Transport

In January 2021, there were approximately **2.3 million vehicles registered in WA** for around **2.7 million people**.[1] Meanwhile, the percentage of children who walk or cycle to school has declined from 75% in the 1980s to 20% in 2021.[2]

What IWA heard

During consultation on the draft strategy, there was broad support from stakeholders across the wide range of issues and recommendations. Stakeholders commented on the need to focus on strategic trends, better planning and non-build elements, and for these to flow more directly into the selection and preliminary assessment of a new longer-term program of large transport infrastructure projects. There was strong support for changes to the current Transport Portfolio governance arrangements.

Some feedback noted a link between proposed reforms and the hypothecation of motor vehicle licence fee revenue and fuel excise. There is a need for any such reforms to ensure ongoing adequate support for regional and local government roads, along with improved resilience, road maintenance and road safety programs, which has been reflected within this chapter.

In response to feedback on the importance of walking and new e-mobility devices, such as e-scooters and e-bikes, the focus on cycling infrastructure and design has been broadened. Stakeholders highlighted the continuing emergence of low and zero emissions vehicles and the optimal roles of the public and private sectors in harnessing opportunities in this area, and this has been explored further.

Transport networks and infrastructure across WA's more than 2.6 million square kilometres connect Western Australians to jobs, services and social opportunities. From passenger transport, which connects people and places, through to freight transport, which moves materials and produce to export and delivers vital supplies to remote communities, the state's transport system is essential to its collective economy and wellbeing.

Government aims to provide a safe, efficient, resilient, accessible and sustainable transport system. To do so, transport networks and infrastructure must be effectively integrated across modes (including road, rail, active, air and maritime), efficiently linking people to employment centres, housing, schools, universities, hospitals and tourism attractions. Achieving this goal requires a highly coordinated approach and alignment between WA's transport planning, investment, delivery, operations and governance arrangements.

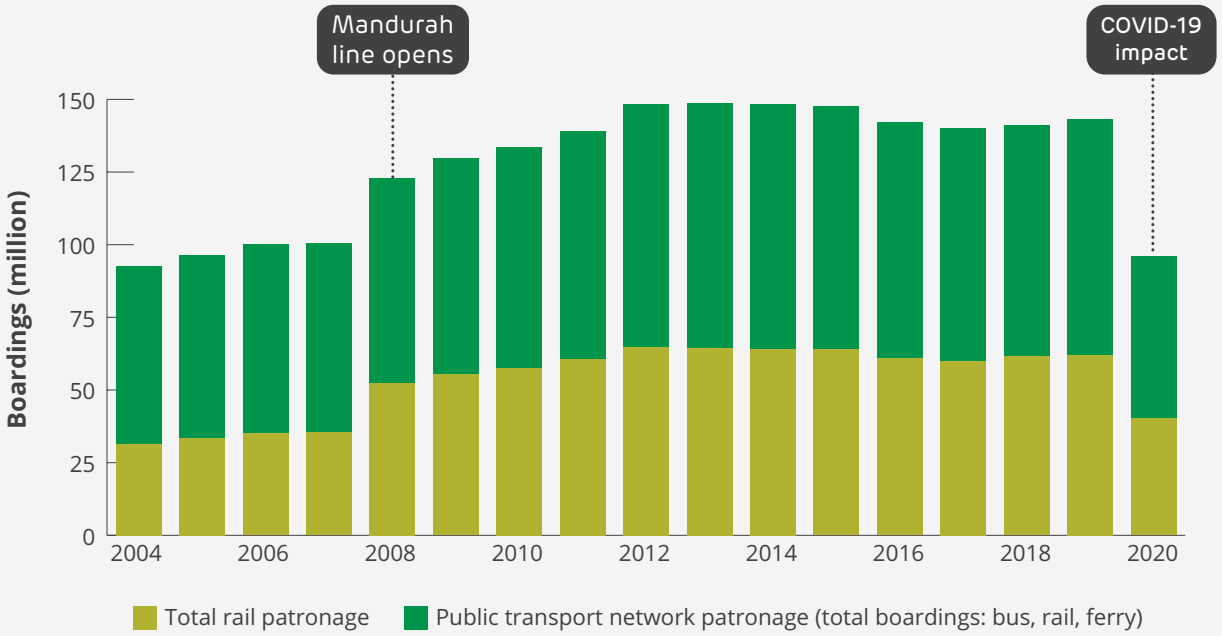
Transport forms a significant part of the WA Government's Asset Investment Program (AIP). In the decade to 2019–20, annual average road and public transport expenditure was $1.4 billion – almost one-quarter of the total public sector expenditure.[3] This increased to $3.3 billion or 41% of the AIP in the 2021–22 mid-year review, in line with the WA Recovery Plan and increased investment in roads and METRONET.[4] Transport investment will also form approximately 45% of the AIP from 2021–22 to 2024–25. It is critical that investment on this scale has an integrated, coordinated approach to optimise long-term public benefit.[5] WA can learn the lessons from costly, build-dominated infrastructure interventions in other jurisdictions by focusing on improving the efficiency of its existing infrastructure through demand management, smaller efficiency-enhancing projects and alignment of infrastructure development with long-term land-use planning. Smart investment in the sector presents opportunities for increased transport sector productivity, reductions in carbon emissions and new service delivery models to achieve desired outcomes.

As well as opportunities, the transport sector faces a number of challenges in the 20-year time frame of the Strategy. These challenges include congestion, reductions in public transport patronage, the scale of the state's transport network, road safety, technological change and, at times, a fragmented approach to transport governance and investment.

Transport infrastructure must respond to increased congestion resulting from population and economic growth, particularly in Perth. The cost of peak period congestion – increased travel time, reduced access to services and reduced economic output – was estimated at $1.5 billion per annum in 2016, increasing to $3.6 billion per annum by 2031.[6]

A current challenge in achieving efficient network operations is the widening gap between reductions in public transport patronage and network expenditure.[7] Patronage on the Transperth system has fallen from a peak of over 148 million trips in 2013 to 96 million in 2020, a reduction of approximately 30%, with patronage relatively flat between 2012 and 2019.[8] Much of this decline is attributable to the COVID-19 pandemic, which has clearly compounded this issue both in Perth and in many other cities around the world. Any ongoing significant decrease in patronage will likely lead to larger operating subsidies across the network. Conversely, road use has increased to above pre-COVID-19 levels (Figure 43).[9]

Figure 43: Transperth annual public transport patronage, 2004 to 2020[10]



Technological change is impacting almost every aspect of the sector across both the passenger and freight network. The advent of low and zero emissions vehicles, such as electric and hydrogen vehicles, are poised to significantly alter fuel consumption and road funding.[11] The choice and uptake of micro-mobility devices such as electric scooters and bicycles are increasing, and smart road infrastructure is having a positive impact on road efficiency and safety. New transport concepts such as mobility-as-a-service models have the potential to change how people travel. While it is not possible to accurately forecast how much the technology trajectory will impact road networks and public transport in the long term, WA must be prepared to respond, ensuring regulatory frameworks and infrastructure keep pace to deliver a well-functioning network.

