15 Traffic, transport and access

The road network in the vicinity of the airport site is currently relatively uncongested, with only sections of The Northern Road, Narellan Road, Elizabeth Drive and Mamre Road experiencing congested conditions in peak periods. This is a result of these being relatively high capacity arterial roads and the existing low density land uses in the area. While there is currently spare capacity on much of the network near the airport site, there is congestion on the broader strategic network including the M4 Motorway, M5 Motorway, M7 Motorway and M31 Hume Highway.

Significant road improvement works are underway as part of the Western Sydney Infrastructure Plan announced in 2015 by the Australian and NSW governments. These improvements will relieve existing bottlenecks and provide additional network capacity over the next decade, while also connecting the airport site to the broader road network.

The peak construction period for the proposed Stage 1 development would generate an estimated 1,254 additional vehicle movements per day on the surrounding road network. This equates to around 150-160 vehicle movements during the AM and PM peak periods. In the context of the capacity of the arterial roads and motorways in Western Sydney, these additional movements would not result in additional congestion. Movements of oversized vehicles or plant and equipment may at times require temporary road closures or escorts to the site but these would generally be conducted outside of peak hours.

A community awareness programme would be implemented during construction to ensure that the local community and road users are kept informed about construction activities and the potential for delays. A Traffic and Access Construction Environmental Management Plan would be implemented to ensure that the movement of construction traffic (including any oversize vehicles) is appropriately managed. The plan would be prepared in consultation with Councils and NSW Roads and Maritime Services.

Stage 1 operations are expected to result in approximately 21,562 vehicles entering the airport site and 21,556 vehicles leaving the airport site each day. The Stage 1 development would generate additional traffic volumes on: Elizabeth Drive, the M12, The Northern Road, Luddenham Road and Mamre Road. However, considering road improvements included as part of the Western Sydney Infrastructure Plan, including the introduction of the M12 Motorway, this volume of additional traffic would not substantially impact the operation of the surrounding road network.

Modelling indicates that Stage 1 operations are predicted to result in:

- an increase in congestion:
  - on the M7 southbound, south of the M4;
  - on sections of the M12, noting that the M12 is still well within capacity;
  - on Elizabeth Drive, east and west of the M7, noting that the Stage 1 development exacerbates existing congestion levels that already exist at these locations;
  - on The Northern Road, north of Elizabeth Drive; and
- a small decrease in congestion on Mamre Road northbound, north of Elizabeth drive.

The public transport, walking and cycling infrastructure proposed by the NSW Government and local councils would also be planned and implemented to cater for the expected airport passenger and employee demand at the proposed airport.

The Australian and NSW governments are undertaking a joint scoping study into Western Sydney's rail needs, which will help to determine the need, cost, timing and route of a future rail connection to the airport site.

15.1 Introduction

This chapter provides a review of the expected traffic and transport impacts associated with the construction and operation of the Stage 1 development. It draws on a comprehensive surface transport and access study (see Appendix J (Volume 4)), summarising the study's main findings and identifying mitigation measures to address potential impacts. This chapter also presents the results of updated traffic modelling completed following exhibition of the draft EIS as a result of a more recent version of the Strategic Travel Model being provided by the NSW Government. The STM3 update included revised forecasts of future population and development projects in Sydney.

The assessment addresses the requirements of the *Guidelines for the Content of a Draft Environmental Impact Statement – Western Sydney Airport* (EIS guidelines) issued by the Australian Government Department of the Environment. The EIS Guidelines include a requirement to assess all relevant impacts including specific consideration of changes in traffic movements during construction and operation (associated with both passenger movements and workers).

15.2 Methodology

15.2.1 Assessment approach

Assessment of the potential traffic, transport and access impacts has considered both the construction and operation of the proposed Stage 1 development.

For the construction phase, the assessment focuses on traffic impacts that would be associated with the haulage of materials, plant and equipment, as well as the traffic generated by construction workers at the airport site. For the purpose of analysing the potential construction impacts, 2021 was selected as representative of the peak construction year, during which the highest number of construction vehicle movements are likely to be generated.

For the operation phase, the assessment focuses on the impact of the proposed airport on wider transport networks in the Western Sydney region. Two modelling 'scenarios' were developed for the purpose of this assessment:

- 'without airport' which represents the likely transport network improvements and likely population and employment size and distribution, without consideration of the expected additional demand generated by the proposed airport; and
- 'with airport' which includes consideration of the expected additional demand generated by the proposed airport.

The operational assessment involved:

- determination of the trips expected to be generated by the proposed airport;
- analysis of how those trips are likely to be distributed across the transport system;
- assessment of the resulting impacts on the transport system; and
- identification of appropriate mitigation measures to alleviate the impacts.

For the purposes of this assessment, no rail line has been assumed to be provided for the Stage 1 development. Rail access to the airport is included in the assessment of the long term development (see Chapter 33 (Volume 3)).

15.2.2 Transport modelling and analysis

15.2.2.1 Strategic Travel Model

The potential impacts of constructing and operating the proposed Stage 1 development were assessed using the STM (Version 3). The STM is a tool, provided by the NSW Bureau of Statistics and Analytics for projecting travel patterns in the Sydney Greater Metropolitan Area (GMA) under different land use and transport scenarios. The model is typically used to test alternative settlement, employment and transport policies, identify likely future capacity constraints, or determine potential usage levels of proposed new transport infrastructure or services.

The STM is programmed in five-yearly increments to account for expected urban development and background traffic conditions. Commencing in 2011, the years included in the model are 2011, 2016, 2021, 2026, 2031 and 2036. The year 2031 has been adopted for the operational traffic assessment because it is broadly consistent with the other EIS assessments undertaken (which adopt 2030 as the year of assessment) and it avoids the need to extrapolate from other time periods in the traffic model. It also provides a consistent basis for comparing outputs from this assessment with other studies using the STM3 model.

15.2.2.2 Airport passenger demand

Airport passenger demand was based on a synthetic aircraft flight schedule provided for the year 2030. The adoption of the 2030 reference year does not affect the general conclusions about the proposed airport's impacts on travel volumes and road capacities.

15.2.2.3 Modelling process

Transport modelling typically comprises four main stages:

1. determination of trip generation, or travel frequency (how many trips would occur to and from a nominated travel zone with regard to the demographics and land uses of that zone);
2. trip distribution (where these trips are likely to go);
3. assignment of travel mode choice (car, bus, rail or a combination); and
4. assignment of route (chosen for each trip and mode, and between each origin and destination). This stage provides the detail for the number of vehicles on each road and people on each public transport service.

For the purposes of this assessment, the following adjustments to the model were necessary:

- removal of trips destined for airport travel zones. This allows assessment of a scenario that includes other proposed development in Western Sydney but does not include the proposed airport (the 'without airport' scenario). This scenario can subsequently be used to identify the specific impact of the proposed airport when added into the model;
- changes to the number of trips to and from the airport site for cars, light goods, rigid and articulated vehicles. This represents construction traffic in 2021 and traffic associated with Stage 1 operations;

- inclusion of additional road infrastructure in the form of the proposed M12 Motorway. This project is currently in the planning phase. The proposed M12 Motorway is expected to run generally parallel to Elizabeth Drive and provide direct motorway-grade access to the proposed airport. The M12 project and any associated environmental assessment and approval requirements are the responsibility of NSW Roads and Maritime Services (Roads and Maritime). The M12 is planned to be operational when the proposed airport opens and is therefore included in all 'without airport' and 'with airport' model scenarios.

The proposed corridor for the Outer Sydney Orbital has not yet been defined and was therefore not included in the modelling and assessment undertaken for the proposed Stage 1 development.

Following these model alterations, the revised travel demand was reassigned to the road network. This was done for the STM AM peak period (7.00 am to 9.00 am), the PM peak period (3.00 pm to 6.00 pm), the period between these peaks (interpeak period) (9.00 am to 3.00 pm), and the evening period (6.00 pm to 7.00 am). Only the AM peak and PM peak are reported in this assessment because these are the periods during which the capacity of the road network is most constrained.

15.2.2.4 Trip generation and modelling assumptions

For the assessment of construction impacts, daily light vehicle numbers were estimated using the assumption that 80 per cent of construction personnel would drive to and from the airport site on any given day, and that the remainder would either use public transport or car-pooling. Heavy vehicle volumes were estimated following an analysis of the indicative construction schedule described in Section 6.2.1 (Volume 1) of this EIS.

Trip generation and traffic generation associated with Stage 1 operations were estimated using the Sydney Airport Land Transport Model (SALTM). This model describes the types of trips to Sydney Airport and is based on surveys completed in 2008.

The modelling process utilised SALTM but has also taken into account recent developments in airport operations, such as self-check-in and bag drop-off as well as notification of security clearance times, which generally allow people to arrive at the airport closer to their flight departure time.

15.2.2.5 Assessment criteria

Assessment of the potential traffic, transport and access impacts has been undertaken with reference to the *Guide to Traffic Generating Developments* (RTA 2002). This guideline is commonly used in NSW and is therefore likely to be familiar to NSW stakeholders and the community. The operational traffic assessment process outlined in the guidelines stipulates that the operating characteristics need to be compared with agreed performance criteria as described below.

Mid-block capacity

The capacity of urban roads is generally determined by the capacity of the intersections or the 'mid-block' capacity (the sections of roads between intersections). The mid-block capacities for roads can be estimated and compared to the existing traffic volumes in terms of volume to capacity ratios (VCR).

The VCR is a measure of the amount of traffic carried by a section of road compared to its nominal capacity. As VCR nears one, the speed on the link decreases and both the likelihood and the duration of flow breakdowns increase.

The Austroads *Guide to Traffic Management*[5] outlines Level of Service (LoS) criteria for mid-block sections of road based on the VCR. A summary of LoS criteria is presented in Table 15–1.

Table 15–1 Level of Service descriptions for roads

Level of Service (LoS)	Uninterrupted flow facilities (motorways)	Uninterrupted flow facilities (arterial and collector roads)	Volume/capacity ratio
A	Free flow conditions in which individual drivers are unaffected by the presence of others in the traffic stream. Freedom to select desired speeds and to manoeuvre within the traffic stream is extremely high, and the general level of comfort and convenience provided is excellent.	Primarily free flow operations at average travel speeds, usually about 90% of the free flow speed (FFS) for the given street class. Vehicles are completely unimpeded in their ability to manoeuvre within the traffic stream. Control delay at signalised intersections is minimal.	0.00 to 0.34
B	Zone of stable flow and drivers still have reasonable freedom to select their desired speed and to manoeuvre within the traffic stream, although the general level of comfort and convenience is less than with LoS A.	Reasonably unimpeded operations at average travel speeds, usually about 70% of the FFS for the street class. The ability to manoeuvre within the traffic stream is only slightly restricted and control delays at signalised intersections are not significant.	0.35 to 0.50
C	Also in the zone of stable flow, but most drivers are restricted to some extent in their freedom to select their desired speed and to manoeuvre within the traffic stream. The general level of comfort and convenience declines noticeably at this level.	Stable operations, however, ability to manoeuvre and change lanes in mid-block locations may be more restricted than at LoS B, and longer queues, adverse signal coordination or both may contribute to lower average travel speeds of about 50% of the FFS for the street class.	0.51 to 0.74
D	Close to the limit of stable flow and is approaching unstable flow. All drivers are severely restricted in their freedom to select their desired speed and to manoeuvre within the traffic stream. The general level of comfort and convenience is poor, and small increases in traffic flow will generally cause operational problems.	A range in which small increases in flow may cause substantial increases in delay and decreases in travel speed. LoS D may be due to adverse signal progression, inappropriate signal timing, high volumes or a combination of these factors. Average travel speeds are about 40% of FFS.	0.75 to 0.89
E	Occurs when traffic volumes are at or close to capacity, and there is virtually no freedom to select desired speeds or to manoeuvre within the traffic stream. Flow is unstable and minor disturbances within the traffic stream will cause breakdown.	Characterised by significant delays and average travel speeds of 33% of the FFS or less. Such operations are caused by a combination of adverse progression, high signal density, high volumes, extensive delays at critical intersections and inappropriate signal timing.	0.90 to 0.99

[5] *Part 3: Traffic Studies and Analysis (2009)*

Level of Service (LoS)	Uninterrupted flow facilities (motorways)	Uninterrupted flow facilities (arterial and collector roads)	Volume/capacity ratio
F	In the zone of forced flow. With LoS F, the amount of traffic approaching the point under consideration exceeds that which can pass it. Flow breakdown occurs and queuing and delays result.	Characterised by urban street flow at extremely low speeds, typically 25% to 33% of the FFS. Intersection congestion is likely at critical signalised locations, with high delays, high volumes and extensive queuing.	1.0 or greater

Source: Adapted from Austroads Guide to Traffic Management – Part 3: Traffic Studies and Analysis.

