

Elizabeth Drive - East Upgrade

Traffic and Transport Assessment Report

08-Sep-2023
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Traffic and Transport Assessment Report

Client: Transport for NSW

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Job No.: 60641411

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Quality Information

Document Elizabeth Drive - East Upgrade
 Ref 60641411
 Date 08-Sep-2023
 Prepared by Islam Rezk
 Reviewed by Roger Jeffries, Tessa Drayson
 Verifier/s Catherine Brady

Revision History

Rev	Revision Date	Details	Approved	
			Name/Position	Signature
0	26-Aug-2022	Draft report for TfNSW review	Tessa Drayson, Senior Environmental Consultant	T Drayson
1	20-Sep-2022	Draft report for TfNSW review	Tessa Drayson, Senior Environmental Consultant	T Drayson
2	11-Oct-2022	Final draft report for TfNSW review	Tessa Drayson, Senior Environmental Consultant	T Drayson
3	03-Jul-2023	Final draft for Gateway review	Tessa Drayson Senior Environmental Consultant	T Drayson
4	08-Sep-2023	Final for client submission	Tessa Drayson Senior Environmental Consultant	T Drayson

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Glossary

Term	Description
Construction ancillary facilities	Dedicated areas of land required for construction amenities, parking, materials/equipment storage, mobile asphalt batch plants and stockpiling.
Construction footprint	The area needed to construct the proposal, including for example construction ancillary facilities, access roads, haulage and water quality basins.
Operational footprint	The area needed for the operation of the proposal.
Proposal	The upgrade of about 7.8 kilometres of Elizabeth Drive between Badgerys Creek Road near the future M12 Motorway and about 600 m east of Duff Road at Cecil Hills.
Study area	Area assessed for the traffic assessment, which includes the full 14 kilometre upgrade of Elizabeth Drive between The Northern Road, and M7 Motorway
Elizabeth Drive upgrades	Includes both the Elizabeth Drive West Upgrade and the Elizabeth Drive East Upgrade proposals.
Elizabeth Drive – East Upgrade	The upgrade of about 7.8 kilometres of Elizabeth Drive between Badgerys Creek Road near the future M12 Motorway and about 600 m east of Duff Road at Cecil Hills. This upgrade is the subject of this technical assessment report.
Elizabeth Drive – West Upgrade	The upgrade of about 3.6 kilometres of Elizabeth Drive from The Northern Road at Luddenham to near Badgerys Creek Road at Badgerys Creek where it would connect with the future M12 Motorway. This upgrade does not form part of the proposal and is the subject of a separate review of environmental factors.

Abbreviations

Acronym	Definition
CCTV	Closed-Circuit Television
CMEP	Construction Environmental Management Plan
CTMP	Construction Traffic Management Plan
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i> (NSW)
EB	Eastbound
HML	Higher Mass Limits
ITS	Intelligent Transport System
km	kilometres
LGA	Local Government Area
LoS	Level of Service
m	metres
RAV	Restricted Access Vehicle
REF	Review of environmental factors
Roads and Maritime	NSW Roads and Maritime Services, now known as Transport for NSW

Acronym	Definition
ROL	Road Occupancy Licence
SCATS	Sydney Coordinated Adaptive Traffic System
SMPM	Sydney Motorway Planning Model
TMP	Traffic Management Plan
Transport	Transport for NSW
TZ	Travel Zone
VMS	Variable Message Signs
VCR	Volume to Capacity Ratio
VKT	Vehicle kilometres travelled
WB	Westbound
WSA	Western Sydney Airport
WSAGA	Western Sydney Airport Growth Area

Executive Summary

Elizabeth Drive is the main east-west corridor between Liverpool and surrounding suburbs. Currently, between Badgerys Creek Road near the future M12 Motorway and Duff Road at Cecil Hills, Elizabeth Drive is predominantly a two-lane undivided road with no footpath and no median.

Transport for NSW (Transport) proposes to upgrade about 7.8 kilometres of Elizabeth Drive between Badgerys Creek Road near the future M12 Motorway and about 600 metres east of Duff Road at Cecil Hills (the proposal).

The development of the Western Sydney Aerotropolis (WSA) is expected to transform Elizabeth Drive from a rural road to a heavily trafficked urban corridor estimated to be able to accommodate between 24,000 and 55,000 vehicles per day. This projected growth would require the upgrade of Elizabeth Drive to provide increased capacity between the existing and planned road corridors in the surrounding area, and to support the projected and planned development of the Western Sydney Aerotropolis.

Subject to detailed design and construction planning, construction of the proposal is anticipated to take about 48 months to complete.

This Traffic and Transport Assessment has been prepared as part of the Review of Environmental Factors (REF) prepared for the proposal. This report assesses the traffic and transport impacts associated with the proposal.

The proposal is located in Fairfield, Liverpool and Penrith local government areas (LGAs). The proposal is also located within the Western Parkland City, which is planned to be established around the WSA and Western Sydney Aerotropolis providing significant projected population growth and employment opportunities in this area.

The Western Parkland City would benefit from a high-quality, future focused transport network which will support mobility within the City, and between the City and the closest strategic centres of Penrith, Liverpool, Campbelltown-Macarthur and the wider Sydney region.

The proposal aligns with various key planning frameworks aimed at supporting the economic development of the Western Parkland City and the wider Western Sydney region including:

- The Future Transport Strategy (Transport for NSW, 2022)
- Metropolis of Three Cities – The Greater Sydney Region Plan (Greater Sydney Commission, 2018)
- Western City District Plan (Greater Sydney Commission, 2018)
- NSW Freight and Ports Plan 2018-2023 (Transport for NSW, 2018)
- Western Sydney Aerotropolis Precinct Plan (NSW Department of Planning and Environment, 2023).

The proposal would connect people in the Western Parkland City to the nearest metropolitan centre in Liverpool. With the proposed upgrades, Elizabeth Drive would have the characteristics of a city-serving corridor and align with the 30-minutes concept.

The proposal is one of two adjacent planned upgrades of Elizabeth Drive between The Northern Road, Luddenham and Duff Road, Cecil Hills. The upgrade has been split into two proposals (Elizabeth Drive upgrades):

- Elizabeth Drive East Upgrade (the proposal) which includes the upgrade of about 7.8 kilometres of Elizabeth Drive between Badgerys Creek Road near the future M12 Motorway and about 600 metres east of Duff Road at Cecil Hills.
- Elizabeth Drive West Upgrade which includes the upgrade of Elizabeth Drive between The Northern Road, Luddenham to near Badgerys Creek Road, Badgerys Creek, where it would connect with the future M12 Motorway. This proposal is the subject of a separate REF and does not form part of this proposal.

Traffic models were prepared for the opening year 2030 and also for 2040 to assess the network performance in the do-nothing scenarios and with Elizabeth Drive upgrades. Results show that in the

do-nothing scenarios, the network would operate at maximum capacity in 2030 and 2040 resulting in unsatisfactorily congestion levels and increased travel time. It is also expected that increased congestion could lead to deterioration in the safety conditions, especially at the intersections operating under priority control.

The operational traffic assessment found that with Elizabeth Drive upgrades, network performance and travel times along Elizabeth Drive would improve in the 2030 and 2040 future scenarios. The upgrades are expected to reduce delays and increase the average speed across the network.

The upgrades would increase the capacity of the road network to accommodate more than 97 per cent of the forecast traffic demands in the 2040 peak hours compared to less than 90 per cent without the upgrades.

With the central median restricting direct access to properties on the opposite side of Elizabeth Drive, the proposal would increase travel time needed to access those properties in 2030 and 2040 conditions. A maximum increase of about 104 seconds is estimated for property access between Western Road and Martin Road in 2040 scenarios. Provision for U-turn function would be provided, however, at the northern legs of Martin Road, Range Road and Western Road.

The six new signalised intersections at Martin Road, Western Road, Salisbury Avenue / Devonshire Road, Mamre Road, Range Road and Duff Road along Elizabeth Drive would provide a balance between the competing traffic demands on the different approaches improving the operations and safety at those intersections.

With the projected increase in future traffic demands, and without improving the existing conditions (including the non-divided carriageway), the potential for vehicle crashes is likely to increase, especially at major intersections along Elizabeth Drive. Signalising the key intersections as part of the proposal would help ease the expected traffic congestion resulting in improved safety conditions. Further, with this expected increase of traffic, providing a central median would reduce the likelihood of rear-end and head-on crashes between vehicles attempting to cross Elizabeth Drive for property access, and the incoming traffic on the opposite direction.

In the do-nothing scenario, access to and from local and private roads are expected to be more difficult with increased volumes of through traffic on Elizabeth Drive. Motorists may take greater risks to turn onto Elizabeth Drive as gaps in the flow of traffic would be less frequent. The proposal has been designed to formalise property access which would improve road safety conditions.

The proposal improves the provision for active transport by providing shared walking and cycling paths on both sides of Elizabeth Drive with cycling crossing facilities at six new signalised intersections.

The new shared walking and cycling paths along the length of Elizabeth Drive improves the connectivity for cyclists on the network by connecting the proposed shared path to the new shared path along The Northern Road and the future shared path on the M12 Motorway.

The proposal would result in a loss of some off-street parking adjacent to Elizabeth Drive, most significantly at Bill Anderson's reserve, where about half of the parking supply would be impacted.

Impacts on traffic during construction on Elizabeth Drive would be temporary in nature. It is estimated that construction of the proposal would generate 200 light vehicles per day associated with workers and 70 heavy vehicles per day. Overall, it is expected that the road network would have the capacity to accommodate these additional movements generated by construction activities during and outside the peak hour hours.

Traffic impacts would occur as a result of the movement of construction and service vehicles along Elizabeth Drive and access roads, for the haulage of construction materials. Temporary reduced speed limits and lane closures on the existing Elizabeth Drive would be required during construction. Final construction methods and sequencing would be refined to minimise traffic and transport impacts during detailed design. Traffic restrictions would, however, be unavoidable during some construction activities. Access to existing properties along the road would be maintained throughout the construction phase. Car parking spaces would be temporarily lost during the construction phase, particularly at the businesses between Clifton Avenue and Mamre Road, and at the Kemps Creek shops.

A number of safeguards and management measures would be implemented to control and minimise the construction impacts of the proposal, including:

- Preparation and implementation of a Traffic Management Plan as part of the Construction Environmental Management Plan
- Maintaining property access during construction and providing landowners with adequate advanced notifications of any planned disruptions to their property access
- Preparation of pre and post-construction road condition reports
- Maintaining pedestrian access during construction and the identification of an alternative route for cyclists to avoid construction work where possible
- Informing the community, including public transport operators of upcoming activities that may affect the operation of public transport
- Installation of Intelligent Transport System systems including Closed-Circuit Television cameras and Variable Message Signs.

It is anticipated that real time signal coordination and ITS would further reduce congestion on the road network and improve the network coordination and incident management when those systems are fully deployed.

1.0 Introduction

Elizabeth Drive is the main east-west corridor between Liverpool and surrounding suburbs. Between Badgerys Creek Road, Badgerys Creek and Duff Road, Cecil Hills, Elizabeth Drive is predominantly a two-lane undivided road, with no footpath and no median.

Future projected and planned growth in this region of Western Sydney is expected with the planned development of the Western Sydney Aerotropolis. It is projected that an expansion of industrial and commercial precincts would be prompted in response to the development of the Western Sydney Aerotropolis, as well as related planned land releases for residential precincts and employment zones in the area.

This projected growth would require the upgrade of Elizabeth Drive to provide increased capacity between the existing and planned road corridors in the surrounding area, and to support the projected and planned development of the Western Sydney Aerotropolis.

1.1 Proposal overview

Transport for NSW (Transport) proposes to upgrade about 7.8 kilometres of Elizabeth Drive between Badgerys Creek Road near the future M12 Motorway and about 600 metres east of Duff Road at Cecil Hills. The proposal would connect Elizabeth Drive with the future M12 Motorway connection to the proposed Western Sydney Airport (WSA).

The location and extent of the proposal is provided in Figure 1-1.

**FIGURE 1-1:
LOCATION OF THE PROPOSAL**



- Legend**
- Construction footprint
 - Operational footprint
 - LGA boundary
 - Road design
 - Primary road
 - Local road

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1.2 Purpose of this technical report

This technical report provides an assessment of the traffic and transport impacts associated with the proposal and has been prepared to inform the review of environmental factors (REF). It contributes to fulfilling the requirements of Section 5.5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) which requires that Transport examines and takes into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the activity.

2.0 Proposal description

Key features of the proposal would include (subject to detailed design):

- Upgrade of Elizabeth Drive from a two-lane rural road, to a four-lane road (two lanes in each direction) with provision of a central median to allow for future upgrade to six lanes
- Signalisation of intersections along Elizabeth Drive: Luddenham Road, Martin Road, Western Road, Devonshire Road, Salisbury Ave, Mamre Road, Range Road and Duff Road
- Replacement of three twin bridges along Elizabeth Drive over Badgerys Creek, South Creek and Kemps Creek
- Active transport provision along the full corridor with the inclusion of shared paths along both sides of the Elizabeth Drive corridor
- Inclusion of public transport infrastructure with bus priority at intersection and bus stops facilities
- New stormwater drainage infrastructure
- Property acquisitions and adjustments on both sides of Elizabeth Drive and some side roads.
- Relocation/adjustment of existing utilities.

Subject to detailed design and construction planning, construction of the proposal is anticipated to take about 48 months to complete.

The following four temporary construction ancillary facilities would be established to support construction of the proposal:

- Western Road (construction ancillary facility 1) – located 200 metres south of the Elizabeth Drive and Western Road intersection on the western side
- Bill Anderson Reserve (construction ancillary facility 2) – located on the southern side of the Elizabeth Drive within Bill Anderson Reserve
- Salisbury Avenue (construction ancillary facility 3) – located 100 metres north of the Elizabeth Drive and Salisbury Avenue intersection on the eastern side
- Mamre Road (construction ancillary facility 4) – Located 500 metres north of the Elizabeth Drive and Mamre Road intersection on the eastern side.