The geography of the state also provides a challenge. Regional transport connections are vast, though often with lower demand. Roads are the most important, and often the only, link between regional communities and other centres. This is particularly relevant for remote Aboriginal communities who can be isolated both socially and geographically as a result of seasonal weather conditions. Maintaining a safe and efficient road network across the state is challenging and expensive. A significant amount of the road trauma occurring in WA takes place on regional roads and the WA road toll is high compared with

other Australian jurisdictions. Continuing to improve the safety of regional roads, in line with the Road Safety Strategy for Western Australia 2020–2030, should be a priority.

The resilience of WA's transport network is vital. Adverse events can lead to transport network failure or place additional pressure on a constrained selection of transport modes. As an example, flooding during the wet season can cause frequent road closures in the Pilbara and Kimberley regions. Similarly, recent bushfires have closed major interstate transport links between WA and South Australia. This can have serious impacts on access to regional and remote communities for passenger and freight traffic. It is important that efforts are made to increase the resilience of the critical infrastructure that underpins the network, and that greater consideration is given to planning for redundancy and network flexibility. The WA Government is working to achieve these transport goals across multiple transport agencies. In addition to the state's commercialised port authorities, WA's Transport Portfolio agencies – Main Roads WA, Public Transport Authority and Department of Transport – can sometimes operate with unaligned objectives. For example, the 3 entities use different systems for public transport and road system planning, which limits the strategic development of the state's transport system. The importance of coordination and governance has previously been recognised through various historic organisational structures. While the creation of the Office of Major Transport

WA's transport networks should move towards a **mobility-as-a-service** model to integrate journeys across all transport modes.

Infrastructure Delivery in 2020 demonstrated progress towards improved cross-agency transport infrastructure delivery in WA, further reform is needed.

In terms of opportunity, WA is well positioned to take advantage of demand for its exports from the emerging global consumer class.[12] To maintain international cost competitiveness for export products, WA needs to ensure its diverse freight and supply chains operate efficiently and minimise costs for business and consumers. Studies that complement the development of a metropolitan supply chain, linked to a new container port in the Fremantle Outer Harbour through Westport, will be integral to this.

Perth Airport is a critical transport hub, facilitating international, interstate and intrastate economic activity and trade. Longer-term planning should consider the planned expansion of Perth Airport and the potential location for a new international airport to cater for long-term growth in demand.

Collisions on regional roads contribute to a significant proportion of WA's road trauma. Progressing regional road safety treatments will contribute to achieving the state's target of **reducing serious road trauma by 50–70% by 2030**.[13]

Options should also be considered for future general aviation needs of the state, as growing urban development around the busy Jandakot Airport may potentially constrain its expansion.

The transport sector's contribution to carbon emissions is also significant.[14] A combination of technological improvements, better integrated planning and a stronger uptake of active and public transport can reduce emissions and simultaneously enhance economic and social outcomes.

The transport recommendations in this chapter have been arranged according to 5 central transport themes:

- governance and planning
- demand management
- mobility
- technology
- industry productivity and freight.

Governance

The WA Government Transport Portfolio comprises:

- Department of Transport
- Main Roads WA
- Public Transport Authority
- 5 port authorities (Kimberley, Pilbara, Mid West, Fremantle and Southern) that report directly to the relevant Minister.

The Department of Transport is responsible for integrating and enhancing the state's transport operations, regulatory functions and policy development across transport modes. Its functions include:

- vehicle, boat and driver licensing and registration
- regulation of aviation
- coastal infrastructure planning
- on-demand transport
- freight, ports and boating facilities
- transport and urban planning
- marine safety and emergency response.

Main Roads WA is responsible for the planning, operation and maintenance of state-owned roads (including bridges, tunnels and railway crossings) and provides some funding and oversight for local roads. It also manages traffic signals and signage. The state-owned road network includes approximately 18,600 km of road, valued at $44 billion.[15]

Public transport in WA is operated through the Public Transport Authority's Transperth division (metropolitan bus, rail and ferry) and various regional train and coach services. Perth's rail operations are operated directly by Transperth, while bus services are contracted to private providers. Regional services are operated through TransWA and TransRegional. The WA Government owns the rail freight network across the south of WA, although this is under a long-term private lease with Arc Infrastructure until 2049. The lease contract is managed by the Public Transport Authority.

Most of the investment in the transport network is planned and delivered though Main Roads WA and the Public Transport Authority. The Office of Major Transport Infrastructure Delivery, comprising teams from the Public Transport Authority and Main Roads WA, was established in May 2020 to better coordinate the delivery of infrastructure projects valued at more than $100 million.

METRONET has been established as a separate office within the Transport Portfolio to drive the government's commitment to expansion of the passenger rail network. Similarly, the Westport Office has been established to progress planning to deliver new container port facilities.

WA's 5 port authorities are responsible for oversight of port operations and strategic planning, with significant private sector participation and ownership of assets within port boundaries.

Case study

Transport for NSW

In New South Wales (NSW), the Department of Transport, trading as Transport for NSW, is responsible for overall governance of transport systems.

Transport for NSW was formed in November 2011 to take responsibility for all non-service delivery aspects of transport system administration in NSW, including policy, planning and funding allocation.[16] It absorbed the responsibilities of previous agencies, such as the State Transit Authority (bus service operator), the Public Transport Ticketing Corporation and transport-related functions from the NSW Department of Planning and Infrastructure.[17]

Over time, new entities such as Sydney Trains, Sydney Metro and NSW Trains were established within Transport for NSW.

In 2019, NSW Road and Maritime Services was incorporated into Transport for NSW and ceased to exist as a separate statutory body. Road and Maritime Services stated this transition would 'better integrate broader transport services with roads and maritime infrastructure to improve the lives of our customers and communities'.

