



Australian Government
Department of Infrastructure
and Regional Development



Transport
for NSW



Western Sydney Rail Needs Scoping Study

Discussion Paper



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1 Foreword

As a region of two million people, Western Sydney has nine per cent of Australia's population and is the country's third largest economy. Over the next 20 years, Western Sydney will continue to grow as it becomes home to about one million more people, thousands more jobs and a range of new attractions.

Recognising this, the Australian and NSW governments are making significant investments in transport infrastructure to unlock Western Sydney's enormous potential and to make the region an even better place to live, work and visit. This includes the proposed Western Sydney Airport, which is a once-in-a-generation opportunity to transform Western Sydney. The proposed airport will create new jobs across a range of industries and offer the people of Western Sydney better access to aviation services.

Good transport links will be needed for the proposed airport to meet its full potential. To this end the Australian and the NSW governments have started construction of the \$3.6 billion Western Sydney Infrastructure Plan, which will provide new and upgraded roads for the proposed airport and the residents of Western Sydney.

Rail will also play a vital role in supporting both the growth of Western Sydney and the proposed airport. This is why the Australian and the NSW governments are working together to undertake the Western Sydney Rail Needs Scoping Study (the Scoping Study) to examine the passenger rail transport needs of the Western Sydney region and the proposed airport.

This discussion paper describes the challenges and opportunities for expanding rail services in Western Sydney and creating a new rail connection to the proposed airport. We want to hear your views on the rail service options presented in this paper

and whether there are other options that need to be considered.

Although no detailed cost estimates have been prepared, it is anticipated that the most expensive single option presented in this paper could cost up to about \$25 billion if delivered today. Cost is dependent on the length of the route selected and the difficulty of construction. Cost is one of the criteria that will be used to assess the options identified through the consultation process.

Given the competing priorities for finite government funding, no government could fund all of the rail options presented in this paper. The Scoping Study will identify which options are the priorities for rail services in Western Sydney. Could one be funded, or more? Could that be done in a few years, or is it still many years away? The answers to these questions will depend in part on whether there are innovative approaches to funding and financing which could be used to deliver new rail services. This is why we are also asking for your views about different ways the rail options could be funded and financed.

Early engagement with the private sector is also important, so that prioritisation of options funding and financing models consider best practice and include all opportunities that might arise. A separate industry engagement briefing paper has been developed to start that conversation.

Your valuable input is vital for helping the Australian and NSW governments plan for the future. All submissions on the discussion paper will help inform the Scoping Study's findings. The study's findings will be outlined in the final report that will be provided to both governments for their consideration.

The City Deal for Western Sydney

The Commonwealth, New South Wales State Government and local governments are partnering in a plan for jobs, housing and improved transport in Western Sydney.

The Western Sydney Airport and the \$3.6 billion Western Sydney Infrastructure Plan have extraordinary transformative potential for the region that will only be realised through better collaboration. The Western Sydney City Deal will capitalise on these major investments, linking planning, reform and infrastructure across all

three levels of government to drive economic growth and improve liveability.

A rail link to the Western Sydney Airport will connect businesses to the world and each other, people to jobs, strengthen regional economic centres and activate new housing and employment lands. In assessing rail options outlined in this paper, governments will consider the extent that options maximise land use and transport opportunities, and drive the broader objectives of the Western Sydney City Deal.

2 About the Western Sydney Rail Needs Study

The Australian and NSW governments are undertaking a Scoping Study to better understand the need, timing and service options for rail investment to support Western Sydney and the proposed Western Sydney Airport.

This study will assess if and how rail services could be operational at the proposed Western Sydney Airport when it opens or, if not, how soon afterwards. It will explore the opportunities to best sequence any new rail services so that the areas that need it most get it first.

This study is predominantly interested in passenger rail requirements for Western Sydney. Freight requirements for Western Sydney are being considered as part of the planning for the Outer Sydney Orbital Corridor Preservation Study.

We want to hear your views on the initial set of rail service options we have identified for Western Sydney and the proposed airport, as well as a range of funding approaches. We also want to know if there are other rail service options or funding approaches that we should consider. Both the Australian and NSW governments wish to ensure that planning processes are developed through genuine community consultation and participation.

The outcome of this study will be a list of preferred rail options that will be recommended for further investigation through detailed technical analysis. The key milestones in the Scoping Study are outlined in Figure 1. Ultimately, the outputs from this study will form part of the work that informs the NSW Government's updated Long Term Transport Master Plan, and support the Greater Sydney Commission's District Plans.

Figure 1 Scoping Study process



The terms of reference for the Scoping Study are available at westernsydneyrail.transport.nsw.gov.au



About this discussion paper

This discussion paper was developed to support consultation with the community and industry about the Scoping Study. We invite you to read this paper and to make a submission to the Scoping Study so you may have your say in the future of Western Sydney's rail network.

This discussion paper describes:

- The growth of Western Sydney (chapter 3)
- Transport projects underway in Western Sydney (chapter 4)
- Rail demand in Western Sydney (chapter 5)
- Initial rail service options under consideration in the Scoping Study (chapter 6)
- The objectives and criteria that will be used to assess the rail service options (chapter 7)
- Funding and financing options under consideration (chapter 8)
- How to respond to the discussion paper (chapter 9)
- Next steps (chapter 10)

Note: All information relating to Western Sydney Airport in this discussion paper has been drawn from the draft Airport Plan or draft Environmental Impact Statement for Western Sydney Airport released for public consultation in October 2015. Some material may be updated in the final *Environmental Impact Statement* or Airport Plan.



About the Western Sydney Airport

In 2014, the Australian Government announced that Badgerys Creek would be the site for a Western Sydney Airport.

The proposed airport is a once-in-a-generation opportunity for Western Sydney, creating more jobs and new industries, and ensuring the growing population and economy has access to first-class aviation infrastructure. A Western Sydney Airport would be operational in the mid-2020s and be capable of handling a range of aircraft to cater for international, domestic and freight services.

The airport would be developed in stages as it expands to cater for the growing Western Sydney economy and population. It is forecast that about five million people will use the airport in its first year of operation – about the same number of annual passengers currently using the Gold Coast Airport. Based on growth projections, the airport will cater to about 37 million annual passengers by 2050 – about the same number of annual passengers using Sydney's Kingsford Smith Airport today. Ultimately a Western Sydney Airport could cater to approximately 80 million people¹.

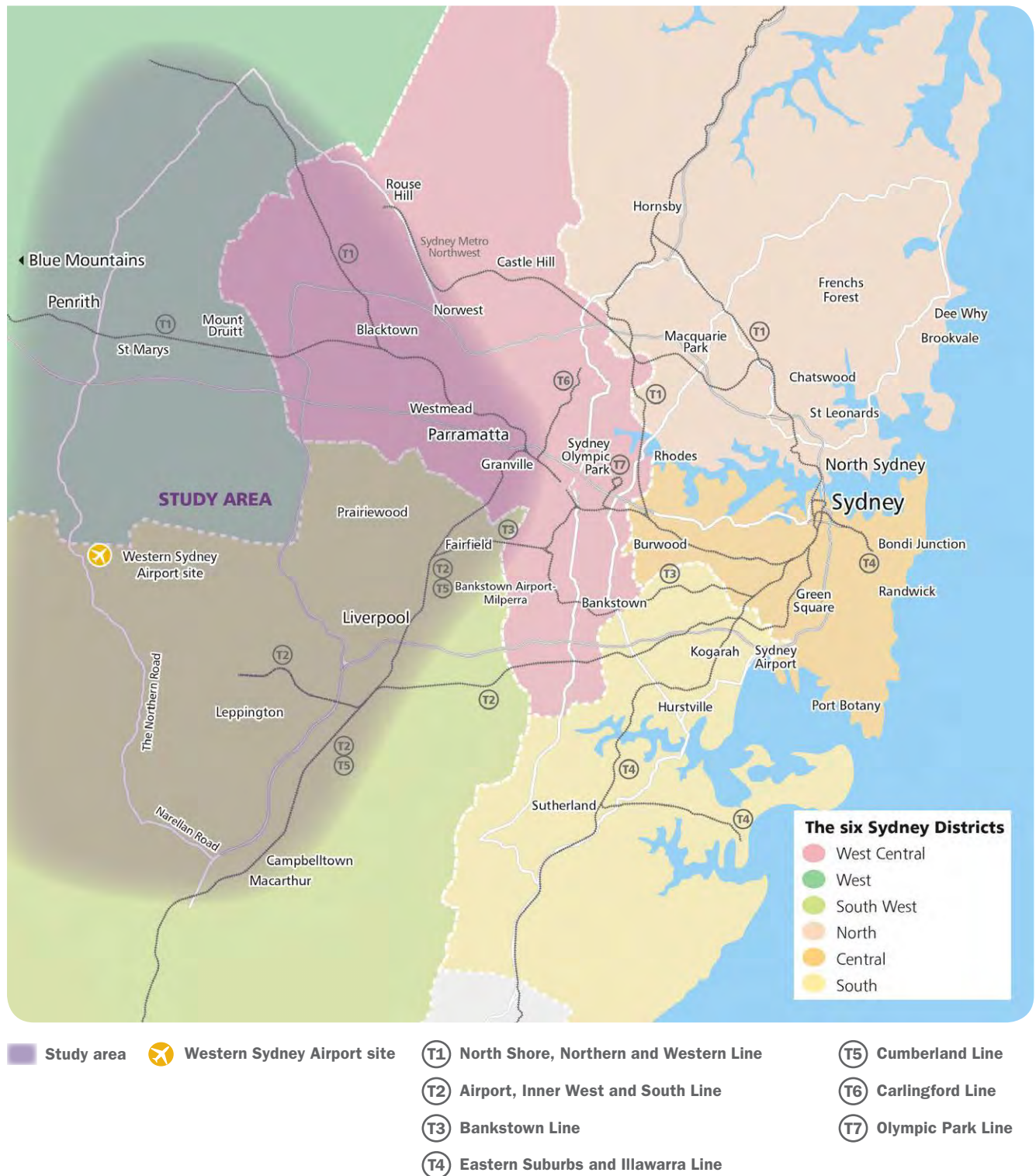
For more information about the proposed airport please go to westernsydneyairport.gov.au

¹ *Western Sydney Airport Draft Environmental Impact Statement*, 2015, Department of Infrastructure and Regional Development, Canberra.

Study area

The study area includes parts of the three Metropolitan Districts that make up Western Sydney: West, West Central and South West districts² as shown in Figure 2. The Greater Sydney Commission is producing District Plans for these districts and the study assessment process will be based on the land use outcomes proposed within the District Plans.

Figure 2 Study area



² For more detail on district areas, go to planning.nsw.gov.au/Plans-for-Your-Area/Sydney/A-Plan-for-Growing-Sydney

Have your say

The Australian and NSW governments want to hear your thoughts about the initial rail options presented in this discussion paper and any other options you believe should be examined in the Scoping Study. We also want to hear about when you think these options should be delivered and what should take priority for investment, along with your ideas for how they should be funded.

Your input will help the Australian and NSW governments plan for the future. This discussion paper poses a number of questions that may assist you in providing feedback.

Please note that any information provided during consultation on the Sydney Metro City & Southwest Bankstown to Liverpool extension or the South West Rail Link Extension Study will be considered as part of the Scoping Study.

The consultation period for the discussion paper is six weeks and submissions are sought by 28 October 2016. Following consultation, submissions will be reviewed and comments taken into account in the final Scoping Study report.

For more information on how to provide your feedback, please see chapter 9.



3 The growth of Western Sydney



About this chapter

This chapter provides an overview of Western Sydney's growing population and economy, and the benefit of the proposed Western Sydney Airport.

Population growth in Western Sydney

In the next 20 years, Western Sydney's population is expected to grow by about one million people and at a faster rate of growth than other parts of Sydney³ and most other regions of Australia. This level of growth in Western Sydney brings great opportunities, but also some pressing challenges.

Understanding and planning for where people will live and work across Sydney and how these places are connected to each other, will influence Western Sydney's long-term success. To support these changes, existing transport infrastructure needs to work effectively, as does new transport infrastructure.

Where population growth will occur

It is anticipated that population growth will occur unevenly across Western Sydney over the coming decades. Figures 3 and 4 show population density across the Greater Sydney Metropolitan region in 2016 and the projected increases to population densities by 2051. These maps show that Sydney's west, north-west, and south-west areas will experience significant population density increases.

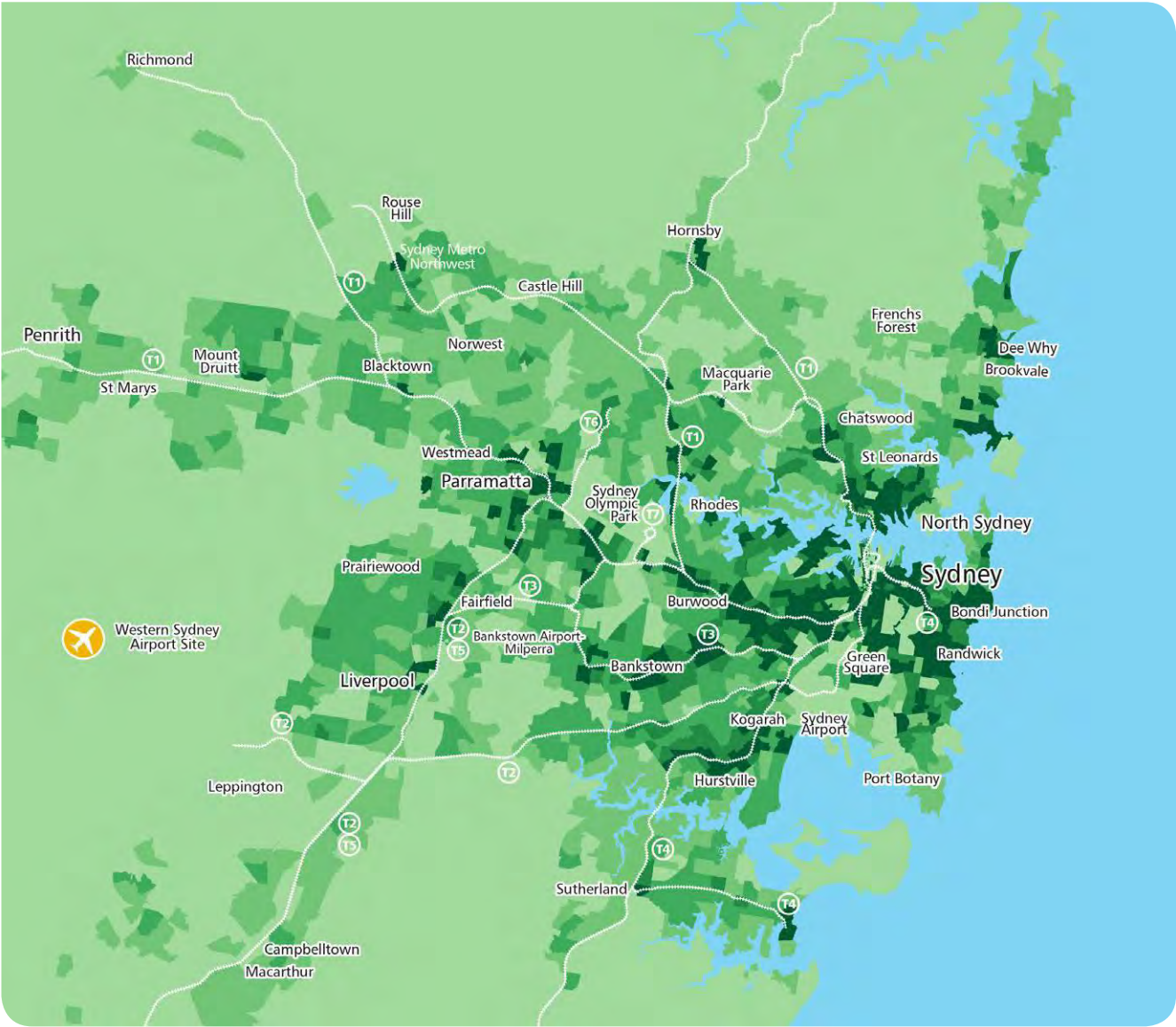
This growth in Western Sydney's population presents two broad transport challenges:

1. Ensuring the transport network has the capacity to support population growth in established areas
2. Ensuring transport services are integrated with the planning of new land releases and areas of urban renewal.