Each construction ancillary facility may include the following activities:

- Establishment of site office/s, amenities, and temporary infrastructure, such as fencing and car parking areas
- Laydown and storage areas, and delivery of plant, equipment and materials
- Secure and bunded storage areas for re-fuelling and chemical storage
- Concrete batching plant
- Material crushing
- Stockpiling areas and spoil management (topsoil, excavated natural material, contaminated material). Stockpile locations would be determined during subsequent design stages using the criteria set out in the Stockpile Management Guideline (RTA, 2015).

Construction of the proposal would involve the following general activities:

- Site establishment including set up of construction ancillary facilities
- Utility adjustments, relocations and replacements, where required
- Demolition of existing buildings/structures
- Property adjustments (eg adjustments to fencing, property accesses)
- Vegetation removal
- Earthworks and drainage work

- Adjustments to existing farm dams within the construction footprint, including dewatering and re-shaping where required
- Bridge work over Badgerys Creek, South Creek and Kemps Creek, including installation of temporary diversion (if required) and temporary creek crossing, construction of new twin bridge structures and demolition/removal of the existing bridges
- Elizabeth Drive upgrade roadwork, including intersections with local roads and walking and cycling infrastructure
- Landscaping and finishing work.

The proposal would connect into new intersections constructed as part of the M12 Motorway project and enable access to WSA. This includes a new signalised intersection at Badgerys Creek Road (constructed as part of the M12 Motorway project) at the western end of the proposal. Continuing west, Elizabeth Drive would carry traffic above the new Sydney Metro Western Sydney Airport line, interchanging with the M12 Motorway connection into the Western Sydney Airport.

At its eastern end, just past Duff Road, the proposal would tie into the new Elizabeth Drive connection constructed by the M12 Motorway project, which connects the upgraded Elizabeth Drive to a new interchange with the M12 Motorway, M7 Motorway and Wallgrove Road.

3.0 Methodology

This section summarises the methodology adopted in developing the traffic models used as the base for the traffic assessment for Elizabeth Drive upgrades.

3.1 Overview of methodology

The methodology for this traffic assessment involved the following:

- Assessment of the traffic and transport conditions within the study area. In addition to the existing conditions, the operational aspects of the study area have been assessed at 2030, which is the proposed opening date of the full upgrade and 2040, 10 years after opening
- Analysis of the operational transport impacts of the upgrade using Aimsun software to assess the impacts on the midblock and intersections of Elizabeth Drive
- Estimation of forecast traffic volumes for the opening year (2030) and 10 years from the opening year (2040)
- Assessment of the impact of the proposal and summarisation of traffic and transport findings
- Consideration of the impact to property access, freight transport, public transport, pedestrians and cyclists
- Assessment of the impact of proposed U-turn function provision on the travel time along the corridor
- Assessment of impacts to off-street car parking during construction and operation of the proposal using a high level desktop review of google maps and an interrogation of concept design plans
- Preliminary assessment of construction traffic
- Identification of mitigation measures to manage and minimise the impacts of construction.

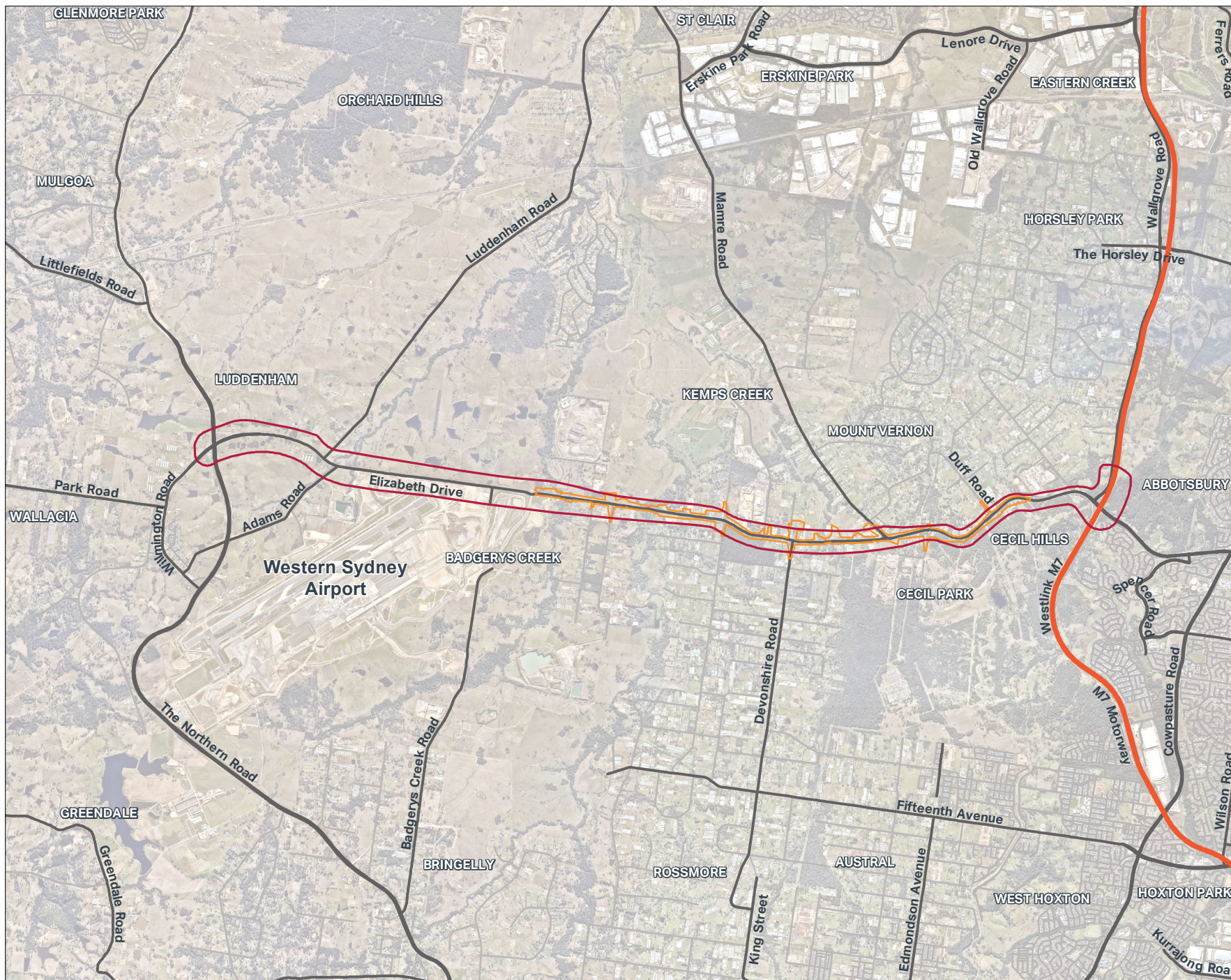
3.2 Study area

The proposal is one of two adjacent planned upgrades of Elizabeth Drive between The Northern Road, Luddenham and Duff Road, Cecil Hills. This includes the following proposals (referred to collectively as the Elizabeth Drive upgrades):

- Elizabeth Drive East Upgrade (the proposal) which includes the upgrade of about 7.8 kilometres of Elizabeth Drive between Badgerys Creek near the future M12 Motorway and about 600 metres east of Duff Road at Cecil Hills
- Elizabeth Drive West Upgrade which includes the upgrade of about 3.6 kilometres of Elizabeth Drive from The Northern Road, Luddenham to near Badgerys Creek Road at Badgerys Creek where it would connect with the future M12 Motorway. This proposal is the subject of a separate REF and does not form part of the proposal.

Given the proximity of the Elizabeth Drive upgrades, and that each upgrade is proposed to have an opening year of 2030, traffic modelling for this assessment has been based on a study area that encompasses both proposed upgrades. It is noted that the benefits of the Elizabeth Drive West Upgrade are expected to be fully realised after the Elizabeth Drive East Upgrade is completed. This is because the improvement along Elizabeth Drive as a result of the Elizabeth Drive East Upgrade has the potential to cause delays along the western extent of Elizabeth Drive (the location of the proposed Elizabeth Drive West Upgrade). This would be due to an anticipated increase in traffic through the priority controlled intersections along the Elizabeth Drive West Upgrade road corridor. The extents of the construction footprint and the modelled study area are shown in Figure 3-1.

FIGURE 3-1:
MODELLED STUDY AREA
(ELIZABETH DRIVE EAST AND WEST)



- Legend**
- Study area
 - Operational footprint
 - Motorway
 - Primary road
 - Local road

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In this report, the proposal refers to the 7.8 kilometre upgrade on Elizabeth Drive between Badgerys Creek Road, Badgerys Creek and east of Duff Road, Cecil Hills, while the study area refers to the extents of the planned full upgrade between The Northern Road, Luddenham and M7 Motorway.

The study area includes all key intersections on Elizabeth Drive between The Northern Road and M7 Motorway including the intersections between Elizabeth Drive and M12 Motorway access ramps. Details of the modelled study area are presented in Section 3.3.5.

3.3 Traffic Modelling

This section summarises the assessment scenarios and key inputs for the development of the traffic models for the base case and future scenarios.

3.3.1 Assessment Scenarios

To assess the impacts of the proposal on the road network, the following scenarios were considered using Aimsun microsimulation modelling:

- 2018 existing situation (model was developed and calibrated to 2018 traffic counts) – this reflects the transport network as it was in 2018 with no new projects or upgrades
- 2030 without Elizabeth Drive upgrades (do-nothing)
- 2030 with Elizabeth Drive upgrades
- 2040 without Elizabeth Drive upgrades (do-nothing)
- 2040 with Elizabeth Drive upgrades.

The planned M12 Motorway, including the flyover crossing over Elizabeth Drive at Badgerys Creek, and the M12 Motorway entry and exit ramps, have been included in the do-nothing scenarios as they are approved projects.

The planned M7 Motorway widening will involve the construction and operation of an additional lane in both directions within the existing median of the M7 Motorway. Construction is expected to commence in 2023 and conclude in 2025. Transport has determined that the M7 widening proposal is unlikely to result in network impacts to the Elizabeth Drive upgrades.

3.3.2 Key inputs to the traffic model

The following information was used to develop the base case traffic model. The base case traffic model was then calibrated and validated to ascertain that the base model reflects the existing conditions before developing the future traffic models.

Table 3-1 Data used for model development

Data Type	Item	Source	Collection / Completion date	Application
Existing traffic model	Aimsun Model	Transport	2017	Transport for NSW Aimsun mesoscopic model has been used to extract the initial road network and external centroids.
Traffic Demand	Sydney Motorway Planning Model (SMPM) Demand	Transport	2016	SMPM cordon matrices have been used for initial traffic demand.
Road network	Nearmap aerial photography	Nearmap	2017 / 2018	Aerial photography has been used for the coding of the road network.

Data Type	Item	Source	Collection / Completion date	Application
Traffic signal operations	Sydney Coordinated Adaptive Traffic System (SCATS) phasing, offset and history data	Transport	June 2017 / April 2018	SCATS phasing plots and history data has been used to assist in the signal coding.
Traffic counts	Intersection counts	Tracsis Traffic Data Australia, Matrix Traffic and Transport Data, Autraffic	July 2015, December 2017, April 2018	Intersection counts have been used for model calibration and demand estimation.
Travel time data	Floating car travel time survey	Matrix Traffic and Transport Data	June 2017	Floating car travel time data has been used for model validation.
Travel time data	HERE travel time data	Transport	June 2017, April 2018	HERE travel time data has been used for model validation.
Bus operations	Bus routes, stops and timetable data	WSAGA Model Transportnsw.info	2017 / 2021	Bus stops, routes and schedule data has been used in the bus route coding.

3.3.3 Travel zones

For the purpose of traffic modelling and understanding travel behaviour patterns, the study area was broken down into smaller units referred to as Travel Zones (TZ). The travel zone system provides a structure for the microsimulation model and provides information such as travel patterns (ie distribution of traffic demands) which then formed the basis for demand adjustment in Aimsun at the study area level.

The travel zones were obtained from the 2016 Sydney Motorway and Planning Model (SMPM) model through a cordon of the existing wider area strategic model network for both peak periods. The 2016 SMPM demand was based on the 2016 Travel Zone system (TZ16).

The SMPM travel zones can be seen in Figure 3-2.

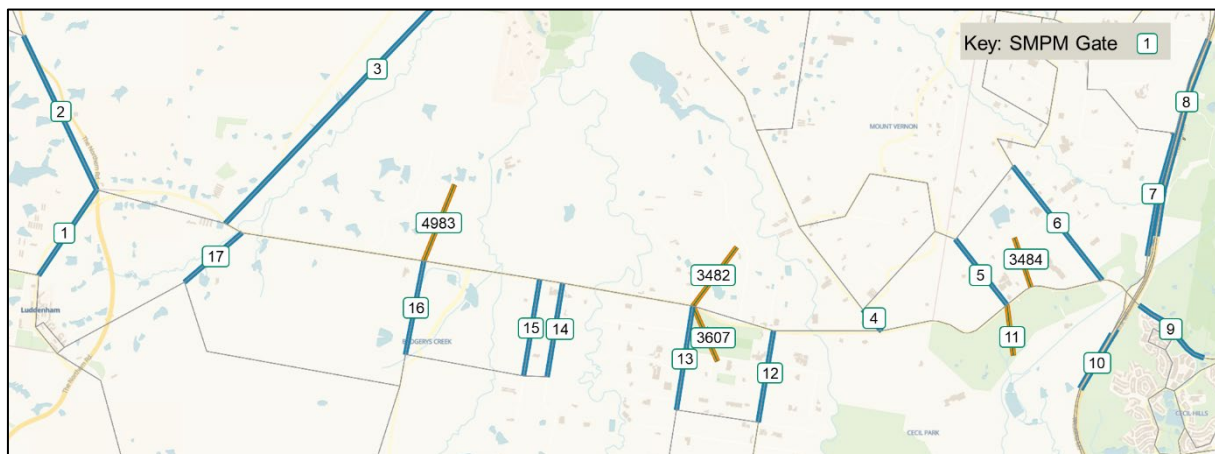


Figure 3-2 SMPM Travel Zones

During the development of the models, further zone disaggregation was carried out based on land use and turn counts for the internal SMPM zones (shown in orange in the map above).