The integrated structure of Transport for NSW and its responsibility for all transport modes supports a focus on cross-modal, long-term future transport planning. The agency has developed the Future Transport 2056 strategy and vision to assess transport needs for a projected NSW population of 12 million people by 2056.[18]

For further information, refer to www.transport.nsw.gov.au.

Recommendations

Governance and planning

Portfolio governance and funding

To meet integrated transport needs over the next 20 years, WA needs a strategic, mode-agnostic approach to transport network planning and delivery across all modes of transport. Interstate and international examples demonstrate a range of potential options to achieve this, from internal reforms to full-scale structural changes. While some initial progress has been made through the creation of the Office of Major Transport Infrastructure Delivery, further reform is needed. The portfolio is also undertaking a collaborative approach to developing a future Perth transport model to improve strategic metropolitan planning.

Income of approximately $1 billion per annum from the licensing of motor vehicles is hypothecated in the State Budget process for investment in road-related projects.[19] Other transport projects, including much of WA's public transport, compete with other state agencies and government trading enterprises for funding on an annual basis. The certainty of revenue flow has allowed Main Roads WA to take an effective, strategic approach to long-term planning of road infrastructure, although the guaranteed income stream has, in many cases, prioritised road projects that focus on motor vehicles. Recently, motor vehicle licence funding has been allocated to support level-crossing road works associated with METRONET. While the design and allocation of other funding sources (for example, fuel excise and traffic infringement revenue) is important to support improved transport outcomes, more consistent and longer-term allocation of motor vehicle licence funding to other transport mode projects will better enable delivery of overarching, portfolio-based transport plans and better address road congestion.

As WA's population continues to grow, it will be important to harness opportunities to balance the investment in diverse transport options, such as the current investment in METRONET, while still providing appropriate maintenance funding for the existing network, including regional and local government roads. This will require further change in existing governance and funding arrangements, with a focus on achieving safety, efficiency, accessibility, resilience and sustainability outcomes for the portfolio and supporting improved land-use outcomes in WA.

Recommendation 56

Ensure investment in transport infrastructure delivers improved transport system outcomes by:

a. further reforming governance arrangements for the Transport Portfolio to achieve an integrated, strategic, mode-agnostic approach to transport network planning and delivery across all modes of transport

b. reforming funding hypothecation legislative arrangements for motor vehicle licence revenue to fund the planning and delivery of priority projects across all transport modes, not only road-related infrastructure.

Planning

Transport Portfolio agencies and port authorities have specific, independently developed infrastructure investment plans. Significant benefits can be achieved if a system-wide approach is taken to plan and prioritise transport investment. Transport infrastructure investment plans should also be refreshed as changes occur in macro-economic conditions, demographics, climate and technology.

A new or updated regional transport plan should be developed that reflects these changes. It should also reflect region-specific freight plans, trading port accessibility and passenger network requirements and consider cross-regional strategic issues, such as direct shipping to and from the Pilbara region and Asia and road upgrades for improved freight connectivity between Perth and the Pilbara region. Existing sub-regional plans such as the Revitalising Agricultural Region Freight Strategy are valuable and should be retained to support existing infrastructure planning.

The main strategic land use and transport plan for Perth is *Perth and Peel@3.5million: the transport network*.[20] However, Main Roads WA's 20-year Road Network Development Plan, the Public Transport Authority's Station Access Strategy (in development) and the Department of Transport's Long Term Bicycle Network Plan are not sufficiently aligned to the Perth and Peel @ 3.5million frameworks to establish a single and coherent plan and list of priorities.

The 20-year Road Network Development Plan and the Public Transport Authority's Rail Growth Plan both propose significant investment to meet forecast growth in peak period demand, based on different forecasts from separate strategic transport models in separate state agencies.

IWA recommends refreshing the Perth and Peel transport plan to better align and prioritise transport infrastructure investments. This will need to consider the interrelated land-use aspects of the transport network. Identifying activity centres and train station precinct intensification opportunities linked to an urban consolidation action program, consistent with Recommendation 25 in the Planning and coordination chapter, would help drive urban infill. This could improve local amenity while supporting greater public transport patronage.

IWA is pleased to note that Main Roads WA is working with portfolio partners to develop a new, single Perth transport model, which can better inform system-wide planning. The new Perth transport model should include refreshed land-use forecasts from the Department of Planning, Lands and Heritage and focus on scenarios of future transport sector disruptions and travel demand management. This should include, but not be limited to, automated, shared and electric vehicles, pricing reforms, changing work practices, micro-mobility and mobility-as–a-service subscription models.

Recommendation 57

Guide future transport infrastructure investments into areas of strategic need by refreshing statewide strategic transport planning, aligned with land-use plans and policies, including:

a. developing, publishing and implementing a new 20-year regional transport plan, including a focus on freight supply chains across all modes and across all regions outside of Perth and Peel that builds on recent region-specific freight plans and considers strategic cross-regional issues

b. developing, publishing and implementing a new 20-year Perth and Peel transport plan that combines and prioritises all key mode-specific transport planning across Transport Portfolio agencies and embeds a diverse range of non-build, demand management and transport innovation opportunities and scenarios, and station precinct intensification opportunities

c. finalising development of the new Perth transport model, which incorporates the use of modern, diverse network usage data and establishes a seamless staffing and operational model for use across the Transport Portfolio.

Demand management

Fuel excise alternatives

The fuel excise, levied by the Australian Government, is the largest single source of road user charging revenue.[21] The current national road-charging system generated total revenue of $29 billion in 2018–19 nationally, not inclusive of toll road revenue in other jurisdictions.[22] This roughly covers the direct cost to government of road provision but not externalities, such as congestion and emissions. Fuel excise revenue is fast becoming outdated due to the uptake of more fuel-efficient vehicles, along with low and zero emissions vehicles, such as electric vehicles, plug-in hybrid electric vehicles and hydrogen fuel cell vehicles. It is a significant issue from a WA perspective, with total fuel excise transferred from WA motorists to the Australian Government in 2019–20 estimated at above $2 billion.[23] A significant decline in this revenue poses a major challenge to future national road asset management and development. Finding an alternative source of revenue to offset the projected decline in fuel excise is a challenge confronting all jurisdictions.[24]

Some jurisdictions are already pursuing reforms to impose charges for road use on low and zero emissions vehicles, which do not pay fuel excise tax.[25] However, these have been criticised by some stakeholders for discouraging the uptake of these low and zero emissions vehicles, potentially delaying significant health and climate benefits of lower transport emissions.

