocational education providers in Korumburra and Leongatha. The services run several days each week, picking up vocational education students from Phillip Island, Leongatha, Wonthaggi and Inverloch. With local contributions, a weekly community bus service from Mirboo North has been added.⁴⁵

The service allows many local students to attend training. There is no other public transport service available to transport students to the region's vocational education providers, including for building and construction courses such as carpentry and plumbing. Access to these training opportunities improves young people's employment prospects and opens career pathways which would otherwise be unavailable.

The service currently runs on Victorian Government funding of \$107,000, with other contributions from partner organisations. However, as a pilot program, funding is set to cease in 2021.



4.3 Connect the regions to help strengthen wellbeing

Improve resilience of regional telecommunications infrastructure

Draft recommendation 86

In the next 10 years, develop more resilient regional telecommunications infrastructure so communities can stay safe during emergencies, including greater network redundancy and back-up power supply.

Telecommunications services are vital during emergencies to keep communities safe, connected and informed.⁴⁶ Victorian can access emergency information and warnings via VicEmergency and other online services,⁴⁷ allowing them to stay informed and take appropriate action. Telecommunications services are also essential in coordinating response efforts to get timely information to emergency personnel during natural disasters.⁴⁸

Mobile coverage is a significant problem throughout regional Victoria.⁴⁹ Regional partnerships identify poor mobile coverage near tourist attractions,⁵⁰ along transport corridors,⁵¹ and in smaller settlements and farming areas as particular problems.⁵² This confirms findings of our own research into regional infrastructure needs.⁵³

The Victorian Government has recognised the importance of improving digital connectivity for regional Victorians through its \$300 million 2020-21 Budget commitment to eradicate mobile black spots in populated areas,⁵⁴ with co-contributions from the Australian Government.⁵⁵

The summer bushfires starkly highlighted resilience issues with existing telecommunications infrastructure in regional Victoria, and the associated implications for public safety. Communication loss was experienced by 38 towns, mostly as a result of power outages, and 17 of these towns were also isolated by road access.⁵⁶ Communities have a right to expect to be able to access telecommunication during emergencies, including to make calls for emergency assistance, access relevant mobile apps, and receive text-based emergency alerts.

The Victorian Government should co-invest with the Australian Government, telecommunications and energy providers to develop more resilient telecommunications infrastructure that supports communities to stay safe during emergencies. This co-investment could build on existing national efforts including Public Mobile Safety Broadband and Emergency Alert.⁵⁷ Priority should be given to high emergency risk areas, road and rail routes, population centres, tourist attractions and areas of agriculture and other economic activity. A comprehensive approach is needed across fixed, mobile

and Wi-Fi networks to ensure more resilient communications. This could include stronger power supply back-up systems and greater telecommunications network redundancy, potentially including third-party use of towers during emergencies. Emergency preparedness may also include educating communities on residential power back up options, including alternative charging methods or battery powered communication devices.

4.3 Connect the regions to help strengthen wellbeing

Fund regional libraries to provide better internet access

Draft recommendation 87

Immediately provide funding for regional and rural libraries to improve community access to fast, free internet services, leveraging existing library infrastructure.

In an increasingly digital age, Victoria's public libraries are evolving to support lifelong learning, community engagement and wellbeing.⁵⁸ They are providing greater – and free – access to digital technologies such as computers, software, broadband and Wi-Fi, as well as training in using them.⁵⁹ A higher proportion of regional households lack access to the internet, particularly those in remote communities, on low incomes, or in social housing.^{60,61} Many of these people use libraries to access digital services, to participate in social networks and use online public services,^{62,63,64} as they are often the only source of free internet access and Wi-Fi in regional areas.⁶⁵ Local libraries also support business needs, with start-ups, small businesses and workers using them for research, access to technology, digital training, co-working spaces and training rooms.⁶⁶ These digital services can be especially critical during and following emergencies.

Libraries in rural areas are often efficient and effective.⁶⁷ They do, however, face greater financial challenges than their metropolitan counterparts. Many regional councils, particularly in rural areas, have limited resources to invest in libraries as they have

a smaller number of rate payers and need to fund multiple services to geographically dispersed towns with small, but often high need, populations.⁶⁸ Local community impact is likely greater, as public Wi-Fi is usually only available in regional areas at libraries during restrictive opening hours, while extended hours and other options are more common in Melbourne.⁶⁹ To continue to provide free access to digital services, libraries in rural and regional Victoria need more investment.

The Victorian Government should provide new, dedicated funding to assist regional libraries to provide access to fast, free internet services. Libraries would be invited to propose solutions for enhancing internet access to meet local community needs, leveraging existing facilities and infrastructure. Specific investments may include: upgrades for reliable, modern digital infrastructure; security systems to support out-of-hours access; layout upgrades to allow out-of-hours access; extending library Wi-Fi to surrounding public spaces outside normal library hours; and installing technology in mobile libraries to support free Wi-Fi access. Out-of-hours access would not be a condition for eligibility, though upgrades may support extended hours. In some cases, libraries

may also be places of refuge during high heat days and bushfire smoke events (see draft recommendation 91).

The new funding stream should be established immediately, with a budget of \$7 million to \$10 million over five years. An investment of \$6.5 million to \$7 million would support upgrades to half of the 140 public library branches in regional and rural Victoria over this period⁷⁰ at up to \$100,000 each (recent upgrades to the Foster Library in Gippsland cost \$92,000, acknowledging that investment will vary).⁷¹ Smaller sums could also support the technical fit-out of the current fleet of 24 mobile libraries⁷² where appropriate. An evaluation should inform any decision on funding beyond the first five years.