3 *A Plan for Growing Sydney*, 2014, Department of Planning and Environment, Sydney.

Figure 3 Sydney population densities 2016

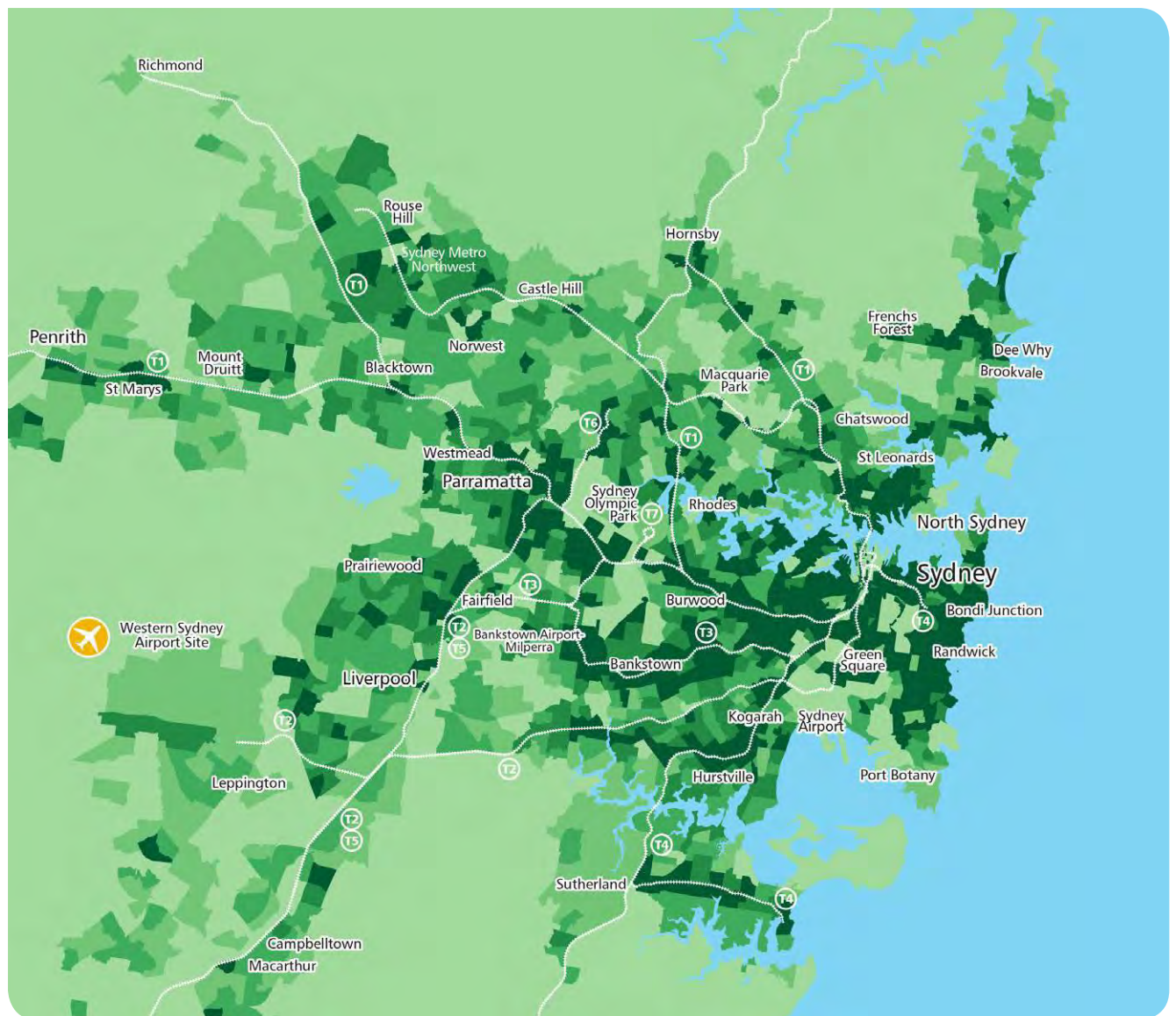


Population density (per square kilometre)

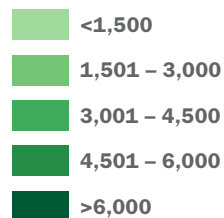
- <1,500
- 1,501 – 3,000
- 3,001 – 4,500
- 4,501 – 6,000
- >6,000

Source: Land Use 14 (Population), Department of Planning and Environment, Sydney

Figure 4 Sydney population densities 2051



Population density (per square kilometre)



Source: *Land Use 14 (Population)*, Department of Planning and Environment, Sydney

Jobs growth in Western Sydney

Both the Australian and NSW governments recognise the importance of planning to ensure services are available when people need them. Understanding the growth of Western Sydney will help shape a range of policy, regulatory and investment settings that will affect infrastructure for Western Sydney communities for decades to come.

Western Sydney is home to about 160,000 businesses operating across a range of sectors. Construction accounts for the largest number of businesses in the region, followed by transport and logistics. The region also has a robust professional services sector that is located primarily in major commercial centres such as Parramatta, Norwest and Penrith. The education and research sectors are also growing rapidly, as evidenced by the expansion of Western Sydney University's multiple campuses and the University of Sydney's growth in the Westmead Health and Education Precinct.

Jobs growth in Western Sydney is being guided by the NSW Government's metropolitan strategy *A Plan for Growing Sydney*. This highlights the need to create 760,000 more jobs across Sydney by 2036 – with 50 per cent in Western Sydney. This plan will be strengthened by the Australian

and NSW governments' Western Sydney City Deal, the single largest planning, investment and delivery partnership in Australia's history.

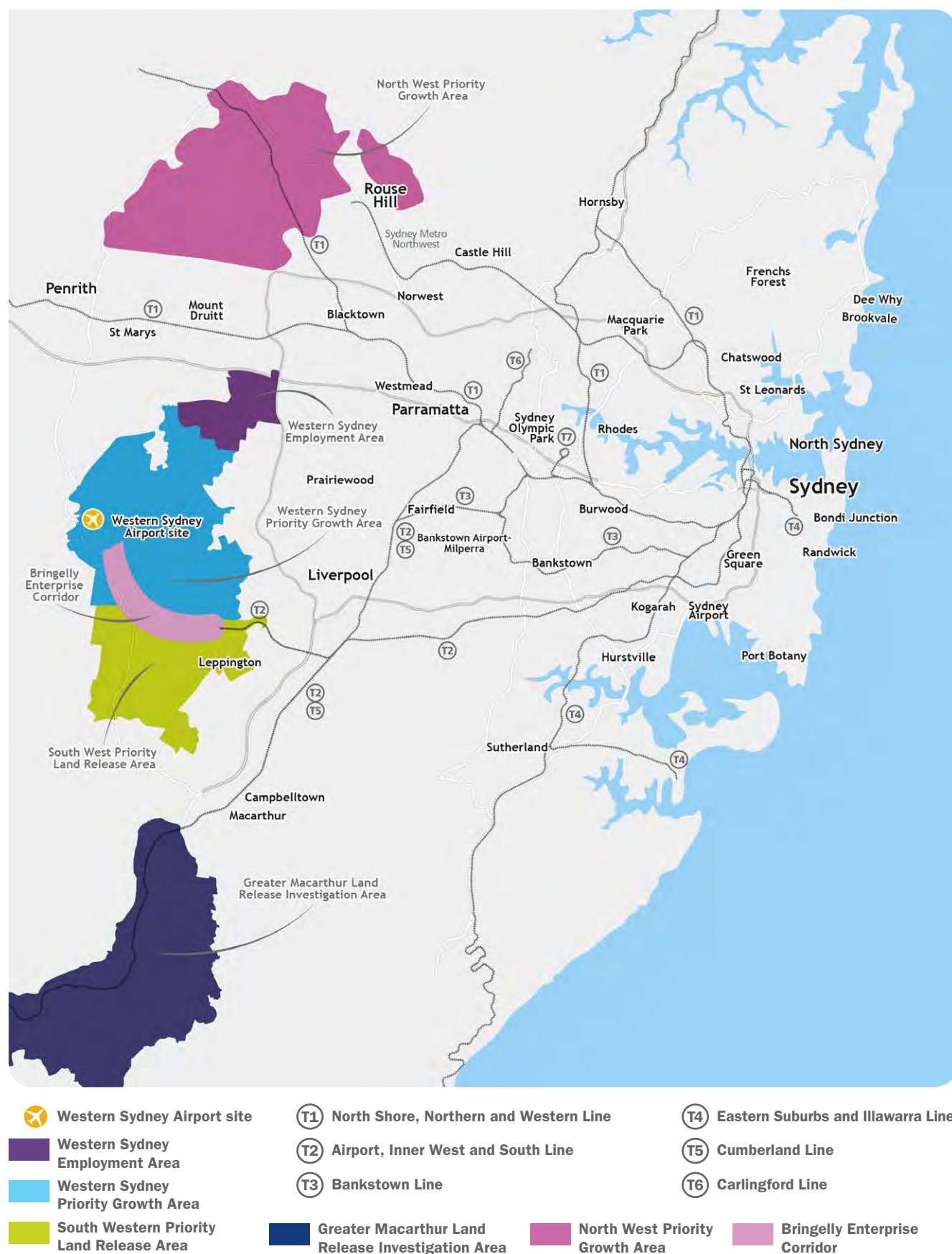
These plans will see more employment opportunities within Western Sydney's existing strategic centres, including Parramatta, Norwest, Penrith, Blacktown, Liverpool, Leppington, and Campbelltown-Macarthur. To complement these strategic centres, the NSW Government has zoned large areas of land in Western Sydney for employment purposes, including:

- Western Sydney Priority Growth Area
- Western Sydney Employment Area
- Bringelly Road Enterprise Corridor
- Bankstown to Liverpool Enterprise Corridor.

Figure 5 shows the location of a number of the key economic areas in relation to the site of the proposed airport.



Figure 5 Western Sydney Growth Precinct Areas



Connecting homes to jobs

While these areas of economic activity have capacity to grow, businesses often cite poor connectivity and lower-quality transport connections as a barrier to relocating to Western Sydney⁴. An efficient and reliable transport network is needed to bring homes and businesses closer together.

Currently, many Western Sydney residents must travel outside of the region for work, particularly for higher-income, knowledge-based jobs. Around 28 per cent of the resident workforce, or close to 226,000 people, travel to other parts of the city to get to work.⁵ This is forecast to grow to 340,000 by 2041⁶.

While connections to the Sydney CBD will continue to be vital, improving transport connections across Western Sydney will help to unlock Western Sydney's full economic potential and offer people a greater range of choices as to where they live and work.

Strengthening Greater Parramatta

Greater Parramatta will play a fundamental role in Western Sydney's economic growth. Already, the Australian and NSW governments are making major transport infrastructure investments that will directly benefit Greater Parramatta, including Parramatta Light Rail and WestConnex. New transport solutions in Western Sydney will need to take into account if and how they can support the growth of Greater Parramatta and provide improved travel times to the Sydney CBD and other parts of Western Sydney.

The economic benefits of a Western Sydney Airport

A Western Sydney Airport would be a catalyst for economic growth in the region for decades to come, creating new businesses and jobs across a range of industries, including transport and logistics, hospitality, education, research and professional services. While the initial construction phase at its peak would be expected to generate over 3,000 jobs, the airport itself would be expected to deliver nearly 9,000 direct jobs in the early 2030s, with that number expected to increase to over 60,000 by 2063. This means an airport will create jobs closer to where people live and help reduce the number

of Western Sydney workers who currently experience long commutes by travelling out of the area.

By the early 2030s, the proposed airport is expected to generate \$77 million a year for the Western Sydney economy and a further \$145 million in the rest of Sydney. Airport operations will continue to grow and by 2063, the airport will boost the Western Sydney economy by \$1.5 billion a year and by \$4.6 billion Sydney-wide.

For more information go to westernsydneyairport.gov.au

⁴ *NSW Long Term Transport Master Plan*, 2012, Transport for NSW, Sydney.

⁵ *2011 Journey to Work datasets*, 2013, Bureau of Transport Statistics, NSW Government.

⁶ D Rezek, T Psychogios, B Artup & supported by the Premier of NSW, *Shaping Future Cities: Designing Western Sydney*, 2015, Deloitte.

4 Transport projects underway in Western Sydney



About this chapter

This chapter provides an overview of the Australian and NSW government's significant investments in road, bus and rail infrastructure to support the growth of Western Sydney.



Roads

Western Sydney Infrastructure Plan

The Australian and NSW governments are funding a 10 year, \$3.6 billion road investment program known as the Western Sydney Infrastructure Plan. This will deliver new and upgraded roads to support integrated transport in the region and capitalise on the economic benefits of developing the proposed Western Sydney Airport at Badgerys Creek.