Alternatives to fuel excise as a major revenue source need to be investigated to address the future loss of revenue and continue to maintain safe and efficient roads. To secure community and industry support, any new charge should seek to maintain rather than increase total road-related revenue. Implementation also presents an opportunity to embed demand management functionality into any futureproofed new technology system. Any alternative to fuel excise systems will likely require national coordination. Infrastructure Australia has recently recommended a national approach to progressing distance-based road user charges to replace the fuel excise and in the longer term implementing a new user-pays charging regime.

The Strategy does not propose the introduction of toll roads in WA. Private toll roads in other jurisdictions have not generally functioned well in managing congestion. Private sector operators are incentivised to maximise revenue rather than consider congestion and equity impacts of the toll. Many tolls in Australia are levied on a fixed basis, with the user paying the same fee to use any segment of the toll road, regardless of time of day, day of the week or congestion condition.

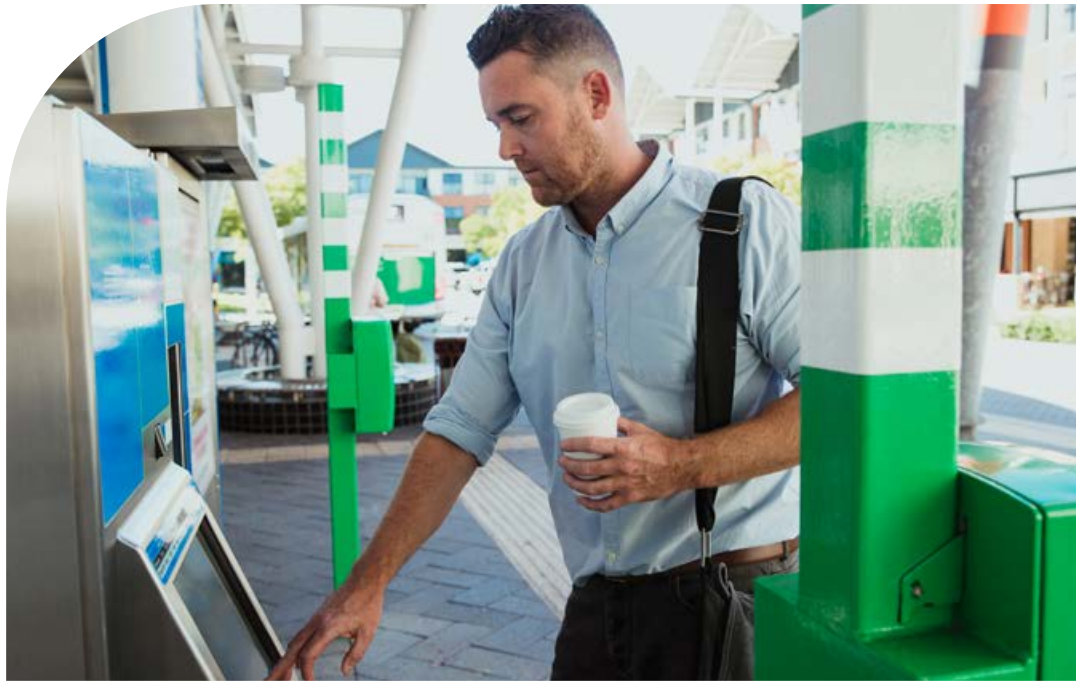
Recommendation 58

Address the future loss of fuel excise revenue by:

a. working with other jurisdictions to design a fair and nationally compatible alternative to fuel excise for low and zero emissions vehicles, with any future charging reform to be combined with other initiatives to ensure an overall net-incentive for the uptake of these vehicles

b. when designing a fuel excise alternative scheme and associated technology, ensuring that:
   - the scheme has the potential to include vehicle mass, distance, location and time-of-day pricing elements
   - total road system revenue is maintained at a stable level as a policy reform objective

c. undertaking a review to investigate the merits of location and time-of-day pricing signals being incorporated into a fuel excise alternative to improve road demand management during peak periods in Perth.



Public transport patronage initiatives

An important element of transport planning is including demand management interventions to address congestion and counteract reductions in public transport patronage.

The high level of investment in major road and rail projects has not entirely mitigated the forecast increase in transport congestion. To adequately address congestion, transport infrastructure must more strongly encourage a shift away from private motor vehicle use and facilitate alternative modes, such as active transport and micro-mobility.

There is a diverse range of demand management interventions that can be considered, including behaviour-change campaigns, improved accessibility and new business models to link transport mode options and enable smooth trip planning.

An effective example of non-build demand management is the WA-based Your Move program, which has changed behaviour, demonstrating important localised successes in increasing public transport patronage and active transport participation rates.[26] Further opportunities for regulatory reform to support the use of micro-mobility innovations such as e-scooters and e-bikes on the local road and path network, including allowing foldable devices onto all bus, train and ferry services, could help to reduce road demand and increase public transport patronage. This would build on the government's recent legislative announcements to introduce a modern safety regime for these devices.[27] Options such as the promotion of carpooling and off-peak commuting (including through off-peak public transport pricing), a Perth e-device share scheme and the removal of station parking charges should also be considered.

Digital platforms tested in other jurisdictions have demonstrated the potential future benefits of mobility-as-a-service models, linking public and private transport options in a single trip and payment model, to provide greater accessibility, efficiency and mobility for urban passenger transport. This can include access to public transport; shared, automated and electric vehicles; micro-mobility devices; and on-demand rideshare models. Public sector responses to this transport model innovation can be supported by enabling third-party access to real-time data on road and public transport network performance and conducting mobility-as-a-service subscription trials incorporating multi-modal connections to stations. The current upgrades to the SmartRider system to enable seamless card payments is another example of how new digital technology can reduce barriers to public transport and increase patronage.

Implementing an urban consolidation action program (see Recommendation 25 in the Planning and coordination chapter) to enable greater levels of appropriate urban infill housing around all station precincts and high-frequency bus corridors would support greater public transport patronage. In addition to this step, developing active transport plans that promote public and active transport for all schools, universities and TAFEs can identify active transport infrastructure gaps and pursue investments and behaviour that promote greater uptake of safe walking and cycling that is linked to public transport use where required (for longer trips).

Recommendation 59

Make better use of existing transport infrastructure, increase public transport usage and reduce road congestion by developing and implementing a public transport patronage action plan with a focus on non-build measures. The action plan should include:

- adopting behaviour-change initiatives, digital technologies, and operational and service delivery innovations, including targeted trials and mobility-as-a-service models and include these in the scope of future business cases for major road and rail infrastructure
- planning for better connectivity to educational facilities and other activity precincts.