The final zone structure for the Elizabeth Drive microsimulation model is shown in Figure 3-3, comprising of a total of 22 travel demand zones. The travel zones align with key intersections within the study area.

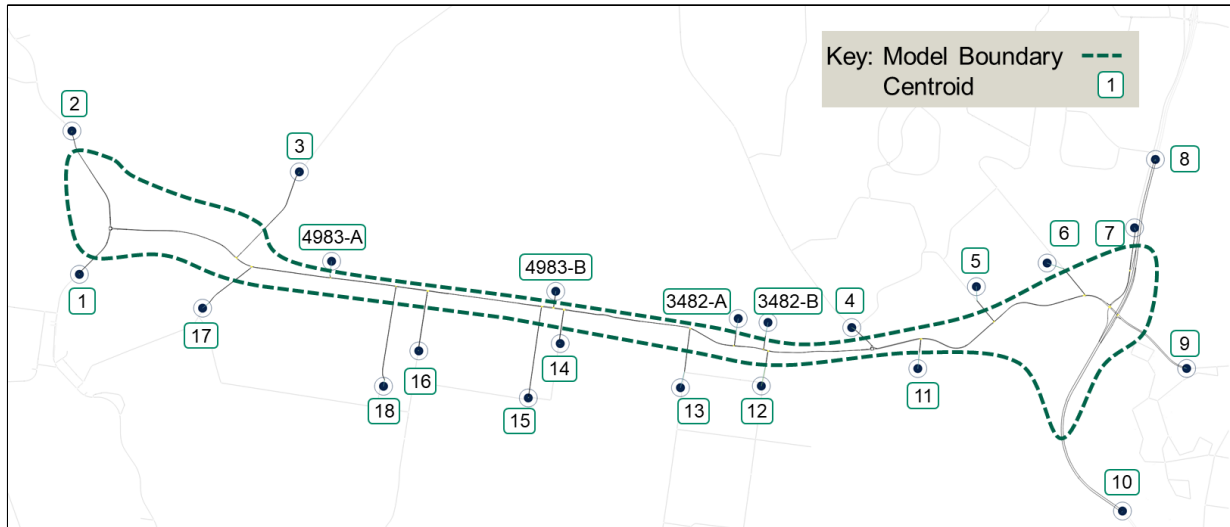


Figure 3-3 Study area final travel zones

3.3.4 Base case traffic model

The Elizabeth Drive microsimulation model was developed using Aimsun Next software. Aimsun Next allows the use of static and dynamic traffic assignment within a unified environment, enabling the application of both static macroscopic modelling based on volume-delay-functions (VDFs) and a more detailed dynamic mesoscopic and microsimulation. At the macroscopic level, Aimsun Next provides the function to undertake static demand adjustment and static equilibrium assignment to refine the initial traffic demand matrices to match the observed count data. The refined matrices are then used at the microsimulation level for the calibration and validation purposes.

The simulation periods include two hours in the AM peak and PM peak periods with 30 minutes of warm-up for both time periods, which allows the model to generate sufficient demands in the network to reach typical traffic conditions at the start of each analysis period.

The road network of the study area was initially based on the WSAGA Base Year Aimsun model. The model included a road hierarchy, comprising different road types and geometry detail of the road network, needed for the mesoscopic simulation level along Elizabeth Drive.

For the microsimulation traffic model, the detailed road network coding was undertaken based on aerial imagery and traffic control signal (TCS) plans. These sources were used to determine the following key network attributes including certain time-dependent traffic measures:

- Number of lanes, length, and gradients
- Intersection layouts and lane arrangements
- Speed limits
- Stop lines at intersections
- School speed zones
- Bus stops.

3.3.5 Development of assessment scenarios

During the future modelling, assessment scenarios were developed for each of the future years 2030 and 2040 for the do-nothing and Elizabeth Drive upgrades as described below.

Do-nothing scenario

The do-nothing scenario was developed to form the base case scenario for the future year modelling as described below:

- **Elizabeth Drive / M7 Motorway southbound off-ramp / on-ramp:**
 - One additional southbound approach lane on M7 Motorway southbound off-ramp (about 80 m)
 - No through movement allowed on M7 Motorway southbound off-ramp into M7 Motorway southbound on-ramp
 - Two dedicated right turn lanes on M7 Motorway southbound off-ramp into Elizabeth Drive for westbound traffic and two dedicated left turn lanes on M7 Motorway southbound off-ramp into Elizabeth Drive for eastbound traffic
 - One additional eastbound exit lane on Elizabeth Drive (about 160 m long before merging)
 - One additional westbound approach lane on Elizabeth Drive (about 140 m) for through movement
 - One additional eastbound approach lane on Elizabeth Drive for through movement
 - One additional westbound exit lane on Elizabeth Drive.
- **Elizabeth Drive / M7 Motorway northbound off-ramp / northbound on-ramp**
 - Two additional eastbound exit lanes on Elizabeth Drive
 - One additional lane on the westbound approach for through movement
 - No through movement allowed on M7 Motorway northbound off-ramp
 - Two dedicated right turn lanes on M7 Motorway northbound off-ramp into Elizabeth Drive for the eastbound traffic and three dedicated left turn lanes on M7 Motorway northbound off-ramp into Elizabeth Drive for westbound traffic
 - One additional westbound exit lane on Elizabeth Drive
 - One additional lane on the left turn slip lane on Elizabeth Drive to M7 Motorway northbound on-ramp
 - Two additional eastbound approach lanes on Elizabeth Drive for through movement.
- **Wallgrove Road / Cecil Road**
 - Relocate Wallgrove Road and implement a traffic signal at Wallgrove Road / Cecil Road intersection.
- **Elizabeth Drive / Wallgrove Road**
 - Upgrade priority-controlled Elizabeth Drive / Cecil Road intersection to signalised Elizabeth Drive / Wallgrove Road intersection.
- **Elizabeth Drive / M12 Motorway off-ramp**
 - A new signalised intersection at Elizabeth Drive / M12 Motorway off-ramp intersection.
- **Elizabeth Drive / Badgerys Creek Road**
 - Relocate Badgerys Creek Road and upgrade from a three-leg priority-controlled intersection to a four-leg signalised intersection.
- **Elizabeth Drive / M12 Motorway / Western Sydney Airport Connection**
 - A new signalised intersection at Elizabeth Drive / Western Sydney Airport Connection intersection.

- **Elizabeth Drive / The Northern Road**

- Upgrade from a roundabout to a signalised intersection
- Provision of two priority-controlled left turn slip lanes on northbound and southbound approaches
- Two dedicated right turn lanes on northbound and southbound approaches
- Three lanes for through movement on northbound and southbound approaches
- Provision of two signal-controlled left turn slip lanes on eastbound and westbound approaches
- Two dedicated right turn lanes on eastbound and westbound approaches
- Two lanes for through movement on eastbound and westbound approaches.

Elizabeth Drive upgrades scenario

The Elizabeth Drive upgrades scenario is assessed for the 2030 and 2040 future years and compared against modelling results of the do-nothing scenario to determine the impacts of the proposed Elizabeth Drive upgrades.

The following priority-controlled intersections were upgraded to signalised intersections:

- Elizabeth Drive / Duff Road
- Elizabeth Drive / Range Road
- Elizabeth Drive / Mamre Road
- Elizabeth Drive / Devonshire Road
- Elizabeth Drive / Western Road
- Elizabeth Drive / Martin Road
- Elizabeth Drive / Luddenham Road.

The geometric layout of the Elizabeth Drive upgrades scenario includes the upgraded intersections which provide additional lanes in both direction on Elizabeth Drive, signal-controlled left turn slip lanes, left turn and right turn short lanes, and bus-only lanes for the westbound and eastbound traffic direction along Elizabeth Drive. It also contains the following changes:

- **Elizabeth Drive / Clifton Avenue**
 - Remove access from westbound traffic on Elizabeth Drive to Clifton Avenue and vice versa
 - One left turn short lane on eastbound approach.
- **Elizabeth Drive / Lawson Road**
 - Remove access from eastbound traffic on Elizabeth Drive to Lawson Road and vice versa.
- **Elizabeth Drive / Adams Road**
 - Remove access from eastbound traffic on Elizabeth Drive to Adams Road and vice versa
 - A left turn short lane on the westbound approach of Elizabeth Drive.

3.3.6 Assumptions and limitations of the traffic modelling

The following assumptions and limitations were made in relation to the development of the base year microsimulation model:

- Traffic survey data is a true and accurate representation of the 2018 traffic conditions
- Analysis is limited to the AM and PM weekday peak periods
- Sydney Coordinated Adaptive Traffic System (SCATS) data (including detector counts, signal history and offset data) is correct. After reviewing the signal timing data, fixed time signal timing was applied in the model

- The accuracy of the traffic distributions is primarily based on the accuracy of the traffic distributions in the Sydney Motorway and Planning Model (SMPM) 2016 demands.
- The 2021 census data for relevant indicators (including journey to work data) was not available at the time of traffic modelling. For data consistency (including with SMPM data), the 2016 census population and travel data were used in this assessment
- The scope of developing the Aimsun model is limited to the agreed model boundary and the model does not consider the impacts of network bottlenecks outside the study area boundary
- The Nearmap aerial photography (2018) sourced from Nearmap was a true and accurate representation of 2018 road geometry.

Since 2018, network changes, such as the completion of The Northern Road upgrades in 2020, would have resulted in some travel pattern changes from 2018 to 2021. However, due to COVID-19 and the noticeable reduction in overall travel across Australian cities as people complied with lockdown orders, it is expected that those travel pattern changes would be temporary and therefore 2018 counts provide a reliable base case for the traffic modelling.

3.4 Traffic performance criteria

To compare the operational impact of the Elizabeth Drive upgrades, the following performance metrics have been considered.

3.4.1 At a network level

Assessment of the performance of the road network as a whole is based on the following study area statistics extracted from the Aimsun traffic model for the morning and evening peaks periods as follows:

- Vehicle kilometres travelled (VKT) – the total distance travelled by vehicles travelling through the subnetwork. Generally, the higher the VKT, the better the network operates
- Vehicle hours travelled (VHT) – the total time taken by all vehicles to enter and drive through the network. Generally, for a given number of vehicles the lower the total travel time, the better the network operates
- Average trip speed – the average speed of all vehicles. Generally, the higher the average speed, the better the network operates.

3.4.2 At a mid-block level

- The volume of vehicles passing through an arbitrary point, showing changes to traffic volumes
- Volume Capacity Ratio (VCR) – a measure of level of congestion on the road. A VCR value greater than one indicates the road is operating at capacity. The lower the value, the less congested the network is.

3.4.3 At intersections

- Level of Service (LoS) – a measure of the overall performance of the intersection. LoS is a standard measure used to assess the operational performance of intersections. It is graded from LoS A to LoS F. The assessment of intersection operation is based on criteria outlined in Table 3-2, as defined by Transport within the Traffic Modelling Guidelines (Transport for NSW, 2013)
- Average delay – commonly used to assess the operational performance of intersections, with LoS used as an index. A summary of the intersection LoS criteria is shown in Table 3-2.

Common practice suggests that the target LoS for intersection performance should be 'D' or better. However, limited road capacity and high demand mean that LoS E and F are regularly experienced by motorists at pinch points on the existing strategic road network in Sydney, generally during peak periods.

Table 3-2 Transport intersection level of service criteria

Level of Service	Average delay (seconds per vehicle)	Criteria
A	<14	Good operation
B	15 to 28	Good operation with acceptable delays and spare capacity
C	29 to 42	Satisfactory
D	43 to 56	Near capacity
E	57 to 70	At capacity, incidents at signals will cause excessive delays
F	>70	Extra capacity required

Source: *Traffic Modelling Guidelines (Transport for NSW, 2013)*

4.0 Existing environment

This section provides a description of the existing environment as it relates to traffic and transport within the study area.

4.1 Land use and transport characteristics

4.1.1 Surrounding land uses

The construction footprint is located in Fairfield, Liverpool and Penrith LGAs. The construction footprint largely comprises of semi-rural properties around an established road transport corridor.

Land use zoning within the construction footprint has changed in response to the proposed Western Sydney Aerotropolis whereby both new and existing zones would be applied to enable further development opportunities in response to the WSA development (Western Sydney Aerotropolis Plan, 2020).

The land uses within the locality comprises (based on the *Liverpool Local Environmental Plan 2008*, *Fairfield Local Environmental Plan 2013* and *Penrith Local Environmental Plan 2010*):

- A large Primary Production Area of Small Lots (RU4) is present in the centre of the construction footprint, abutted by Badgerys and Kemps creeks on either side. This lies adjacent to a small section of Rural Landscape (RU2) in this area. Another portion of RU4 lies to the north of Elizabeth Drive at the eastern extent of the construction footprint
- Other land uses are located south of Elizabeth Drive, including small areas zoned for Public Recreation (RE1) at Bill Anderson Reserve, and Light Industrial (IN2) near the intersection with Mamre Road.