This investment in roads will relieve pressure on existing infrastructure and unlock the economic capacity of the region by cutting travel times, easing congestion and providing first class road connections to the proposed airport and across the Western Sydney region.



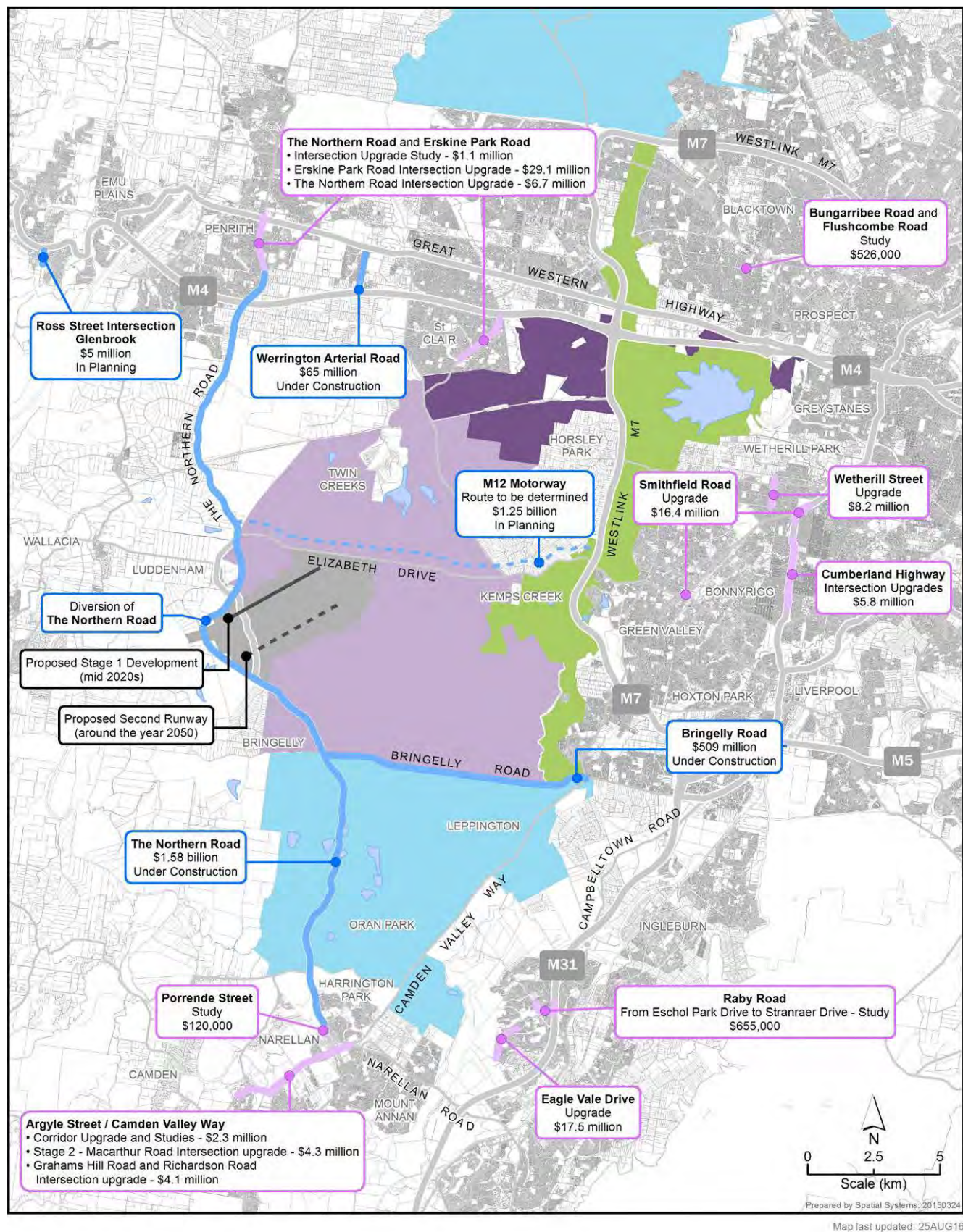
This plan includes:

- Upgrade of The Northern Road to a minimum of four lanes from Narellan to Jamison Road, Penrith
- Construction of a new east-west motorway to the airport between the M7 Motorway and The Northern Road (to be known as the M12 Motorway)
- Upgrade of Bringelly Road to a minimum of four lanes between The Northern Road and Camden Valley Way
- Construction of the Werrington Arterial Road by upgrading Kent Road and Gipps Street to four lanes between the Great Western Highway and the M4 Motorway and providing ramps to the M4
- Upgrade of the intersection of Ross Street and the Great Western Highway
- A \$200 million package for local road upgrades, to be delivered over 10 years (across five rounds of funding).

For more information go to rms.nsw.gov.au

The Western Sydney Infrastructure Plan will be complemented by the preservation of corridors for the Outer Sydney Orbital and South West (passenger) Rail Link Extension, enabling additional road and rail infrastructure that will support the growth of Western Sydney (see page 22 for more detail).

Figure 6 Western Sydney Infrastructure Plan



Sydney's Bus Future

Sydney's Bus Future is the NSW Government's long-term strategy for the development of Sydney's bus network. As outlined in Table 1 below, this plan will see Sydney supported by an integrated three-tiered bus network⁷.

Table 1 *Sydney's Bus Future*

Route type	Purpose	Service levels
Rapid	Dedicated, frequent, fast and reliable services between major centres, including rail interchanges.	<ul style="list-style-type: none"> • 'Turn up and go' services • Services every 5-10 minutes during daytime hours (6am-7pm) • Not more than 15 minutes between services on weekends • Stops every 800m-1km.
Suburban	Provide frequent access to local and neighbourhood destinations and creating opportunities to interchange between bus routes and with rail.	<ul style="list-style-type: none"> • Mix of 'turn up and go' services and timetabled services • Services every 10 minutes during daytime hours (6am-7pm) • Every 15 minutes on weekends. • Stops every 400m.
Local	Provide access to local and neighbourhood destinations and opportunities to interchange.	<ul style="list-style-type: none"> • Timetabled services • Services depend on demand but typically every 15-30 minutes during daytime hours (6am-7pm) and every 30-60 minutes on weekends • Stops every 400m.



⁷ It should be noted that bus services will be available at the proposed Western Sydney Airport at the time of its opening.

Rapid bus network

The NSW Government has developed a plan for the Western Sydney rapid bus network that will support the growth of the region over the next 15 years (until 2031). The planned Western Sydney rapid bus network includes the following routes:

Rapid routes

- Liverpool – North Bringelly – Western Sydney Airport – Penrith
- Parramatta – Western Sydney Airport
- Rouse Hill – Schofields – Marsden Park – Penrith
- Blacktown – Hornsby
- Castle Hill – Parramatta

Suburban routes

- Liverpool – Leppington – Bringelly – North Bringelly – Western Sydney Airport
- Camden – Oran Park – Leppington – North Bringelly – Western Sydney Airport
- Campbelltown – Oran Park – North Bringelly – Western Sydney Airport
- Parramatta – Wetherill Park – Western Sydney Airport
- Blacktown – Wetherill Park – Western Sydney Airport
- Mt Druitt – Western Sydney Airport

Other suburban and local routes are being planned to complement this network.

Principles guiding bus network planning

The following key principles will guide the planning of Western Sydney's bus network:

- Provide public transport access to all significant centres and destinations in Western Sydney
- Provide access to major centres and most areas of the region with a maximum of one change of service
- Provide access to new release areas to support their development and encourage use of public transport from the outset.

Sydney's Rail Future – the strategic approach to rail planning

Sydney's Rail Future is the NSW Government's plan to transform and modernise Sydney's rail network so that it can grow with the population and meet the needs of customers into the future. *Sydney's Rail Future* is a long-term plan to increase the capacity of Sydney's rail network through investment in new services and upgrading of existing infrastructure.

Sydney's Rail Future outlines five stages for increasing the capacity of Sydney's rail network. As illustrated in Table 2, significant progress has been made on each of these stages.

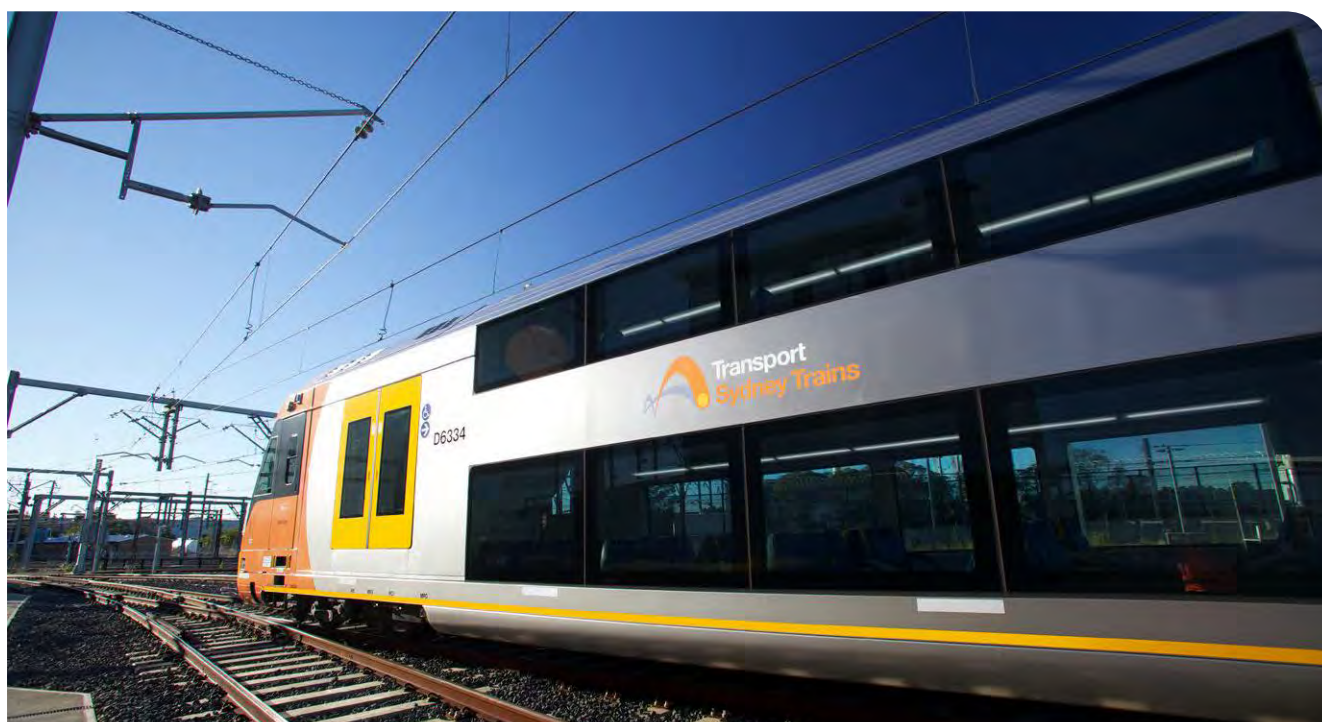


Image courtesy of TfNSW, Simon Freeman 2013

The different types of metropolitan rail services

In line with the approach of focusing on the specific needs of different customers, *Sydney's Rail Future* is delivering a three-tiered system.

TIER 1: Metro (rapid transit)

- Frequent 'turn up and go' services without the need to consult a timetable
- Fast, single-deck trains, with more doors, designed for easy boarding and alighting.

TIER 2: Suburban

- Timetabled services
- Double-deck trains with more seats per train.

TIER 3: Intercity

- Timetabled services
- Double-deck trains for Central Coast, Newcastle, Wollongong and Blue Mountains services
- Comfortable services for long-distance commuters and leisure travel, with on-board facilities for improved customer convenience.

Table 2 The five stages of Sydney's Rail Future

Stage	Description	Status
1. Operational efficiencies	<ul style="list-style-type: none"> • Timetable overhaul • Significantly improved dwell management (the time a train needs to stop in a station for passengers to board and alight) • Platform de-cluttering • Better incident recovery management 	Complete or underway
2. Network efficiencies	<ul style="list-style-type: none"> • Complete South West Rail Link, station upgrades and Rail Clearways projects • Introduce even simpler timetables across the network making it easier for customers to use the network • Introduce Automatic Train Operations • Roll out dedicated fleet types for some lines • Enhance track infrastructure • Platform re-design 	Complete or underway
3. New rapid transit system	<ul style="list-style-type: none"> • Complete the Sydney Metro Northwest • Procure rolling stock for the new rapid transit single-deck train system • Investigate extending Sydney Metro from Bankstown to Liverpool 	To be completed 2019
4. Sydney Metro City & Southwest	<ul style="list-style-type: none"> • Complete new tunnel under the Harbour and a new Sydney CBD line, allowing services from Sydney Metro Northwest to extend directly to the Sydney CBD. 	To be completed 2024
5. Southern sector conversion	<ul style="list-style-type: none"> • Extend the Sydney Metro to Bankstown and Hurstville • Continue major timetable changes to the existing suburban services to continue major capacity increases to the South West and Western Sydney • Better express services introduced due to separation from rapid transit. 	Extension of Sydney Metro to Bankstown underway

For more information go to mysydney.nsw.gov.au

The Transport Access Program

In 2012, the NSW Government announced the Transport Access Program which delivers accessible, modern, secure and integrated transport infrastructure where it is needed most. The Transport Access Program included more than \$770 million over four years.

On 23 June 2015, the Government announced a significant boost to the Transport Access Program with \$890 million to be invested over the next four years on station upgrades and more commuter car parks.

Since the program began, more than 450 projects have been completed or are underway.

The program aims to provide:

- Accessible stations
- Modern, efficient interchanges to support an integrated travel network
- Commuter car parking
- Safety improvements, such as extra lighting, help points and other security measures
- Better signs/wayfinding.

Rail in construction

Sydney Metro

The NSW Government's Sydney Metro is Australia's largest public transport project. It will transform Sydney, delivering more trains and faster services for customers across the network.

Construction is underway for the Sydney Metro Northwest, which will deliver fast, safe and frequent services between Rouse Hill and Chatswood. It is anticipated the Sydney Metro Northwest will open in the first half of 2019.

Work has begun on the Sydney Metro City & Southwest, which will extend the metro rail from Chatswood to Bankstown. This will include a new crossing beneath Sydney Harbour, new railway stations in the lower North Shore and CBD, and the upgrade and conversion of the current line between Sydenham and Bankstown. Investigations are also underway into the potential extension of the metro rail from Bankstown to Liverpool.