Mobility

Road network

Cars and trucks are the dominant form of transport for households and businesses in WA. This model generally enables efficient travel and is likely to continue. However, together with urban development patterns, this model has reinforced high levels of car dependency, which contributes to road congestion, rising vehicle operating costs and high emissions.

Over time, increased penetration of low and zero emissions vehicles may help to address some of these negative environmental impacts.

Main Roads WA has sophisticated systems for asset management, real-time operations, project delivery and long-term planning. As referenced earlier in this chapter, this is underpinned by strong and consistent levels of funding for roads through the hypothecation of motor vehicle licence fee revenue. To date, significant financial resources and expertise have largely been focused on additional road development. This type of investment often provides immediate decongestion benefits but reinforces long-term car dependency.

A predominant focus on the transport efficiency of roads can also work against community expectations of public space and place-making objectives, which could be better serviced using movement and place principles in strategic planning for specific corridor development.

One area that requires continued focus is road safety. On average, 168 people are killed and 1,513 people are seriously injured on WA roads every year.[28] Consistent with the Road Safety Strategy for Western Australia 2020–2030, further measures could entail implementing traffic calming, improved road design to prevent collisions with cyclists and pedestrians, investigating lower speed limits on local roads, making intersections safer and extending regional road safety treatment programs.[29]

Resilience is an increasingly important characteristic of effective transport networks, and road network resilience is particularly crucial in regional areas where other options are unavailable. Maintaining resilient and fit for purpose networks across WA will support the economic and social integration of regional areas and support WA export opportunities. Future upgrades focused on this issue could include the Great Northern Highway in the Kimberley, fully sealing the Outback Way and improved connections to direct shipping port facilities (see Recommendation 68d). The long-term funding program by the WA and Australian governments for the progressive upgrade and sealing of the Outback Way can support network resilience by providing an additional interstate road corridor. Infrastructure Australia has also identified the Outback Way upgrade, running across 3 jurisdictions, as a nationally significant infrastructure priority.

While road investment should continue to provide fit for purpose road networks, focus should shift towards more targeted investment in safety, regional productivity, embracing technological innovations and supporting all transport modes. The cost to deliver the large number of road projects currently in planning is significant and may constrain funding available for other government priorities.

Recommendation 60

Progress targeted expansion and improvement of the road network by:

a. delivering road safety programs in line with *Driving change: Road Safety Strategy for Western Australia 2020–2030*, including urban design innovations, speed reductions on local streets where appropriate and regional road safety treatments

b. delivering regional maintenance and freight productivity programs to provide fit for purpose road networks

c. progressing targeted, high-impact programs, including intersection upgrades, expanding the use of technology on arterial roads and trials for dynamic bus prioritisation

d. progressing capacity and efficiency upgrades to freeways and major urban highways (particularly Mitchell and Kwinana freeways), incorporating all modes and greater use of technology as a priority option

e. estimating impacts from a range of potential low and zero emissions vehicles and connected and automated vehicle rollout scenarios modelling and sensitivity testing in all major transport project business cases

f. investigating the feasibility of these long-term major projects: Orrong Road, EastLink WA, Brand Highway and North West Coastal Highway upgrade and Stock Road tunnel river crossing.

Heavy rail

There is currently a high level of investment in expanding the metropolitan heavy rail passenger network. The short-term to medium-term priority for heavy rail, beyond the implementation of the current METRONET program, should be on investment to support the efficient operation of the existing heavy rail network and other transit modes, rather than further heavy rail expansion. IWA supports high capacity signalling (currently in procurement) and a program of station precinct access upgrades as a priority in the short term. New signalling will replace existing systems approaching end-of-life and enable trains to operate at higher frequencies.

A range of complementary investments for the existing rail network are set out in the Public Transport Authority's Rail Growth Plan, including station upgrades and platform lengthening on the current rail passenger network, level-crossing removals, power systems and additional stabling to accommodate the additional rolling stock coming into the network over coming years.[30]

The Rail Growth Plan is based on meeting pre-COVID-19 patronage growth forecasts. The impact of COVID-19 on patronage has been significant and patronage has not returned to 2019 levels. The longer-term impact on patronage remains uncertain, though current METRONET projects and recent reforms to public transport fares may have a positive impact. The current investment in new rolling stock and proposed investment in signalling will provide additional system capacity. This means other proposed complementary investments can be considered over the longer term, although the cascading of older rolling stock onto the 3 'heritage lines' (Armadale, Midland and Fremantle) will require careful ongoing planning. Most station platform extensions may be relatively straightforward to deliver, although the more complicated CBD stations and the underground Subiaco station will be more challenging and may be required earlier.

Providing more convenient and safer access to stations from nearby areas can also boost public transport demand. This involves improving public and active transport connections to train stations, including by supporting the use of micro-mobility devices such as e-bikes and e-scooters. It is also important to ensure station accessibility upgrades are compliant with the *Disability Discrimination Act 1992* (Cth), with lists of significant projects and minor works programs in the surrounding catchments. Responsibility for delivery of these programs requires clarification, as it currently falls across multiple transport agencies and relevant local governments.

Long-term proposals for the expansion of the heavy rail network, such as the East Wanneroo Rail Link and an orbital rail route in the Perth metropolitan area, require further early-stage feasibility investigations. This includes assessing potential costs and patronage and considering alternative modes and alignments. An underground CBD metro system is unlikely to be required for at least the next 20 years, with light rail and/or bus rapid transit a higher priority. Investigation into the viability, benefits and costs of a Bunbury Faster Rail link in the long term will support future government decision-making in relation to connectivity and land use in the South West region and potentially other regional centres.

Recommendation 61

Plan and invest in the future development of new heavy rail infrastructure by:

a. investing in high capacity signalling
b. investing in improved station precinct accessibility through public and active transport programs and improving compliance with the *Disability Discrimination Act 1992* (Cth)
c. further investigating the merit and staging of investments in the Rail Growth Plan
d. investigating the feasibility of these long-term major projects: East Wanneroo Rail Link, Bunbury Faster Rail and Perth metropolitan orbital rail route.

Light rail and bus rapid transit

With the current emphasis of public transport investment largely in the outer suburbs, the focus in the short to medium term should shift to the CBD and inner and middle suburbs to address congestion and support in meeting Perth's urban consolidation targets. Light rail and/or bus rapid transit can improve overall transport network efficiency, stimulate infill housing development and reduce car dependency.