The proposal is partially situated on land subject to the *State Environmental Planning Policy (SEPP) (Precincts - Western Parkland City) 2021*. Land within the SEPP area is zoned:

- Environment and Recreation areas (ENZ) stretch along the creek lines and ephemeral tributaries of South, Badgerys and Kemps Creeks crossing Elizabeth Drive
- An Enterprise zone (ENT) has been applied directly to the north and south of Elizabeth Drive to the west of South Creek in accordance with the planned Western Sydney Aerotropolis infrastructure
- The area comprising the WSA (currently under construction) is zoned SP2 Infrastructure, as well as Elizabeth Drive.

Further detail on land use zoning is provided in Chapter 4 of the REF.

4.1.2 Socio-economic factors

The following section presents data related to the Statistical Area Level 2 (SA2) geographic areas that are adjacent Elizabeth Drive. SA2s are a geographic area determined by the Australian Bureau of Statistics to be a medium sized general-purpose area that represents a community that interacts together socially and economically. The study area encompasses four SA2 areas; Austral – Greendale, Badgerys Creek, Horsley Park – Kemps Creek and Mulgoa – Luddenham – Orchard Hills (refer Figure 4-1).

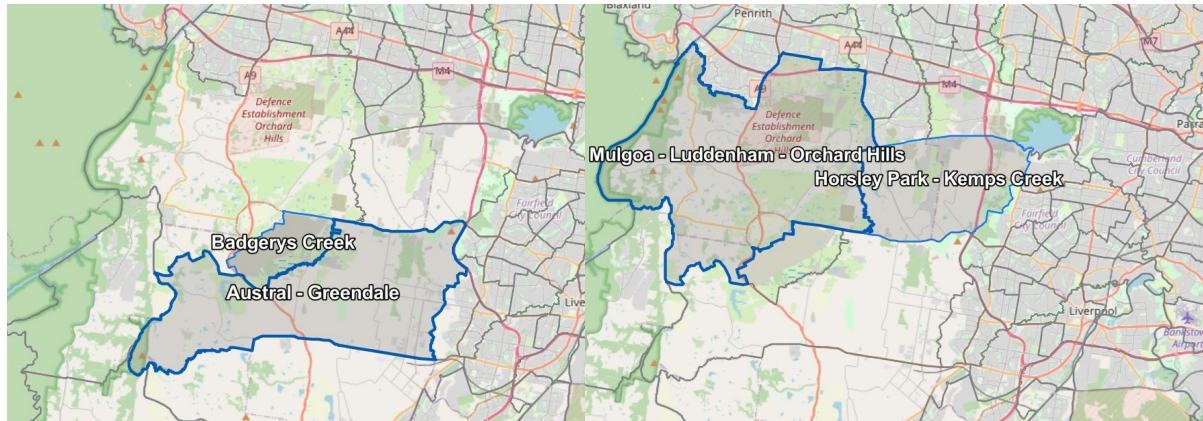


Figure 4-1 Study area and adjacent SA2s

Table 4-1 presents the 2016 population and employment data of the adjacent SA2s.

Table 4-1 Population and Employment of SA2s adjacent Elizabeth Drive (2016)

SA2	Population	Employment ¹
Austral - Greendale	8,918	3,240
Badgerys Creek	59	13
Horsley Park - Kemps Creek	4,426	3,079
Mulgoa - Luddenham - Orchard Hills	9,541	2,578
Total	22,944	8,910

¹People travelling to the SA2 as a place of work

4.1.3 Existing travel characteristics

Analysis of the journey to work census data from 2016 shows that the private vehicle is the predominant mode of travel for people living in the suburbs adjacent to the study area. This is true for both of people who live in the area and those who travel to work in the area. As per the 2016 census data and compared to Greater Sydney, the mode share for public transport and active transport is lower in the study area.

Table 4-2 Journey to Work mode share of employees living in SA2s adjacent Elizabeth Drive (2016)

	Austral Greendale	Badgerys Creek	Mulgoa Luddenham Orchard Hills	Horsley Park Kemps Creek	Greater Sydney
Public Transport	5%	0%	6%	5%	23%
Active Transport	4%	0%	2%	2%	5%
Private Vehicle	70%	78%	76%	74%	59%
Worked at home	18%	22%	14%	16%	12%
Other/Not Stated	3%	0%	1%	3%	2%

Table 4-3 Journey to Work mode share of employees working in SA2s adjacent Elizabeth Drive (2016)

	Austral Greendale	Badgerys Creek	Mulgoa Luddenham Orchard Hills	Horsley Park Kemps Creek
Public Transport	1%	0%	2%	1%
Active Transport	4%	0%	3%	2%
Private Vehicle	75%	100%	75%	85%
Worked at home	18%	0%	19%	11%
Other/Not Stated	2%	0%	1%	2%

Employment trips generally provide a good indication of the total mode share of the surrounding area and are particularly relevant to this proposal as the proposed land uses to the south of the study area associated with the WSA would be primarily employment related.

As discussed in Section 3.3.6, the 2021 census travel information was not available at the time of writing and therefore the 2016 census population and travel data were used for data consistency.

4.2 Existing road network

This section details the characteristics and operational details of the major roads in the study area.

4.2.1 Road hierarchy

There are three key road categories in NSW:

- State roads, which form the primary routes for the movement of people and goods within and between major urban centres and include roads classified as Freeways, State Highways and Main Roads under *the Roads Act 1993*. State Roads are managed by Transport
- Regional roads, which provide for travel between smaller towns and districts as well as perform a sub-arterial function within major urban centres. These roads are managed by local councils but often receive funding from the State Government due to their importance to the road network in NSW
- Local roads, which include collector and local access roads and are managed by local councils.

The study area for the traffic and transport assessment of the proposal includes several key roads, which are described in the sections below, including:

- State roads such as Elizabeth Drive, Mamre Road, M7 Motorway and The Northern Road
- Regional roads such as Luddenham Road, Devonshire Road and Badgerys Creek Road.

Figure 4-2 shows the location of these roads with respect to the proposal and study area.

**FIGURE 4-2:
ROAD HIERARCHY IN
THE WIDER STUDY AREA**



- Legend**
- Regional road
 - State road

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Elizabeth Drive

Elizabeth Drive is a key east-west corridor stretching about 24 kilometres in length and connects Liverpool to the surrounding suburbs and Luddenham in Western Sydney. Elizabeth Drive is classified as a state road.

Elizabeth Drive is predominantly two lanes in each direction for 10 kilometres between Liverpool and the M7 Motorway before dropping to a single carriage way in each direction with no median for 14 kilometres between the M7 Motorway and Luddenham. The surrounding land use is mainly rural, semi-rural and enterprise/industrial. The Western Sydney Aerotropolis is located south of Elizabeth Drive and west of Badgerys Creek.

The Northern Road

The Northern Road is a state Road west of Elizabeth Drive and a key north-south road between Narellan and Richmond, connecting major growth areas to Penrith and the M4 Motorway. The Northern Road intersects with a number of state, regional and local roads such as (from south to north) Camden Valley Way, Bringelly Road, Elizabeth Drive, M4 Motorway, Great Western Highway and Richmond Road.

The Northern Road is two lanes in each direction and provides a direct access to the WSA.

M7 Motorway

The M7 Motorway is a state road that intersects with Elizabeth Drive at the eastern side of the study area. The M7 Motorway is a key north-south link in Sydney's motorway network, linking the M5 South-West Motorway and M31 Hume Motorway to the south, the M4 Western Motorway and the Hills M2 Motorway. Further, the M7 Motorway is a key freight route that facilitates access to surrounding industrial precincts. The M7 Motorway is planned to be widened within the existing median by adding one lane in each direction between the M5 Motorway interchange at Prestons and the M7 Motorway bridge at Richmond Road (with construction planned to be carried out between 2023 and 2025).

Mamre Road

Mamre Road is a state road and a key north-south road connecting The Great Western Highway to Elizabeth Drive. Mamre Road is about 13 kilometres long and a key transport link for general traffic and freight in Western Sydney.

Other key roads within the study area

The study area also comprises the following regional roads that interface with Elizabeth Drive as presented in Table 4-4.

Table 4-4 Existing regional roads

Intersection with Elizabeth Drive	Description
Luddenham Road	<ul style="list-style-type: none"> One lane each direction 80 kilometre per hour posted speed limit Nine kilometres long Connects Luddenham area to Mamre Road in the north near St Clair and Elizabeth Drive to the south
Old Badgerys Creek Road	<ul style="list-style-type: none"> One lane each direction No posted speed limit Six kilometres long Provides access to the WSA construction work
Devonshire Road	<ul style="list-style-type: none"> One lane each direction 70 kilometre per hour posted speed limit Six kilometres long Provides access to Kemps Creek, Austral and Rossmore from Elizabeth Drive

4.2.2 Key intersections within the study area

Table 4-5 presents the key intersections with Elizabeth Drive within the study area between The Northern Road and M7 Motorway.

Table 4-5 Key intersections within the study area

Intersection with Elizabeth Drive	Description
The Northern Road	<ul style="list-style-type: none"> • A signalised intersection with slip lanes on each approach. Bus only lanes with bus-jump facilities are provided on The Northern Road for buses travelling north and south. • No restrictions on turning movements • Upgraded in 2020 from a roundabout
Luddenham Road	<ul style="list-style-type: none"> • Unsignalised T-intersection. • No restrictions on turning movements • Turning lanes provided on both east and west approaches on Elizabeth Drive • Luddenham Road provides north-south connection to Mamre Road
Adams Road	<ul style="list-style-type: none"> • Unsignalised T-intersection. • No restrictions on turning movements.
Old Badgerys Creek Road	<ul style="list-style-type: none"> • Unsignalised T- intersection • Provides access to WSA construction site
New Badgerys Creek Road	<ul style="list-style-type: none"> • Unsignalised roundabout • Badgerys Creek Road realigned and roundabout constructed in 2020 • No restrictions on any turning movements • Right turn lane provided on west approach on Elizabeth Drive • Badgerys Creek Road provides north-south connection to The Northern Road
Lawson Road	<ul style="list-style-type: none"> • Unsignalised T-intersection • No restrictions on turning movements • Right turn lane provided on west approach on Elizabeth Drive
Martin Road	<ul style="list-style-type: none"> • Unsignalised T-intersection • No restrictions on turning movements • Turn lane provided on both east and west approaches on Elizabeth Drive
Western Road	<ul style="list-style-type: none"> • Unsignalised T-intersection • No restrictions on turning movements.
Clifton Avenue	<ul style="list-style-type: none"> • Unsignalised T-intersection • No restrictions on turning movements • Right turn lane provided on east approach on Elizabeth Drive
Salisbury Avenue	<ul style="list-style-type: none"> • Unsignalised T-intersection • No restrictions on turning movements
Devonshire Road	<ul style="list-style-type: none"> • Unsignalised T-intersection. • No restrictions on turning movements • Right turn lane provided on west approach on Elizabeth Drive • Devonshire Road provides north-south connection to Bringelly Road
Mamre Road	<ul style="list-style-type: none"> • Unsignalised three-legged roundabout • A slip lane for vehicles turning left is provided on the north approach • Elizabeth Drive is two lanes in each direction at this location • Mamre Road provides a connection to M4 Motorway in the north
Range Road	<ul style="list-style-type: none"> • Unsignalised T-intersection • No restrictions on turning movements • Elizabeth Drive is two lanes on the west approach at this location • Left turn lane provided on the east approach on Elizabeth Drive

Intersection with Elizabeth Drive	Description
Duff Road	<ul style="list-style-type: none"> Unsignalised T-intersection. No restrictions on turning movements Right turn lane provided on the east approach on Elizabeth Drive
Cecil Road	<ul style="list-style-type: none"> Unsignalised T-intersection No restrictions on turning movements
M7 Motorway	<ul style="list-style-type: none"> Signalised interchange with Elizabeth Drive Access to and from northbound M7 Motorway lanes provided at a signalised intersection at Wall grove Road Access to and from southbound M7 Motorway lanes provided at a signalised intersection under M7 Motorway flyover

4.2.3 Traffic volumes

Classified intersection turning movement counts were undertaken for the study area during the peak hours across three years (2015, 2017 and 2018) as shown in Figure 4-3. The traffic counts were used to calibrate the base year traffic models.



Figure 4-3 Surveyed intersections in the study area

There has been an average increase of seven per cent in the total traffic at the intersections on Elizabeth Drive traffic in the AM peak (8am – 9am) between 2015 to 2018. The highest increase was observed at the intersection of Elizabeth Drive and The Northern Road (14 per cent).

In the PM peak (4pm – 5pm) the average increase was close to 9 per cent with the highest increase also observed at the intersection of Elizabeth Drive and The Northern Road (18 per cent). Figure 4-4 and Figure 4-5 show the growth in traffic volumes at intersections along Elizabeth Drive. The percentage labels on the graphs show the percentage growth from 2015.