The NSW Government has committed about \$10 billion to the Sydney Metro City & Southwest. The Australian Government committed a further \$1.7 billion to the project in the 2016 Federal Budget.

For more information go to sydneymetro.info

Rail in planning

Parramatta Light Rail

Greater Parramatta sits at the centre of Western Sydney's growth.

The NSW Government has announced a preferred light rail network for Greater Parramatta, which combines a core CBD spine that offers connections across Greater Parramatta with branches to Strathfield via Sydney Olympic Park and to Carlingford. As per current plans, the Parramatta Light Rail will be over 20 kilometres long, connecting residential, employment, cultural and education precincts. It is anticipated that construction will commence in late 2018.

To date, the NSW Government has committed \$1 billion to the Parramatta Light Rail. The Australian Government committed a further \$78 million in the 2016 Federal Budget.

For more information go to transport.nsw.gov.au

Future proofing – corridor preservation

The NSW Government is planning ahead by preserving corridors for future additional public transport services in Western Sydney (Figure 7). Corridor preservation is a process to identify and preserve an area of land for future transport use. A preserved corridor provides certainty for communities, businesses and land owners about how the land will be used in the future and reduces the cost of providing infrastructure in the long term. Corridor preservation is not a process that will automatically lead to the delivery of transport infrastructure. What it does mean is the corridor will be preserved now, so it is available in the future to meet future transport needs.

South West Rail Link Extension

The NSW Government is preserving a public transport corridor in Sydney's south-west to provide a north-south connection through the South West Priority Growth Area and the Western Sydney Employment Area, including the proposed Western Sydney Airport. The extension corridor is proposed to connect Leppington Station to Bringelly and then head in two directions: north to the T1 Western Line near St Marys; and south to Narellan. The NSW Government is also considering the possibility of extending the corridor further south to the existing T2 Inner West and South Line. To date, the NSW Government has consulted extensively with local communities about these plans and sought their feedback on the alignment of the rail corridor.

While the South West Rail Link Extension may connect to the proposed airport, the NSW Government anticipates that this extension will be needed regardless of the airport to support population growth in Sydney's south-west.

For more information go to transport.nsw.gov.au

The Outer Sydney Orbital

The NSW Government is working to identify a preferred corridor for consultation that will provide a north-south connection for a future motorway and freight rail. The northern section of the South West Rail Link Extension between Bringelly and the T1 Western Line may be included as part of the Outer Sydney Orbital Corridor Study.

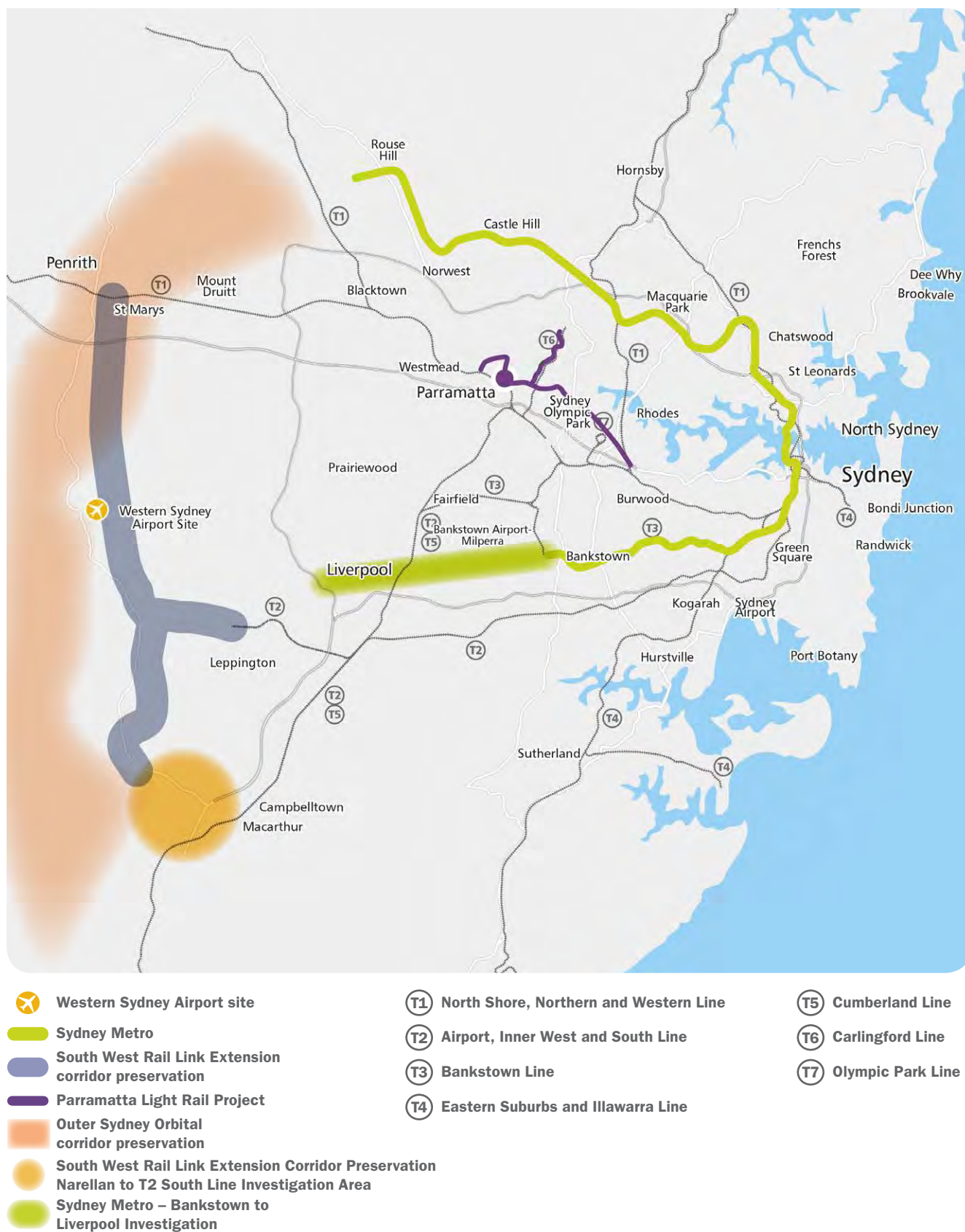
For more information go to transport.nsw.gov.au

Getting the airport site 'rail ready'

The Australian and NSW governments believe rail will be integral to the future transport needs of a Western Sydney Airport. As a result, the layout of the airport site will safeguard space for future stations and will preserve a rail corridor that will enable two independent rail lines to service the proposed Western Sydney Airport. These rail lines could include heavy rail and/or a dedicated rail express service.

The Australian Government committed \$26 million in the 2016 Federal Budget for developing the detailed concept design for rail access at the airport site. This work will confirm the design of the line and tunnels through the airport site and station design so that the land to meet rail requirements for tunnels and station boxes is properly preserved.

Figure 7 Transport initiatives in Western Sydney



5 Rail demand in Western Sydney



About this chapter

To better understand where new or enhanced rail services are needed, this chapter presents an overview of the existing and future demand on the rail network in the Western Sydney region.

The importance of rail

Rail is the backbone of the public transport system and provides a platform that supports all other transport modes. For this reason, rail services will be an essential part of the transport solution for Western Sydney.

This chapter illustrates the current travel patterns in Western Sydney and the present and forecast demand on the rail network. The analysis indicates that the existing rail network in Western Sydney will be significantly constrained from about 2030. This chapter also illustrates the forecast potential demand for rail as a consequence of the development of a Western Sydney Airport and the expected patronage levels of an airport rail connection.

How people now travel in Western Sydney

People living in Western Sydney are more dependent on cars for transport than other parts of the city due to lower urban density and having less access to bus and rail services. The average vehicle kilometres travelled per person in Campbelltown and Liverpool, for example, is twice that of residents in inner Sydney or the eastern suburbs. While cars will continue to play an important role for many journeys, well-designed public transport networks including heavy and light rail, buses and active transport (cycling and walking) are essential for efficient, convenient and environmentally friendly transport of large numbers of people within and between economic centres.

Figure 8 shows how average vehicle kilometres travelled (VKT) per person varies between regions across Sydney⁸. Unsurprisingly, this figure illustrates that people who live further away from the Sydney CBD drive more than people who live closer to the Sydney CBD.

⁸ VKT data is used by transport planners for a number of purposes including the allocation of resources, estimation of vehicle emissions and energy consumption and the assessment of traffic impacts

Figure 8 Average vehicle and public transport use

Summary of vehicle use across Sydney Local Government Areas and regions on an average weekday					
	Penrith	Liverpool	Campbelltown	Parramatta	Sydney average*
% of trips as the vehicle driver	58%	53%	52%	48%	48%
% of trips on public transport	5%	9%	11%	14%	12%
Vehicles per household	2.0	1.8	1.7	1.5	1.6
VKT per person	29.2	23.7	21.7	15.3	17.5

* The Sydney average is based on the ABS Greater Capital City Statistical Area

Demand on Sydney's rail network

Population and employment growth are key drivers of rail demand. In the Greater Sydney Metropolitan Area, population is forecast to increase to around 9.2 million by 2051⁹. Over the same period the rail passenger demand in the morning peak one hour is forecast to more than double as shown in Figure 9.

Figure 9 Forecast population and rail patronage growth for Greater Sydney

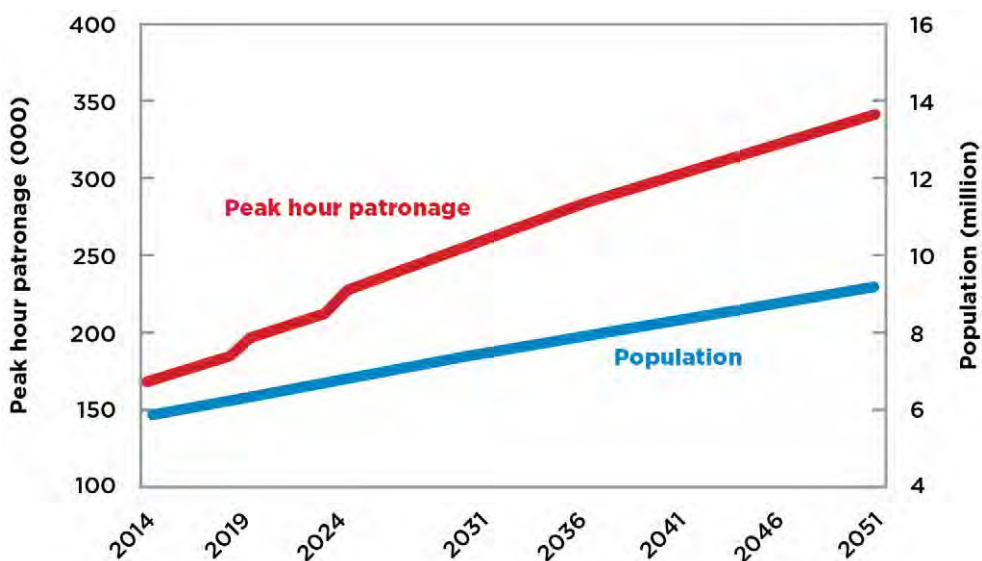
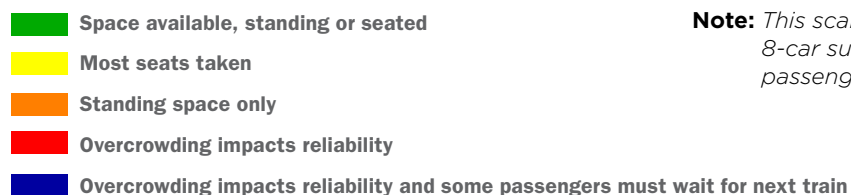
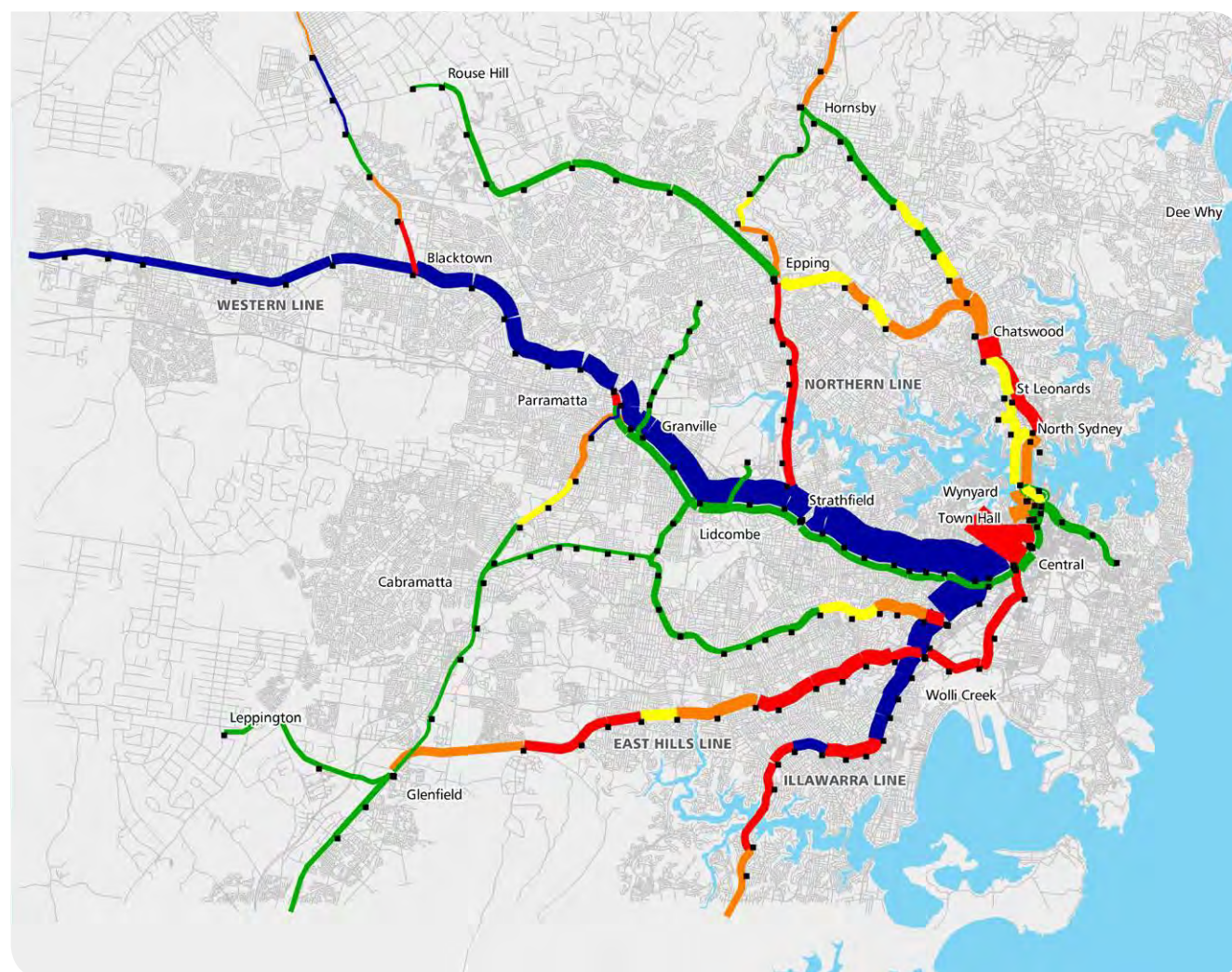


Figure 10 shows how demand on the rail network will impact the different rail lines in the absence of investments in new rail lines or enhancements to existing lines over the next 35 years. These projections assume that the Sydney Metro Northwest and Sydney Metro City & Southwest will be operational running 20 x 8-car trains per hour.