Light rail and/or bus rapid transit can function as a new public transport mode that operates between heavy rail and regular bus services. In addition to light rail and bus rapid transit, innovative new vehicle types should be investigated. Light rail and/or bus rapid transit systems already operate in every other major city in Australia. Numerous state governments have considered light rail systems for Perth, but no system has eventuated to date.

Any new system should include a corridor running from east to west along a primary axis of the CBD, together with connections to nearby activity centres. Further strategic planning is required to select the 2 key project criteria: mode and alignment. A light rail system would be more costly but could stimulate higher value uplift and urban infill development due to the visible permanence of the route. Alternatively, a more geographically extensive bus rapid transit system could potentially deliver an equivalent or higher level of transport benefits for a similar cost. A light rail route proposed in earlier plans would link the University of Western Australia with Curtin University and Canning Bridge Train Station via the Perth CBD (the Knowledge Arc light rail corridor). This should be considered further in planning and business case development. Light rail and/or bus rapid transit should also be explored further alongside the refresh of the Perth and Peel transport plan.

Beyond this, transport agency responsibility for planning and implementing light rail, bus rapid transit and other bus priority measures should also be resolved as part of IWA's separate recommendation on a new transport plan (see Recommendation 57b). Previous transport plans have identified numerous suburban corridors for improved bus services and light rail, although the process and state agency responsibility to deliver

these remains unclear. Without clear strategic direction, local governments have independently progressed more detailed planning for a number of these corridors, such as Scarborough Beach Road and Fremantle to Murdoch.

Recommendation 62

Provide certainty for future metropolitan planning by developing a business case for light rail and/or bus rapid transit as the next stage of major public transport priority investment in Perth, particularly in the Perth CBD and inner and middle suburbs, including completing a full options assessment comparing the Knowledge Arc light rail corridor against a potentially more extensive bus rapid transit system for Perth.

Cycling and walking

When a person walks or rides a bike instead of making a car trip, it saves fuel, improves their health, avoids emissions and decreases road congestion. The increase in cycling participation during the COVID-19 pandemic has highlighted the community's interest in active transport, including walking and cycling. The uptake of new technology through electronic micro-mobility devices (such as e-bikes and e-scooters) is also increasing demand for active transport infrastructure.

While Perth has an excellent shared path network for cyclists and pedestrians in many areas, there are still very few safe cycling routes through the heart of the Perth CBD, even though this has been proposed in strategic plans for decades. The percentage of children who walk or cycle to school has fallen from 75% in the 1980s to around 20% today.[31]

While there are many contributors to this trend, a significant barrier to greater take-up of active transport is the perception of cycling and pedestrian safety and amenity. More work is required to address this issue by improving street design, traffic calming and separation between different modes (including pedestrians, cyclists and micro-mobility users) and prioritising active transport access in and between activity centres.

These issues also need to be considered in the context of the Road Safety Strategy 2020–2030.

A long-term cycle network has been developed for Perth, and agreed by state and metropolitan local governments (a total of 5,570 km of new links).[32] More than $265 million in funding has been allocated to pedestrian and cycling infrastructure over the next 4 years, with the majority going to the cycling components of major road and rail projects, and CBD projects such as the new Causeway Pedestrian and Cycling Bridge.[33] Only an average of $5 million in 50% co-funding is available annually to both metropolitan and regional local governments for local cycling infrastructure projects.[34] These projects have delivered over 18 km of local cycling infrastructure annually, on average, between 2015–16 and 2019–20.[35]

Recent investment focus has been on completing the Principal Shared Path network to the edge of the CBD, along railways and major roads. Some innovative bike projects on local streets are also rolling out, along with vehicle speed reduction trials. These are positive steps, although cycling infrastructure elsewhere frequently presents safety issues and, in some areas, is outdated. For part of their journey, people often have no option but to cycle unprotected along painted lanes on busy roads. The lack of a safe 'first and last mile' discourages potential cyclists who have safety concerns, as the probability of a fatal outcome increases substantially if a person is hit by a vehicle at speeds above 30 km per hour.[36]

Unprotected painted bike lanes continue to be built as standard practice throughout WA, even where safe and cost-effective alternatives exist. Painted lanes fall short of international best practice and do not meet Austroads national guidelines. This situation is also inconsistent with the safe system principles that underpin various road safety strategies and are designed to protect vulnerable road users through lower speeds and a safer road environment. This is a barrier to cycling becoming a major transport mode, and reduces the benefits derived from the Principal Shared Path and rail networks.

Recommendation 63

Provide enhanced cycling and walking infrastructure by:

a. allocating a greater portion of state funding to local government cycling projects that deliver strategic, continuous cross-suburban linkages, based on Perth Long Term Cycling Network priorities and equivalent regional plans, including higher state co-funding contributions, further CBD links, projects across multiple local government boundaries and safer active transport links to schools

b. seeking federal funding contributions for a program of cycling infrastructure priority projects

c. requiring application of new safe active transport infrastructure design guidelines for all state and local government projects, based on international best practice, including addressing the needs of micro-mobility device users, cyclists and pedestrians through relevant updates to the WA Planning Commission's policies and Main Roads WA's procedures for the design, review and approval of local government road works.

Technology

Low and zero emissions vehicles

Low and zero emissions vehicles are likely to replace a significant portion of internal combustion engine vehicle sales over the next 10 to 20 years. The Commonwealth Scientific and Industrial Research Organisation predicts that electric vehicles could potentially account for around 40% of Australia's vehicle fleet by 2050 under a central scenario, based on current trends and assuming little or no policy intervention.[37] This market penetration is low compared to the policy targets of many other advanced nations. Electric vehicles appear the more likely focus for urban mobility and last-mile freight, while hydrogen fuel may become more prevalent for long-haul and heavy-freight vehicles (see Recommendation 47c in the Energy chapter).

Faster uptake of low and zero emissions vehicles in WA can deliver significant environmental benefits, public health benefits from a reduction in particulates, and lower vehicle operating and maintenance costs. The 2020 State Electric Vehicle Strategy for Western Australia sets out a range of measures to support the uptake of low and zero emissions vehicles, including a 25% electric vehicle fleet target for new light vehicles by 2025–26.[38] Given the current low uptake rate both in WA and nationally compared to many other nations, this Strategy recommends further steps be taken. This should include a more ambitious state fleet electric vehicle target beyond 2025–26 to help support the development of a larger market in WA.