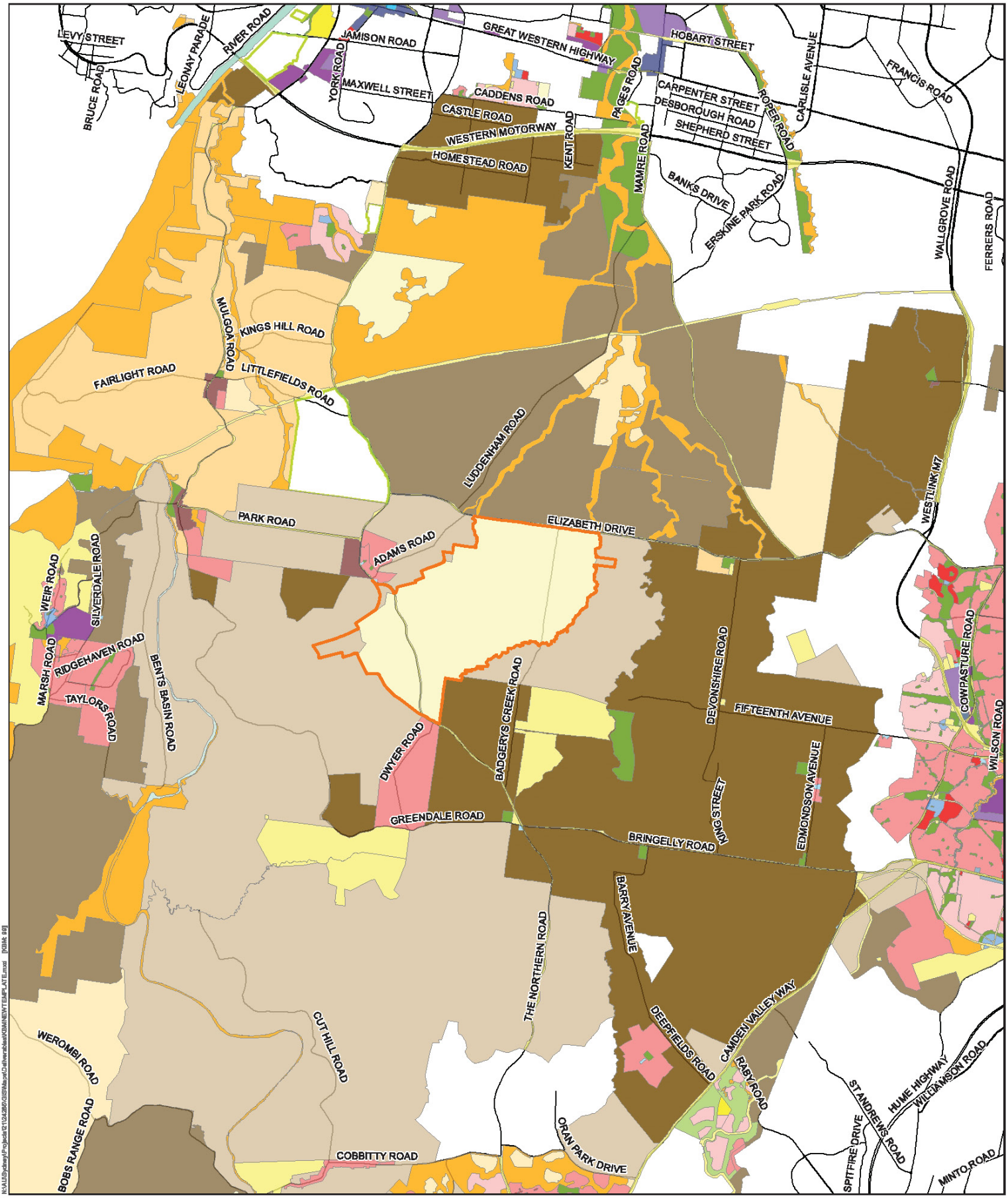
15.3 Existing environment

15.3.1 Existing road network

Roads and Maritime define four levels in a typical functional road hierarchy, ranging from high mobility and low accessibility, to high accessibility and low mobility. These road classes are:

- Arterial Roads – controlled by Roads and Maritime, they typically exhibit no limit in flow and are designed to carry vehicles long distances between regional centres;
- Sub-Arterial Roads – can be managed either by council or by Roads and Maritime under a joint agreement. Typically, their operating capacity ranges between 10,000 and 20,000 vehicles per day. Their aim is to carry through-traffic between specific areas in a sub region, or provide connectivity from arterial road routes (regional links);
- Collector Roads – provide connectivity between local sites and the arterial road network, and typically carry between 2,000 and 10,000 vehicles per day; and
- Local Roads – provide direct access to properties and the collector road system and typically carry between 500 and 4,000 vehicles per day.

A description of the roads within and servicing the airport site, including their functional category is provided in Table 15–2. The location of these roads and the broader land use context are shown in Figure 15–1. The areas surrounding the airport site are mostly rural residential properties with a few residential areas adjacent to The Northern Road and Park Road intersection and further south of The Northern Road.



LEGEND

- Airport site
- B1, Neighbourhood Centre
- B2, Local Centre
- B3, Commercial Core
- B4, Mixed Use
- B5, Business Development
- B6, Enterprise Corridor
- Deferred Matter
- E1, National Parks and Nature Reserves
- E2, Environmental Conservation
- E3, Environmental Management
- E4, Environmental Living
- IN1, General Industrial
- IN2, Light Industrial
- IN3, Heavy Industrial
- R1, General Residential
- R2, Low Density Residential
- R3, Medium Density Residential
- R4, High Density Residential
- R5, Large Lot Residential
- RE1, Public Recreation
- RE2, Private Recreation
- RU1, Primary Production
- RU2, Rural Landscape
- RU4, Rural Small Holdings
- RU5, Village
- SP1, Special Activities
- SP2, Infrastructure
- SP3, Tourist
- W1, Natural Waterways
- W2, Recreational Waterways

Data Source: Please refer to "Digital Data Sources" on the second page of the EIS

0 0.75 1.5 3
Kilometres

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Figure 15.1 - Existing road network and land use

Table 15–2 Existing roads servicing the airport site

Road	Functional category	Description
Westlink M7 Motorway	Arterial	The M7 Motorway connects Western Sydney with the broader road network and Sydney CBD by providing an uninterrupted journey between the M2, M4 and M5 motorways. It is a fully electronic toll road that uses a distance based tolling system with no toll booths. In the vicinity of Elizabeth Drive, the M7 has two lanes in each direction separated by a grass median around 14 metres wide. The M7 provides for travel at variable speeds up to 100 kilometres per hour. An off-road shared cycle / pedestrian pathway traverses the motorway and connects with the Sydney Cycleway network.
The Northern Road	Arterial	The Northern Road connects Narellan in the south-west to the Great Western Highway in Penrith. In the vicinity of Luddenham, The Northern Road has an undivided carriageway with one lane in each direction and a sign posted speed limit of 80 kilometres per hour.
Elizabeth Drive	Arterial	Elizabeth Drive connects The Northern Road at its western end, and the M7 Motorway at its eastern end. Between The Northern Road and the Mamre Road roundabout, Elizabeth Drive has an undivided carriageway with one lane in each direction and a sign posted speed limit of 80 kilometres per hour. Elizabeth Drive between Mamre Road and the M7 has two eastbound lanes and one westbound lane. In the vicinity of Wallgrove Road, Elizabeth Drive carries around 26,000 vehicles per day.
Bringelly Road	Collector	Bringelly Road connects to The Northern Road at Bringelly and to Camden Valley Way at Horningsea Park. Bringelly Road is around 10 kilometres in length and has an undivided carriageway with one lane in each direction, unsealed shoulders and a sign posted speed limit of 80 kilometres per hour for the majority of its length.
Badgerys Creek Road	Collector	Badgerys Creek Road connects The Northern Road at a roundabout to the north of Bringelly to Elizabeth Drive, and is around seven kilometres in length. The carriageway is undivided with one lane in each direction, unsealed shoulders and a sign posted speed limit of 80 kilometres per hour. The component of Badgerys Creek Road within the airport site was compulsorily acquired by the Australian Government.
Adams Road	Collector	Adams Road connects The Northern Road at Luddenham to Elizabeth Drive. The carriageway is undivided with one lane in each direction and a sign posted speed limit of 70 kilometres per hour.
Mamre Road	Arterial	Mamre Road connects the Great Western Highway in St Marys to Elizabeth Drive. Mamre Road has an undivided carriageway with one lane in each direction and a sign posted speed limit of 80 kilometres per hour.
Luddenham Road	Collector	Luddenham Road connects Elizabeth Drive at Luddenham to Mamre Road. The carriageway is undivided with one lane in each direction and a sign posted speed limit of 80 kilometres per hour.
Local roads within the airport site	Local	The following local roads are located within the airport site: Ferndale Road; Fuller Street; Gardiner Road; Jackson Road; Jagelman Road; Leggo Street; Longleys Road; Pitt Street; Taylors Road; Vicar Park Lane; and Winston Close. These roads were compulsorily acquired by the Australian Government in July 1991 and are currently maintained by Liverpool City Council under an agreement with the Australian Government. These roads will be progressively closed when they are no longer required.

15.3.2 Traffic volumes and profile

Daily traffic volumes recorded for roads within the vicinity of the proposed airport are provided in Table 15–3. Data presented are for 2005 (the last year these counters were in operation) and represent a combination of vehicle counts and axle pair counts. An axle pair is the equivalent of a passenger car (passenger car unit) with two axles and is a standard method of determining the volume of traffic passing a counting location. A correction factor is applied to the axle spacing to determine a volume for heavy vehicles.

Table 15–3 Average annual daily traffic 2005

Location	Average annual daily traffic	Count type
The Northern Road north of Bringelly Road	16,944	Vehicle
The Northern Road north of Elizabeth Drive	16,654	Vehicle
Elizabeth Drive east of The Northern Road	7,311	Axle pairs
Mamre Road south of Erskine Park Road	13,793	Vehicle
Bringelly Road west of Camden Valley Way	8,900	Axle pairs
Bringelly Road east of The Northern Road	6,212	Axle pairs

Roads and Maritime have permanent counting stations on Elizabeth Drive at Cecil Hills and Bonnyrigg. Recent results from these counters and the percentage growth per annum are presented in Table 15–4.

Table 15–4 Elizabeth Drive traffic volumes and growth rate

Location	Direction	2008	2008 combined	2014	2014 combined	% growth per annum compounding
Elizabeth Drive at Cecil Hills	Westbound	10,927	22,523	12,923	26,598	38,121
	Eastbound	11,596		13,675		
Elizabeth Drive at Bonnyrigg	Westbound	16,726	35,600	17,989	2.8%	1.2%
	Eastbound	18,874		20,132		

Table 15–5 provides a summary of the 2015 traffic counts undertaken by RMS for The Northern Road and Bringelly Road.

Table 15–5 Existing daily traffic volumes 2015

Location	Vehicles per day (weekday)	Vehicles per day (weekend)	Vehicles per day (7 day average)
The Northern Road north of Bringelly Road	16,916	12,286	15,593
The Northern Road south of Bringelly Road	14,745	11,100	13,704
Bringelly Road east of The Northern Road	6,462	4,908	6,018

15.3.3 Existing road network performance

The STM provides a mechanism for assessing the impact of land use and transport infrastructure changes. The 2011 base year model in the STM has been analysed to provide an insight into the prevailing peak period performance in the area surrounding the airport site. No changes were made to the 2011 model for this analysis. The 2016 base year model in the STM only contains a forecast of future traffic and land use development patterns which is periodically updated and will not be finalised until sometime in 2017. It was therefore considered preferable to use the next most recent year, 2011, which does not rely on forecast or incomplete data.

Modelling indicates that the road network in the vicinity of the airport site is currently relatively uncongested (2011 base model), with only sections of Narellan Road and Camden Valley Way showing a level of service (LoS) of D or worse in either the AM or PM peak periods.

While there has been residential and commercial development in the area since 2011, including in the Western Sydney Employment Area, the Western Sydney Priority Growth Area and the South West Priority Growth Area, there remains spare capacity on much of the network near the airport site. Figure 15–2 and Figure 15–3 show the existing (2011) network conditions.