This map shows that demand will be greatest on the following rail lines:

- Western Line
- East Hills Line
- Northern Line
- Illawarra Line.

Figure 10 Sydney train network capacity (2051)¹⁰



Note: This scale relates to the loaded capacity of an 8-car suburban or metro train of nominally 1200 passengers per train.

Demand on Western Sydney's existing rail network

Increased customer demand means that parts of Western Sydney's rail network are already operating at peak capacity, with lower on-time running time performance than the average across the Sydney rail network. This is imposing restrictions on the efficient movement of people and freight.

A range of new initiatives are improving rail access and capacity in Western Sydney including signalling and track upgrades on the T1 corridor, the South West Rail Link, Sydney Metro Northwest and Sydney Metro City & Southwest.

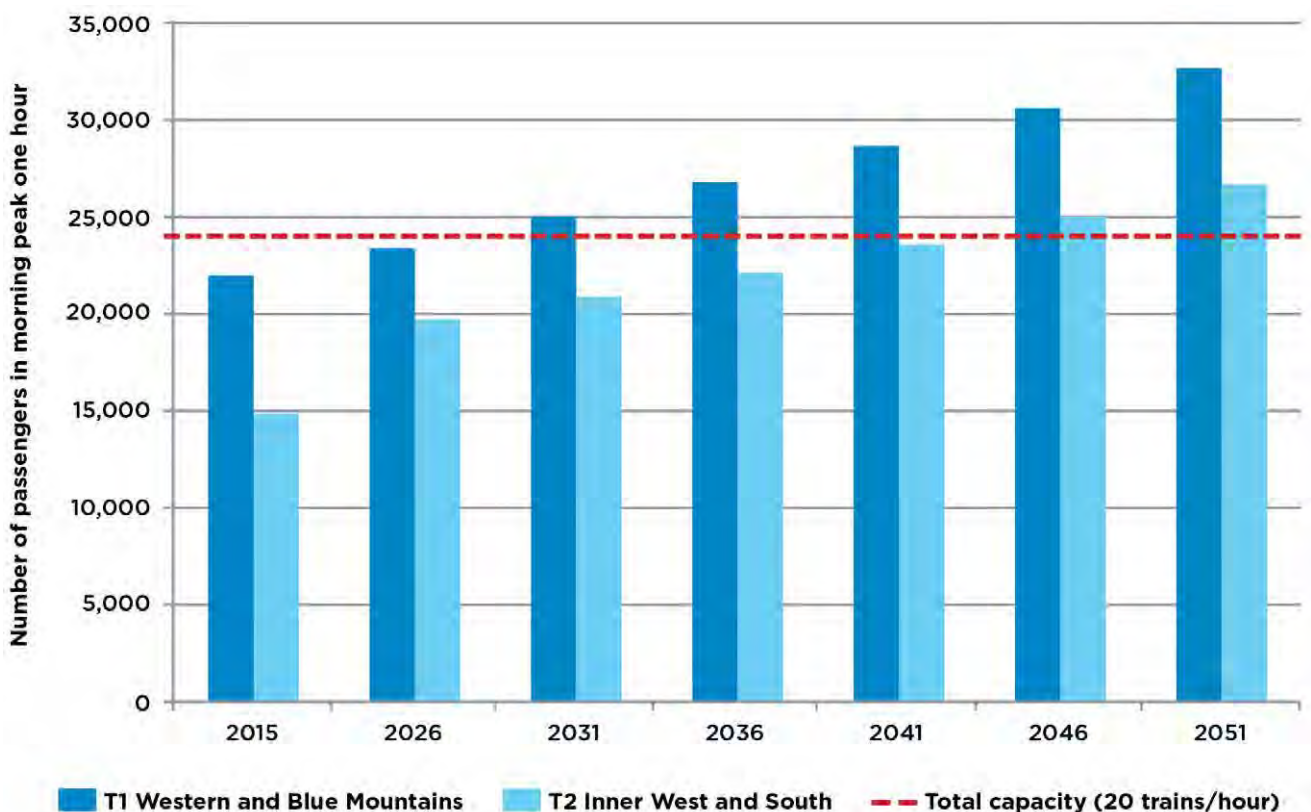
However, rail demand for Western Sydney is anticipated to grow strongly over the coming

years. The city-bound peak hour passenger demand on the T1 Western and Blue Mountains Line is forecast to increase by 50 per cent between 2015 and 2051, while the T2 Inner West and South Line is forecast to increase by 80 per cent over the same period.

Figure 11 illustrates that by 2031, the T1 Western Line will exceed the total capacity of 20 trains an hour.

The opening of Sydney Metro City and Southwest in 2024 will provide increased capacity on the T2 Inner West and South Lines and these lines are not forecast to exceed the total capacity of 20 trains an hour until after 2041.

Figure 11 Forecast morning peak hour passenger demand and capacity on the T1 West and T2 Inner West and South Lines (2015 to 2051)¹¹



11 Transport for NSW

What this means for the existing rail network

The NSW Government is undertaking signalling and track upgrade work to increase the capacity of the T1 Western Line adding additional capacity and improving reliability. In the longer term, further investment will be required to address demand issues and capacity constraints. These include:

- The capacity of the rail network will be significantly constrained from about 2030, particularly the T1 Western Line
- Crowded trains that are slow for passengers to board and alight will result in long dwell times (the time a train needs to stop in a station for passengers to board and alight)
- Increasing numbers of residents without access to rail will rely on the road network for travelling to work and other key destinations. This will result in greater congestion and longer journey times
- Increasing difficulty in balancing the needs of customers and freight that share a number of Sydney's rail lines – particularly the T1 Western Line.

Rail at a Western Sydney Airport

The Australian and NSW governments recognise that a Western Sydney Airport requires effective public transport connections and that a rail service that meets customers' needs will be required at the appropriate time.

Rail services are able to move significantly more people per hour and have the potential for faster journey times than other public transport modes. However, they are more expensive as they require their own dedicated right-of-way. Timing of delivery is important to ensure there is sufficient demand to justify the expenditure.

For rail to be attractive to airport passengers, the service must provide frequent services that enable airport passengers to arrive at and leave from the airport without a significant wait. There will also be a number of customer requirements for a Western Sydney Airport service, such as providing space for customer luggage and offering connections to key destinations and interchanges that will help Western Sydney Airport passengers travel across Western Sydney.

Train services to international airports

While rail's global average market share of ground transportation for airport passengers is about 20 per cent¹², there are significant variations between airports (Figure 12). The percentage of passengers using rail depends on the attractiveness of the rail link compared with other modes of transport and other factors such as the community's preference for public transport over other modes, congestion, road user charging and the cost of car parking.

A well-connected airport rail link in a country where people are already accustomed to using public transport could achieve at least 20 per cent market share¹³, with many Asian and European airport rail links demonstrating significantly more than 20 per cent. However, no airport links in North America or Australia exceed 20 per cent mode share.

Passenger market share for airport rail links around the world is influenced by multiple factors,¹⁴ including:


































- Urban density
- Competitive travel times (when compared to other transport modes)
- Service amenity (e.g. train frequency, trains that cater for travellers' needs such as space for luggage)
- Travel distance to the CBD
- Transfer convenience (the ability to easily change to other connections or transport modes)
- Cultural factors (e.g. current levels of public transport usage and car ownership).

12 Transport Associates Pty Ltd (Peter Thornton), presentation to IARO Meeting, Washington DC, 19 October 2015 transportationassociates.com.au/files/IARO%20Presentation%20WashingtonV5.pdf

13 Ibid

14 Bradley, A comparison of Australian airport rail links with elsewhere in the world, 2005, Australasian Transport Research Forum, atrf.info/papers/2005/2005_Bradley.pdf

Figure 12 Rail services to international airports

Airport	Airport passenger numbers (per annum)	Share of airport passengers travelling by rail	Time to city by rail (minutes)	Distance from CBD centre (kilometres)
London				
Heathrow	73.4m	 20%	 15-51	 24
Gatwick	40.3m	 43%	 35	 43
Paris				
Charles de Gaulle	65.8m	 27%	 35	 25
Orly	28.3m	 11%	 30	 13
Tokyo				
Narita	35.6m	 48%	 55-80	 76
Haneda	72.8m	 30%	 25	 14
New York				
JFK	56.8m	 11.4%	 45	 20
Newark Liberty	37.5m	 5.6%	 41-52	 23
Australia				
Sydney Kingsford Smith	39.7m	 15%	 11-22	 10
Brisbane	21.9m	 4.2%	 22	 16
Hong Kong				
Hong Kong	68.5m	 23%	 32	 25

Demand for rail by passengers at a Western Sydney Airport

A Western Sydney Airport would grow with demand and is projected to cater to approximately 37 million passengers a year by about 2050 – this is around the same number of passengers currently using Sydney Airport each year. By 2050, the new airport would cater to passengers who live in the broader Sydney basin and not just Western Sydney.

Table 3 shows the projected yearly and daily rail customer projections for the proposed Western Sydney Airport and the corresponding train carriage usage. These projections are based on an assumption that 20 per cent of airport passengers use a rail service¹⁵. Twenty per cent is the expected upper end of patronage for an airport rail link in the current Australian context, without a significant change to the factors that affect rail patronage, as discussed earlier in the section on train services to international airports.

Table 3 Customer projections for the Western Sydney Airport

	Estimated annual airport passengers ¹⁷	Estimated annual rail customers	Daily rail customers	Hourly rail customers*
First year of operation	5 million	1 million	2,750	115
Fifth year of operation	10 million	2 million	5,500	230
By 2063	80 million (approximately)	16 million	43,000	1800

* Hourly rail customers are indicative and averaged at this stage and will be confirmed in more detailed rail modelling.

The numbers in Table 3 refer to airport passengers only. It is forecast that by 2063 there will also be about 60,000 airport employees¹⁷ travelling to the Western Sydney Airport site.

The Scoping Study will assess patronage from other potential developments around the airport and in Western Sydney that would augment the demand for rail services to the proposed Western Sydney Airport.

15 Western Sydney Airport Draft Environmental Impact Statement, 2015, Department of Infrastructure and Regional Development, Canberra

16 Western Sydney Draft Airport Plan, 2013, Department of Infrastructure and Regional Development, Canberra

17 Ibid

Western Sydney Rail Needs Scoping Study | Discussion Paper

Forecast users of a Western Sydney Airport

Analysis indicates that passenger demand for a Western Sydney Airport would mostly come from the Western Sydney region in the early years of the airport's operations, providing Western Sydney residents faster and easier access to aviation services. During initial stages of operation, Western Sydney Airport would truly be an airport for the people of Western Sydney.

Figure 13 shows the likely airport catchments in the Sydney basin when operations begin, based on current transport planning. In addition to highlighting that the proposed airport would cater for Western Sydney residents in the early years, this map demonstrates the need for transport connections to facilitate travel across and within the Western Sydney region (the orange area) to the airport site.

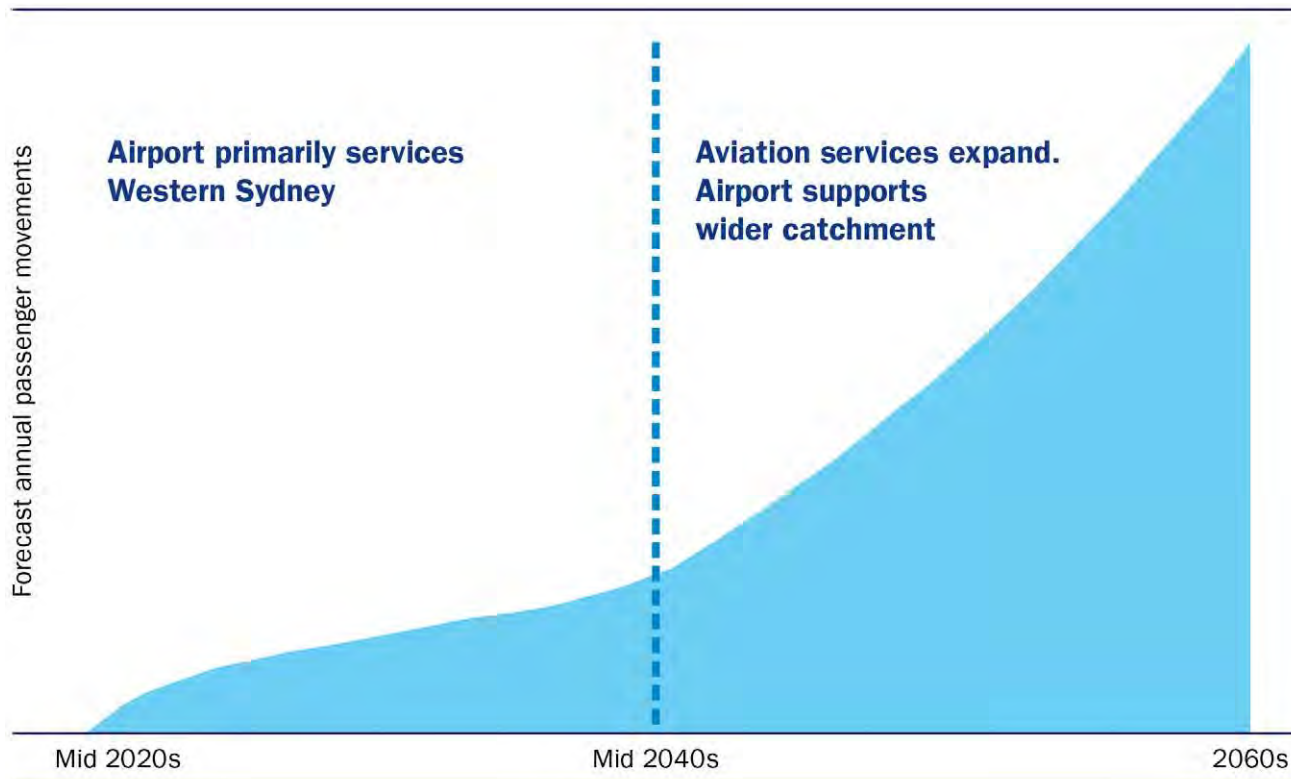
Figure 14 shows how the passenger make-up of a Western Sydney Airport would change as aviation demand grows and Sydney's overall population grows.