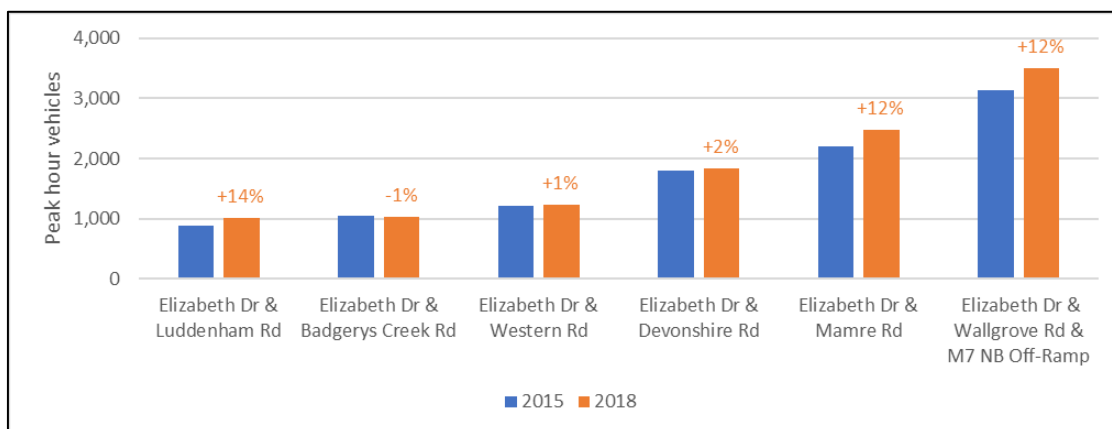


Figure 4-4 AM peak hour traffic volumes and growth from 2015 to 2018

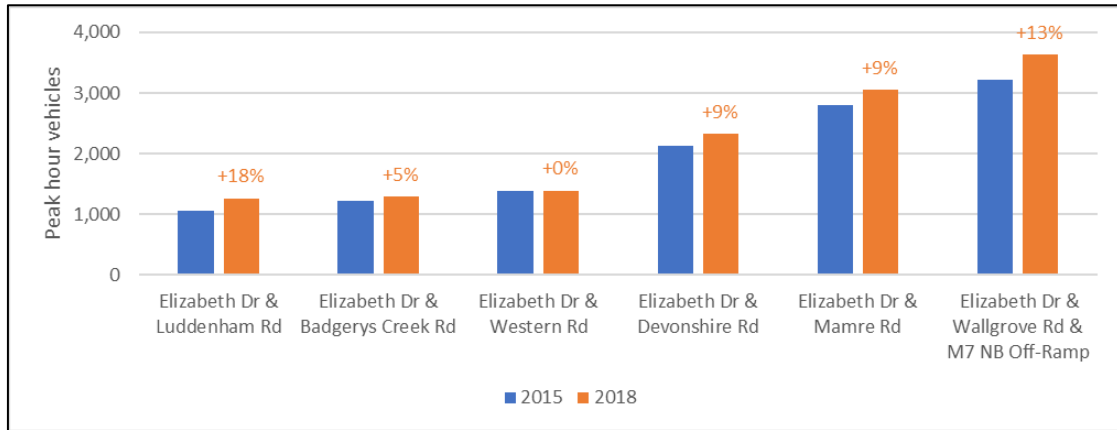


Figure 4-5 PM peak hour traffic volumes and growth from 2015 to 2018

4.2.4 Speed environment

Figure 4-6 presents the posted speed limit along different sections of Elizabeth Drive. Elizabeth Drive East has a posted speed limit of 80 kilometres per hour between Badgerys Creek Road and The M7 Motorway.

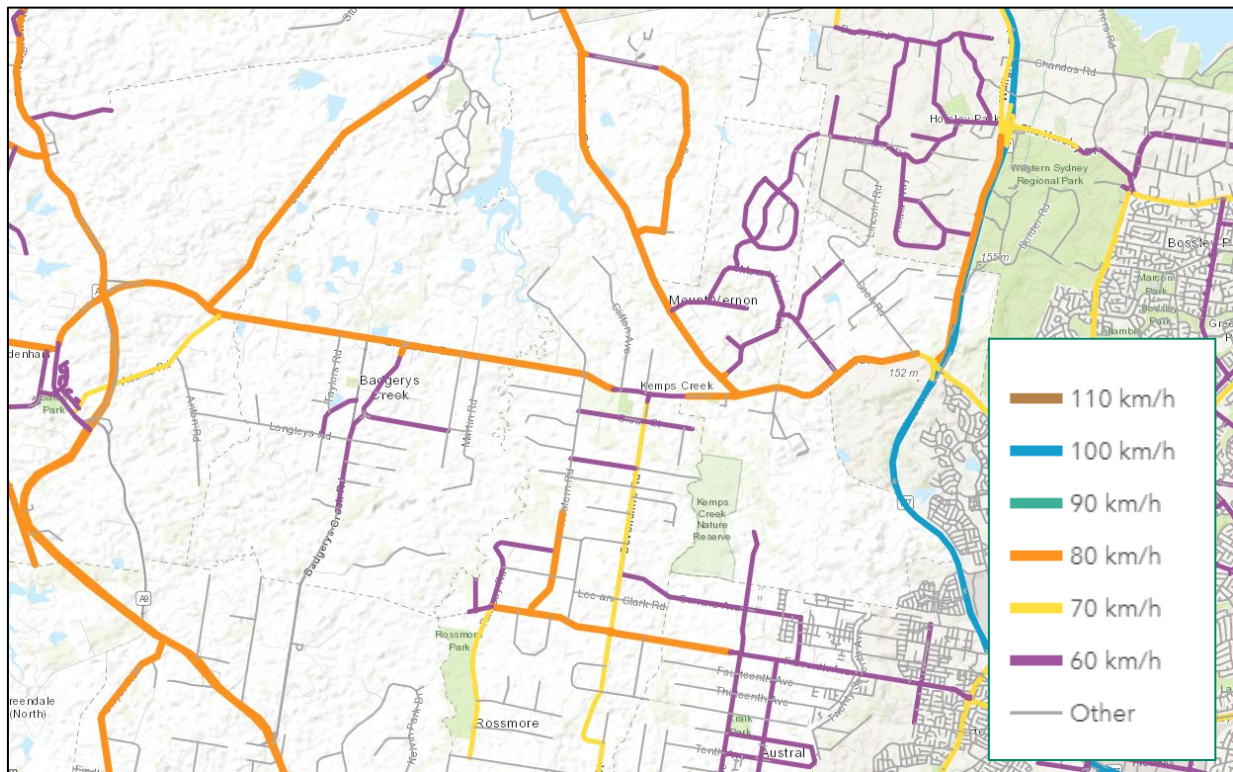


Figure 4-6 Speed environment in the wider study area

4.2.5 Freight transport

Figure 4-7 shows designated B-Double truck routes in the study area. Elizabeth Drive is a designated B-double route for trucks up to 26 m in length with connections to other B-Double routes including The Northern Road, M12 Motorway, Mamre Road, Devonshire Road, Martin Road, Lawson Road, Badgerys Creek Road and Luddenham Road.



Figure 4-7 B-Double routes in the wider study area

4.2.6 Crash data analysis

Historical crash data in the construction footprint was collected for five years between January 2016 to December 2020. The location and severity of these crashes are shown in Figure 4-8.

A summary of the number, severity, and types of crashes along Elizabeth Drive within the construction footprint are summarised in Table 4-6 to Table 4-7.

Table 4-6 Severity of Crashes within the construction footprint (2016 – 2020)

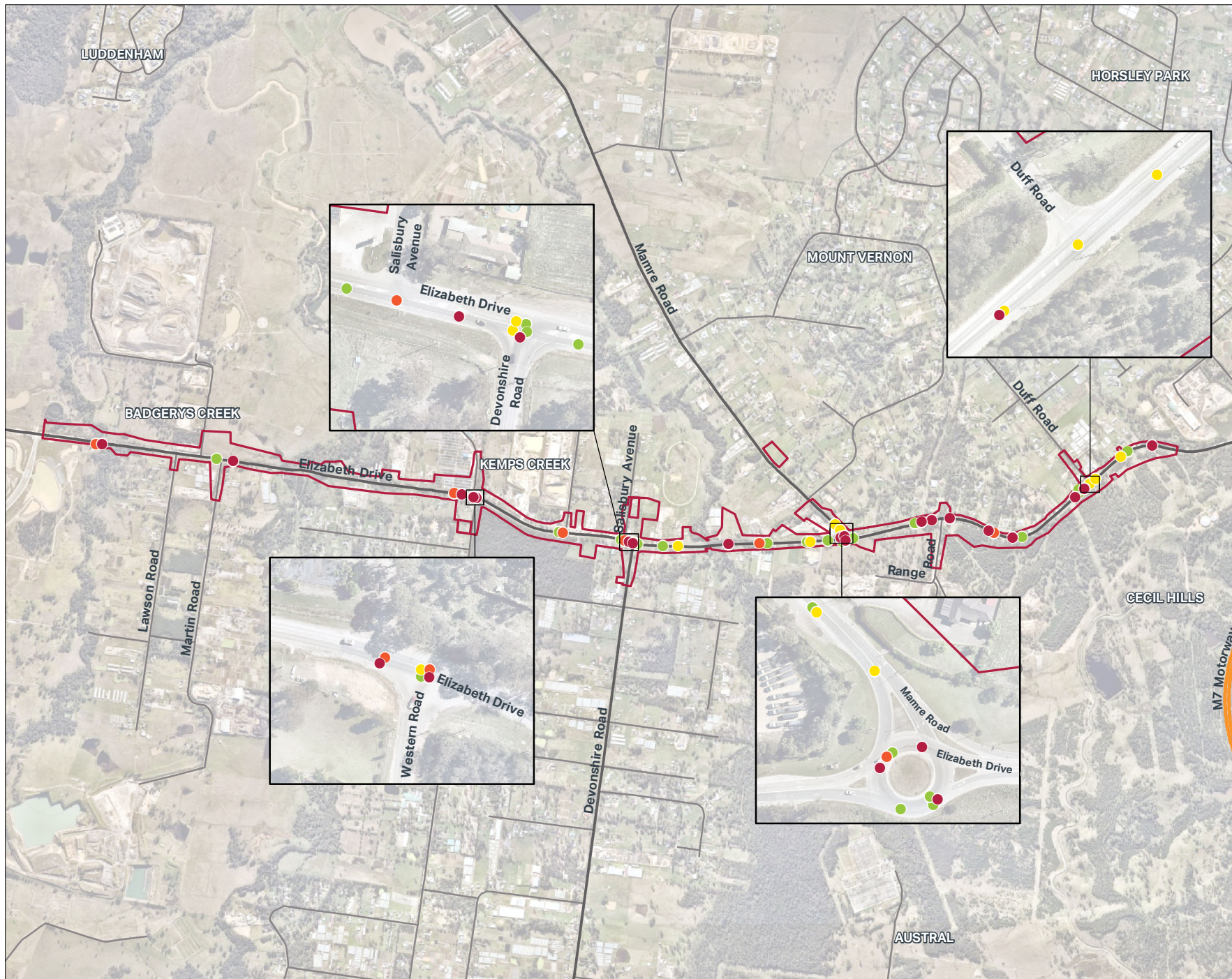
Fatality	Serious injury	Moderate injury	Minor/other injury	Non causality / Tow away	Total
0	19	9	11	21	60

Table 4-7 Type of Crashes within the construction footprint (2016 – 2020)

Cross traffic	Right thru	Opp. Head on	Rear end	Right rear	Off to the left	Other
1	2	5	16	7	4	25

The analysis shows that out of the 60 reported crashes, 47 crashes occurred within 300 metres from one of the key proposal intersections, namely the intersections of Elizabeth Drive with Duff Road, Range Road, Mamre Road, Western Road, Martin Road and Lawson Road. Eleven crashes were reported at the intersection of Elizabeth Drive and Mamre Road resulting in two serious injuries, one moderate injury and two minor injuries.

FIGURE 4-8:
LOCATION AND SEVERITY OF
CRASHES (2016 TO 2020)



- Legend**
- Construction footprint
 - Motorway
 - Primary road
 - Local road
- Crash Severity**
- Serious Injury
 - Moderate Injury
 - Minor/Other Injury
 - Non-casualty/Towaway

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4.2.7 Network performance

This section provides an assessment of the existing traffic conditions at midblock locations and the intersections in the construction footprint. An assessment of the 2018 base case year was undertaken using microsimulation modelling.

The results discussed in this section relate to the sections of Elizabeth Drive and other roads that would be impacted by the construction and operation of the proposal. Existing traffic volumes provide an understanding of how many vehicles use these roads during morning and afternoon peak hours. The proportion of heavy vehicles that comprise the traffic provide an understanding of the importance of these roads as heavy vehicle corridors.

The existing conditions presented below are outputs of the 2018 base case model. For the purposes of the assessment, the peak periods are 7am to 8am for the weekday AM peak and 4pm to 5pm for the PM weekday peak.

Midblock Performance

The peak hour directional traffic flows on the road sections within the construction footprint are summarised in Table 4-8. Volume Capacity Ratio (VCR) for the peak direction traffic volumes have also been calculated assuming a capacity of 2,400 vehicles per lane per hour. Elizabeth Drive is primarily one lane in each direction within the construction footprint.

The five sections of the road within the construction footprint in Table 4-8 operate with a VCR of less than 0.7 indicating sufficient capacity along those sections.

The proportion of heavy vehicles on Elizabeth Drive within the construction footprint is relatively high, up to 16 per cent on the eastbound direction and up to 22 per cent in the westbound direction during the peak hours indicating Elizabeth Drive is a significant heavy vehicle route. It is likely that the high heavy vehicle percentage is attributed to the ongoing WSA construction activities.

Table 4-8 Midblock traffic volumes from 2018 base year model

Section	Direction	AM		PM	
		Vehicles	VCR	Vehicles	VCR
M12 Motorway off-ramp to Duff Road	Eastbound	1,520	0.63	1,020	0.43
	Westbound	820	0.34	1,330	0.55
Duff Road to Range Road	Eastbound	1,460	0.61	960	0.40
	Westbound	770	0.32	1,280	0.53
Mamre Road to Devonshire Road	Eastbound	1,240	0.52	690	0.29
	Westbound	600	0.25	1,320	0.55
Devonshire Road to Western Road	Eastbound	1,060	0.44	550	0.23
	Westbound	470	0.20	850	0.35
Western Road to Martin Road	Eastbound	1,010	0.42	470	0.20
	Westbound	440	0.18	820	0.34

Travel speeds on Elizabeth Drive

Travel speeds provide a means of assessing the performance of a network that is consistent with the experience of a road user. Further, travel speeds can be used as a proxy of travel times. A summary of travel speeds at sections along Elizabeth Drive is shown in Table 4-9 below.