While roads near the airport site are relatively unconstrained, there are constraints on the broader strategic motorway network (2011 base model). For the AM peak, the model shows capacity constraints on the following motorways:

M4 Motorway:

- LoS F eastbound to the west of the M7; and
- LoS E eastbound to the east of the M7.

M7 Motorway:

- LoS E in both directions south of the M4; and
- LoS E southbound to the north of the M4.

M5 Motorway:

- LoS F eastbound, east of the M7; and

Narellan Road:

- LoS E south-east-bound towards the M31 (Hume Highway).

In the PM peak, capacity constraints are generally less acute; however, the model still shows constraints for the following motorways;

M5 Motorway:

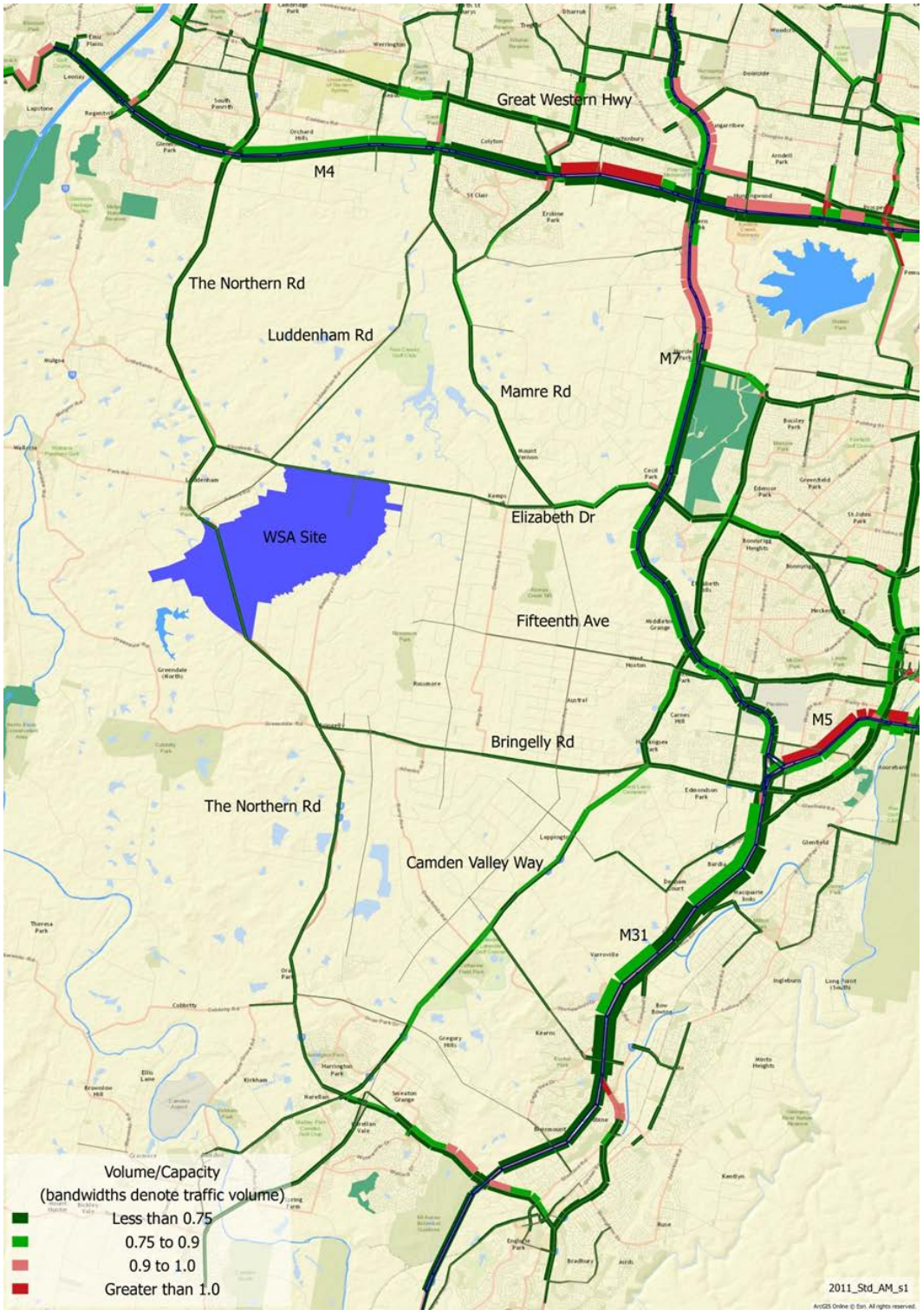
- LoS E, westbound, east of the M7.

M4 Motorway:

- LoS D, westbound along much of the length of the motorway.

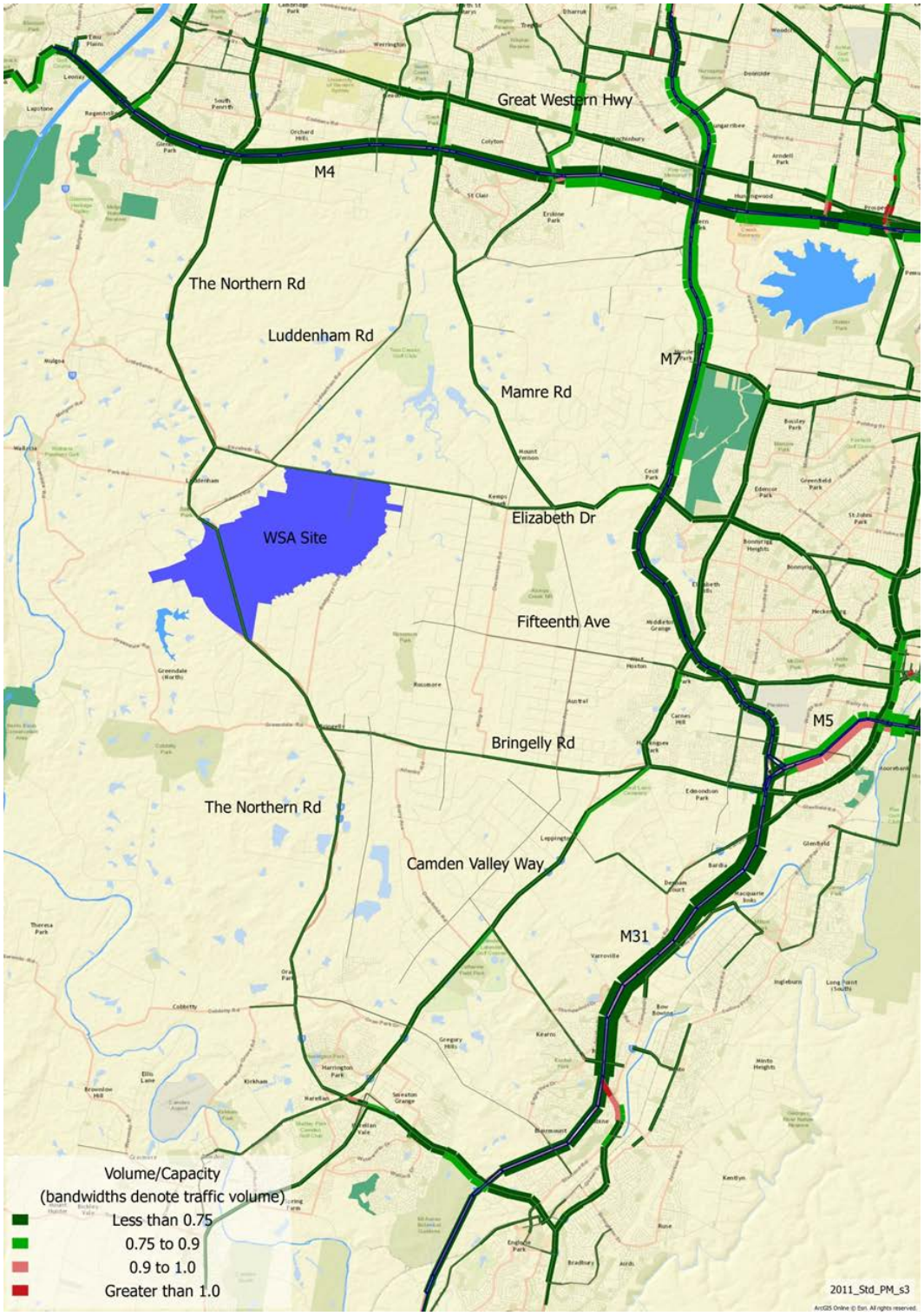
M7 Motorway:

- LoS D in both directions, particularly close to the M4 intersection.



Note: Volume/capacity ratio bandwidth definitions are outlined in Table 15–1

Figure 15–2 2011 AM peak volume/capacity − existing conditions



Note: Volume/capacity ratio bandwidth definitions are outlined in Table 15–1

Figure 15–3 2011 PM peak volume/capacity – existing conditions

15.3.4 Road safety and crash history

RMS crash data were available for the major roads in the vicinity of the proposed airport. They indicate that the numbers of crashes are generally consistent with the high traffic volumes carried by these roads. The data are summarised in Table 15–6.

Table 15–6 Crash data for key roads near the airport site

Location	Period	Crashes	% resulting in injury (fatality)
The Northern Road – between Maxwell Street and Mersey Street	January 2009 to December 2013	304	43% (1%)
The Northern Road – between Badgerys Creek Road and Mersey Street	July 2009 to June 2014	16	38% (6%)
Bringelly Road – between The Northern Road and Camden Valley Way	July 2009 to June 2014	113	54% (2%)
Elizabeth Drive – between The Northern Road and M7 Motorway	July 2009 to June 2014	157	48% (1%)
Mamre Road – between Elizabeth Drive and M4 Motorway	July 2009 to June 2014	159	50% (1%)
Badgerys Creek Road – between Elizabeth Drive and The Northern Road	July 2009 to June 2014	24	9% (0%)
Adams Road – between Elizabeth Drive and The Northern Road	July 2009 to June 2014	6	67% (0%)

15.3.5 Public transport

There are currently four bus routes that traverse the airport site and/or service the immediate surrounds:

- Route 789 - Penrith Interchange to Luddenham;
- Route 801 - Liverpool Interchange to Badgerys Creek Road;
- Route 855 - Austral to Liverpool via Prestons and Churchill Gardens; and
- Route 856 - Bringelly to Liverpool via Prestons and Churchill Gardens.

The following train interchanges are closest to the airport site:

- T1 Western Line – Penrith Interchange;
- T2 Inner West and South Line – Liverpool Interchange; and
- South West Rail Link – Leppington.

Penrith and Leppington railway stations are around 15 kilometres from the site and Liverpool station is around 21 kilometres from the site.

15.3.6 Pedestrians and cyclists

Pedestrian and cycling infrastructure in the area is currently limited, reflecting the predominantly rural character of the area.

As the Western Sydney Priority Growth Area and South West Priority Growth Area develop, additional cycleway links will be provided and integrated within the Liverpool cycleway network. By 2018, the expected Bringelly Road Stage 1 and Stage 2 upgrades described in the Western Sydney Infrastructure Plan will deliver more than 10 kilometres of shared pedestrian and cyclist paths between Leppington and The Northern Road.

According to the Western Sydney Infrastructure Plan, The Northern Road is expected to have shared pedestrian and cyclist paths between Narellan and the M4 Motorway by 2019. The M12 is also expected to include an off-road shared path for pedestrians and cyclists.

15.4 Assessment of impacts during construction

15.4.1 Construction traffic volumes and distribution

Construction vehicles would access the site via Elizabeth Drive, Anton Road, The Northern Road and Badgerys Creek Road. Construction vehicle generation would be expected to reach its peak in 2021. Table 15–7 provides the expected traffic volumes by period and vehicle type.

Table 15–7 Peak construction vehicle generation

Vehicles	Direction	AM peak 07.00 – 09.00	Interpeak 09.00 – 15.00	PM peak 15.00 – 18.00	Evening 18.00 – 07.00	Total (vtpd)
Light vehicles	In	264	88	0	88	440
	Out	0	66	220	154	440
Semi-trailers	In	4	11	5	2	22
	Out	4	11	5	2	22
B-Double and Truck and Dog	In	21	63	31	50	165
	Out	21	63	31	50	165
Total		314	302	292	346	1,254

The following vehicle distribution assumptions were made for the purposes of this assessment:

- the majority of light vehicles would arrive and depart the site between 5.00 am and 7.00 pm; and
- heavy vehicles would operate to and from the site 24 hours per day during main construction activities.