This funding should be in addition to that already provided through the Living Libraries Infrastructure Program, which currently funds upgrades to library infrastructure and is already oversubscribed.⁷³ The Victorian Government could provide this funding through a new library technology fund which is complementary to the Living Libraries Infrastructure Program. Local government would continue to be responsible for ongoing operational costs.

Case study

Foster Library, West Gippsland

Foster, in Victoria's Gippsland region, has a population of fewer than 1,200 people. The town's library serves as a gathering point for the community. Foster Library is the first in Victoria to open 24 hours a day, seven days a week. From August 2019, approved library members have been able to swipe to enter the library after hours, giving them secure access to books, workspaces and free Wi-Fi (those under the age of 18 cannot enter unless accompanied by an adult with a valid family pass).

West Gippsland Libraries first envisaged the model in response to community requests for increased opening hours. During community consultation, they determined that round-the-clock access would best suit community needs because over half of the community work more than 35 hours a week and a quarter of people do not have internet access at home.

The library continues to be staffed during its normal opening hours, and staffed hours have recently been extended. Security systems, alarms and video cameras have been installed for safety and security. The upgrade cost \$92,000, which was funded by the Victorian Government, with \$20,000 from West Gippsland Libraries, and \$3,000 from the Friends of the Foster Library.

As at the end of March 2020, Foster Library has seen a 14% increase in active memberships and a 54% increase in visits compared with the prior year. Following the success of the trial in Foster, West Gippsland Regional Library Corporation plans to roll out 24/7 access to more libraries across its network.^{74,75,76,77,78}



4.3 Connect the regions to help strengthen wellbeing

Use rural schools for children's specialist and allied telehealth services

Draft recommendation 88

Retrofit or better use selected rural school infrastructure for children's specialist and allied telehealth services to improve children's health and development. Immediately begin with a trial in Wimmera Southern Mallee.

Children's health and development in regional and remote areas are consistently behind those in urban areas, with paediatricians struggling to meet their emerging needs.⁷⁹ Increasing numbers of children have developmental or behavioural concerns in disadvantaged regional communities.⁸⁰ Those families experiencing the greatest disadvantage have the most to gain, but are least likely or able to engage with health and education services. Better quality and easier access to health care and support services for families can help children before and during school.^{81,82}

Victoria's regions face a critical shortage of skilled health and support workers. Allied health workers in rural and remote areas service a population at least five times greater than their metropolitan counterparts.⁸³ Greater use of telehealth services could help. While not appropriate for all health needs, telehealth services can complement in-person services through using digital infrastructure to provide access to specialist and allied health services (for example, paediatricians).⁸⁴ Specialist telehealth services have substantial capacity for expansion. For instance, in the Wimmera Southern Mallee region between January 2017 and August 2019, only 77

out of 2,315 specialist outpatient appointments at the Royal Children's Hospital were delivered by telehealth.⁸⁵

State and federal governments fund many universal and secondary health and education services. Together they can prevent, identify and intervene to deliver better outcomes. Current services vary widely in quality and effectiveness, and are often poorly coordinated.⁸⁶ Government schools across Victoria already have technology and facilities for e-learning.⁸⁷ This existing technology could also be used to deliver paediatric and allied telehealth services, with a focus on prevention and early intervention for all children 0-18 years. Victorian school sites already deliver health services in secondary schools such as consultations with doctors⁸⁸ and mental health practitioners.⁸⁹ Extending health services to paediatrics and allied telehealth would mean children and families in need of these services could use school facilities to attend appointments closer to home with specialists located in Melbourne. By increasing the uptake of technology, schools can be a gateway for children and families to access multiple health services and supports.

The Victorian Government should fund a trial to develop and operate a range

of paediatric and allied telehealth services from selected rural schools, as part of moving to a more integrated service model. This gives children and families virtual access to specialist health services and skilled allied health workers and reduces long-distance travel.

Victoria's Wimmera Southern Mallee region is among those most able to benefit. Families travel long distances from this region to access health care, due to local difficulties in accessing timely specialist support for children with behavioural and developmental issues. The trip takes between three and five hours one way, often requiring an overnight stay at significant social, educational and financial cost to families. Families also experience difficulties receiving the right information, education, health care support and expertise once children start school.⁹⁰

Trialling this approach in the Wimmera Southern Mallee region can demonstrate its potential benefits and identify improvements through an evaluation, before any decision to expand the service. The selection of appropriate sites and delivery models should be informed by local service planning, as well as identifying any regulatory, transport or other barriers to effective delivery.

Discussion questions

Infrastructure Victoria welcomes feedback on these draft recommendations. In particular, we are interested in answering:

?

Are there other cost-effective ways to connect people to local jobs and services?

?

Are there specific locations where implementing these recommendations would have a greater impact on regional community wellbeing?



To answer these questions and more, visit infrastructurevictoria.com.au



4.4

Foster regional Victorians' health, safety and inclusion

Health, education and community services need supporting infrastructure, such as suitable buildings, to enable effective service delivery. Transport and digital services can sometimes improve access to services in regional areas, but some services require personal interaction and face-to-face care and support, and must be directly delivered in local communities.