Figure 13 Sydney Basin aviation catchment distribution during the early years of operation of a Western Sydney Airport (WSA)



Note Greater Sydney as defined by the Greater Capital City Statistical Area (GCCSA) under the ABS Australian Statistical Geography Standard (ASGS) 2011. Catchment classifications based on 2026F cost of access.
Source: ABS; L.E.K. research and analysis

Figure 14 Forecast Western Sydney Airport annual passenger movements



Findings from the draft *Environmental Impact Statement*



The 2015 draft *Environmental Impact Statement* (EIS) for the proposed Western Sydney Airport assessed that the road upgrades under the \$3.6 billion Western Sydney Infrastructure Plan (detailed in chapter 5) would be adequate to support anticipated airport demand for at least a decade after opening. The draft EIS also found that to realise full potential, the long-term operation of the proposed Western Sydney Airport would require the construction of a rail connection.

What this means for providing a rail service to Western Sydney and a Western Sydney Airport

This chapter illustrates that the current rail network in Western Sydney will become constrained from about 2030 in the absence of further rail investments. Additionally, transport can be an enabler for change in a region. It provides opportunities to support growth and economic activity and to shape the city while at the same time, facilitating movement of its residents.

A new airport presents the opportunity to adopt the latest thinking in urban planning and ensure the right transport connections are in place at the right time to link to the airport. On opening, Western Sydney Airport is estimated to have about five million passengers annually (about 12 per cent of Sydney Kingsford Smith Airport's annual passengers in 2015).

If 20 per cent of airport passengers use rail there may not be sufficient demand to justify an express limited service from Sydney's CBD to the proposed airport that meets customer's needs for frequency in the early years of its operation. Consequently, an initial airport rail service may need to connect to other employment and housing areas in Western Sydney to provide the patronage, economic benefit and the frequency required for a major investment in rail.

If a rail service to and from the proposed airport in the initial years of operation is not part of an existing suburban rail line and is a dedicated airport rail connection, it may not meet passenger needs. It would either have infrequently timetabled

services or require heavy public subsidies to ensure frequent availability and to offset what would be mostly empty trains. Making an investment in an airport rail service therefore must consider both the rail needs of the broader Western Sydney region and the proposed airport.

In Sydney, as in many large cities, people do not live close to where they work for lifestyle reasons and due to constraints such as cost, location of family and schools. Many Western Sydney residents must currently travel outside of the region for work, particularly for higher-income, knowledge-based jobs.

While connections to the Sydney CBD will continue to be vital, improving transport connections across Western Sydney to residential areas, commercial and business precincts, university and health precincts as well as a Western Sydney Airport will help to unlock Western Sydney's full economic potential. Better integration between land use and transport planning is essential to ensure that people have a greater range of options for where they live and work and to increase the efficiency and competitiveness of the region.

We are interested in hearing your views on the priority and type of rail services and the degree to which governments, through taxpayer funds, should subsidise these services.



Image courtesy of TfNSW, Simon Freeman 2013

Despite the Australian and NSW governments' significant investments in Western Sydney's transport infrastructure, the projects identified in chapter 4 will not be sufficient to meet the region's long-term transport needs. Further investment in transport infrastructure will be needed to support the growing population, to bring jobs closer to homes and over time, to support passenger growth at the proposed Western Sydney Airport.



Questions

- 1** What is the key challenge that should be addressed by rail services for Western Sydney?
- 2** What areas of Western Sydney are most in need of new or upgraded rail services? Why?
- 3** What rail services would help you access employment, health, business and education precincts in Western Sydney?
- 4** What other challenges should the Scoping Study address?
- 5** How could governments best take an active role in encouraging greater use of public transport given the potential benefits to the environment and sustainability?

6 The options



About this chapter

This chapter provides an overview of the initial set of rail options identified to service Western Sydney and the proposed Western Sydney Airport.

How the initial options were selected

An initial set of rail options have been identified to service Western Sydney and the proposed Western Sydney Airport. The selection of these options was informed by projected customer demand and population growth and ideas presented by the community and other stakeholders in public forums. The Australian and NSW governments encourage you to provide feedback on these initial options, and to let us know whether there are other rail service options that we should consider.

The options are presented in this chapter according to whether they:

- Connect directly to the proposed airport (Options 1-6)
- Provide new or enhanced connections between the Western Sydney region and other parts of Sydney (Options A-E).

It is important to note that the benefits of each set of options are not mutually exclusive. An airport rail service could provide benefits for the Western Sydney region and a Western Sydney rail service could benefit the airport. All options will be considered individually and in various combinations (as indicated in Figure 15).

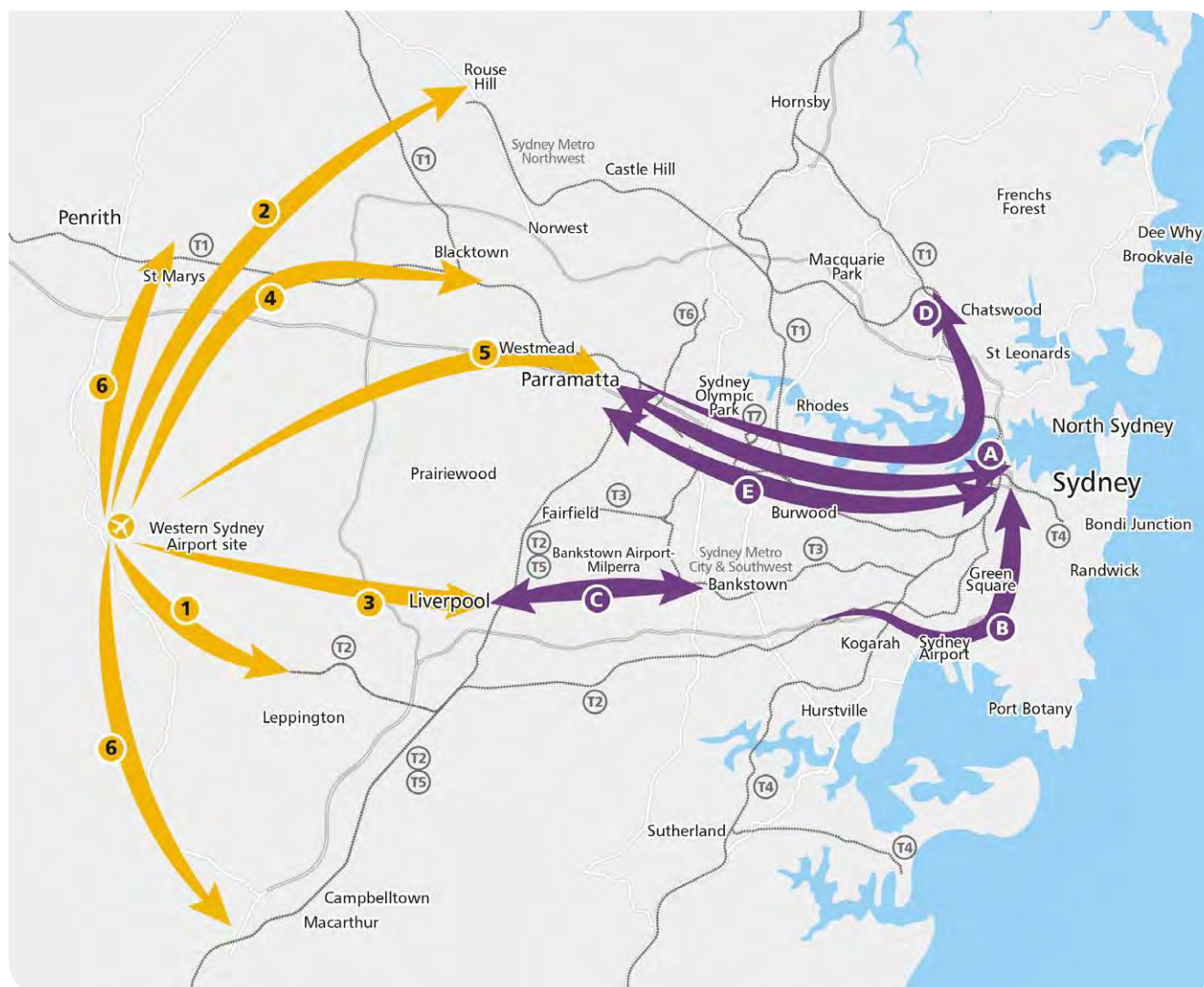
This study will assess the viability of each of these options, and other options identified through the consultation process, to determine which have the most merit and should be recommended for more detailed investigation. The final outcome of this assessment may be the selection of several preferred options or combinations of options delivered in different time frames.



The rail service options

The map below shows the initial set of options under consideration by the Scoping Study. Additional options may emerge through the feedback received during the consultation period. Both the options indicated in Figure 15 and any additional options identified through consultation will be assessed against the assessment criteria presented in chapter 7 of this discussion paper.

Figure 15 Western Sydney rail options



1 WSA to the South West Rail Link

2 WSA to Sydney Metro Northwest

3 WSA to Liverpool

4 WSA to the T1 Western Line via St Marys

5 Direct rail express service: WSA to Parramatta

6 A north-south link: Macarthur-WSA-St Marys-Schofields

A New western metro-style service

B Converting the T2 Airport Line between Revesby and Sydney CBD to a separate metro-style service

C Extending the Sydney Metro City & Southwest

D Increase capacity of existing network

E New higher speed tunnel linking Parramatta and the Sydney CBD

Western Sydney Airport (WSA) site

T1 North Shore, Northern and Western Line

T2 Airport, Inner West and South Line

T3 Bankstown Line

T4 Eastern Suburbs and Illawarra Line

T5 Cumberland Line

T6 Carlingford Line

T7 Olympic Park Line



How much will these services cost to build?

Although no detailed cost estimates have been prepared, it is anticipated that the most expensive single option presented in Figure 15 could cost up to about \$25 billion if delivered today. The government is interested in hearing from the public and industry about innovative ways of reducing the costs of rail connections for Western Sydney and ways of funding the expenditure. See chapter 8 for more detail on funding.

Options that connect to the proposed Western Sydney Airport

Below are the service options under consideration for rail in Western Sydney that include a connection to the proposed Western Sydney Airport (WSA). In line with *Sydney's Rail Future*, when considering each of these options we need to understand how they will integrate with the operation of the existing network. See Table 4 for indicative journey times of these rail options from the proposed airport to the Sydney and Parramatta CBDs.

1. WSA to the South West Rail Link

The simplest way to provide a train service to the proposed Western Sydney Airport would be to extend the South West Rail Link from Leppington via Bringelly to service the airport site using the double-deck suburban trains. This could provide good connections to Sydney's south-west including Campbelltown through to Liverpool and ultimately to places such as Parramatta and Sydney. This service also offers the potential to support additional developments at new stations between Leppington and the proposed Western Sydney Airport. In 2014-15, the NSW Government conducted community consultation for the corridor preservation of the South West Rail Link extension. Feedback from this consultation will be considered as part of this study.

2. WSA to Sydney Metro Northwest

A new line from the proposed Western Sydney Airport to link with the Sydney Metro Northwest could provide connections to the existing rail network at places such as St Marys and Schofields. This could also provide rail connections for housing and employment developments at intermediate locations such as the Penrith Education and Health Precinct and Marsden Park. The line could run as a separate, stand-alone, metro-style service.

3. WSA to Liverpool

If the Sydney Metro City & Southwest was extended from Bankstown to Liverpool (as described in option C) then a connection could be constructed to service the proposed Western Sydney Airport. This could provide good metro connections from the airport to the Liverpool to Bankstown area, and ultimately through to the Sydney CBD. This line also offers the potential to support additional developments at new stations between the proposed Western Sydney Airport and Liverpool.

4. WSA to the T1 Western Line via St Marys

A branch of the existing T1 Western Line to the proposed Western Sydney Airport could enable suburban double-deck services to start at the airport and travel up to St Marys/Mt Druitt and then run express to Blacktown, Parramatta and Sydney. Combined with a new tunnel from Parramatta to Sydney (see option E), this line could provide a reasonably direct link from the airport to Parramatta and Sydney. This line also offers the potential to support additional developments at new stations between the proposed Western Sydney Airport and the T1 Western Line.

5. Direct rail express service: WSA to Parramatta

This option would include a direct rail express service from the proposed Western Sydney Airport to Parramatta and through to Sydney CBD. This line would require a new tunnel as it approaches Parramatta and from Parramatta through to the Sydney CBD. This service offers the potential for the fastest service between the airport and these two major centres, but would be comparatively expensive to construct. Initial assessments indicate that such a line could achieve journey times of 15 minutes from the proposed Western Sydney Airport to Parramatta and 12 minutes from Parramatta to the Sydney CBD based on a maximum speed of 160 kilometres per hour. While such a service would provide a short travel time to the broader Sydney basin and CBD, it would not necessarily service the population who are expected to work at and use a Western Sydney Airport in the short-term.

6. A north-south link: Macarthur-WSA-St Marys-Schofields

A north-south link of the T2 Inner West and South Line through to the T1 Western Line would provide north-south connectivity, and a useful connection between the proposed Western Sydney Airport and the existing rail network. As well as serving the airport, this link could open up a large part of Western Sydney for further development including Narellan, Oran Park, Bringelly, Badgerys Creek and the Penrith Education and Health Precinct. This rail service could potentially run as a stand-alone shuttle service using single-deck trains.