The existing average speeds along Elizabeth Drive is close to the posted speed indicating uninterrupted flow during the peak hours.

Table 4-9 Existing average travel speeds

Section	Direction	Average travel speed (km/h)	
		AM	PM
M12 Motorway off-ramp to Duff Road	Eastbound	73	79
	Westbound	64	59
Duff Road to Range Road	Eastbound	68	74
	Westbound	64	61
Mamre Road to Devonshire Road	Eastbound	59	60
	Westbound	73	68
Devonshire Road to Western Road	Eastbound	57	64
	Westbound	72	73
Western Road to Martin Road	Eastbound	78	80
	Westbound	72	67

Intersection Performance

Table 4-10 summarises the existing intersection performance at the key unsignalised intersections within the construction footprint. The LoS for unsignalised intersections is based on the worst performing approach which generally reflects the performance on the side road as the main road would have minimal delays.

The average delays on the side road at an unsignalised intersection is a general indicator of the average time needed to join the main traffic on Elizabeth Drive.

All intersections currently operate with LoS D or better except for Elizabeth Drive and Devonshire Road which currently operate at LoS F during the peak hours. Average delays on Devonshire Road range between 143 seconds in the AM peak to 222 seconds in the PM peak.

Table 4-10 Intersection performance from 2018 base year model

Intersection with Elizabeth Drive	Time Period	2018	
		Delay (s)	LoS
Duff Road	AM	43	D
	PM	33	C
Range Road	AM	21	B
	PM	29	C
Mamre Road	AM	28	B
	PM	21	B
Devonshire Road	AM	143	F
	PM	222	F
Salisbury Ave	AM	28	B
	PM	20	B
Western Road	AM	40	C
	PM	24	B
Martin Road	AM	19	B
	PM	24	B

4.3 Public transport

There is currently limited public transport provision within the study area, as outlined in the following sections.

4.3.1 Rail network

There are no rail links to the suburbs immediately north or south of Elizabeth Drive to the west of Cecil Hills. The nearest main train stations are Liverpool, Leppington and Edmondson Park stations.

4.3.2 Bus network

Overall, the bus network coverage in the study area is very poor, with few services provided and low frequencies. This reflects the rural land use and low population density of the study area generating a low demand for public transport.

The following bus routes operate on Elizabeth Drive:

- Route 801 currently operates with limited daily services along the eastern section of Elizabeth Drive and provides connection between Liverpool and Badgerys Creek as shown in Figure 4-9. Two morning services and one afternoon service currently operate for bus route 801 from Badgerys Creek to Liverpool. Three afternoon services currently operate in the opposite direction from Liverpool to Badgerys Creek
- Route 813 runs twice per day in each direction along a short section of Elizabeth Drive between Mamre Road and Duff Road as shown in Figure 4-10. A shorter version of this bus route runs more frequently and does not use Elizabeth Drive
- Two school services also operate on the eastern parts on Elizabeth Drive, once per day in each direction.

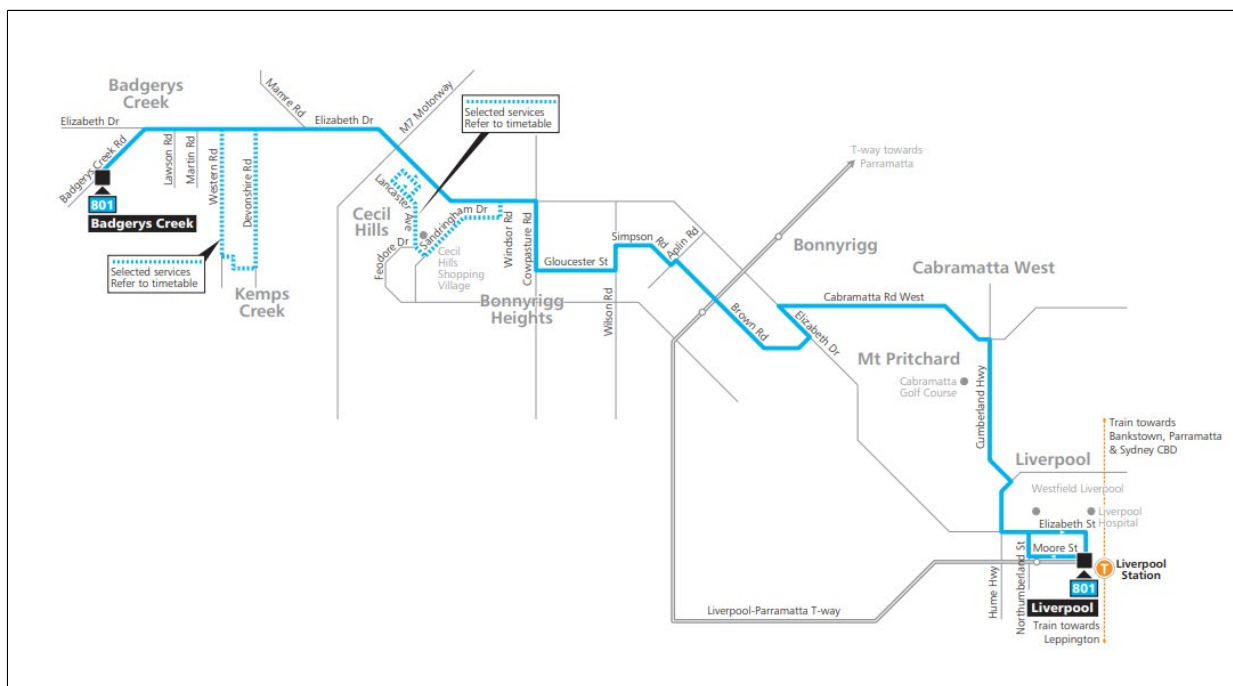


Figure 4-9 801 bus route

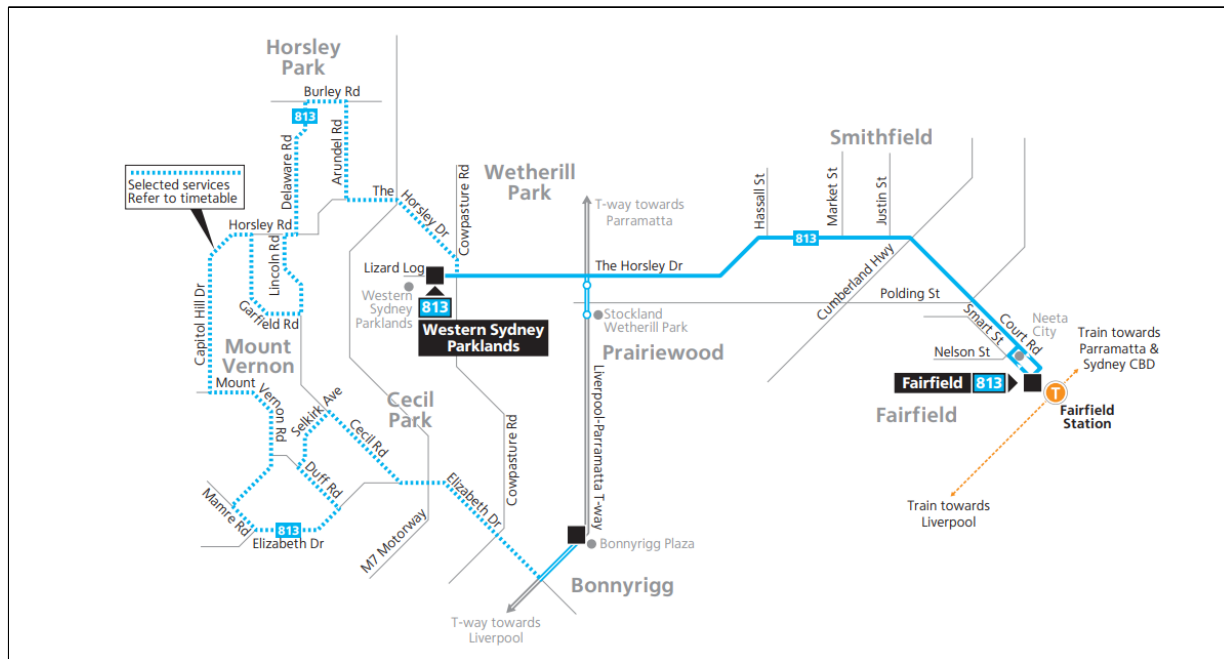


Figure 4-10 813 bus route

4.4 Active Transport

There are limited dedicated walking and cycling facilities along Elizabeth Drive. Shoulders and verges are the only available means for pedestrians to travel along Elizabeth Drive exposing them to live traffic. The lack of footpaths and cycling paths is a safety issue for pedestrians and cyclists along Elizabeth Drive and the side roads.

Limited off-road cycling facilities are provided in the wider study area. In the existing conditions, only The Northern Road has a shared path running along the northbound direction with cycling crossing facilities at the intersections with side roads.

4.5 Parking

There are no on street parking spaces along Elizabeth Drive. The off-street parking facilities in the study area are associated with business and land uses that are adjacent Elizabeth Drive. Informal parking on residential properties along Elizabeth Drive has not been included in the assessment. The type and quantity of parking in the study area is summarised in Table 4-11.

Table 4-11 Parking inventory in Elizabeth Drive corridor

Location	Type of parking	Number of parking spaces or size of parking area
Animal Welfare League NSW,	Business parking	13 marked parking spaces 1 accessible parking space
1605 Elizabeth Drive	Private parking	Informal parking area with space for approximately 8 vehicles
Roladuct Spiral Tubing Group	Business parking	815 square metres of informal parking area
Kemps Creek Mitre 10	Business parking	Approximately 30 parking spaces
United Petroleum	Business parking	Approximately 5 informal parking spaces
Australia Post Kemp's Creek LPO and First Class Cafe	Business parking	8 for the post office and 4 for the cafe

Location	Type of parking	Number of parking spaces or size of parking area
Apex Petroleum and Kemps Creek Auto Repairs	Business parking	7 informal parking spaces
Nando's Meat Market and Tobacconist	Business parking	24 parking spaces
Bill Anderson Reserve	Business parking	146 parking spaces 2 accessible parking spaces
Ampol IGA X-press Kemps Creek	Business parking	11 parking spaces 2 accessible parking spaces
Science of the Soul	Business parking	133 parking spaces 9 accessible parking
Ifran College	School parking	52 parking spaces 1 accessible space
Christadelphian Heritage College	School parking	1320 square metres of informal parking area 2 accessible parking spaces 20 marked parking spaces

5.0 Planned future environment

In April 2014, the Commonwealth Government committed to the construction of Sydney's second airport, located in Badgerys Creek. The proposal is located within the Western Parkland City, which is planned to be established around the WSA and Aerotropolis providing significant projected population growth and employment opportunities in this area.

The Western Parkland City would benefit from a high-quality, future focused transport network which would support mobility within the City, and between the City and the closest strategic centres of Penrith, Liverpool, Campbelltown-Macarthur and the wider Sydney region.

5.1 Strategic planning and policy framework

As part of the artery of the Western Parkland City, Elizabeth Drive is set to become an important thoroughfare in Sydney, connecting the new WSA and the Western Sydney Aerotropolis with the western Sydney strategic centres and the wider Sydney region.

This section describes the compatibility of the proposal with the current strategic planning policy documents and frameworks for the Western Parklands City and the wider region.

5.1.1 Western Sydney City Deal – Smart Cities Plan

The *Western Sydney City Deal – Smart Cities Plan* (Western Sydney City Deal Delivery Office, 2018) is a three-tiered government collaborative approach, setting a plan for investment for the Western Parkland City. The Western Sydney City Deal would build on the significant investment in WSA, which is a catalyst for economic activity within the region, creating jobs for the local community. The six key commitments that are provided in the Western Sydney City Deal include:

- Connectivity
- Jobs for the future
- Skills and education
- Liveability and environment
- Planning and housing
- Implementation and governance.

The 'City Deal' is enabled by the Future Transport Strategy and the Greater Sydney Region Plan 2018 which jointly define the future of Sydney, from both a land use and transport perspective, as a highly connected city of three cities.

With an increased investment in infrastructure, Western Sydney would become more connected to Greater Sydney. Upgrading Elizabeth Drive would provide a crucial piece of infrastructure allowing increased movement and connectivity to growth areas with employment lands.

5.1.2 Future Transport Strategy

The Future Transport Strategy: Our vision for transport in NSW (Transport for NSW, 2022) sets the strategic direction for Transport to achieve world-leading mobility for customers, communities and businesses. It provides the framework that informs network plans, service plans and policy decisions to achieve the following three outcomes:

- Connecting our customer's whole lives
- Successful places for communities
- Enabling economic activity.

The proposal would support a number of these strategic directions under each outcome, including:

- Connecting our customer's whole lives: the proposal would
 - Improve east-west connectivity and play an important role in connecting people and freight between the nearest strategic centres in Western Sydney and the wider Sydney Region

- Provide a shared walking and cycling path, bus priority features, as well as urban design measures to improve amenity
- Improve active transport and enable faster commutes to employment to support a healthy lifestyle
- Include new bus bays along Elizabeth Drive that are compliant with accessibility requirements
- Successful places for communities:
 - Provision for improved public transport infrastructure
 - Improve road safety along Elizabeth Drive for all road users
 - Avoid and minimise environmental impacts where possible, as outlined in this REF
- Enabling economic activity:
 - Increase the capacity of Elizabeth Drive to support the nearby developments and planned economic growth within the area, including improvement of freight travel times
 - Optimise existing infrastructure by upgrading the current Elizabeth Drive road corridor
 - Improve connectivity with the wider Sydney region, supporting visitor access across NSW.