Fit for purpose infrastructure can also help foster local participation and improve community amenities. This includes infrastructure to help communities connect – from community facilities to parks, volunteer emergency services or civic infrastructure.¹ Affordable, appropriate and well-located housing supports social inclusion by improving access and proximity to services, facilities, jobs and transport.²

Diverse regional communities have complex needs

Every Victorian community includes poverty and socio-economic disadvantage.³ But regional Victoria has higher levels of disadvantage, caused by industry restructuring, an older population, and greater exposure to climate change impacts.⁴ Eight of the top 10 most disadvantaged local government areas are in regional Victoria.⁵

People with complex needs require multiple and often overlapping services. The higher proportion of regional Victorians experiencing disadvantage translates into a higher potential demand for health and social services, compared with Melbourne.⁶

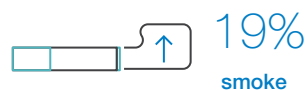
For example:



19% of regional Victorians are aged over 64 compared with 14% in Melbourne⁷



15% of regional Victorians have asthma compared with 11% in Melbourne⁸



19% of regional Victorian adults smoke tobacco compared with 14% in Melbourne⁹



An estimated 19% of regional Victorian adults have potentially harmful levels of alcohol consumption compared with 13% in Melbourne.¹⁰

Regional Victoria's diverse and changing demographic mix is likely to alter future service demand. Ageing populations, most notably in small rural communities, will affect the scope and mix of services needed.¹¹ Conversely, some regional cities and peri-urban areas are experiencing rapid population growth, placing pressure on services and facilities.¹²

Climate change is forecast to bring higher temperatures, more days of extreme heat, declining rainfall and more frequent catastrophic bushfires conditions to regional Victoria,¹³ complicating the challenges facing local communities. Extreme heat, heatwaves and prolonged bushfire smoke exposure can have significant health

impacts. For example, heatwaves cause more deaths each year than any other natural disaster.¹⁴ Risks are higher for regional Victoria's older, more disadvantaged population.¹⁵

For these reasons, 'cookie cutter' infrastructure approaches will not work in regional Victoria. Solutions need to account for local differences and adjust to changing circumstances, populations, climates and needs over time. Place-based approaches can tailor investment to different places, coordinate effectively across different levels of government and create opportunities for meaningful engagement with local communities, making them more successful in helping to address disadvantage.¹⁶

Delivering and accessing regional services is challenging

Local governments deliver many social and community services to regional communities, including child and family services, aged care, health care services and programs to foster social inclusion and improve wellbeing.¹⁷ But many regional councils, particularly in rural areas, have budgets constrained by small numbers of ratepayers with lower average incomes.¹⁸ They also need to fund multiple services to geographically dispersed towns with small, often high need populations.¹⁹

Victoria's councils manage assets worth over \$110 billion.²⁰ They spend about \$2 billion on infrastructure each year.²¹ Regional councils can struggle to afford the facility upgrades for accessible, safe

infrastructure to support the many services their communities need. Selling assets can be difficult because they have few potential purchasers, or encounter community opposition.²²

Relatively dispersed populations and infrastructure can lead to higher service delivery and asset maintenance costs,²³ often unattractive for private sector providers.²⁴ Regional cities such as Ballarat, Bendigo, Geelong and Wodonga have higher population growth and may be more financially sustainable than the smaller rural shires, but also have high and growing numbers of residents experiencing disadvantage, and consequent service demand.²⁵

Access barriers can compound service delivery challenges. Limited public or community transport options constrain service access in many places.²⁶ Inadequate communications infrastructure and limited transport options exacerbate regional Victorians' difficulties reaching employment, education, health and community services that help them overcome the disadvantage they face.²⁷

To respond to these pressures, local governments must innovate and flexibly manage service provision facilities. Despite each local area's different challenges, all councils will need to better use and adapt their infrastructure to match their communities' changing needs.

Well-located, affordable housing improves job and service access

As home prices have risen, fewer Victorians own their homes, especially those with lower incomes.²⁸ Rents have also increased.²⁹ Very few properties in the regions are now affordable and appropriate for most households on income support, with single people faring the worst.³⁰ Well-located social housing, with good transport access, allows people to live close to jobs and services,³¹ especially where private local rental markets are unavailable or unaffordable.

Existing social housing does not meet current demand, let alone future growth. Homelessness rates are increasing in Victoria's regions, rising by 4% between 2011 and 2016. Barwon and the Great South Coast have seen homelessness increase by 23% and 24% respectively.³² Nationally, social housing averages 4.5 dwellings, but in regional Victoria it is 4.1. This is higher than Melbourne's average of 3.1,³³ but regional Victorians more commonly face many difficulties driving

social housing demand. The most frequent reasons Victorians seek homelessness support are family violence, financial difficulties, and experiencing a housing crisis.³⁴ Regional Victorians are overrepresented in instances of family violence,³⁵ and are more likely to experience rental stress. For example, 30% of regional Victoria's renting households experience rental stress, compared with 26% in Melbourne.³⁶

The type and size of social housing dwellings do not match either the current or future tenant need. For example, one-bedroom homes would have to nearly double to meet demand.³⁷ Social housing is also poorly adapted to help tenants cope with the impacts of climate change. Social housing tenants, many with multiple and complex needs, are particularly exposed and vulnerable to extreme heat.³⁸



Draft recommendations to improve health, wellbeing and inclusion

Infrastructure Victoria is considering the following draft recommendations to improve regional Victoria's health, wellbeing and inclusion. These link with draft recommendations to improve connectivity in Victoria's regions (see section 4.3) and aligning social infrastructure with services delivery more generally (see section 3.3).



4.4 Foster regional Victorians' health, safety and inclusion

Deliver multipurpose shared social service facilities in the regions

Draft recommendation 89

Immediately undertake collaborative inter-agency planning for regional social services to identify opportunities for multipurpose shared facilities, then deliver them where appropriate in partnership with local governments and community organisations.