The increasing uptake of low and zero emissions vehicles will put pressure on fuel excise revenue. Pursuit of a nationally consistent alternative to fuel excise is recommended. Any alternative should be complemented by future measures to ensure that overall incentives for the uptake of vehicles remain. Electric vehicle batteries can also benefit the energy network by recharging during the day when significant solar power is being generated and feeding back into the grid when demand is high in the evenings. Energy Policy WA's recently released Electric Vehicle Action Plan considers the impacts and opportunities associated with electric vehicles for the energy system, with recommended actions to prepare for increased electric vehicle uptake.[39]

Recommendation 64

Reduce the environmental impacts of road infrastructure use and achieve a higher uptake rate of low and zero emissions vehicles by implementing further measures that support the State Electric Vehicle Strategy for WA, including:

a. setting a more ambitious target for the WA Government light vehicle fleet uptake
b. accelerating the transition or conversion of other state government vehicles to low and zero emissions technologies, including specialised fleets of public transport buses and emergency services vehicles
c. expanding the rollout of charging infrastructure on government land and buildings, including at train station car parks
d. supporting the private sector to provide charging infrastructure, including in the Perth CBD through the *Perth Parking Management Act 1999* and through planning system policy reforms.

Connected and automated vehicles

Connected and automated vehicles have the potential to significantly disrupt the transport system. Potential impacts include improved safety outcomes and cost efficiency across the road network, as well as reducing traditional public transport patronage, shifting parking demand and even changing private vehicle ownership patterns. The benefits will be maximised when automated vehicles are also connected with other vehicles and the surrounding road network, and if the introduction of connected and automated vehicles coincides with the rollout of low and zero emissions vehicles and new models of shared transport.

The time frames and exact manner of the penetration of connected and automated vehicles are still unclear, particularly with an anticipated transitional period in which both driverless and driver vehicles are likely to share the roads. Collaborative, ongoing work at a national level, addressing the legislative and regulatory challenges involved in enabling connected and automated vehicles to operate on the road network, needs to be progressed.

WA also has some existing comparative advantages relating to connected and automated vehicles in the public and private sectors. In addition to the WA public sector playing a significant role in legislative considerations to date, WA has established autonomous truck and train mining operations in the state's north: the Neerabup Automation and Robotics Precinct and the Collie Westrac Automation Technology Training Centre.[40]

Recommendation 65

Support the introduction of connected and automated vehicles by ensuring the anticipated future road infrastructure and related technology system requirements of these vehicles are incorporated in the scope of future transport business cases and strategic planning.

Industry productivity and freight

Westport and Fremantle Inner Harbour

The development of a new metropolitan container port is a significant undertaking that will have major implications for WA. It is on a scale that exceeds almost any other public infrastructure project in the state. Making the right decisions will impact economic activity, future trade opportunities, land use and the long-term efficiency of the metropolitan freight network. Alongside these opportunities are the multi-year impacts of such a large-scale project, including on the State Budget and the private sector's capacity to deliver the government's infrastructure agenda. The project will have impacts on the Fremantle Inner Harbour, Outer Harbour and regional ports. Effective planning and delivery across multiple works packages will require significant coordination across government.

Subsequent to the conclusions of the *Westport: future port recommendations – stage 2 report*, the WA Government has begun detailed planning to deliver a new container port terminal at the Fremantle Outer Harbour in Kwinana. This area has long been considered a likely location for this investment. It already houses various bulk freight port facilities and forms part of the economically critical Western Trade Coast, a 3,900 hectare strategic industrial region that employs 11,000 people.[41]

The timing of investment in a new port may be influenced not only by trends in container volumes and road network congestion, but also by the ageing Inner Harbour berth wall asset life, the ongoing global trend towards larger cargo ships and the opportunity for supply-chain cost efficiencies. Although the preferred location of a new container port has been identified, a number of related studies are still required.

While Westport planning has focused on future container port requirements, the Fremantle Inner Harbour also caters to various other trades, including motor vehicles, live animals, cruise ships and scrap metal. Less lucrative than containers, these trades are nonetheless important and must be catered for in the future. Future options may include consolidating all the non-container trades in North Fremantle, or also shifting these trades to the Outer Harbour, which may require further investment. Cruise shipping is anticipated to remain at Victoria Quay in the Fremantle Inner Harbour.

The timing of the development of a port at the Outer Harbour will also significantly influence the broader metropolitan freight supply chain, including optimal future investments in road, rail and intermodal terminal upgrades, which require further consideration. Westport investment decisions also need to be considered in the context of leveraging broader strategic economic development opportunities. This will require government to consider supporting strategic industry clusters around the new port in the Western Trade Coast.

As the location of all future port activities is determined, government should progress work to determine the optimal future strategic land use and transport requirements for the Inner Harbour at Fremantle and North Fremantle. Diverse new commercial, hospitality and tourism-related initiatives and projects have already been proposed. Due to the required safety buffer area, residential development is only feasible if all container trade shifts to the Outer Harbour. Changing land uses, including higher density residential development, will also have different transport impacts compared to current uses.

Recommendation 66

Complement Westport's preparations for a new container port in Kwinana by conducting further strategic planning, including:

a. refining and monitoring the estimated optimal required timing for Outer Harbour investment and operations

b. identifying the future location of non-container trades currently based in the Fremantle Inner Harbour

c. optimising the road and rail supply chain servicing the Inner Harbour

d. developing a long-term Inner Harbour masterplan to support future redevelopment, including transport network capacity

e. consistent with Recommendation 31 in the Planning and coordination chapter, progressing planning for strategic economic development opportunities in the Western Trade Coast to leverage planned Westport investment.

Australian Marine Complex

The Australian Marine Complex in Henderson is a large and strategic defence hub, and a major industrial and shipbuilding precinct near the Royal Australian Navy's Fleet Base West. It is now well established as a globally competitive agglomeration of advanced marine-related manufacturing. The Australian Marine Complex has experienced significant growth over the past 2 decades, and now accommodates over 150 businesses.[42]

Further infrastructure investment is required to cater for forecast industry demand and capture significant economic and employment growth. The opportunity for WA is significant and aligned to the WA Government's economic diversification policies. The Australian Marine Complex functions support established primary industries, in addition to opportunities within the defence sector.

Commercial and defence shipbuilding is worth approximately $3 billion per annum, growing at around 4% per annum. Approximately half of that is based at the Australian Marine Complex, which is also home to some of Australia's largest commercial and defence shipbuilders.[43]

The Australian Marine Complex forms a key part of the broader Western Trade Coast. Further investigations should consider improved regional transport connections and the relationship to nearby strategic industrial land across the Western Trade Coast.