5.1.3 The Greater Sydney Region Plan – A Metropolis of Three Cities

The Greater Sydney Region Plan – A Metropolis of Three Cities (Greater Sydney Commission, 2018) sets out a vision for three, integrated and connected cities. The three cities identified are the Western Parkland City, the Central River City and the Eastern Harbour City, each with supporting metropolitan and strategic centres, which would enable workers to locate closer to knowledge-intensive jobs, city-scale infrastructure and services, entertainment and cultural facilities.

As described in the plan, the population of Greater Sydney is projected to grow to eight million people by 2058, with almost half of that population residing west of Parramatta. Re-balancing economic and social opportunities across Greater Sydney would leverage that growth and deliver the benefits more equally and equitably.

The proposal is located within the Western Parkland City, which is planned to be established around the WSA and Aerotropolis providing significant projected population growth and employment opportunities in this area.

The proposal aligns with several directions and associated objectives described in the plan, including:

- *Objective 1: Infrastructure supports the three cities:* The objective recognises that connections to existing infrastructure in the three cities need to be improved, and that transport corridors and locations for new centres need to be safeguarded for future infrastructure investments. The proposal would support this objective by improving existing infrastructure and connection to the M12 Motorway and WSA and Aerotropolis.
- *Objective 2: Infrastructure aligns with forecast growth – growth infrastructure compact:* The proposal would support this objective by providing increased capacity for the projected traffic volumes on Elizabeth Drive associated with growth in the surrounding area of the Western Parkland City.
- *Objective 3: Infrastructure adapts to meet future needs:* The proposal would support this objective by upgrading Elizabeth Drive to meet the projected traffic needs. The proposal has also been designed so as not to preclude further adaption in the future such as adding a third lane in each direction.
- *Objective 4 – Infrastructure use is optimised:* The proposal would support this objective by upgrading the existing Elizabeth Drive to optimise its use as a key connecting road corridor in the area.
- *Objective 6: Services and infrastructure meet communities' changing needs:* The proposal would support the projected growth of the area and assist in providing a better connection to surrounding

suburbs. It would also improve liveability by providing a shared walking and cycling path and improving the urban design of the road corridor.

- *Objective 15: The Eastern, Greater Paramatta and Olympic Peninsula, and Western Economic Corridors are better connected and more competitive:* The proposal would improve a east-west transport link in the 'Western Economic corridor', and would connect to centres on the future Sydney Metro Western Sydney Airport.
- *Objective 16: Freight and logistics network is competitive and efficient:* The proposal would support this objective by improving the efficiency of Elizabeth Drive and its key intersections within the construction footprint for freight and logistics.

5.1.4 Greater Sydney Services and Infrastructure Plan

The Greater Sydney Services and Infrastructure Plan 2018 is a transport blueprint designed to facilitate the growth of Greater Sydney over the next 40 years.

The Greater Sydney Services and Infrastructure Plan supports the whole-of-government approach to Greater Sydney becoming a metropolis of three cities. The Greater Sydney Services and Infrastructure Plan aims for people to have access to jobs and services in their nearest Metropolitan Centre and Strategic Centre within 30-minutes by public transport, seven days a week.

There are two components to the 30-minute city concept within Greater Sydney:

- Connecting people in each city to their nearest Metropolitan Centre or Cluster; Harbour CBD, Greater Parramatta, Airport -Aerotropolis, Greater Penrith, Liverpool and Campbelltown-Macarthur.
- Connecting residents in each of the five districts to one of their Strategic Centres by public and active transport, giving people 30-minute access to local jobs, goods and services.

The 30-minute city directly aligns with the customer outcomes of Future Strategy Transport 2056. To support the vision for Greater Sydney, the NSW Government has developed a vision for the transport system to enable people and goods to move around the city efficiently and reliably adhering to the 30-minute city concept through the use of three types of transport corridors:

- City-shaping corridors – major trunk road and rail public transport corridors providing higher speed and capacity linkages
- City-serving corridors – higher density corridors concentrated within about ten kilometres of Metropolitan Centres providing high frequency access with more frequent stopping patterns
- Centre-serving corridors – corridors that support local trips to connect people with their nearest centre and transport node.

Figure 5-1 presents the Greater Sydney strategic transport corridors.



Figure 5-1 Greater Sydney strategic transport corridors

Source: Greater Sydney Services and Infrastructure Plan (Transport for NSW, 2018)

The envisaged future network includes higher speed and volume linkages between metropolitan centres and metropolitan clusters / strategic centres. The network is expected to enable people living in any of the three cities to access their nearest metropolitan centre within 30-minutes and to be able to travel efficiently between the metropolitan centres.

As Greater Sydney transitions to a metropolis of three cities, the transport network would expand to provide improved access to and between each metropolitan centres / metropolitan cluster, particularly Greater Parramatta and centres in the Western Parkland City.

The proposal is aligned with the objectives of the Greater Sydney Services and Infrastructure Plan as it would connect people in the Western Parkland City to the nearest metropolitan centre in Liverpool. With the proposed upgrades, Elizabeth Drive would have the characteristics of a city-serving corridor and align with the 30-minutes concept.

5.1.5 Western City District Plan

The *Western City District Plan* (Greater Sydney Commission, 2018) recognises planning priorities and actions for improving the quality of life for residents as the Western City district grows and changes. The plan is a guide for implementing the *Greater Sydney Region Plan, A Metropolis of Three Cities*, at a district level and is a bridge between regional and local planning. The Western City District covers the Blue Mountains, Camden, Campbelltown, Fairfield, Hawkesbury, Liverpool, Penrith and Wollondilly LGAs.

The 20-year Plan aims to manage economic, social and environmental growth. The Plan highlights Liverpool and Penrith as key areas of growth in Greater Sydney. It leverages the transformative and economic improvements from the WSA and considers the transport, infrastructure, services, affordable housing, and open spaces that will be required as the population grows, and demographics change.

The Australian Government's investment in the WSA and Aerotropolis aims to shape the Western Parkland City and provide a catalyst for economic growth. A primary objective for the Western Parkland City is to provide residents with more jobs and services within a 30-minute journey of where they live. Some 200,000 jobs are planned within the Aerotropolis, meaning it is integral to achieving this objective. Furthermore, the Aerotropolis aims to enable a resilient 24-hour economy, with a transport network that supports the safe and efficient movement of people and goods.

To satisfy the commitment to providing jobs close to home, the *Western City District Plan* identifies the need to enhance and create east-west and north-south transport links, including Elizabeth Drive, which is identified as a major east-west transport link servicing the WSA and Aerotropolis and directly connecting them to Liverpool and Penrith city centres.

The proposal aligns with the following planning priorities described in the plan:

- W1 – Planning for a city supported by infrastructure
 - The proposal would improve a key piece of road infrastructure aligned to projected future growth in the area and linking the road to other key transport corridors
- W7 – Establishing the land use and transport structure to deliver a livable, productive, and sustainable Western Parkland City
 - The proposal would improve a key east-west transport route, enhancing connectivity and access to major transport infrastructure, employment areas and services including The Northern Road, M12 Motorway, M7 Motorway, WSA and Aerotropolis
 - The proposal would improve a part of the freight and logistics network with access to the WSA
- W8 Leveraging industry opportunities from WSA and Aerotropolis
 - The proposal would support this planning priority by enhancing the transport connection to the WSA and Aerotropolis.

5.1.6 NSW Freight and Ports Plan 2018-2023

The *NSW Freight and Ports Plan 2018-2023* (Transport for NSW, 2018) is a supporting plan to the *Future Transport Strategy 2056* (the previous revision of the Future Transport Strategy, published in 2018). It provides industry with the continuity and certainty it needs to make long-term investments benefiting businesses and the wider State. The plan identifies five key objectives and associated goals to be met by 2023 and includes over 70 initiatives to achieve these. The proposal would support the following objectives and related goals:

- Objective 3 – Capacity: Goal 2: Deliver new infrastructure to increase road freight capacity and improve safety
- Objective 4 – Safety: Goal 1: Safer networks, transport, speeds, and people.

The proposal would support these goals by providing an additional travel lane in each direction on a section of Elizabeth Drive projected to experience increased traffic over time, thereby increasing its capacity. The proposal would also assist the safe and efficient freight movements along a freight route which provides for 25-26 metre B-double heavy vehicles.

5.2 Western Sydney Aerotropolis

The Western Parkland City is projected to grow from a population of 740,000 in 2016 to over 1.5 million by 2056. It is also intended to provide a greater range of job opportunities in proximity of residents. The Western Parkland City encompasses both the WSA and the broader Western Sydney Aerotropolis (Aerotropolis). The Aerotropolis would be the focal point for job creation and economic development aligned with the Airport and Western Parkland City.

A primary objective for the Western Parkland City is to provide residents with more jobs and services within a 30-minute journey of where they live. Some 200,000 jobs are planned within the Aerotropolis, meaning it is integral to achieving this objective. Furthermore, the Aerotropolis aims to enable a resilient 24-hour economy, with a transport network that supports the safe and efficient movement of people and goods.

The Aerotropolis is located within the Liverpool City Council and Penrith City Council Local Government Areas and will eventually contain ten precincts: Aerotropolis Core, Agribusiness, Badgerys Creek, Dwyer Road, Kemps Creek, Mamre Road, North Luddenham, Northern Gateway, Rossmore and Wianamatta-South Creek.

5.2.1 The Western Sydney Aerotropolis Precinct Plan

The Western Sydney Aerotropolis Precinct Plan (NSW Department of Planning and Environment, 2023) has been prepared and is in force under the provisions of *SEPP (Precincts – Western Parkland City) 2021*, Chapter 4 Western Sydney Aerotropolis. The precinct plan provides the place-based objectives and requirements to guide development in the Aerotropolis in a consistent and sustainable manner over time. This plan sets out the finer grain detail to support the land use zoning and other provisions of the Aerotropolis SEPP.

This precinct plan applies to five precincts within the Western Sydney Aerotropolis, as shown on the Land Application Map at Figure 5-2:

- Aerotropolis Core
- Badgerys Creek
- Wianamatta-South Creek
- Northern Gateway
- Agribusiness (excluding Luddenham Village as shown on Figure 5-2).

Planning for the remaining precincts will be undertaken at a later stage, and the provisions of other planning instruments continue to apply to those areas.

The precinct plan outlines a movement framework and related transport objectives for the development of the above five precincts. One of the objectives of the movement framework is to 'Create a road network for private vehicles and freight which can provide efficient links and integration to the broader regional network while also supporting local accessibility in centres and between places.'

In this plan Elizabeth Drive is designated as a primary arterial road, with signalised intersections to other primary and sub-arterial roads that traverse each of the precincts. One of the requirements of the precinct plan is that the roads and streets are to be designed in accordance with the Western Sydney Street Design Guidelines (Western Sydney Planning Partnership, 2020). The Western Sydney Street Design Guidelines outlines that arterial roads functions as primary freight and through traffic routes, while also supporting Rapid Bus routes at key locations. Arterial roads are generally two to three lanes in each direction.

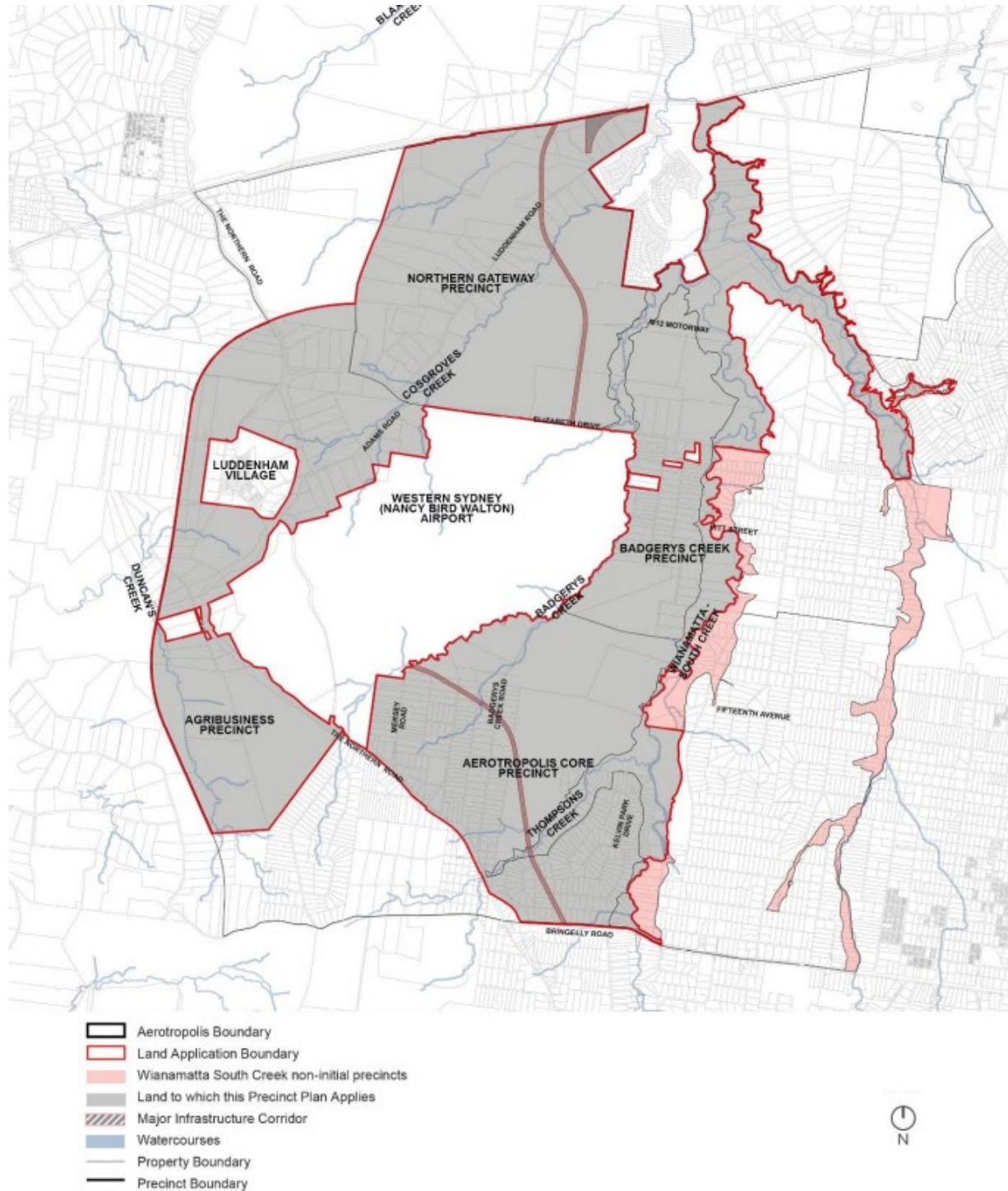


Figure 5-2 Western Sydney Aerotropolis precincts

Source: Western Sydney Aerotropolis Precinct Plan

One of the five initial precincts namely the Badgerys Creek Precinct interfaces with Elizabeth Drive with direct access from the road to the precinct. Badger creek precinct is to the south of the construction footprint.