Victoria's regions are geographically and demographically diverse. Some towns and places are highly disadvantaged, showing lower health and education outcomes relative to others,³⁹ and 15% of regional Victorians live below the poverty line.⁴⁰ A broader group is vulnerable to more severe disadvantage because of their distance from and reduced access to services.⁴¹

Regional social service sites are often smaller in scale than in metropolitan areas, while on average, regional Victorians have higher levels of disadvantage, and often require multiple and inter-linked services.⁴² These factors mean regional Victoria can particularly benefit from multipurpose shared facilities. Co-locating services together in a shared facility can benefit individuals and groups with complex needs, because they can support smoother transitions between services and create opportunities for access to a wider range of services. Potential services include primary and allied health, education, child and family, housing, legal and financial support services, as well as consulting rooms and community spaces. Co-location can also improve service quality,⁴³ by bringing together many staff capabilities and diverse skills, reducing the professional

isolation of practising in rural areas,^{44,45} and providing opportunities for collaboration and innovation. Co-located services can provide easier service access in the regions, because people need only travel to a single place, especially if transport planning is aligned with these locations (see draft recommendation 85).

Planning, delivery and managing shared facilities is more complex than for single purpose facilities. Shared facilities will not work in all circumstances and must incorporate an appropriate mix of services. The Victorian Government needs to better plan and deliver social service infrastructure. Firstly, Victorian Government agencies can undertake shared area service planning to identify shared facility opportunities, by building new or retrofitting and upgrading existing facilities. Shared service planning can highlight the facilities and services suitable for shared use, to determine the best location, and to collaborate in infrastructure delivery. This requires a change from usual governance arrangements and may require the Victorian Government to facilitate shared decision-making across its agencies.⁴⁶ The Framework for Place-Based Approaches⁴⁷ provides a starting point for departments and agencies to proceed.

The Queensland Government has recently developed a new approach to whole of government social infrastructure planning which could be applied in the Victorian context (see Box).

Upfront building costs of shared facilities can be more expensive than single purpose facilities but can generate efficiencies through scale and shared maintenance. With flexible design, shared facilities can adapt more readily to changing needs compared to single purpose facilities. The costs can vary too. Co-locating a kindergarten on an existing school site can cost around \$400,000. A new fully integrated school and community facility can cost in the order of \$32 million.⁴⁸

Across regional Victoria, there is support for shared facilities to improve service delivery for disadvantaged Victorians. Infrastructure Victoria received 16 submissions specifically mentioning such facilities, including suggestions for an integrated health and wellbeing hub for Corio-Norlane,⁴⁹ an integrated health and community hub for Mitchell Shire⁵⁰ and the Mount Alexander Shire Health and Wellbeing Precinct.⁵¹

Case study

Queensland Social Infrastructure Strategy

The Queensland Government has a new approach to whole-of-government social infrastructure planning which could be applied in the Victorian context. The strategy assumes that human services planning has already occurred before the consideration of place-based infrastructure response are developed.⁵²

The strategy provides a framework for the planning, design, location and use of Queensland's social infrastructure. It aims to achieve more integrated, accessible, well-located, multi-functional and cost-effective social infrastructure. It requires departments and agencies to:

- \\ make better use of existing infrastructure to deliver broader services and community benefits
- \\ use every new infrastructure investment as an opportunity to deliver more integrated outcomes for inclusive communities.

Effective cross-government systems and governance are essential to support the strategy and ensure broader outcomes can be achieved. The key components of the strategy include:

Enhanced cross-agency collaboration

The Queensland Government is adopting a place-specific approach to social infrastructure in identified priority areas. These are areas where multiple agencies have identified infrastructure needs that may realise improved social infrastructure outcomes through strategies such as co-location, sharing facilities, or coordinating delivery.

Flexible land management

The Queensland Government is investigating a more flexible whole-of-government approach to land acquisition and management to help maximise capital investment and foster more innovative partnerships to achieve better outcomes.

Overarching governance

The implementation of the strategy establishes a place-specific social infrastructure champion in the Infrastructure Minister and a Social Infrastructure Ministerial Committee to prioritise place-specific social infrastructure investment. A champion drives a partnership-first approach to the provision of social infrastructure, responsible for rallying for changes to business-as-usual approaches across government and calling for what might otherwise be lost opportunities. Establishing a champion at the most senior level of government will help drive the understanding that change is required to drive even better social infrastructure outcomes for Queensland communities.

Early engagement in strategic planning

The adoption of a place-specific approach to social infrastructure planning further improves upon existing processes. Through early coordination of strategic planning across service providers, services are more likely to be well located in relation to transport, situated alongside aligned services, or co-located in flexible, future-focussed buildings that provide a range of human services.

4.4 Foster regional Victorians' health, safety and inclusion

Support regional councils to update, repurpose or retire outdated community infrastructure

Draft recommendation 90

Fund regional councils in the next five years to update, repurpose or retire outdated community infrastructure for better service delivery.

Victoria's councils manage a sprawling asset base and spend about \$2 billion on infrastructure each year.⁵³ Services for children, youth, families and the elderly are delivered from these facilities. They are especially important in Victoria's regions because regional areas are over-represented in statistical rankings of socio-economic disadvantage,⁵⁴ and their smaller populations mean viable private sector alternatives are limited.⁵⁵

Many regional council facilities are no longer fit for purpose, limiting service quality. Councils face complex challenges in managing these facilities well. Often, communities have strong historical attachments to old assets, and some have heritage value, even when they are no longer meeting wider community needs. This can result in resistance to selling old assets, even when it can help fund higher quality services. Communities particularly oppose asset consolidation if sale proceeds are not reinvested in the area.⁵⁶

Many regional councils struggle to afford the facility upgrades required for efficient service delivery. They spend more on facilities per person than Melbourne councils, having smaller populations, larger land areas, and their costs are growing faster than inflation.⁵⁷ Short of revenue, regional councils rely on grants,⁵⁸ but few

can be used for maintenance and renewal of ageing assets.