Table 4 Indicative journey times for WSA rail options

Option	In-vehicle train time (mins)*	
	WSA to Parramatta	WSA to CBD**
1. WSA to the South West Rail Link	52	55
2. WSA to Sydney Metro Northwest	35	57
3. WSA to Liverpool	49	64
4. WSA to the T1 Western Line via St Marys	33	48
5. Direct rail express service: WSA to Parramatta	15	27
6. A north-south link: Macarthur-WSA-St Marys-Schofields	35	55

Notes:

* In-vehicle time is the time by the fastest train service between WSA and Parramatta and Sydney CBD

** CBD is assumed to be Central Station in options 1, 2, 3 and 6, and Wynyard in options 4 and 5

Options that connect Western Sydney to other areas in Sydney

Below are high-level descriptions of options for new rail services offering improved connections between Western Sydney and the Sydney CBD and other parts of Metropolitan Sydney. These options do not include a connection to the proposed Western Sydney Airport. However, as indicated in Figure 15, some of these options could be combined with Western Sydney Airport options.

A. New western metro-style service

This line requires a tunnel to be built between Sydney and Parramatta/Westmead with stations located every few kilometres. It could operate as a stand-alone, metro-style, all-stops service using high-capacity single-deck trains with the potential to transport 40,000 extra passengers per hour. It could potentially provide journey times between Sydney and Parramatta of around 30 minutes and relieve some demand on the existing network. This could also support opportunities for new developments at locations such as Olympic Park, Five Dock and The Bays Precinct.

B. Converting the T2 Airport Line between Revesby and Sydney CBD to a separate metro-style service

The line from Revesby to Sydney via the Kingsford Smith Airport could be separated from the suburban network and operated as a metro-style shuttle terminating at a new station located in the Sydney CBD. This could allow an additional 12 trains per hour on the City Circle and an additional 7,000 passengers per hour between the Leppington/Campbelltown area and Sydney. This service could also provide a train more suited to customers with luggage travelling to and from Kingsford Smith Airport.

C. Extending the Sydney Metro City & Southwest

A separate study is assessing the options for extending the Sydney Metro City & Southwest from Bankstown to Liverpool. A direct connection to the metro line could provide faster journey times between Liverpool and Sydney and could free up additional capacity on the suburban trains that travel through Liverpool. It also offers the potential to support additional developments at new stations between Bankstown and Liverpool. Feedback received from consultation on the Sydney Metro City & Southwest Bankstown to Liverpool extension will be considered as part of the Scoping Study.

D. Increasing the capacity of the existing suburban network

Introducing advanced train management systems has the potential to increase the number of trains on each line by up to 20 per cent. This would provide capacity on double-deck suburban trains for an additional 4,000-5,000 passengers every hour per line.

E. New higher speed tunnel linking Parramatta and the Sydney CBD

This line would require a tunnel to be built between Sydney and Parramatta, with stations that could include The Bays Precinct and Olympic Park. This line could provide a quick connection between these two CBDs and could enable express services from the Blue Mountains and Western Sydney to the Sydney CBD, potentially doubling the capacity for services from Western Sydney and providing for an additional 25,000-30,000 passengers per hour.

What is high-speed rail and what are direct rail express services?

A direct rail express service, such as the combination of Option 5 with Option E, is different to a long-distance high-speed rail service. The Scoping Study is not considering long-distance high-speed rail as this would require a detailed analysis of the needs of long-distance journeys far outside of the study area.

Direct rail express service

The direct rail express considered in this Scoping Study, through the combination of Option 5 with Option E, would provide an efficient service primarily for customers to the proposed Western Sydney Airport to/from the Sydney and Parramatta CBDs. This service could have the major co-benefit of efficiently connecting Sydney's two CBDs for residents and workers.

High-speed rail

High-speed rail is a mode of rail transport capable of moving people at speeds of at least 250 kilometres per hour, usually over long distances on dedicated tracks (with some systems using conventional rail for short distance sections to access some stations). The most recent Australian study of high-speed rail, from 2013, proposed a dedicated track.

Internationally, high-speed rail is used between major cities but also provides opportunities for stops in regional areas and fast commuter rail services from outer metropolitan areas. High-speed rail stations are typically located within city centres, close to population and business centres.





Questions

- 6 What rail services should be delivered as the highest priority to service a Western Sydney Airport?
- 7 What other rail options should be considered in this study to service a Western Sydney Airport?
- 8 What is the highest priority rail service required for the Western Sydney region?
- 9 What other rail options should be considered in this study to service other parts of the Western Sydney region?
- 10 Should rail services to a Western Sydney Airport be prioritised over services to other Western Sydney locations? Why?
- 11 If a rail connection is provided to the proposed Western Sydney Airport, should it be provided when the airport opens or when there is sufficient demand?
- 12 Is it more important to be able to travel (by rail) to the proposed Western Sydney Airport or to other locations in Western Sydney? Why?



7 How the options will be assessed



About this chapter

This chapter provides an overview of the criteria and objectives that will be used to assess all rail options.

The criteria and objectives

The initial list of rail options for Western Sydney and the proposed Western Sydney Airport plus any suggestions received during the consultation process will be assessed using the project objectives and assessment criteria in Table 5. These project objectives were drawn from the Australian and NSW governments’ published goals for Western Sydney, including *A Plan for Growing Sydney*, *Sydney’s Rail Future*, and the draft *Airport Plan* for the proposed Western Sydney Airport.

Each of the rail service options will be assessed against modelling for 2036 and 2056.

Table 5 How the options will be assessed

Objective	Description	Assessment criteria
Customer Focus	Deliver high-quality, customer-focused services that prioritise frequency, journey time and reliability	<ul style="list-style-type: none">• Frequency• Reliability• Journey time
Connectivity & City Shaping	Develop a rail network that: <ul style="list-style-type: none">• Equitably improves access to services and opportunities• Supports Sydney’s long-term housing needs• Shapes the location of housing and employment to achieve more efficient development, including release of lands for housing and employment	<ul style="list-style-type: none">• Connect households to services and opportunities• Improve connections to the regional centres within the Sydney Metropolitan Region• Promote opportunities for urban renewal• Provides connections to a Western Sydney Airport appropriate to demand
Network Capacity	Provide the capacity and flexibility required to: <ul style="list-style-type: none">• Cater for predicted demand• Shape Sydney’s growing demand for transport	<ul style="list-style-type: none">• In-vehicle capacity (the number of people who can comfortably travel in each carriage)• Station capacity• Train-path capacity
Environmental Sustainability	Grow the proportion of travel by sustainable modes, ease congestion and improve asset utilisation and energy efficiency	<ul style="list-style-type: none">• Grow the proportion of travel by rail• Contribute to improving the energy efficiency of the transport sector

Objective	Description	Assessment criteria
Productivity	Contribute to and facilitate the sustainable and efficient economic development of Sydney's metropolitan region and a Western Sydney Airport	<ul style="list-style-type: none"> • Reduce travel time to knowledge hubs and high-productivity centres • Facilitate rather than hinder increased freight on rail
Social Inclusion	Support Western Sydney communities through providing more transport choice and opportunities to contribute	<ul style="list-style-type: none"> • Increase accessibility to high-value employment and education
Financial Sustainability	Ensure the government has the financial capacity to meet the growing demand for infrastructure and services.	<ul style="list-style-type: none"> • Capital and whole-of-life costs, including operations and maintenance • Ability to use value sharing as part of a comprehensive funding solution • Impact on timing of funding being available • Affordability
Delivery Risk	Modernise Sydney's rail network in a responsible and seamless way that minimises disruptions to the travelling public	<ul style="list-style-type: none"> • Minimise project delivery risks • Minimise construction impact on residents, important community facilities and open spaces • Minimise operational impact during construction
Safety	All options will be designed to meet minimum safety requirements	<ul style="list-style-type: none"> • Ensure members of the public, passengers and employees can travel safely each day • Safety legislation and regulation will be the baseline for all operations



Question

13 What other assessment criteria should the Scoping Study consider?

8 Funding and delivery



About this chapter

This chapter provides an overview of options for funding and financing the rail transport needs for Western Sydney.

The funding challenge

The Scoping Study is examining various options to fund and finance the rail transport needs for the Western Sydney region and a Western Sydney Airport.

In Australia, major public infrastructure is delivered by both the public and private sectors. Although a given piece of infrastructure may be delivered by the private or public sector alone, increasingly infrastructure is delivered through public-private partnerships. Regardless of who owns, delivers or finances projects, there are only two main sources of funding for public infrastructure: funding from general government revenue raised through taxation; and charges on those who benefit from the infrastructure.

Over the coming decades, the Australian and NSW governments will face increasing budgetary pressures as the population grows and ages, particularly in the areas of health, education and transport services. Expenditure needs to be managed so that governments can continue to deliver the services the community needs and expects. Given these competing priorities, it is not possible to fund every rail option considered in this Scoping Study.

Transport infrastructure is often seen as the solution to support the needs of communities and workers, and to help strengthen the economy. However, it has to be the right transport infrastructure, in the right place and at the right time. The contributions that are made by the Australian and NSW governments are done so on the basis of whether or not the project demonstrates positive economic, social and environmental benefits, largely assessed through cost benefit analyses.

Funding and financing options

Outlined below are the funding and financing options under consideration for new rail services in Western Sydney. Each of these funding options has strengths and limitations in terms of how much funding it can deliver, and the balance between funding from users, beneficiaries and other taxpayers. How these strengths and limitations apply to rail transport for the Western Sydney region and the proposed Western Sydney Airport need to be understood before a 'bankable' package of funding options can be developed. Rail options that can generate more funding from a range of sources may be able to be delivered sooner, or with less call on limited government budgets.



Funding versus financing

The term **funding** refers to how infrastructure is paid for. Ultimately, there are only two sources of funding for infrastructure: government investment made available through the tax base, or charges on users or beneficiaries of the infrastructure.

Financing refers to the way in which the upfront capital is raised to allow the delivery and operation of an infrastructure project. This can include the use of equity and/or debt, such as loans.

How much will these services cost to build?

Although no detailed cost estimates have been prepared, it is anticipated that the most expensive single option presented in this paper could cost up to about \$25 billion if delivered today. In addition to construction costs, consideration also needs to be given to ongoing costs for running and maintaining any new rail service. Cost is dependent on the length of the route selected and the difficulty of construction. Cost is one of the criteria that will be used to assess the options identified through the consultation process. The government is interested in hearing from the public and industry about innovative ways of reducing the costs of rail connections for Western Sydney and ways of funding the expenditure. At this stage of the study process, there is no provision for government funding for the construction of a Western Sydney rail project, as no specific project has yet been identified.

Conventional government funding

Historically, rail infrastructure in NSW has largely been funded through traditional government budget allocations. Rail must compete for finite government funding against the multiple demands for infrastructure and services from communities across the state. There is a limit to the amount and timing of funds available for rail infrastructure. As a result, rail projects need to be prioritised and it may not be possible or may take longer to deliver rail services through government funding alone than what is expected by the community.

User pays

Investment in rail services for Western Sydney is expected to directly benefit new and existing travellers, including rail and airport customers. Given the expected costs of any new rail infrastructure, fares and user charges are not expected to cover the costs of construction. However, fares and other direct user charges could contribute to funding the operation of a service once it is built. Different types of rail services will better service some markets than others, and future customer demand will affect both the size and timing of revenue from fares.

Value sharing

Investment in rail services for Western Sydney will bring benefits to multiple communities and stakeholders, including commuters, airport travellers, landowners, property developers, and local residents and businesses. For this reason, it is important to consider who will benefit from new rail infrastructure and who can contribute to the funding of this infrastructure.

The right kind of government intervention can result in the creation of additional value or uplift for a range of beneficiaries. Value sharing describes a variety of mechanisms that enable governments to leverage future revenue streams from this uplift in value, and apply these revenues to project funding and upfront financing.

A 'value sharing' or 'beneficiary pays' approach considers how a project delivers value to different groups of beneficiaries, and what mechanisms are available to enable some of this increased value to be realised as revenue streams that can contribute to project funding.

Value sharing can allow governments to invest in rail infrastructure earlier, or deliver a better project than what might be possible using government funding or user pays funding alone. Contributions should be based on the principle of proportional, fair and appropriate benefit sharing.

The Scoping Study will look at the following three broad areas of value sharing opportunities:

- Revenue from increased productivity and economic activity
- Revenue from higher-value land use
- Contributions from new property development opportunities.

Understanding the role of value sharing

Value sharing and other innovative measures are only one part of funding future rail infrastructure. Experience from Australia and overseas has shown that conventional funding sources will continue to play a major role in meeting the funding challenge.

On 8 December 2015, the preferred network for the Parramatta Light Rail project was announced with the core spine of the preferred network from Westmead to Camellia via Parramatta CBD, and branches to Carlingford and Sydney Olympic Park via Strathfield. The NSW Government also announced the introduction of a Special Infrastructure Contribution (SIC) Scheme to contribute funding to the Project as well as funding for road network improvements and community infrastructure.

Value sharing can help contribute to infrastructure needs by:

- Providing funding mechanisms that allow future value creation to support project financing facility
- Assisting with the overall funding task by reducing the total call on government budgets
- Promoting equitable sharing of project benefits between those who directly benefit from a project and other taxpayers
- Strengthening the link between project planning and project benefits.

Value sharing models and opportunities are context specific. For this reason, the value sharing models outlined above might not be suitable for all Western Sydney projects. It is now standard practice for both the Australian and NSW governments to consider the value sharing opportunities for all infrastructure projects. Value sharing opportunities for rail service options considered in this study will be examined on a project-by-project basis.



Opportunities for the private sector

Both the Australian and NSW governments wish to optimise private sector engagement (including through innovative financing) by creating the right policy and regulatory settings for investment, while sharing costs fairly between those who benefit most and the broader Australian community.

Projects that incorporate financing innovation such as co-investment or partnership arrangements, have the potential to enable government funds to achieve a greater impact for the community. Like the value sharing approach, this may also allow rail infrastructure to be delivered earlier than might be possible using government funding alone.

There are a number of financing tools that allow governments access to additional investment capital other than through increasing government debt. These include:

- Public-Private Partnerships (PPPs)
- Concession agreements
- Leases
- Vendor finance and other structured finance arrangements.

How funding and financing options will be assessed

Over the coming months the Scoping Study project team will be assessing the likely benefits and impacts of each of the options identified and developing funding options that suit the rail transport needs for the Western Sydney region and the proposed Western Sydney Airport. This includes investigation and modelling of:

- The trade-offs for different funding options
- How the different types of rail options being considered can best support a range of funding sources
- The commercial and financial implications of the different funding options.



Questions

- 14** How do you think rail services in Western Sydney should be funded?
- a Government funding
 - b Value sharing
 - c User pays
 - d A combination of the above
 - e How else could future rail services be funded?

9 Responding to the discussion paper

The Australian and NSW governments want to hear your views on the initial set of rail service options we have identified for Western Sydney and the proposed airport, as well as a range of funding approaches. We also want to know if there are other rail service options or funding approaches that we should consider.