The geographic distribution of light vehicles was assumed to be consistent with existing vehicle movements in this area derived from the existing 2021 STM.

Detailed information on a probable distribution for heavy vehicles was not available, however for the purpose of the EIS, the following assumptions are considered reasonable:

- 50 per cent of trips to and from the M31 Hume Motorway;
- 20 per cent of trips to and from the M5;
- 10 per cent of trips to and from the M4 (east);
- 10 per cent of trips to and from the M4 (west); and
- 10 per cent of trips to and from the M7 (north).

15.4.2 Effect on road network performance

The expected distribution and volume of construction traffic discussed in Section 15.4.1 suggests there would be approximately 160 additional vehicle movements per hour (to and from the airport site) on Elizabeth Drive during the AM peak and approximately 150 additional vehicle movements per hour (to and from the airport site) on Elizabeth Drive during the PM peak. The forecast AM peak traffic volume equates to about an 8 per cent increase in traffic on this road.

Modelling indicates that this level of additional traffic volume would not result in operating conditions worse than LoS C on Elizabeth Drive in the vicinity of the airport site.

There would be capacity constraints on the wider network, principally on the M4, M5 and M7 motorways; however:

- these constraints currently exist;
- the LoS does not deteriorate when construction traffic is included, with the exception of a minor increase from LoS C to D on Cowpasture Road and from LoS B to C on Luddenham Drive during the PM peak; and
- the proportion of construction traffic compared to overall traffic reduces with distance from the airport site and therefore the impact of construction is reduced with distance from the site.

The types and volumes of vehicle movements associated with the construction of the proposed airport are not expected to substantially impact on the surrounding transport system, with the exception of potential oversized vehicle movements required for the delivery of large construction equipment. These movements may require temporary road closures or escorts.

A community awareness programme would be implemented during construction to ensure that the local community and road users are kept informed about construction activities and the potential for delays. A Traffic and Access Construction Environmental Management Plan would also be implemented to ensure that the staging and movement of construction traffic (including any oversize vehicles) are appropriately managed. The plan would be prepared in consultation with local councils, emergency services and Roads and Maritime.

15.5 Assessment of impacts during operation

To assess the potential transport network impacts of Stage 1 operations, consideration was given to the travel demand associated with passengers, airport employees and freight. The expected trip generation for each of these is outlined in Section 15.5.2, Section 15.5.3 and Section 15.5.4 respectively. The consequential transport network impacts are discussed in Section 15.5.6. Road infrastructure providing access to the proposed airport is described in Chapter 5 (see Section 5.9 (Volume 1)).

The assessment has not considered traffic associated with future commercial development. While the land use plan in the revised draft Aiport Plan includes areas identified for future non-aeronautical commercial development, the details of such development would be developed by the ALC and would be subject to separate authorisation under the Airports Act.

15.5.1 Future transport network

15.5.1.1 Road network

As part of the Western Sydney Infrastructure Plan, the Australian and New South Wales governments have committed $3.6 billion over 10 years in major road infrastructure upgrades in Western Sydney. These upgrades would relieve pressure on existing infrastructure and provide connectivity to the proposed airport and surrounding areas before the airport begins operation. The key projects which comprise the Western Sydney Infrastructure Plan are listed in Table 15–8.

Table 15–8 Key Western Sydney Infrastructure Plan projects

Initiative	Description
The Northern Road	Upgrade to a minimum of four lanes from Narellan to Jamison Road, Penrith.
M12 Motorway	Construction of a new four-lane motorway between the M7 Motorway and The Northern Road.
Bringelly Road	Upgrade to a minimum of four lanes from Camden Valley Way to The Northern Road.
Werrington Arterial	Construction of the Werrington Arterial by upgrading Kent Road and Gipps Street to four lanes between the Great Western Highway and the M4 Motorway.
Ross Street, Glenbrook	Upgrade of the intersection of Ross Street and the Great Western Highway to reduce congestion.
Local roads	$200 million package for local road upgrades.

15.5.1.2 Public transport network

There are three additional bus routes identified by Transport for NSW to service the proposed airport. These routes are:

- Liverpool-Badgerys Creek-Penrith (suburban);
- Campbelltown-Oran Park-Badgerys Creek (suburban); and
- Leppington-Badgerys Creek-Mt Druitt (local).

The service frequencies would be determined based on the demand for travel to the proposed airport.

15.5.1.3 Rail

While no rail connection to the proposed airport is currently confirmed for the Stage 1 development, planning for the proposed airport preserves flexibility for several possible rail alignments including a potential express service. As described in Section 5.8.4 of Volume 1, the Australian and NSW governments are undertaking a Joint Scoping Study into Western Sydney's rail needs, which will help to determine the need, cost, timing and route of a future rail connection to the airport site. A final alignment would be determined in consultation with the NSW Government.

15.5.2 Passenger trip generation

During Stage 1 operations, it is estimated that the proposed airport would be handling approximately 10 million passengers per year. In order to understand the transport impact these passenger movements may have, they need to be translated into 'trips' and assigned to the surrounding road network using the STM. This process is illustrated in Figure 15–4.

While this generalised figure shows rail as a mode of transport, the Stage 1 development does not currently include a rail service.

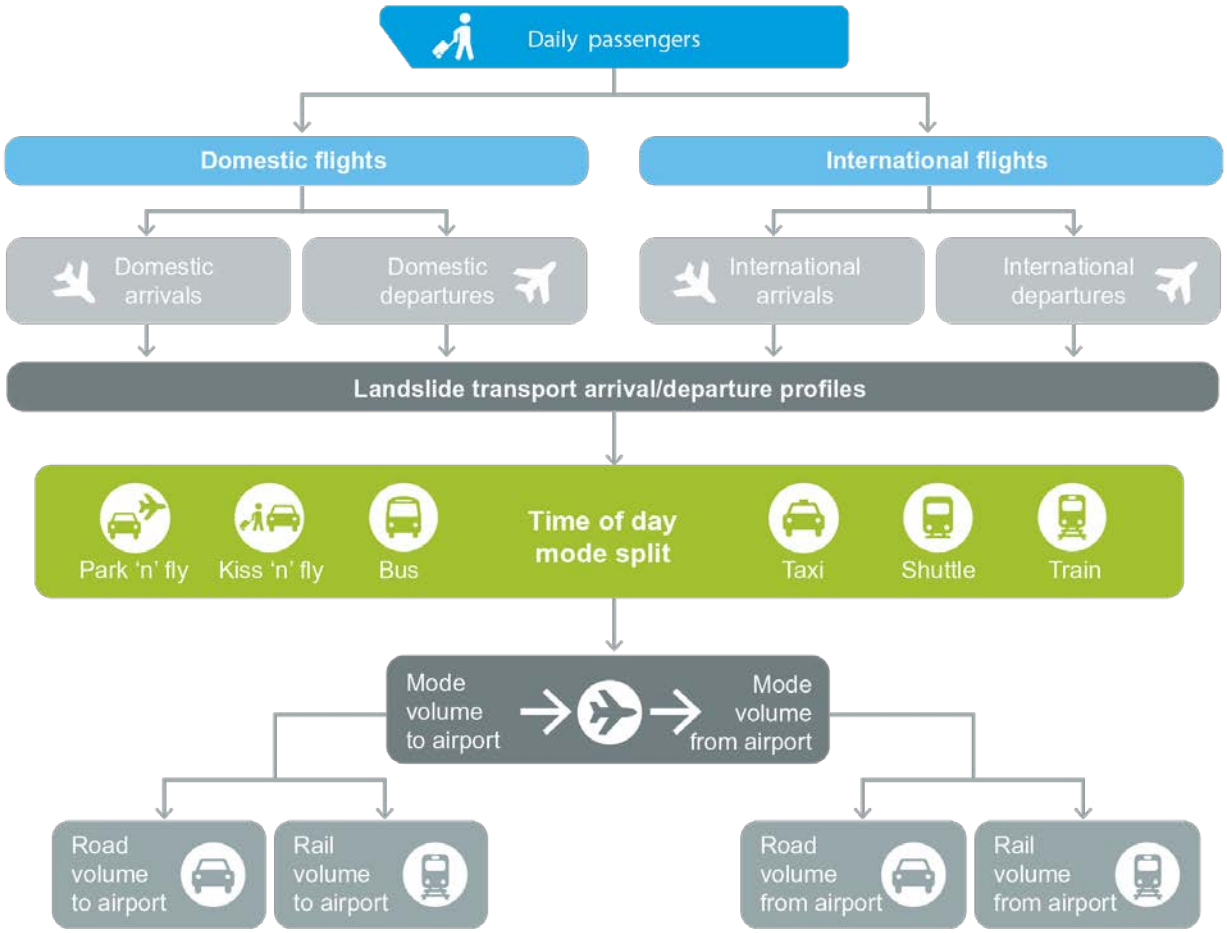


Figure 15–4 Process for determining passenger trip generation

15.5.2.1 Flight movements

A synthetic passenger flight profile for Stage 1 operations was developed for the Airport Plan and is shown in Figure 15–5.

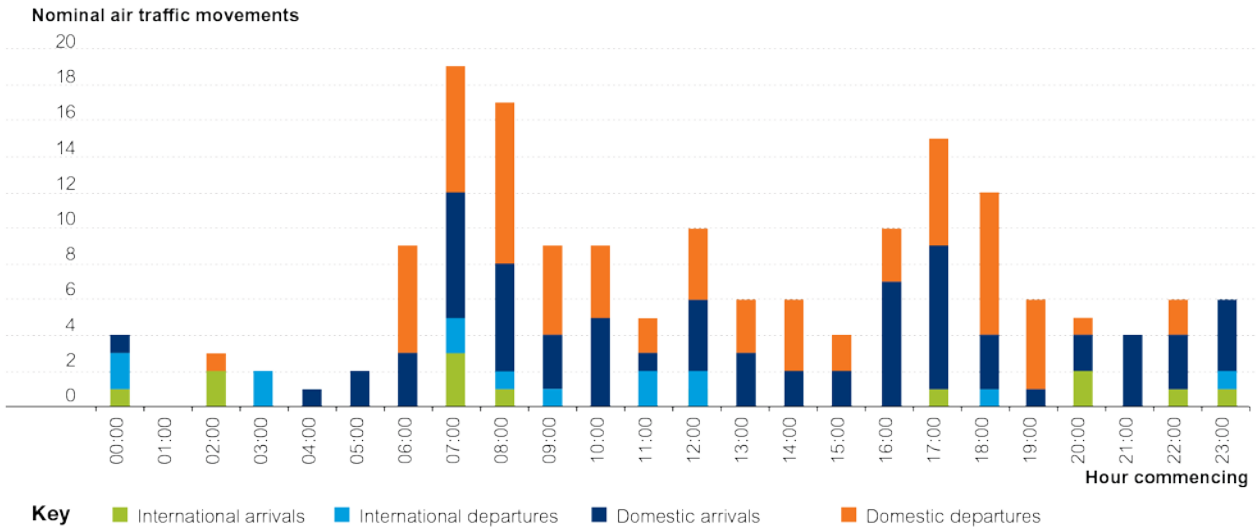


Figure 15–5 Flight arrivals/departures profile - Stage 1 operations

On a typical busy day during Stage 1 operations, a total of 170 passenger flights would be expected, of which 144 flights are assumed to be domestic and 26 international. During the peak hour, anticipated to be between 7:00 am and 8:00 am, there are predicted to be 19 passenger flights, comprising nine arrivals and 10 departures (for both domestic and international sectors).

15.5.2.2 Passenger movements

For each domestic and international flight, a profile for the passengers entering and exiting the airport was determined based on the Sydney Airport Land Transport Model, as explained in Section 15.2.2. The following assumptions were made for the purposes of calculating passenger volumes:

- for each domestic aircraft, an average capacity of 180 passengers with an average flight occupancy of 93 per cent; and
- for each international aircraft, an average capacity of 400 passengers with an average flight occupancy of 95 per cent.

Using the passenger profile and the above assumptions, a passenger arrival/departure profile was developed in order to determine the associated demand for ground transport services. The resulting profile is illustrated in Figure 15–6.