The Victorian Government should establish a new fund to provide targeted support for regional councils to update, recycle and rationalise community infrastructure. Regional councils could apply for up to \$2 million, after undertaking service planning demonstrating their facilities are no longer fit for purpose and inhibit quality service delivery. Grants could reflect a council's ability to pay, promote co-investment, leverage other grants and encourage shared facilities where possible. Separately, the fund would allow smaller contributions of up to \$50,000 for smaller rural councils to develop service plans that explain their infrastructure needs. This service planning may find that service needs can be best met through changes to delivery models such as outreach services, teleservices or sharing existing assets with a neighbouring council.

The Victorian Auditor General has suggested regional grant funding can be allocated based on measurable indicators of disadvantage.⁵⁹ Funding applications should prioritise facility upgrades in, or serving, disadvantaged communities. Other priority criteria can include: evidence that facilities limit service quality; asset maintenance cost reductions; and consolidation of updated, multi-sectoral

shared facilities (see draft recommendation 89), and should meet contemporary accessibility standards.⁶⁰ In some instances, the selected infrastructure could be repurposed as a climate-adapted facility (see draft recommendation 91). Councils will need to demonstrate their communities have capacity to manage, staff and deliver services from the facilities, and evaluate investment outcomes. To maintain community support, revenue from asset sales should be directed to consolidating and upgrading local facilities.

The fund should be established as soon as possible, with a budget of \$100 million for the next five years. Representing \$20 million a year, these funds would allow up to 10 successful applications for the \$2 million maximum, or a larger number of smaller grants – enough for the most disadvantaged councils. This type of expenditure is also stimulatory, helping create and maintain jobs in the regions. The fund should be evaluated at the end of the five years.

4.4 Foster regional Victorians' health, safety and inclusion

Create climate-adapted facilities for rural communities

Draft recommendation 91

In the next five years, fund local governments to plan and help deliver a network of designated, accessible climate-adapted community facilities, to manage the health impacts of extreme heat and bushfire smoke.

Extreme heat can have serious impacts on communities, including increasing illness and death, particularly for the most vulnerable. Without adaptation efforts, more days of extreme heat could cause 400 deaths each year in Victoria by 2050.⁶¹ Extended bushfire smoke events commonly occur after drier conditions, including drought, and can also severely impact the health of many vulnerable regional Victorians.⁶²

Regional Victorians are more at risk to extreme weather.⁶³ They are, on average, older,⁶⁴ less healthy,⁶⁵ more disadvantaged,⁶⁶ more exposed to the impacts of extreme heat,⁶⁷ and more sensitive to smoke.⁶⁸ Unlike cities, in many rural areas there are relatively few privately provided places to escape the heat on hot days, such as shopping centres or cinemas. The impacts of climate change are also magnified in rural inland areas, where projected changes in temperature are higher.⁶⁹

Many vulnerable regional Victorians live in low quality private and public housing. Upgrading all rural housing to become more energy efficient and resilient during extreme heat would help people live more comfortably,⁷⁰ but will take considerable time and investment. During these events,

people need to remain indoors to stay cool and have cleaner filtered air. The Victorian Government should ensure that regional social housing is suitable for the climate (see draft recommendation 95) and has included initial measures in the 2020-21 Victorian Budget. As a complementary response, climate-adapted community facilities can provide a safe place to avoid exposure.

The Victorian Government should help establish a network of accessible climate-adapted community facilities to reduce the health impacts of exposure to heat, and prolonged smoke from bushfires. These would not duplicate emergency relief centres, but instead provide temporary respite during the worst parts of hot days and bushfire smoke events,⁷¹ in addition to their regular purpose.

The Victorian Government should allocate funds and determine criteria for local governments and other eligible community facility owners to plan and deliver these facilities within the next five years. Facilities should be in safe locations, have suitable air conditioning and filtration, back-up power, and comfortable amenities like cooking facilities and internet access. Existing community facilities can be retrofitted to be climate-adapted and fit for purpose.

In most instances, these are likely to be existing local government facilities in town, such as libraries, community centres, neighbourhood houses, and town halls. Suitable facilities owned by others should also be considered, such as bush nursing hospitals, not-for-profit facilities, or community health centres.

Funds to retrofit infrastructure could be as small as the installation of an air conditioner (\$10,000) to a major refurbishment of a heritage building (\$500,000), requiring approximately \$50 million over five years. It is not feasible for every town in rural Victoria to be included, so local governments should lead the identification of priority places with their communities. Areas already identifying as vulnerable to future climate change impacts and in need of these facilities – such as Macedon Ranges, Central Goldfields, Mount Alexander and Gippsland shires – are prime candidates for early funding.⁷²

4.4 Foster regional Victorians' health, safety and inclusion

Build regional residential alcohol and drug rehabilitation facilities

Draft recommendation 92

Within five years, build residential detoxification and rehabilitation facilities in regional Victoria to provide equitable access to alcohol and other drug treatment.