Your input will help the Australian and NSW governments plan for the future and we welcome the opportunity to assess your feedback.

Please note that any information provided during the Sydney Metro City & Southwest Bankstown to Liverpool extension consultation and the South West Rail Link Extension Corridor Preservation Study will be considered as part of this Scoping Study.

The consultation period for the discussion paper closes on 28 October 2016.

Submission requirements

To provide your feedback, we encourage you to respond to the questions and issues presented in this discussion paper. We ask that you provide us with key information about yourself, including:

- Your name
- Email contact
- Postcode of your home, workplace and/or place of study.

Submissions should be titled 'Response to the Discussion Paper'.



You can make a submission:



Online

westernsydneyrail.transport.nsw.gov.au



Email

westernsydneyrail@transport.nsw.gov.au



Write

Western Sydney Rail Needs: Feedback
PO Box K659
Haymarket NSW 1240

Information provided in response to this discussion paper will be treated as public information and may be published. Unless otherwise agreed in writing, the Australian and NSW governments are free to use, reproduce adapt, modify, perform, distribute, communicate, and exploit without charge and without restriction the material contained within submissions for any purpose related to the Scoping Study and the improvement of transport links in NSW. All personal information provided in feedback or submissions will be shaded or covered before being made publicly available on the project webpage.

The final Scoping Study will outline the themes and issues raised within the submissions. Individuals and organisations are free to publish their own submissions if they wish to do so.

Submissions will be collected and managed by the NSW Government. Copies of submissions will be provided to the Australian Government.

We also want to hear from industry

We encourage industry to have their say on the Scoping Study so that we can consider their views and interests early in planning for rail services in Western Sydney.

In addition to the questions posed in this Discussion paper, we also want to hear your ideas on:

- How the private sector can collaborate with government to fund and finance rail solutions in Western Sydney, including through value sharing opportunities
- What alignments, connections and rail service offerings could attract direct rail or land development investment
- Innovative ways to enhance the network to meet Western Sydney's transport challenges (for instance alignments, service solutions, technology upgrades etc).

For more detail about how industry can participate in this study, please see the NSW Government Western Sydney Rail Needs Industry Briefing available at westernsydneyrail.transport.nsw.gov.au

Unsolicited proposals

You should not submit any unsolicited proposals as part of your submission to the Scoping Study. If a private sector entity wants to submit an unsolicited proposal to the NSW Government on a specific option to which they intend to contribute funding and wish to claim intellectual property, this should occur separately through the process identified in the NSW Government's *Unsolicited Proposals: Guide for Submission and Assessment*, available from nsw.gov.au

Please note that any such proposals may not be considered or assessed against the needs identified in the Scoping Study until after the Scoping Study has concluded unless ideas are also submitted in response to this discussion paper.

Privacy

Your submission, including any personal information supplied, is being collected by the Department of Infrastructure and Regional Development in accordance with the *Privacy Act 1998 (Commonwealth)* and by Transport for NSW in accordance with the *Privacy and Personal Information Protection Act 1998 (NSW)* for the purposes of informing the Scoping Study and the improvement of transport links in NSW.

The Commonwealth Department of Infrastructure and Regional Development and Transport for NSW will take all reasonable steps to ensure that your personal information is stored securely.

Your personal information will be used by these agencies, and disclosed by these agencies to their advisers and other Commonwealth and NSW agencies for use in consideration of the Scoping Study and the improvement of transport links in NSW, including making contact with you about your submission.

By making a submission you consent to the collection, use and disclosure of the personal information supplied by you in the context of your submission for the above purposes.





Discussion paper questions

The questions below are designed to capture your ideas about the needs, preferences and priorities of rail services in Western Sydney for the next twenty years and beyond.

Please answer as many or as few questions as you like. Alternatively, if you'd prefer to use these questions as a prompt only and provide your feedback in an alternative format, please send your submission to westernsydneyrail@transport.nsw.gov.au

- 1 What is the key challenge that should be addressed by rail services for Western Sydney?
- 2 What areas of Western Sydney are most in need of new or upgraded rail services? Why?
- 3 What rail services would help you access employment, health, business and education precincts in Western Sydney?
- 4 What other challenges should the Scoping Study address?
- 5 How could governments best take an active role in encouraging greater use of public transport given the potential benefits to the environment and sustainability?
- 6 What rail services should be delivered as the highest priority to service a Western Sydney Airport?
- 7 What other rail options should be considered in this study to service a Western Sydney Airport?
- 8 What is the highest priority rail service required for the Western Sydney region?
- 9 What other rail options should be considered in this study to service other parts of the Western Sydney region?
- 10 Should rail services to a Western Sydney Airport be prioritised over services to other Western Sydney locations? Why?
- 11 If a rail connection is provided to the proposed Western Sydney Airport, should it be provided when the airport opens or when there is sufficient demand?
- 12 Is it more important to be able to travel (by rail) to the proposed Western Sydney Airport or to other locations in Western Sydney? Why?
- 13 What other assessment criteria should the Scoping Study consider?
- 14 How do you think rail services in Western Sydney should be funded?
 - a Government funding
 - b Value sharing
 - c User pays
 - d A combination of the above
 - e How else could future rail services be funded?

10 Next steps

To create a rail solution for Western Sydney that puts the needs of the customer first, both the Australian and NSW governments will be listening to the community, listening to the experts and listening to the transport industry to gather ideas, experiences and input.

In addition to gaining feedback through responses to the discussion paper, we will be consulting through a range of events and web-based consultation.

Following the consultation we will consider all feedback to develop preferred options for further investigation. Figure 16 outlines the key stages of the Scoping Study.

Ultimately, the outputs from this study will form part of the work that informs the NSW Government's updated Long Term Transport Master Plan, and support the Greater Sydney Commission's District Plans.

Figure 16 Key steps in the Scoping Study

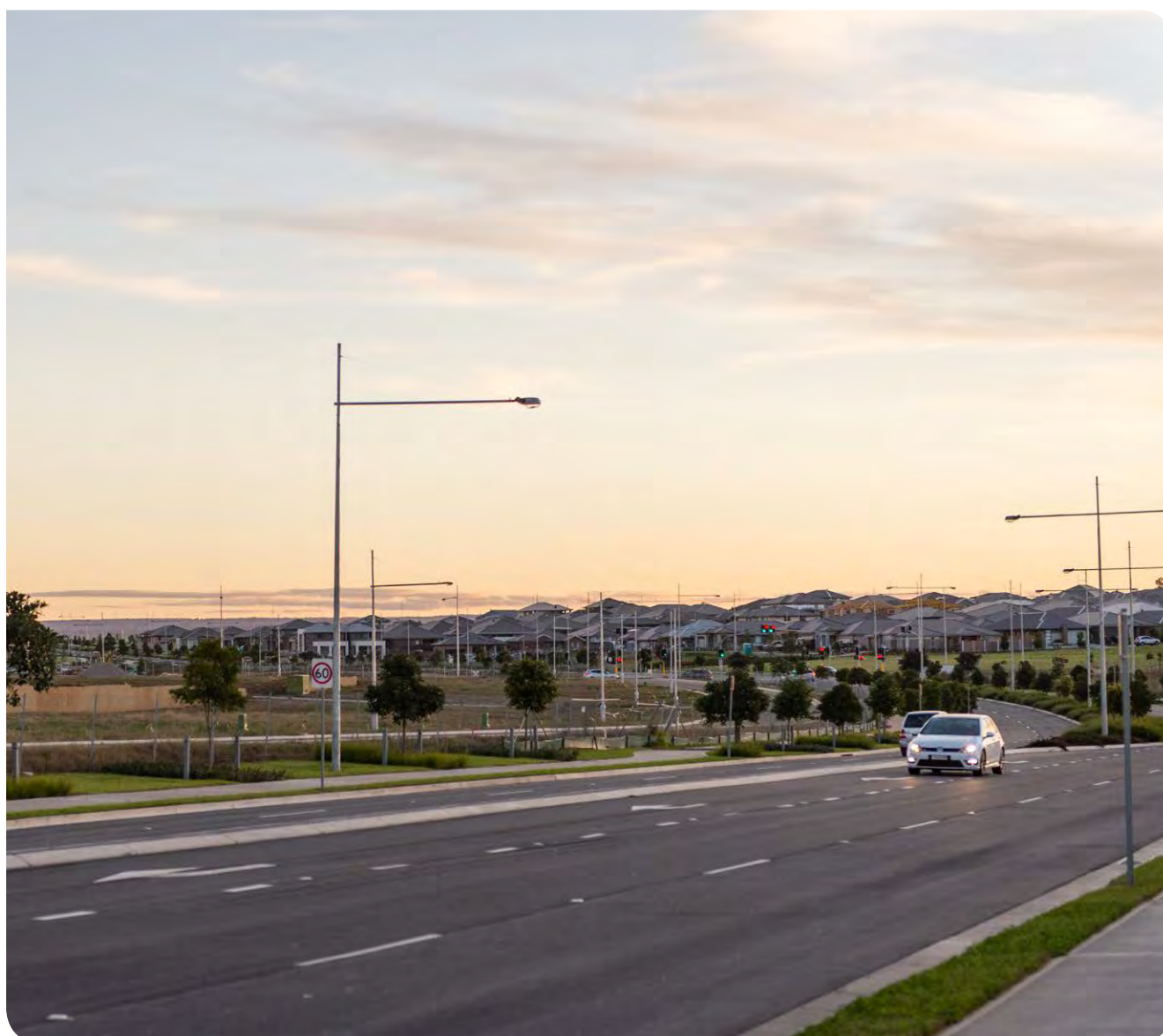


A Glossary

Term	Definition
Concession agreements	A negotiated contract between a company and a government that gives the company the right to do business in a particular area or venue in exchange for some carefully negotiated terms.
Corridor preservation	Process to identify and preserve an area of land for future transport use.
Direct rail express services	Conventional rail infrastructure and trains capable of supporting speeds up to 160 kilometres per hour.
Dwell times	The time a train needs to stop in a station for passengers to board and alight.
Enterprise corridor	An area designed to attract investment and stimulate employment-generating development that is aligned with specific sections of road or rail transport infrastructure.
Greater Western Sydney Region (GWS)	<p>Covers 8,941 square kilometres and includes local government areas within three sub-regions:</p> <ul style="list-style-type: none"> • West Central & North West: covers the local government areas of Parramatta and Cumberland • West: covers the local government areas of Blacktown, Hawkesbury, Penrith, and the Hills • South West: covers the local government areas of Canterbury Bankstown, Camden, Campbelltown, Fairfield, Liverpool, and Wollondilly.
Heavy rail	<p>Rail transport that generally operates on fully grade-separated rights-of-way. In NSW, all trains operated by Sydney Trains, NSW TrainLink and Sydney Metro are classified as heavy rail.</p> <p>Traditionally the distinction between 'heavy rail' and 'light rail' was based on the weight of the trains, expressed in the load per each axle. Although there is no firm distinction between the two, 'heavy rail' trains generally have axle loads of 15 tonnes or more. For modern rail systems the distinction between 'heavy' and 'light' is determined by the type of service (service frequency and distance between stations) and train characteristics such as floor heights.</p>
High-speed rail	Fixed-track mode of transport, capable of moving people at speeds of at least 250 kilometres per hour, usually over long distances.
Land release area	Areas of land rezoned for a purpose other than the original zoning, e.g. Crown land rezoned for residential or commercial development.
Light rail	Urban public transport using rolling stock similar to trams but operating on an exclusive right-of-way.
Metro or rapid transit	High-capacity, electric railways that operate on an exclusive right-of-way, often grade separated in tunnels or on elevated railways.

Term	Definition
Metropolitan Sydney	Metropolitan Sydney is classified as Greater Sydney (Greater Capital City Statistical Area) by the Australian Bureau of Statistics (ABS). The area extends from Wyong and Gosford in the north to the Royal National Park in the south. Towards the west, the region includes the Blue Mountains, Wollondilly and Hawkesbury. Greater Sydney covers 12,367.7 square kilometres.
North West Priority Growth Area	<p>The North West Priority Growth Area is approximately 10,000 hectares in size and includes parts of The Hills, Blacktown and Hawkesbury local government areas.</p> <p>It is divided into 16 Precincts that are being progressively released and rezoned for sustainable urban development.</p>
Outer Sydney Orbital (OSO)	<p>The OSO is a multi-modal transport corridor, currently in the planning phase, which will ultimately connect the Central Coast and Illawarra regions. It is proposed that the OSO project will be delivered in three stages:</p> <ul style="list-style-type: none"> • Stage 1 Hume Motorway and main Southern Rail Line to Windsor Road • Stage 2 Hume Motorway and main Southern Rail Line to Illawarra • Stage 3 Windsor Road to M1 and main Northern Rail Line <p>A corridor preservation study is currently underway for Stage 1.</p>
Public-Private Partnership (PPP)	<p>PPPs are contractual arrangements between the government and one or more private sector companies to fund and operate infrastructure.</p> <p>PPPs have the following principal features:</p> <ul style="list-style-type: none"> • Creating public infrastructure assets through private sector financing and ownership control • A contribution by government through land, capital works, risk sharing, revenue diversion or other supporting mechanisms • Engaging the private sector for a specified period for the delivery of related services.
South West Priority Growth Area	<p>The South West Priority Growth Area is approximately 17,000 hectares in size and includes parts of the Liverpool, Camden and Campbelltown local government areas.</p> <p>It is divided into 18 Precincts that are being progressively released for planning and rezoned for sustainable urban development.</p>
Special Infrastructure Contribution (SIC)	Special Infrastructure Contribution is a financial contribution paid during the development.

Term	Definition
Transport corridor	Generally, a linear area defined by one or more modes of transportation like highways, railroads or public transit that share a common course. Development often occurs around transport corridors because they carry so many people.
Urban renewal	Process of planning and delivering changes to infrastructure, streets and the public domain to deliver the greatest community benefit.
Value sharing	Recognises that where a project delivers benefits to different groups of stakeholders, it may be appropriate that they should also contribute towards funding of the project.
Western Sydney Employment Area (WSEA)	Located 50 kilometres west of Sydney's CBD, the area is roughly bordered by the M4 Motorway to the north, the M7 Motorway to the east, Bringelly Road to the south and The Northern Road to the west, and is expected to eventually accommodate some 40,000 workers.





This document contains important information about public transport projects in your area. If you require the services of an interpreter, please contract the Translating and Interpreting Service on **131 450** and ask them to call Transport for NSW on **(02) 9200 0200**. The interpreter will then assist you with translation.

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