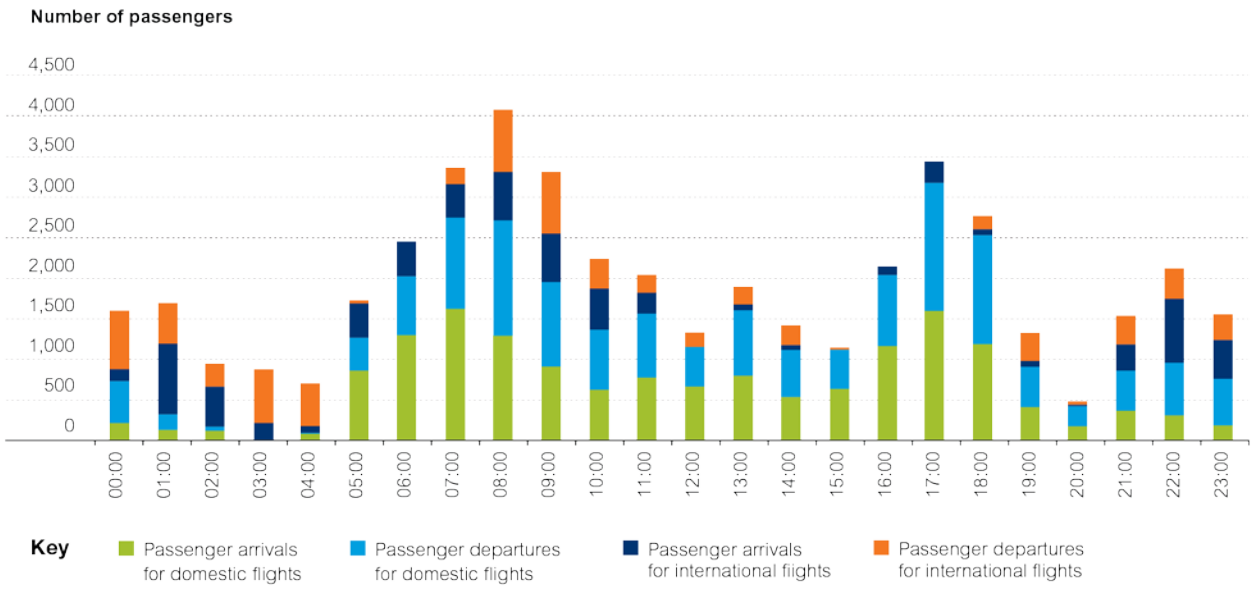


Figure 15–6 Ground transport demand per hour – Stage 1 operations

15.5.2.3 Transport mode split

The Sydney Airport Land Transport Model (and its assumed mode split) was used to assign the calculated ground transport demand to the modes listed in Table 15–9.

Table 15–9 Stage 1 operations assumed mode split

Mode	Stage 1 operations assumed mode split			
	Domestic		International	
	Drop-off	Pick-up	Drop-off	Pick-up
Kiss and fly	30%	30%	40%	40%
Park and fly	35%	35%	30%	30%
Taxi	20%	20%	20%	20%
Shuttles	5%	5%	5%	5%
Bus	10%	10%	5%	5%

Rail was not included in the assumed mode split because rail has been assumed to service the proposed airport some time after the Stage 1 development. Walking and cycling to the airport (by passengers) was assumed to be minimal.

Suitable dwell times for each mode were then applied (with, for example, longer times assumed for international kiss and fly passengers when compared to their domestic counterparts).

Figure 15–7 shows the number of expected passenger arrivals via ground transport at the proposed airport. Figure 15–8 shows the total departures expected via ground transport from the proposed airport.

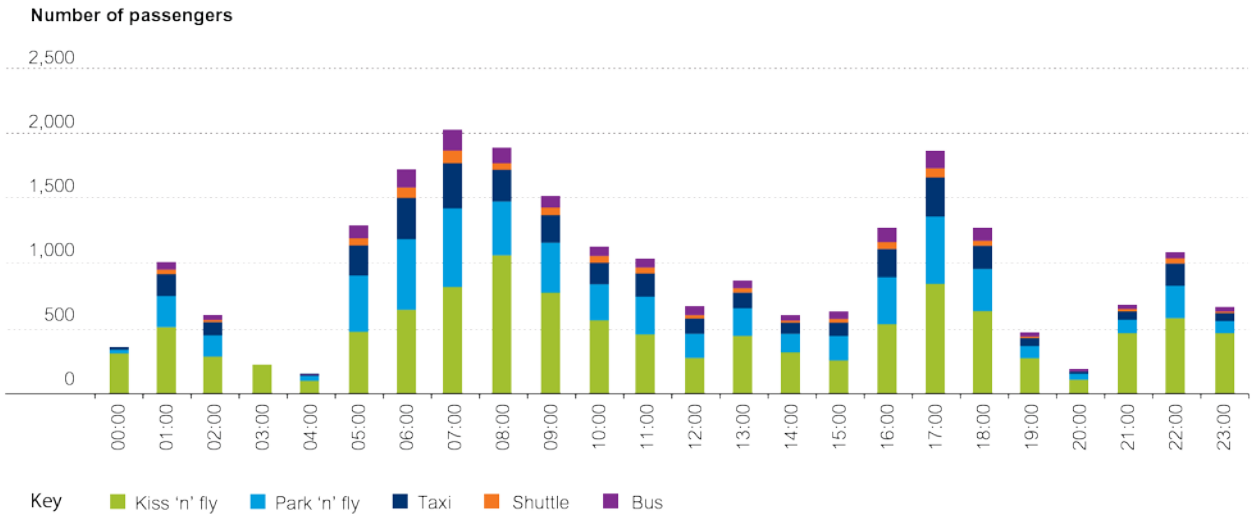


Figure 15–7 Total passenger arrivals at the proposed airport via ground transport - Stage 1 operations

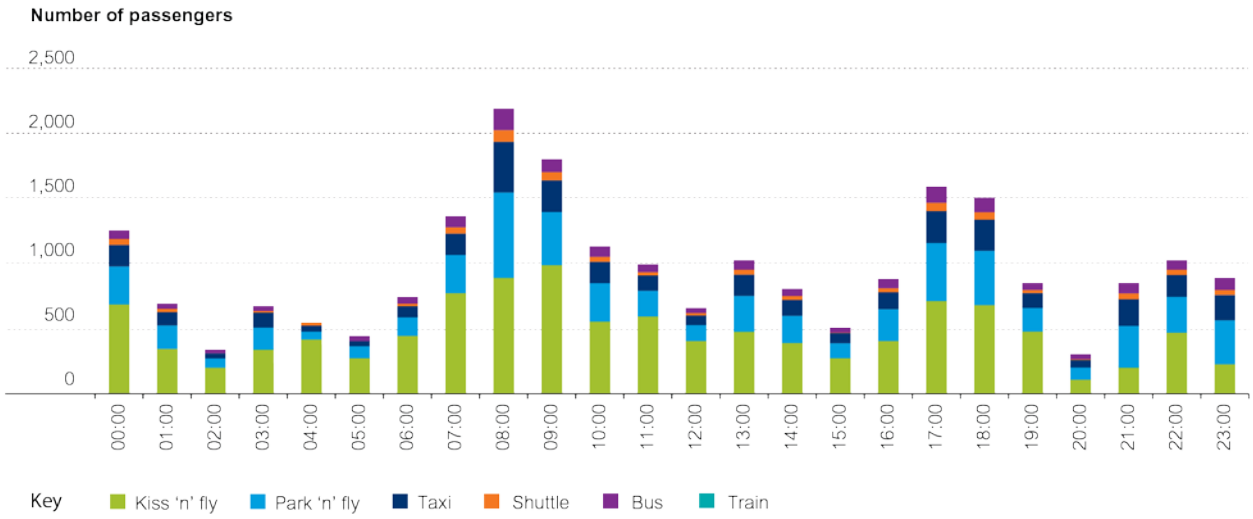


Figure 15–8 Total passenger departures from the proposed airport via ground transport - Stage 1 operations

The trips (by mode) shown in Figure 15–7 and Figure 15–8 were assigned to vehicles entering and exiting the airport site to determine the passenger-related traffic generation (excluding vehicle movements that only circulate internally within the airport site, such as some taxi movements).

Figure 15–9 shows that for Stage 1 operations, 1,419 vehicles would be expected to enter the airport site during the AM peak hour (7.00 am to 8.00 am) and 1,346 vehicles would be expected to enter the airport site during the PM peak hour (5.00 pm to 6.00 pm).

Figure 15–10 shows that for Stage 1 operations, 1,481 vehicles would be expected to leave the airport during the AM peak hour (8.00 am to 9.00 am) and 1,183 would be expected to leave the airport during the PM peak hour (5.00 pm to 6.00 pm).

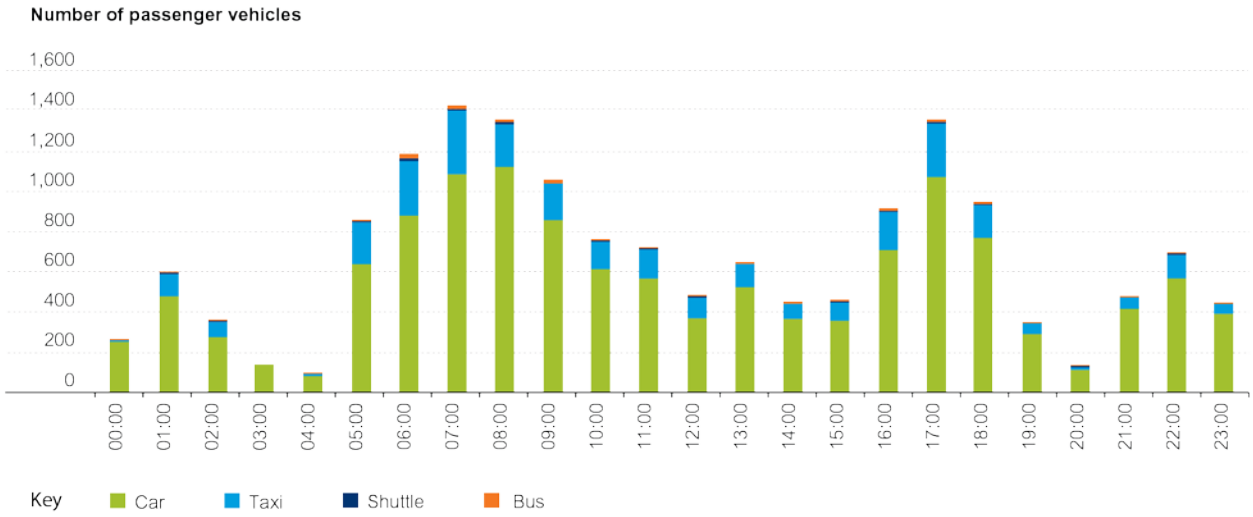


Figure 15–9 Passenger vehicles entering the proposed airport site - Stage 1 operations

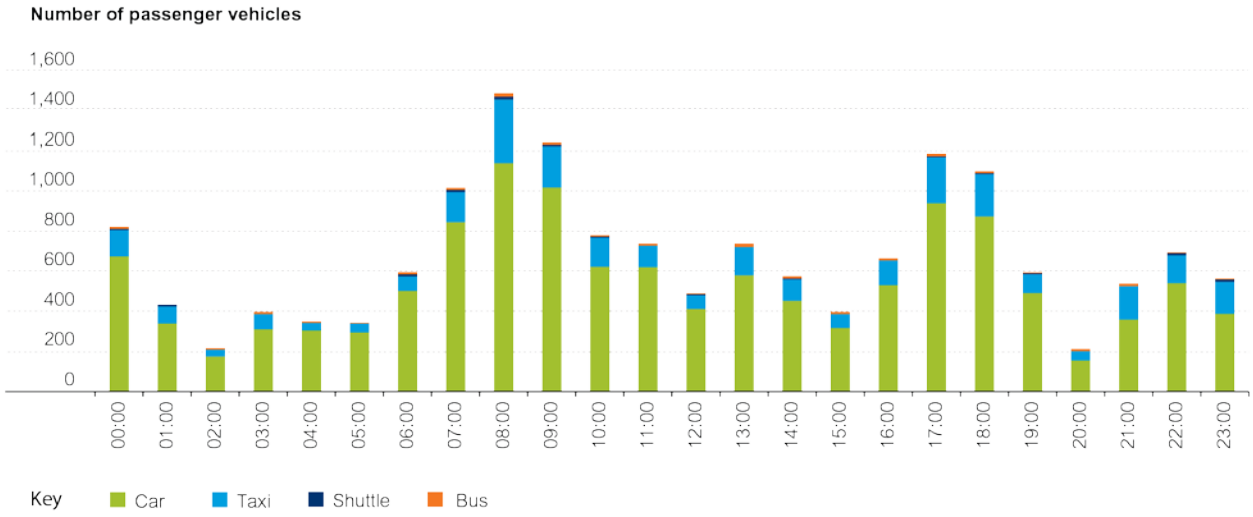


Figure 15–10 Passenger vehicles leaving the proposed airport site - Stage 1 operations

15.5.3 Employee trips

Airfield, terminal and airside employment estimates are directly related to the volume of passengers expected to pass through the proposed airport. Appendix P3 (Volume 4) contains the results of an international benchmarking analysis conducted at 20 selected airports. Characteristics such as an airport's scale, operating model and surrounding community can each have a significant effect on the employees required to service passenger movements. Consistent with the results of this analysis, a ratio of 750 employees per one million annual passengers has been used as the basis on which to estimate the number of full time employees at the airport.