Problem alcohol and other drug (AoD) use continues to affect the health, productivity and wellbeing of individuals and communities in Victoria. Regional areas face particular challenges, as drug and alcohol abuse is growing faster than in Melbourne,⁷³ and people in regional areas are more likely to have used an illicit drug⁷⁴ or consumed alcohol at dangerous quantities.⁷⁵ The rate of unintentional drug-induced deaths per capita has increased every year in rural and regional Victoria since 2012, even as Melbourne's has declined, and was a staggering 80% higher than Melbourne in 2017.⁷⁶

Some people can be treated with regular appointments with doctors or detoxification at home. These options do not work for everyone, including for those who need longer-term or more structured care, or who face poverty or domestic violence.⁷⁷ In these circumstances, residential rehabilitation and detoxification facilities providing 24-hour staffing and treatment programs on site are more likely to be effective – especially in the longer term.⁷⁸ New South Wales research has found residential rehabilitation central to treating high severity cases⁷⁹ and particularly effective in addressing dependency on methamphetamines⁸⁰ – for which there are currently no pharmacological treatments.⁸¹

The Victorian Government has set out plans to increase residential rehabilitation beds,⁸² but regional residents face barriers to accessing treatment.⁸³ The regions have too few facilities to meet demand, and existing services are unevenly distributed and often scarce in regional areas.⁸⁴ While private facilities have filled some of the gap, they can be prohibitively expensive – up to \$30,000 for a single stay.^{85,86} Regional services also struggle to treat people in a timely manner, with waiting lists commonly over six months.⁸⁷ Travelling to Melbourne is the only option for many,⁸⁸ but the distances and costs involved can be a barrier to seeking treatment, including because many areas have no public transport.⁸⁹ Without affordable services, particularly for severe substance dependence, more people end up in emergency departments, hospitalised, or in prison,⁹⁰ contributing to entrenched social disadvantage in some areas.⁹¹

Within five years, the Victorian Government should build new residential rehabilitation and detoxification facilities in regions where they are not currently available or planned – including the Great South Coast, Mallee, Wimmera Southern Mallee and Goulburn.⁹² Communities in the Great South Coast and Mallee have particularly urgent needs, as residents live far from other centres. To reflect a standard of one for every 10,000 residents,⁹³ the Victorian Government

should deliver a minimum of: 11 beds for the Great South Coast; 10 for the Mallee; 5 for Wimmera Southern Mallee; and 17 for Goulburn, on 2018 population figures.⁹⁴ Service planning should determine the optimum size of each facility, noting that larger facilities may have other efficiency and continuity benefits. New facilities should be designed and delivered in cooperation with people with lived experience of addiction and mental illness, in keeping with the recommendations of the Royal Commission into Victoria's Mental Health System (see draft recommendation 75).⁹⁵ Planning should begin as soon as possible.

Every \$1 invested in alcohol or drug treatment can return \$7 in benefits.⁹⁶ Extrapolating from recent projects, we estimate the initial cost to purchase land and construct facilities to be between \$3 million and \$6 million. The Government recently invested \$6.7 million to establish and run a 20-bed centre in the Grampians over four years,⁹⁷ and \$9.7 million to acquire land for three new residential rehabilitation services in Traralgon, Corio and Wangaratta.⁹⁸ The 2020-21 Victorian Budget provided extra funds to operationalise these three sites and upgrade existing facilities.

4.4 Foster regional Victorians' health, safety and inclusion

Fund more Youth Foyers in regional Victoria

Draft recommendation 93

Fund more Youth Foyers in regional Victoria, beginning with Geelong, Wodonga and Bendigo by 2026, to build on existing education infrastructure and support vulnerable young people.

Many young people currently experience disadvantage in regional Victoria, and lack access to economic, human or social capital resources.⁹⁹ New South Wales research indicates that vulnerable young people are 4.3 times more likely to have alcohol and other drugs related hospital admissions, 3.6 times more likely to use social housing services, and 3.4 times more likely to interact with the justice system, compared to others.¹⁰⁰ While vulnerable young people need support in every part of Victoria, pockets of regional cities are some of most disadvantaged in the nation, and have become more disadvantaged over time.¹⁰¹ For example, the smaller job market in regional Victoria can make it difficult for young people to gain employment without training or qualifications.¹⁰²

The Victorian Government can better support vulnerable people in regional areas to navigate crucial life transitions and help break cycles¹⁰³ of disadvantage.¹⁰⁴ Successful transition from school into work is essential for vulnerable Victorians to thrive in later life.^{105,106} Interventions and support during this time can have a lifelong impact, shifting young people onto more advantaged trajectories.¹⁰⁷

Youth Foyers provide young people aged 16-24 with stable accommodation for up to three years while they undertake education or training. They offer supported medium-term accommodation, usually co-located with an educational institution like a TAFE campus, acting as a nexus between homelessness and independent or semi-independent living.¹⁰⁸ Youth Foyers provide the time, personalised attention, mentoring, coaching and access to opportunities needed to assist young Victorians to lead fulfilling, independent and productive lives. One study found after the program, Year 12 or equivalent completion rates increased from 42% at entry to 67% at exit and 75% a year later.¹⁰⁹ Other Australian Youth Foyers have reported consistently positive outcomes, such as 90% of leavers in Perth securing long-term accommodation.¹¹⁰ Our proposal for extra Youth Foyers aligns with the values in Victoria's existing youth reforms, with the Home Stretch¹¹¹ and Raising Expectations¹¹² programs supporting education opportunities for young people.

Youth Foyers demonstrate some cost efficiencies by centralising social workers and services as well as avoiding significant future costs to government in employment welfare, housing, health and policing.¹¹³ One evaluation estimated higher benefit-to-

cost ratios over a 20-year period, compared with transitional housing management services,¹¹⁴ and estimated program benefits far outweighed capital and operational costs.¹¹⁵ Compared to other models, 40-bed Youth Foyers appear to have the lowest service delivery costs.¹¹⁶

The Victorian Government should fund at least three new 40-bed Youth Foyers in regional Victoria in the next five years. This can reduce young people's experience of homelessness and increase those achieving a qualification and becoming productively employed. Geelong, Wodonga and Bendigo are suitable locations for Youth Foyers, due to high levels of school disengagement and youth unemployment, good public transport links, and easy access to community services and tertiary education opportunities.