Further capacity expansion for the Australian Marine Complex should be guided by the *AMC Strategic Infrastructure & Land Use Plan*, future capacity requirements and ongoing engagement with the defence sector and industry. The plan includes strategic infrastructure proposals, such as a large-vessel dry berth to support the construction and out of water maintenance of large-hulled vessels. This facility would support a future build and sustainment program for large-hull naval and commercial vessels. In addition, a proposed Marine and Advanced Technologies Collaboration Hub would support the delivery of technologies related to surveillance, hydrography and surface and underwater autonomous systems. WA Government commitments should be leveraged to potentially attract funding contributions from the Australian Government and the private sector.

The September 2021 announcement of a trilateral security agreement between Australia, the United Kingdom and the United States of America provides increased opportunities for defence, maritime and other industries. It may also have infrastructure implications for the Australian Marine Complex and elsewhere throughout the state. The infrastructure and industry development implications of the announcement need to be considered as part of the further planning and development of the Australian Marine Complex.

Recommendation 67

Support strategic economic development opportunities at the Australian Marine Complex by undertaking further planning and staged expansion of common-use infrastructure consistent with the *AMC Strategic Infrastructure & Land Use Plan* and industry requirements.

Direct shipping to the north

Currently, most freight destined for WA's north is shipped to Fremantle Port and then trucked to the north of the state. Enabling direct freight shipping services between Asia and ports in the Pilbara and Kimberley regions could realise significant cost savings and transform intrastate freight markets. Some direct shipping services have recently commenced.

The establishment and growth in cargo demand may increase the use and pressure on existing berths in the north of the state, which could require the expansion of general cargo port capacity. Minor upgrades, policy support and investment in the road freight network connections to relevant ports could also be required.

Recommendation 68

Enhance supply chain efficiency by supporting expansion of direct shipping services to the state's north, including:

a. assessing the viability, costs and benefits of long-term direct shipping services and associated infrastructure requirements
b. seeking Northern Australia Infrastructure Facility and private funding for any major new port facility required for direct shipping, including new common user general cargo facilities
c. funding, in partnership with the Australian Government, all relevant port facilities to have appropriate 'first point of entry' infrastructure and systems (for border control, customs and quarantine requirements)
d. planning for fit for purpose road connections to direct shipping facilities.

Freight rail and the agricultural region supply chain

Freight rail plays a central role in many of WA's key supply chains for bulk resources, agriculture and container freight. However, due to the geographic dispersion and nature of goods transported, the components of the network have distinct infrastructure needs. The northern freight rail systems carry very large volumes of iron ore and other commodities from mines to ports in the Pilbara region. These rail lines are in private ownership as part of integrated mine-to-port operations.

A separate system, the freight rail network across the state's south, is publicly owned, though it is under the long-term control of private leaseholder Arc Infrastructure until 2049. This rail system complements road freight operations, connecting the Wheatbelt region and agricultural producing areas of the south to ports, and plays an important role in facilitating competitive exports of agricultural produce. WA grain exporters currently compete year-round with emerging lower-cost Northern Hemisphere producers. Improved supply-chain efficiency helps ensure that local grain harvests can ship to international customers quickly at peak periods of demand, to secure higher prices and export earnings. Rail has a strong capacity to move large volumes efficiently during peak demand periods, while also removing trucks from roads, which benefits local communities and reduces road maintenance costs.

A good example of a strategic approach to freight productivity is the Revitalising Agricultural Region Freight Strategy.[44] It is focused on grain exports, which for some railway lines is the only commodity transported. The strategy provides clear guidance for further investment in the associated supply chain across all modes, with multiple subsequent funding allocations.

Underlying commercial viability varies across different sections of this network. The effect of leasing the state freight network has been to shift responsibility for planning and investment in network expansion to the leaseholder, with costs to be recovered from users. State agencies have therefore not prioritised holistic strategic planning for the future of the network to the same extent as other modes, such as roads, that are under direct public control. This means that the WA Government is not as well positioned when it comes to considering public funding contributions for freight rail network development proposals that emerge over time.

Changes have been approved to the Rail Access Regime, which covers the state freight network, the Public Transport Authority's urban network, the Pilbara Infrastructure railway and Roy Hill's railway. These reforms are intended to streamline processes and improve outcomes for future access seekers. Planning upgrades and maintaining the network remain the responsibility of the leaseholder, although leaseholders may be less willing to invest in network expansions or major upgrades as the end of their lease period approaches, due to insufficient payback periods.

Grain is a seasonal, high-volume commodity, with **total production varying from 14.3 to 18.2 million tonnes per annum over the last 5 years**.[45] Ninety per cent of WA's grain harvest is handled by CBH Group and approximately 60% is transported to port by rail, with the other 40% by road.[46]

A more coordinated and forward-looking approach to network planning should be pursued by state agencies. This would be supported by a new regional transport plan, as recommended in this Strategy (see Recommendation 57a). Developing principles to guide public contributions towards private sector investment (see Recommendation 40b in the Infrastructure delivery chapter) will also assist in making more informed decisions when these requests are presented to the government. Current freight rail expansion proposals include the Kalgoorlie rail realignment, which has recently been allocated business case funding.

Recommendation 69

Support long-term investment decision-making for the state's freight rail network over the remainder of the lease period, consistent with Recommendation 40b in the Infrastructure delivery chapter, by:

a. implementing a structured approach to planning and consideration of public contributions towards proposals for expansion of the network, supporting government contributions by exception under limited circumstances
b. pursuing further investigations, including for:
    i. WA Agricultural Supply Chain Improvements
    ii. Kalgoorlie Rail realignment.

Perth and Jandakot airports

Proposed investment by Perth Airport in a third runway and the consolidation of passenger terminals by 2025 will help to ensure it can service WA's aviation needs for well beyond 20 years. Even with this proposed capacity upgrade, a new civil aviation airport may be required in the very long term.

Extensive lead times are needed for planning and delivering major airport infrastructure, and airport location has significant impacts on surrounding land use and development. As such, identifying and protecting suitable sites and corridors now for a new civil aviation airport for Perth represents good long-term planning and further work will need to be progressed. This should also incorporate considerations relating to a new general aviation airport, currently serviced by Jandakot Airport, which may be required within the 20-year time frame of this Strategy.

Recommendation 70

Progress strategic planning by working with the Australian Government to plan for the long-term potential needs of a new civil aviation and general aviation airport for Perth, including the identification and preservation of sites, and associated connecting infrastructure corridors.