In order to determine the expected number of trips generated by these employees, they were allocated into shifts across the proposed 24-hour operation of the airport and then assigned to a transport mode. Figure 15–11 illustrates the process.

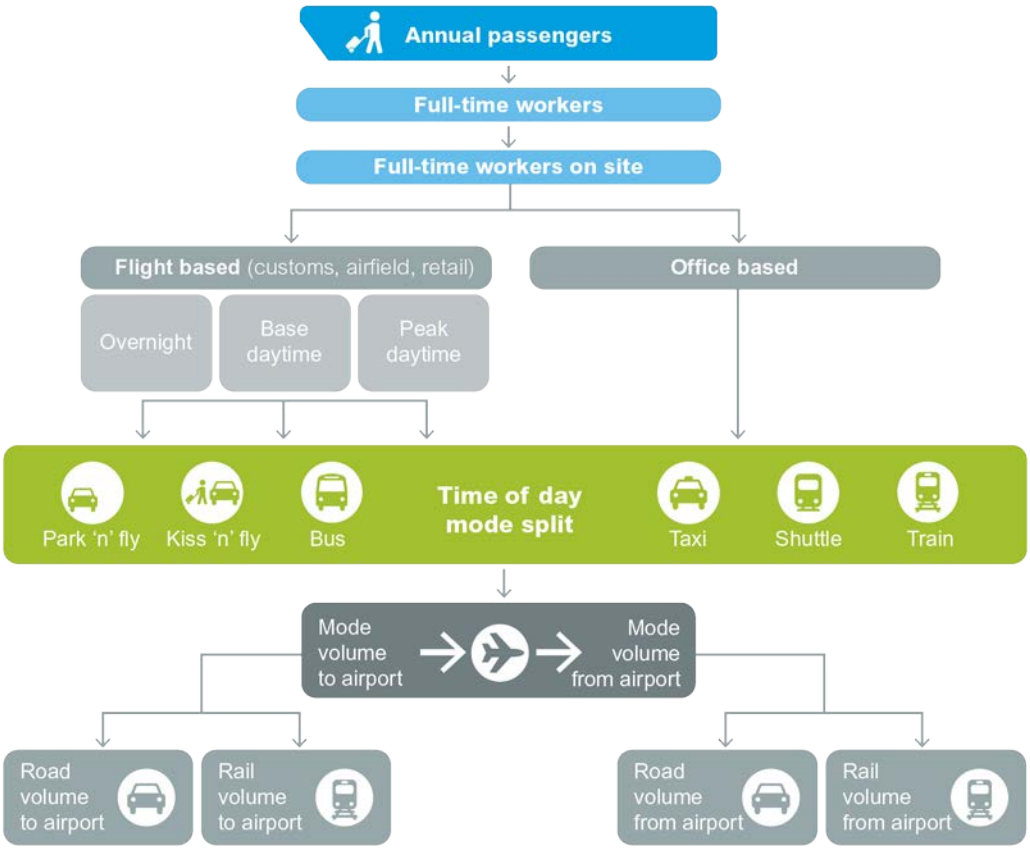


Figure 15–11 Employee trip generation

15.5.3.1 Employees and shifts

During Stage 1 operations, up to 8,730 employees are expected to service the proposed airport. Consistent with the experience at Sydney Airport and other international airports, it was assumed that up to 80 per cent of employees (6,984) would be onsite on any given day.

The airport employees were categorised as follows:

- airfield operations (three shifts of 8.5 hours);
- terminal support (two shifts of 7 hours plus two split-shifts of four hours); and
- office workers (two shifts of nine hours, offset by one hour).

15.5.3.2 *Employee arrival and departure profiles*

A profile for employee arrivals and departures prior to and after their shifts was developed and is shown in Figure 15–12. The profile acknowledges that some employees would arrive in the hour before their shift starts and/or leave in the hour after their shift finishes.

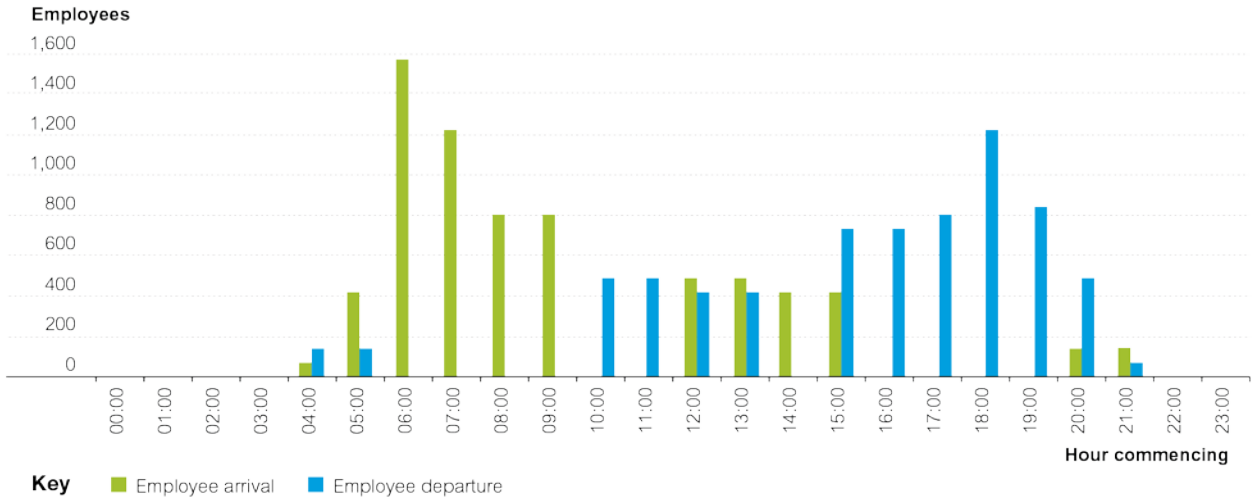


Figure 15–12 Employee arrival and departure profile – Stage 1 operations

Figure 15–12 shows that the AM peak hourly arrival rate is expected to be around 1,571 employees (between 6.00 am and 7.00 am) and the PM peak hourly departure rate for employees (between 6.00 pm and 7.00 pm) is 1,222 employees.

15.5.3.3 Mode split

The employee mode split has been determined using the Sydney Airport overall mode splits for journey to work, but reassigning the 11 per cent of trips taken by train (to Sydney Airport) to car based modes for the proposed airport.

Additionally, it was assumed that no employees would use public transport during early morning hours due to likely service limitations.

Figure 15–13 and Figure 15–14 show the expected distribution of arrivals and departures by mode. Both figures show the largest proportion of arrivals and departures are by private transport given the limited availability of public transport services, although public transport usage is likely to be higher in the peak periods.

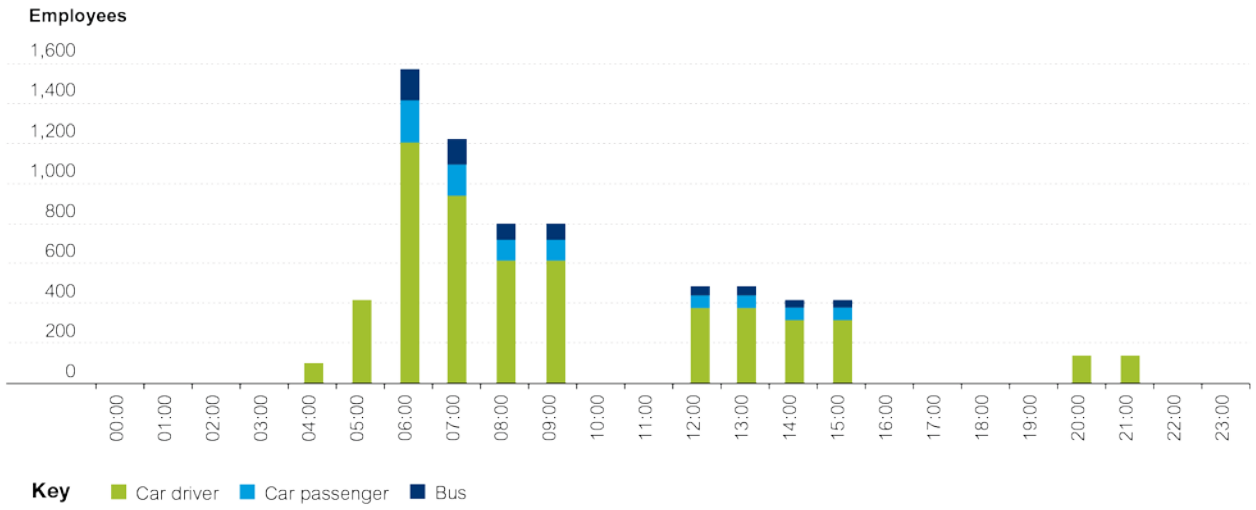


Figure 15–13 Employee arrivals by mode and time of day – Stage 1 operations

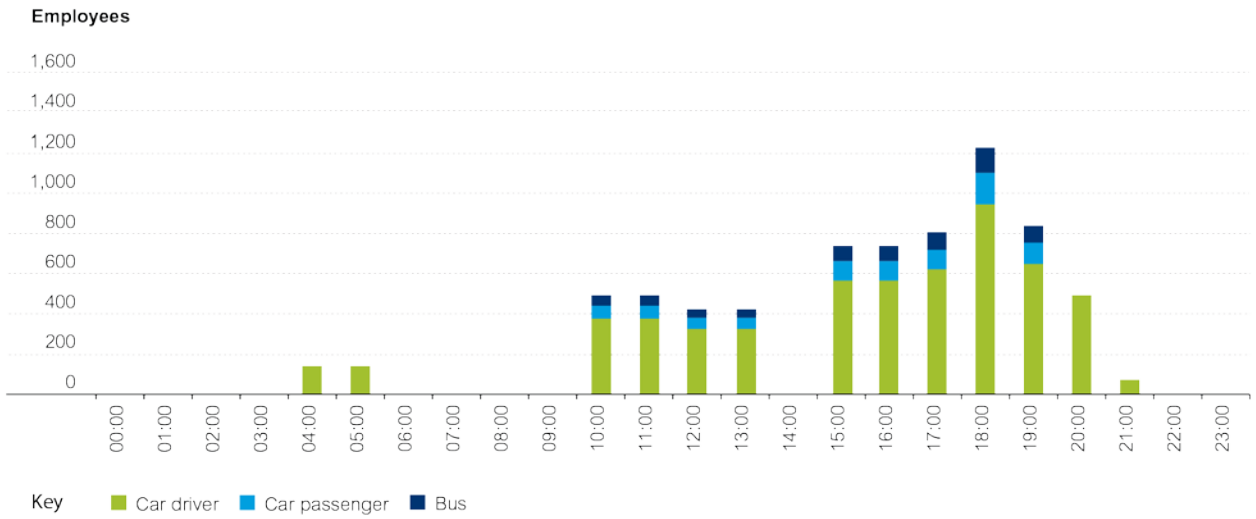


Figure 15–14 Employee departures by mode and time of day – Stage 1 operations

15.5.3.4 Traffic generation

The calculated employee arrivals and departures were assigned to vehicles to determine the number of vehicles entering and leaving the airport site throughout the 24-hour operational period. The results are shown in Figure 15–15 for arrivals and Figure 15–16 for departures. The figures show that the employee traffic generation peaks would be expected to be outside the nominal main traffic peak periods (7.00−9.00 am and 4.00−6.00 pm as used in STM3) for both the arrival and departure of employees.