Youth Foyers will require appropriate support funding to ensure that a high quality service response can be successfully delivered to vulnerable young people. Establishment of partnerships with local community services, businesses and local government will be critical. These sites can be evaluated, potentially supporting further locations in the future.

4.4 Foster regional Victorians' health, safety and inclusion

Expand social housing in regional centres, in locations with good access

Draft recommendation 94

Focus social housing investments in regional centres, near access to transport and services, to contribute to a target of 4.5 social housing dwellings for every 100 Victorian households by 2031.

Social housing infrastructure meets a basic need for secure, affordable and appropriate housing among low income and vulnerable Victorians, which is not being supplied by the private market.¹¹⁷

The higher proportion of people experiencing disadvantage contribute to significant regional social housing demand.¹¹⁸ Social housing provides housing at discounted rents to disadvantaged individuals, who otherwise would not have access to affordable rental housing. Rents are typically capped at 25 – 30% of weekly income.¹¹⁹ Living in social housing reduces subsequent homelessness¹²⁰ and reduces health service use.¹²¹

The Victorian Government should expand the supply of social housing to better assist disadvantaged and vulnerable Victorians, to contribute to a statewide target of 4.5 dwellings for every 100 households (see draft recommendation 73). Regional social housing should not further disadvantage tenants by being located far from the services and opportunities they need to overcome the disadvantages they experience.

New regional social housing stock should focus primarily on regional centres, with those forecast to experience strong forecast population growth an immediate priority (for example, Geelong, Ballarat and Bendigo¹²²).

These centres are best situated to provide access to transport, services and jobs, which are increasingly concentrated in regional hubs. The specific sites for social housing development should be selected to maximise good access to services by walking and good public transport service. Future investment should seek to address the imbalance between demand for social housing and available supply, in terms of dwelling size. Based on existing patterns of demand in the regions, increased provision of one and two-bedroom accommodation should be an immediate priority. To achieve 4.5 properties for every 100 households in Victoria's regions will require provisioning an estimated 9,000 more dwellings by 2031, or 6,400 with slower population growth.¹²³ However, the statewide target need not aim for the same proportion in every region, instead focussing on places with the highest need.

The Victorian Government's \$5.3 billion Big Housing Build will construct 9,300 social housing dwellings over four years,¹²⁴ of which an estimated 2,300 will be in regional areas.¹²⁵ This is a significant new investment which will advance the social housing needs of regional Victorians. The extra investment will need to be further supplemented to achieve a statewide target of 4.5 social housing dwellings for every 100 households.

4.4 Foster regional Victorians' health, safety and inclusion

Make social housing suitable for changing local climates

Draft recommendation 95

Prioritising northern Victoria, continue to deliver a long-term program of modifying social housing to be climate-resilient by improving the energy efficiency and energy affordability of residences.

Climate change is projected to cause temperature increases of 0.8°C to 1.9°C in Victoria's regions by 2030.¹²⁶ The northern regions of Victoria already experience frequent extreme heat events, and their frequency is likely to double by 2050.¹²⁷

Extreme heat can affect anyone, but can especially affect older people, pregnant women, young children, people with disability and chronic health conditions, and people who have low incomes or are socially isolated.¹²⁸ Children may experience disrupted sleep, affecting their learning and health.¹²⁹ The standard of housing and the neighbourhoods in which low income households live can exacerbate heat-related health risk.¹³⁰

In current conditions, homes in the northern regions of the state are unable to maintain a comfortable, healthy temperature during summer without the use of air conditioning. In particular, social housing is often low quality, meaning homes heat up faster and stay hot for a prolonged time.¹³¹ Tenants' heat related discomfort can be worse inside than outdoors.¹³²

However, social housing tenants are often unable to modify their homes. They often cannot afford improvements, or the higher energy bills and extra maintenance costs,

and must navigate a highly cumbersome approval process to make any changes to their home.¹³³ The Victorian Government has introduced a flagship Solar Homes program,¹³⁴ which subsidises home installation of solar panels, solar hot water systems, and home battery storage.¹³⁵ The 2020-21 Victorian Budget further supplemented the Solar Homes program, and provided \$112 million for targeted energy efficient upgrades for social housing properties.

The Victorian Government should continue these efforts in a long-term program to retrofit social housing dwellings to be energy efficient, maintain thermal comfort and have low energy costs. The program should include the option of installing split system air conditioning, energy efficiency improvements, and photovoltaic solar panels to help improve energy affordability for low income tenants and help offset any extra costs of increased electricity use.

Energy efficiency improvements may include draft-proofing, insulation, ceiling fans, external blinds, more energy efficient appliances, or painting roofs a lighter colour to reflect sunlight. Not all modifications will be necessary or possible in all homes, but they should be selected for best value after an energy assessment, such as the

Victorian Government's Scorecard.¹³⁶ Such modifications would represent beneficial investments at a relatively low cost, depending on the homes' build quality and orientation. Some improvements take as little as three years to pay back their costs in energy savings.¹³⁷ Infrastructure Victoria estimates a full upgrade could cost up to \$12,000 for each home, but newer homes or more limited modifications would be cheaper. We estimate the cost to be around \$20 million each year for 30 years, but broader renewal of ageing stock (see draft recommendation 57) would reduce this estimate.

Given some regions of Victoria are more affected by extreme heat, the program should prioritise the northern part of the state – the Mallee region and northern parts of Wimmera Southern Mallee, Ovens Murray, Loddon Campaspe and Goulburn – and expand to other regions over time. More energy efficient social housing also helps achieve progress on Victoria's 2050 zero emissions target.



Discussion questions

Infrastructure Victoria welcomes feedback on these draft recommendations. In particular, we are interested in answers to the following:

?

Are there other cost-effective infrastructure solutions that build health, wellbeing and inclusion in regional Victoria?

