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 Sydney. 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.
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 2051\(^6\). 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 8  Average vehicle and public transport use

<table>
<thead>
<tr>
<th>Summary of vehicle use across Sydney Local Government Areas and regions on an average weekday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penrith</td>
</tr>
<tr>
<td>% of trips as the vehicle driver</td>
</tr>
<tr>
<td>% of trips on public transport</td>
</tr>
<tr>
<td>Vehicles per household</td>
</tr>
<tr>
<td>VKT per person</td>
</tr>
</tbody>
</table>

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

Figure 9  Forecast population and rail patronage growth for Greater Sydney

\[9\]  Transport for NSW
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)**

**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)\textsuperscript{11}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure11.png}
\caption{Forecast morning peak hour passenger demand and capacity on the T1 West and T2 Inner West and South Lines (2015 to 2051)\textsuperscript{11}}
\end{figure}

\textsuperscript{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 cent\(^\text{12}\), 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 share\(^\text{13}\), 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,\(^\text{14}\) 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).


\(^{13}\) Ibid

## Figure 12: Rail services to international airports

<table>
<thead>
<tr>
<th>Airport</th>
<th>Airport passenger numbers (per annum)</th>
<th>Share of airport passengers travelling by rail</th>
<th>Time to city by rail (minutes)</th>
<th>Distance from CBD centre (kilometres)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>London</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heathrow</td>
<td>73.4m</td>
<td>20%</td>
<td>15-51</td>
<td>24</td>
</tr>
<tr>
<td>Gatwick</td>
<td>40.3m</td>
<td>43%</td>
<td>35</td>
<td>43</td>
</tr>
<tr>
<td><strong>Paris</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Charles de Gaulle</td>
<td>65.8m</td>
<td>27%</td>
<td>35</td>
<td>25</td>
</tr>
<tr>
<td>Orly</td>
<td>28.3m</td>
<td>11%</td>
<td>30</td>
<td>13</td>
</tr>
<tr>
<td><strong>Tokyo</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Narita</td>
<td>35.6m</td>
<td>48%</td>
<td>55-80</td>
<td>76</td>
</tr>
<tr>
<td>Haneda</td>
<td>72.8m</td>
<td>30%</td>
<td>25</td>
<td>14</td>
</tr>
<tr>
<td><strong>New York</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>JFK</td>
<td>56.8m</td>
<td>11.4%</td>
<td>45</td>
<td>20</td>
</tr>
<tr>
<td>Newark Liberty</td>
<td>37.5m</td>
<td>5.6%</td>
<td>41-52</td>
<td>23</td>
</tr>
<tr>
<td><strong>Australia</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sydney Kingsford Smith</td>
<td>39.7m</td>
<td>15%</td>
<td>11-22</td>
<td>10</td>
</tr>
<tr>
<td><strong>Hong Kong</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hong Kong</td>
<td>68.5m</td>
<td>23%</td>
<td>32</td>
<td>25</td>
</tr>
</tbody>
</table>
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 service\(^\text{15}\). 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>
<thead>
<tr>
<th></th>
<th>Estimated annual airport passengers(^\text{17})</th>
<th>Estimated annual rail customers</th>
<th>Daily rail customers</th>
<th>Hourly rail customers*</th>
</tr>
</thead>
<tbody>
<tr>
<td>First year of operation</td>
<td>5 million</td>
<td>1 million</td>
<td>2,750</td>
<td>115</td>
</tr>
<tr>
<td>Fifth year of operation</td>
<td>10 million</td>
<td>2 million</td>
<td>5,500</td>
<td>230</td>
</tr>
<tr>
<td>By 2063 (approximately)</td>
<td>80 million</td>
<td>16 million</td>
<td>43,000</td>
<td>1800</td>
</tr>
</tbody>
</table>

* 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 employees\(^\text{17}\) 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.

\(^\text{15}\) Western Sydney Airport Draft Environmental Impact Statement, 2015, Department of Infrastructure and Regional Development, Canberra

\(^\text{16}\) Western Sydney Draft Airport Plan, 2013, Department of Infrastructure and Regional Development, Canberra

\(^\text{17}\) 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
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.

**Findings from the draft Environmental Impact Statement**

![Diagram showing forecast Western Sydney Airport annual passenger movements with two phases: Airport primarily services Western Sydney and Aviation services expand. Airport supports wider catchment.](image)
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.
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?