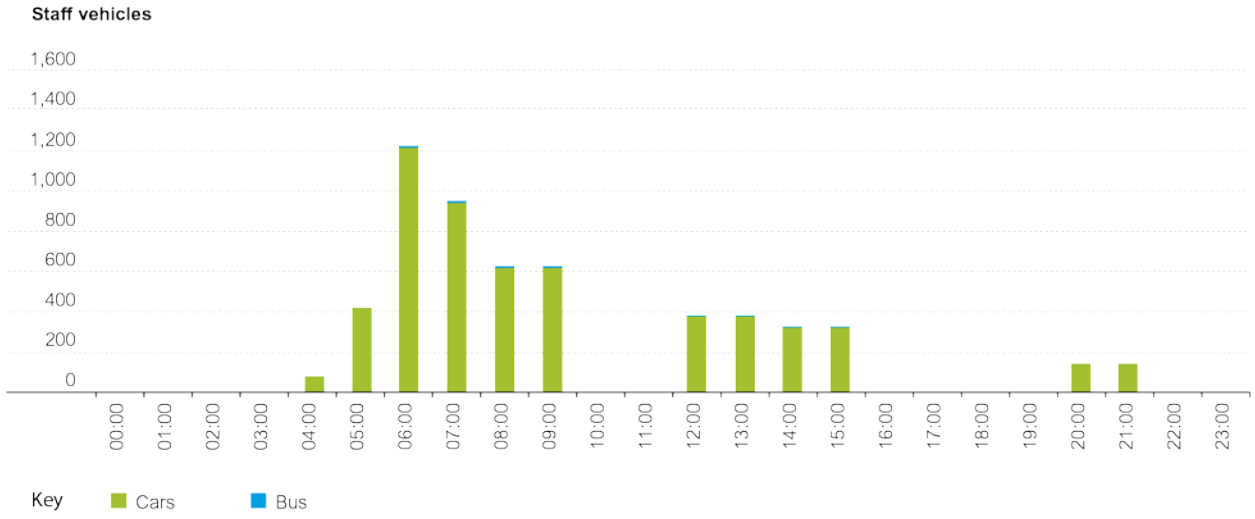


Figure 15–15 Employee vehicle arrivals by mode – Stage 1 operations

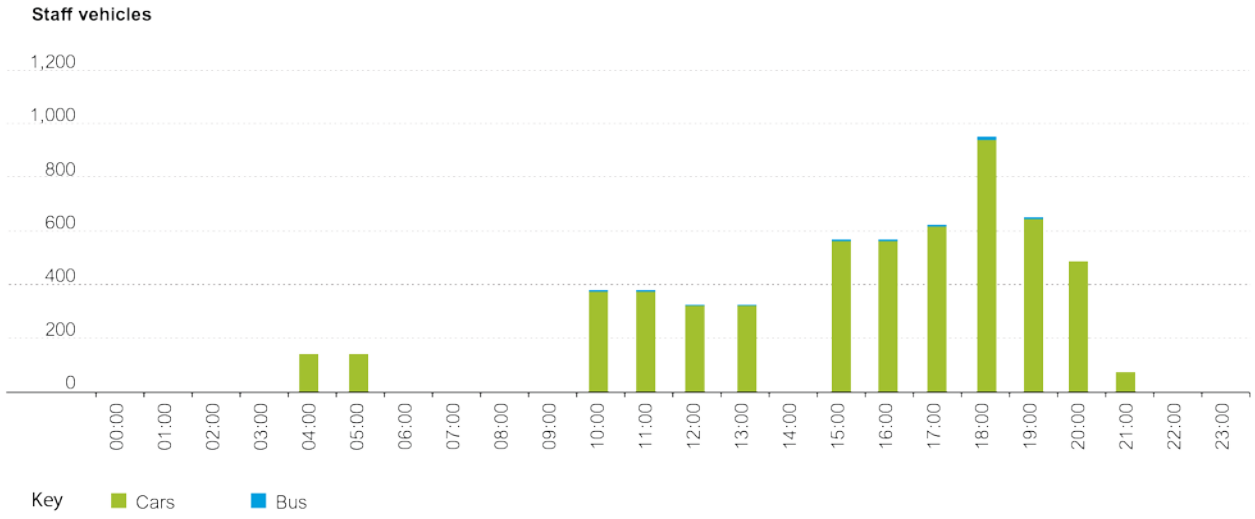


Figure 15–16 Employee vehicle departures by mode – Stage 1 operations

15.5.4 Freight trips

Freight demand has been identified for air freight cargo and for the delivery of aviation fuel to the fuel farm. Demand estimates for airport consumables (e.g. food, retail items) or waste removal cannot be calculated before a detailed terminal plan is developed and have therefore been excluded from the assessment.

The freight demand for air cargo during Stage 1 operations is estimated to be 220,000 tonnes. It has been assumed that the cargo freight arrives at and departs from the airport on heavy rigid trucks, semi-trailers and B-Doubles. Table 15–10 provides the estimated heavy vehicle volumes (and car equivalents) adopted for the assessment.

Table 15–10 Estimated freight movements – Stage 1 operations

Vehicle type	Annual movements	Daily movements	Hourly movements	Passenger car equivalents per hour
Heavy Rigid Truck (12.5 metres long)	16,824	56	4.67	9.35
Semi-Trailer (19 metres long)	2,200	7	0.61	1.83
B-Double (23 -26 metres long)	667	2	0.19	0.93

15.5.4.1 Fuel deliveries

Assuming a fuel supply pipeline is not available to service the proposed airport, it has been estimated that approximately 43 B-Doubles of fuel per day would be required to meet fuel use requirements for Stage 1 operations. This would be equivalent to about two B-Doubles per hour, or 10 passenger car units (pcus) per hour on average entering and leaving the airport site. These volumes are minimal in comparison to the volumes generated by other airport activities.

15.5.5 Total airport traffic generation estimate

Table 15–11 presents the results of the total airport trip generation estimate for passengers, employees and freight provided in the previous sections. The slight discrepancy in accessing and egressing totals is due to park-and-fly trips where access and egress profiles are calculated separately and external taxi trips where the inbound and outbound occupancy rates differ.

Table 15–11 Total modelled traffic to / from the proposed airport – Stage 1 operations

	AM peak	Interpeak	PM peak	Evening	24 hour
Arriving at airport					
Passengers	1,383	687	907	481	15,901
Airport workers	786	285	746	153	5,595
Freight	5	5	5	0	66
Total (arriving)	2,175	977	1,658	638	21,562

Departing from Airport					
Passengers	1,248	758	746	507	15,879
Airport workers	-	235	588	188	5,611
Freight	5	5	5	0	66
Total (departing)	1,254	999	1,339	695	21,556

Notes: Each peak period is presented as the average hourly trip generation of that period.

AM peak (7.00 am to 9.00 am), Interpeak (9.00 am to 3.00 pm), PM peak (3.00 pm to 6.00 pm), Evening (6.00 pm to 7.00 am)

15.5.6 Effect on network performance

As noted in Section 15.5.5, Stage 1 operations are expected to result in 21,562 vehicles accessing the site and 21,556 vehicles leaving the site each day. This would increase traffic on nearby north−south routes in the area including The Northern Road (less than 300 additional vehicles per peak hour by direction), and Luddenham Road and Mamre Road (both less than 200 additional vehicles per peak hour by direction). At the same time, the M12 Motorway is predicted to attract approximately 700 vehicles per hour on the sections closest to the airport. Volumes on Elizabeth Drive, Bringelly Road and Fifteenth Avenue also increase.

Table 15–12, Figure 15–17 and Figure 15–18 show the network conditions for the 'without airport' and equivalent Stage 1 operations 'with airport' assessment scenarios, for the respective AM and PM peak periods. The table indicates predicted changes in level of service (LoS), while the figures show changes in volume to capacity ratios.

The following specific network effects are expected to result from road traffic associated with Stage 1 operations:

Motorway Network

Traffic demands do not appreciably change on the motorway network, with the exception of:

- an increase from LoS E to LoS F on the M7 southbound, south of the M4; and
- increases from LoS A/B on the M12. The M12 is still well within capacity in the 'with airport' scenario.

Arterial Road Network

Traffic volumes increase on Elizabeth Drive and the Northern Road, increasing LoS in the following locations:

- Elizabeth Drive:
  - from E to F, east of the M7. The trip generation from the airport exacerbates the congestion that already exists at this location in the 'without airport' scenario. This section of Elizabeth Drive is not being upgraded as part of the M12 scheme and no relief to this section is conferred by the M12; and
  - from D/E to E/F, west of the M7.
- The Northern Road:
  - from C to D, north of Elizabeth Drive; and

- LoS F south of the M4 is unchanged between the 'without airport' (existing conditions) and the with airport case.

Collector/Local Roads

- A slight improvement of LoS on Mamre Road from D to C north of Elizabeth Drive. This may be due to the redistribution of background traffic away from the airport due to greater congestion on surrounding roads.
- An overall neutral effect is predicted on Luddenham Drive with some improvement and deterioration in LoS at different locations. Overall, it is still well within capacity in the 'with airport' scenario.

Having regard to the proposed road developments in the vicinity of the airport site, including the Western Sydney Infrastructure Plan, it is predicted that Stage 1 operations would not generate the level of traffic required to impact the capacity of the surrounding road network significantly. The Operational Environmental Management Framework (see Section 28.6 (Volume 2b))provides for the preparation and implementation of a Ground Transport Operational Environmental Management Plan to manage impacts on the local road network and internal airport road network.

15.5.7 Public transport, walking and cycling

The public transport, walking and cycling networks proposed by the NSW Government and local councils are expected to have sufficient capacity to cater to the expected airport passenger and employee demand.

Bus routes 789 and 801 currently traverse the airport site and would therefore need to be appropriately altered in consultation with the bus operator and Transport for NSW.

15.5.8 Access

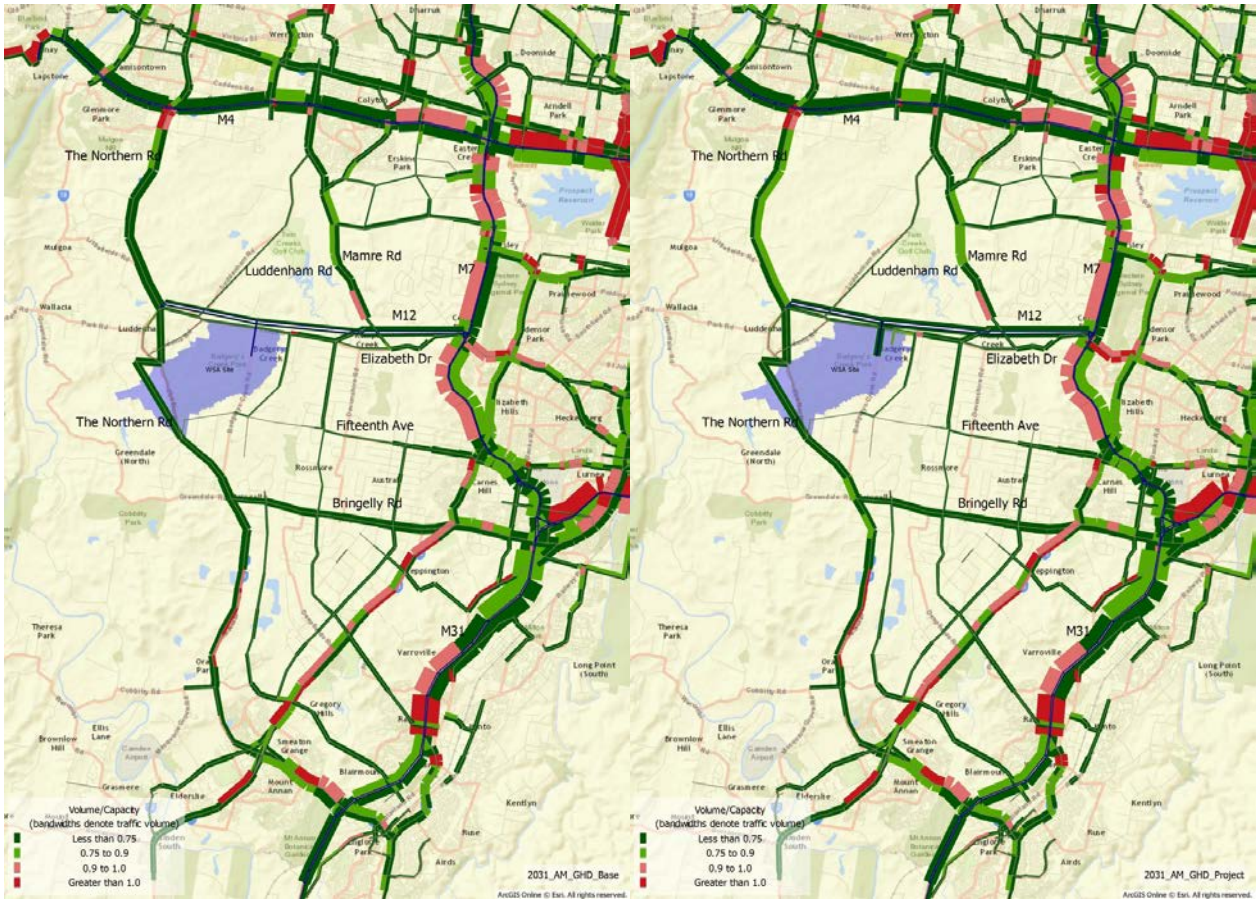
Local traffic originating in Bringelly which currently travels north to Elizabeth Drive via Badgerys Creek Road may need to be re-routed via The Northern Road and proposed M12 Motorway should Badgerys Creek Road be closed at its northern end. Ground transport infrastructure to service the proposed airport is discussed further in Chapter 5 (Volume 1).