?

Are there specific locations where implementing these recommendations would have a greater impact on regional communities' health, safety and inclusion?



To answer these questions and more, visit infrastructurevictoria.com.au

From draft to final strategy

This report represents a draft update to Victoria's 30-Year Infrastructure Strategy. It is an opportunity to test Infrastructure Victoria's advice on Victoria's infrastructure needs and priorities, and to seek community feedback on our assumptions, evidence and draft recommendations. This will inform the final strategy update which will be delivered to the Victorian Parliament in mid-2021.

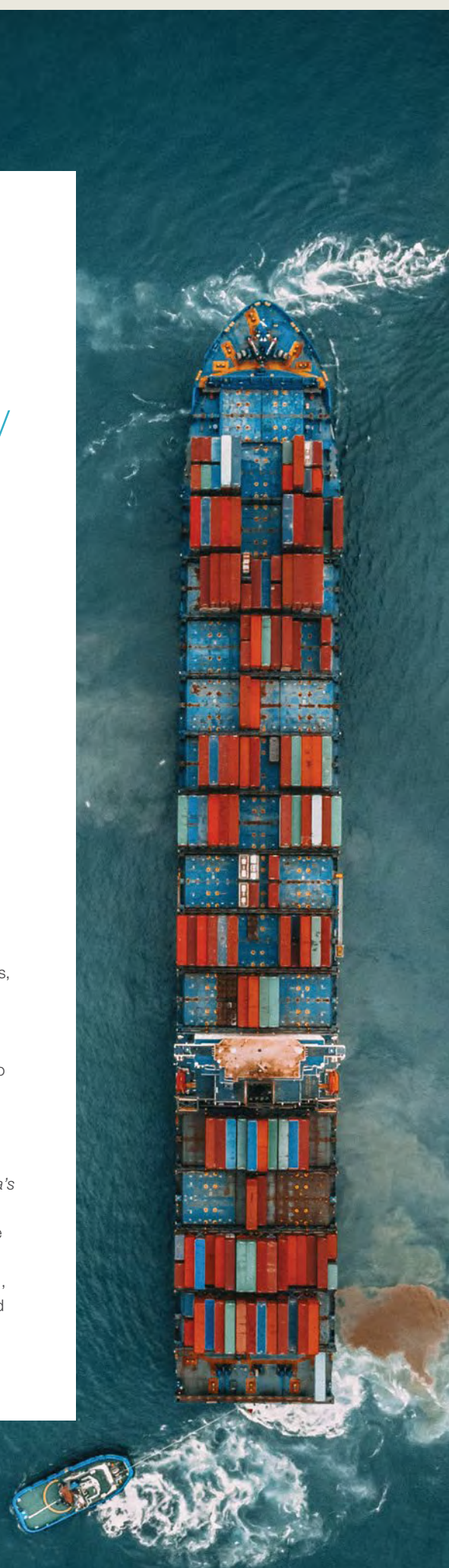
Over the coming weeks we will be engaging with stakeholders and communities across the state, seeking your feedback on the draft recommendations and whether they collectively address the infrastructure challenges and opportunities facing Victoria now and over the next 30 years.

At the same time, we will be doing further work to test and refine the costings and timelines outlined within our draft recommendations to ensure they are based on the best available information. Findings from community consultation and our additional research and analysis will be consolidated into the final strategy.

Delivering the final strategy to the Victorian Parliament in 2021 does not represent the end of the process. The Victorian Government will have up to 12 months to respond to our recommendations and develop a five-year infrastructure plan. This will identify priority projects and how these will help achieve the social, economic and environmental objectives outlined in the final strategy.

Infrastructure Victoria will then assess the Victorian Government's infrastructure priorities and overall progress in meeting the state's infrastructure needs on an annual basis, as part of an ongoing dialogue aiming to improve long-term infrastructure planning. It is not an audit, but an opportunity for Infrastructure Victoria to monitor changes as an independent infrastructure adviser to the Victorian Parliament.

Infrastructure Victoria refreshes *Victoria's 30-Year Infrastructure Strategy* every three to five years to ensure our advice remains relevant and timely. Following the release of the final strategy in 2021, the cycle of research, engagement and review to inform the next strategy update will begin again.



Acronyms

Term	Definition
ACT	Australian Capital Territory
AEMO	Australian Energy Market Operator
AoD	Alcohol and other Drugs
CBD	Central Business District
COAG	Council of Australian Governments
COVID-19	Coronavirus Disease 2019
DET	Department of Education and Training
GW	Gigawatt
ICT	Information and Communications Technology
kW	Kilowatt
MM2	Melbourne Metro Two
MtCO₂-e	Megatons of carbon dioxide equivalent
NABERS	National Australian Built Environment Rating System
NatHERS	National House Energy Rating Scheme
NBN Co	National Broadband Network Corporation
NEIC	National Employment and Innovation Cluster

Term	Definition
NEM	National Electricity Market
NSW	New South Wales
PSP	Precinct Structure Plan
RACV	Royal Automobile Club of Victoria
SDGs	Sustainable Development Goals
SWRRIP	Statewide Waste and Resource Recovery Infrastructure Plan
TAC	Transport Accident Commission
TAFE	Technical and Further Education
TEU	Twenty-foot equivalent units
VITM	Victorian Integrated Transport Model
VLUTI	Victorian Land Use and Transport Integration
VNI	Victoria – New South Wales Interconnector
VPA	Victorian Planning Authority
VPP	Victoria Planning Provisions
Wi-Fi	Wireless Fidelity

Endnotes

1. Confront long-term challenges

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4. Develop regional Victoria

4.1 Enhance market access and productivity

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