Table 15–12 Level of Service for 2031 with and without the proposed airport

ID	Road	Location	Without the airport				With the airport			
			AM Peak		PM Peak		AM Peak		PM Peak	
			Nbd/Ebd	Sbd/Wbd	Nbd/Ebd	Sbd/Wbd	Nbd/Ebd	Sbd/Wbd	Nbd/Ebd	Sbd/Wbd
1	The Northern Road	North of Elizabeth Drive	C	C	C	C	C	D	D	C
2	The Northern Road	South of M4	F	F	F	F	F	F	F	F
3	The Northern Road	South of Bringelly Road	C	C	C	C	C	C	C	C
4	M4	West of Mamre Road	D	C	C	D	D	C	C	D
5	M4	West of M7	E	C	C	E	E	C	C	E
6	M7	South of M4	E	E	F	D	E	F	F	D
7	M7	South of Elizabeth Drive	E	D	D	D	E	D	D	D
8	M5	East of M7	F	D	E	F	F	D	E	F
9	M31	South of Campbelltown Road	D	C	C	D	D	C	C	D
10	Narellan Road	North of Tramway Drive	D	F	D	D	D	F	D	D
11	Bringelly Road	West of Cowpasture Road	C	C	C	C	C	C	C	C
12	Cowpasture Road	At M7	D	D	D	D	D	D	D	D
13	Elizabeth Drive	East of M7	E	E	E	E	F	E	E	F
14	Elizabeth Drive	West of M7	E	B	D	B	F	B	E	B
15	Elizabeth Drive	West of Mamre Road	A	A	A	A	A	A	A	A
16	Elizabeth Drive	East of the Northern Road	C	C	C	C	C	B	C	C
17	Mamre Road	North of Elizabeth Drive	D	B	C	C	C	B	C	C
18	Mamre Road	South of M4	E	C	F	C	E	C	F	C
19	Luddenham Drive	West of Mamre Road	C	A	A	B	B	B	B	B
20	Lawson Road	South of Elizabeth Drive	B	A	A	B	C	A	A	B

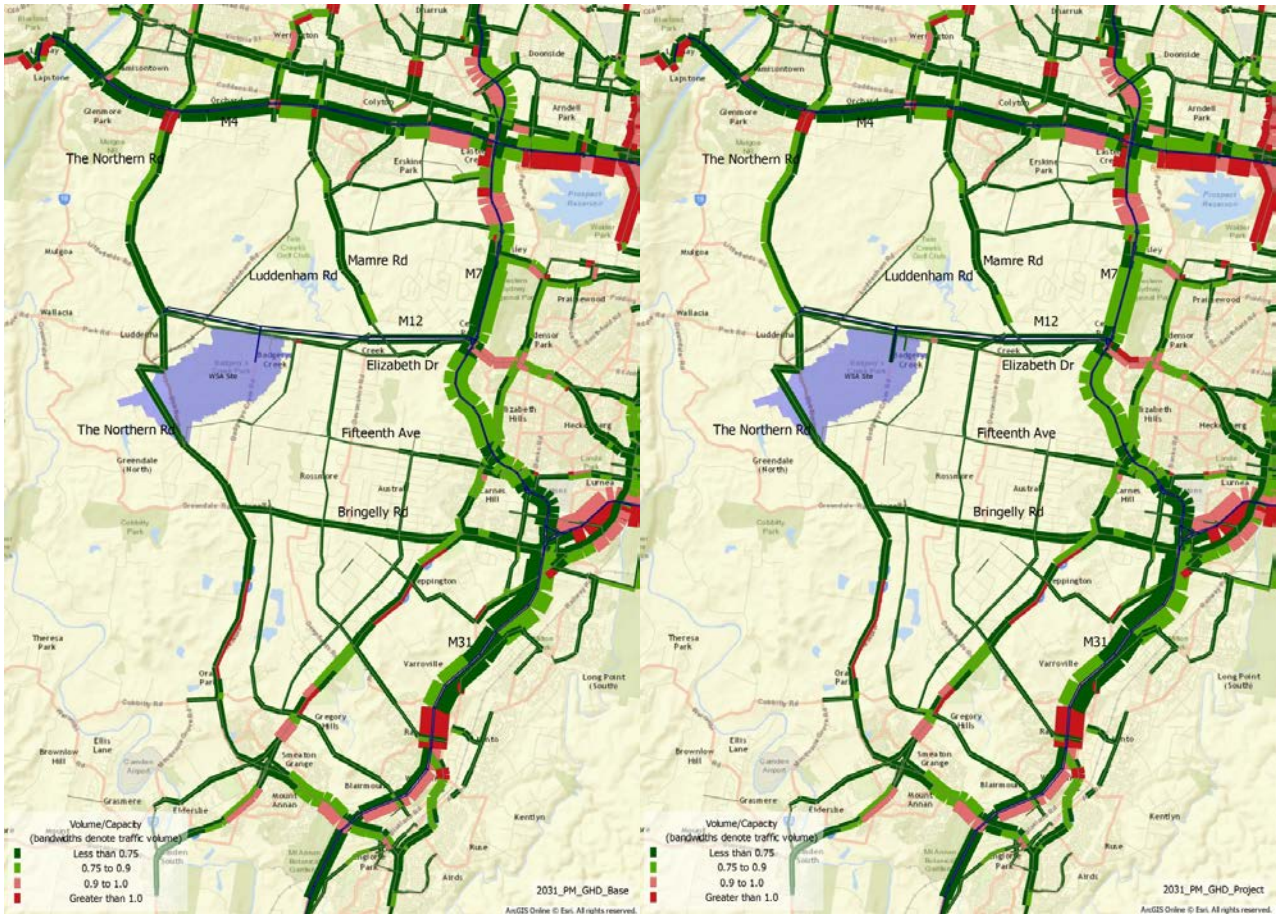
ID	Road	Location	Without the airport				With the airport			
			AM Peak		PM Peak		AM Peak		PM Peak	
			Nbd/Ebd	Sbd/Wbd	Nbd/Ebd	Sbd/Wbd	Nbd/Ebd	Sbd/Wbd	Nbd/Ebd	Sbd/Wbd
21	Western Road	South of Elizabeth Drive	C	B	B	C	C	B	B	C
22	Fifteenth Avenue	West of Cowpasture Road	B	A	B	B	B	A	B	B
23	M12	West of M7	C	A	B	B	C	**B**	B	**C**
24	M12	West of Mamre Road	A	A	A	A	**B**	A	A	**B**
25	M12	East of the Northern Road	A	A	A	A	**B**	A	A	A

Note: Improvements are indicated in **green bold**. Deteriorations are indicated in **red bold**



Note: Volume/capacity ratio bandwidth definitions are outlined in Table 15–1

Figure 15–17 AM peak Volume/Capacity – without airport (left), with airport (right) – Stage 1 operations



Note: Volume/capacity ratio bandwidth definitions are outlined in Table 15–1

Figure 15–18 PM peak volume/capacity − without airport (left), with airport (right) – Stage 1 operations

15.6 Mitigation and management measures

Table 15–13 outlines the mitigation and management measures that are proposed to address the expected traffic and transport effects associated with the proposed Stage 1 development.

A Traffic and Access Construction Environmental Management Plan (CEMP) and Ground Transport Operational Environmental Management Plan (OEMP) will be prepared and submitted for approval prior to Main Construction Works and operation of the Stage 1 development respectively.

The environmental management plans will collate the mitigation and management measures discussed in this section and itemised in Table 15–13. These and other environmental management plans are discussed in further detail in Chapter 28 (Volume 2b).

Table 15–13 Mitigation and management measures

Topic	Mitigation measures	Timing
Community Awareness	As part of the community and stakeholder engagement plan a community awareness programme will be implemented prior to Main Construction Works commencing and would continue throughout the entire construction period. The programme will aim to make road users (including local residents) aware of construction traffic and safety issues, such as diversions, temporary road closures, traffic signalling and speed limits.	Pre-construction Construction
Construction traffic and access	To mitigate and manage potential traffic impacts the Traffic and Access CEMP will include the following elements: • management for the temporary and permanent closures of roads within the airport site; • ongoing consultation with NSW RMS and local councils as appropriate and emergency services; • induction for drivers working on the project to cover safety measures particularly for night works; • review of speed environments along transport corridors; • restriction of construction related traffic within the AM and PM peak periods where required; • management of the transportation of construction materials to optimise vehicle loads in order to minimise vehicle movements; • traffic control measures to manage and regulate traffic movements during construction; • identification of potential disruption to road users; • identification of any road closures and/or road upgrades that may be required; • construction vehicle routes, including the use of arterial roads, haulage routes, access to the airport site and procedures for oversize and heavy vehicles; • parking facilities for construction workers; and • measures to support and encourage sustainable travel for construction workers to and from the airport site, including public transport, shuttle buses, cycling, walking, and car-sharing (as also outlined in the Air Quality Construction Environmental Management Plan).	Construction

Topic	Mitigation measures	Timing
Operational traffic and transport impacts	A Ground Transport OEMP will be prepared as part of the detailed design of Stage 1 and approved before the proposed airport begins operating. The plan will address: • road design speeds; • security issues; • traffic loads from the airport and other onsite developments; • connections with off-site/external roads, including matching capacity, speeds and road geometry; • forecast traffic flows, including public transport requirements; • car parking; • commercial and operational vehicles and storage; • terminal interface; • passenger pick-up and drop-off by private and commercial vehicles; • pedestrian linkages between terminals and all transport drop-off/pick-up areas; • pedestrian, cycle or road networks for movement around the airport site; • use of dedicated busways; • the ability to continue to provide access to and from the airport when key intersections are unavailable; and • the ability to expand, with minimal disruption, to meet future airport and business development requirements.	Pre-operation

15.7 Conclusion

The construction phase of the Stage 1 development is expected to generate an additional 1,254 vehicle movements per day on the surrounding road network during the peak construction period. This equates to around 150-160 peak hour vehicle movements during the morning and afternoon peak periods. The predicted construction traffic would be dispersed throughout the broader road network and would not be significant in the context of the road transport network in the broader Western Sydney region.

Of the major roads used during construction, Elizabeth Drive would likely experience the greatest increase in vehicle volumes due to its proximity to the site and the assumption that most construction vehicles would therefore use it. The forecast AM peak traffic equates to about an 8 per cent increase in traffic on this road. This increase would not be expected to lower the level of service on Elizabeth Drive. Depending on the site activity and origin/ destination, other roads may offer a higher quality of service or more direct route and may therefore also be utilised.

A community awareness programme and Traffic and Access CEMP would be implemented to provide information to road users and manage construction traffic, including oversize vehicles based on the construction methodology proposed by the contractor.

Stage 1 operations are predicted to result in approximately 21,562 vehicles accessing the site and approximately 21,556 vehicles leaving the site each day. With the introduction of the M12 Motorway, this volume of additional traffic is not likely to affect the capacity of the surrounding road network significantly.

A substantial amount of road improvement works is proposed as part of the Western Sydney Infrastructure Plan, in addition to others identified by the NSW Government. These upgraded roads are expected to provide sufficient capacity to cater for the expected passenger, employee and freight travel demand associated with the proposed Stage 1 development. A Ground Transport OEMP would be prepared prior to the commencement of operations to manage impacts on the local and internal airport road networks.

Rail has not been considered as a mode of transport for Stage 1 operations. The Australian and NSW governments are undertaking a Joint Scoping Study into Western Sydney's rail needs, which will help to determine the need, cost, timing and route of a future rail connection to the airport site.

The public transport, walking and cycling systems proposed by the NSW Government and local councils would also have sufficient capacity to cater to the expected airport passenger and employee demand at the proposed airport.