Elizabeth Drive would provide indirect access to the other four precincts.

Badgerys Creek

Badgerys Creek Precinct will support the WSA operations and be well connected to the Aerotropolis Core metropolitan centre to the south and the Northern Gateway to the north-west. The Precinct will transform from lower density and less intensive land uses, buildings and structures to higher order employment-focused technology, advanced manufacturing and industry uses with the opportunity for between 9,000 – 11,000 jobs. The Precinct will be linked to the east across Wianamatta-South Creek to areas such as Rossmore.

The Precinct adjoins the WSA with access to Elizabeth Drive and the M12 Motorway. New developments will be designed to benefit from nearby major infrastructure and to appropriately integrate with existing resource recovery industries and new circular economy hubs.

5.2.2 Development sequencing and high priority areas

Within each Precinct, areas are categorised or sequenced into first, second and third priority areas. First priority areas align with the first stages of transport and utilities infrastructure delivery and are intended to be the initial stages of development, working towards achieving the employment and population targets of the Western Sydney Aerotropolis Plan.

The Elizabeth Drive upgrades are critical to the development sequencing as set out in the precinct plan objectives. Objective DS03 of the precinct plan seeks to align the sequencing of development within the Western Sydney Aerotropolis with the following criteria of relevance to the proposal: proximity to, and the timing of delivery of the M12 Motorway, The Northern Road and the proposal; access to the WSA for freight and passengers; and job creation potential and demand for land for new development.

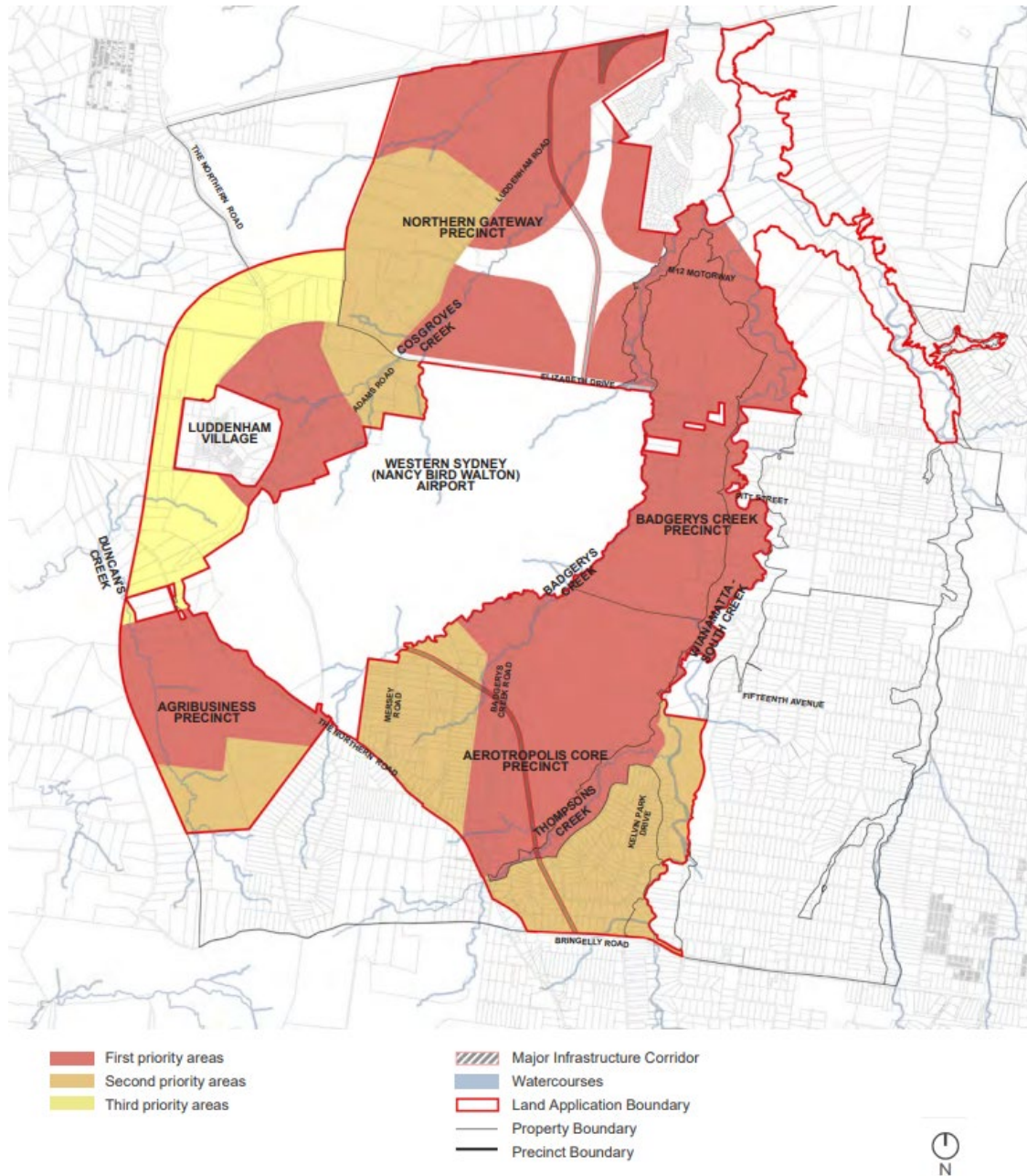


Figure 5-3 Western Sydney Aerotropolis development sequencing
Source: Western Sydney Aerotropolis Precinct Plan

5.2.3 Surrounding land use

The land use and structure plan for the five initial Aerotropolis precincts is shown in Figure 5-4.

The five initial Western Sydney Aerotropolis precincts will accommodate a range of land use zonings including agribusiness and industrial. Previous zoning within the Aerotropolis was dominated by RU1 Primary Production, RU2 Rural Landscape, RU4 Primary Production Small Lots, SP1 Special Activities and SP2 Infrastructure. Zoning has now been updated to align with the future land uses: Enterprise Zone, Agribusiness Zone, Mixed Use Zone, SP2 Infrastructure Zone and Environment and Recreation Zone. Elizabeth Drive provides an arterial function as it sits adjacent precincts that are planned to predominately be enterprise and light industry.

Due to the nature of the planned land uses listed above there are about three planned jobs for every planned resident in the five initial Western Sydney Aerotropolis precincts. This means the dominant transport task during the morning peak period will be to accommodate people travelling longer distances to the Aerotropolis from other parts of Sydney.

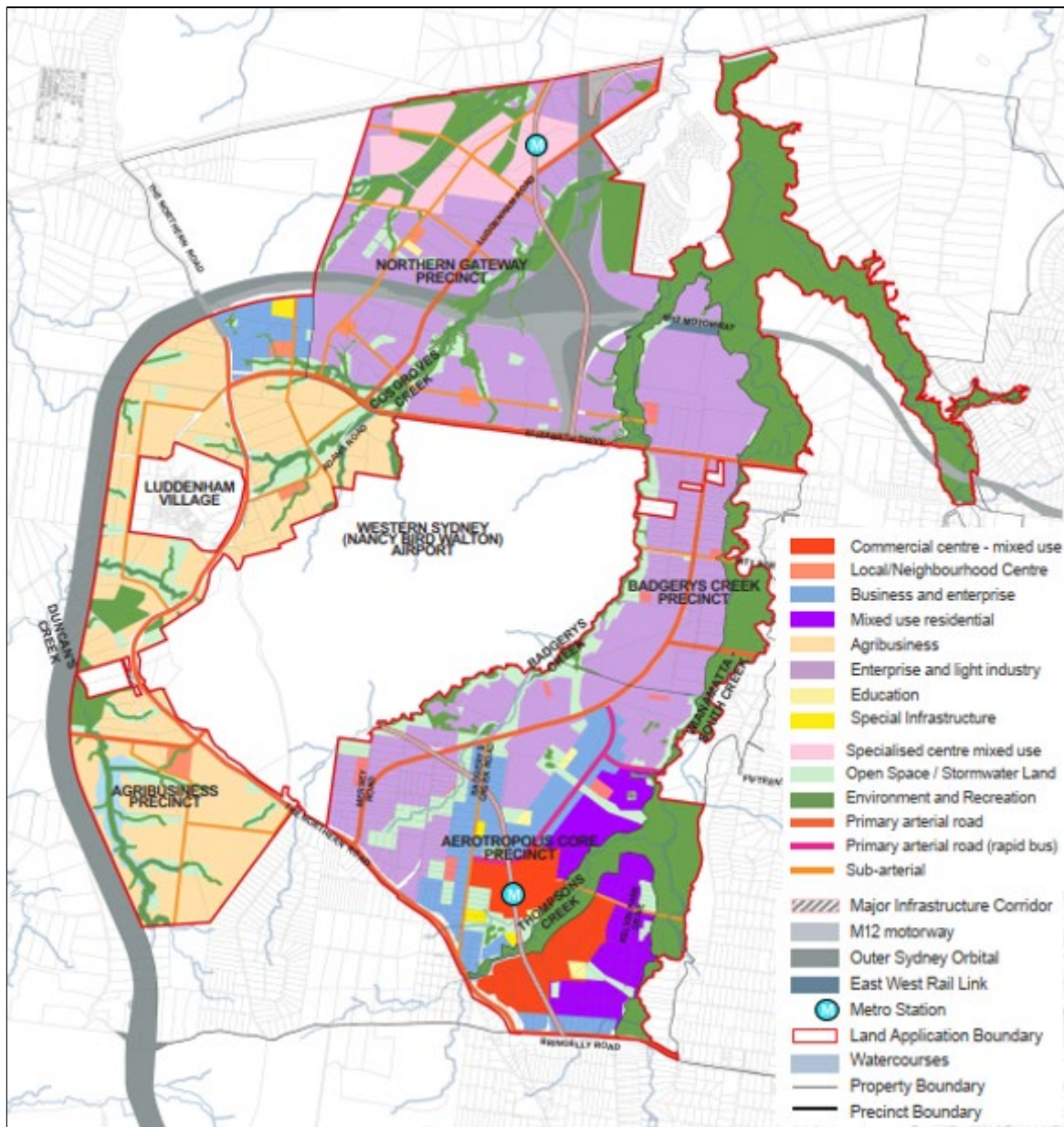


Figure 5-4 Western Sydney Aerotropolis land use
 Source: Western Sydney Aerotropolis Precinct Plan

5.2.4 Socio-economic factors

The five initial Western Sydney Aerotropolis precincts comprise about 6,600 hectares (or 59 per cent) of the overall Aerotropolis land area of 11,200 hectares.

Together, the five initial Western Sydney Aerotropolis precincts are projected to accommodate 102,000 new jobs and 34,000 new residents by 2056. This equates to a job density of 16 jobs per hectare and a population density of five residents per hectare.

These projections indicate the five initial Western Sydney Aerotropolis precincts will have a job to resident ratio of 3:1, meaning the dominant task is to transport people into the five initial Western Sydney Aerotropolis precincts from across Greater Sydney.

Table 5-1 outlines the future employment and population projections for the five initial Western Sydney Aerotropolis precincts.

Table 5-1 Future employment and population projections for the five initial precincts

Precinct	Area (hectares)	Jobs	Job density (jobs per hectare)	Residents	Population density (residents per hectare)
Aerotropolis Core	1,382	60,000	43	24,000	17
Northern Gateway	1,616	21,000	13	10,000	6
Agribusiness	1,572	10,000	16	Minimal	0
Badgerys Creek	612	11,000	18	No additional	0
Wianamatta – South Creek	1,392	0	0	0	0
Total	6,574	102,000		34,000	

Source: *Western Sydney Aerotropolis Transport Planning and Modelling, AECOM 2021*

Aerotropolis Core is projected to have the highest number of jobs (60,000) and the highest job density (43 jobs per hectare). It is also projected to have the highest number of residents (24,000) and the highest population density (17 residents per hectare).

In contrast, Wianamatta – South Creek is expected to become a recreational and environmental precinct with no development planned. As such, it is not expected to accommodate jobs or housing.

5.2.5 Transport strategy and travel characteristics

Planning for land uses needs to be balanced against different customer requirements to develop a cohesive transport framework, across all modes, that caters for all users. This balance of strategic and local travel demands will facilitate sustainable patterns of movement and mobility.

Section 4.6 of the Western Sydney Aerotropolis Precinct Plan identifies key objectives that form the basis of the transport strategy for the area. These objectives are as follows:

- Use the Transport Network to move people and goods safely and efficiently and create connections between places
- Integrate land and prioritise public transport to support the 30-minute city and meet current and future demand
- Create a road network for private vehicles and freight which can provide efficient links and integration to the broader regional network while also supporting local accessibility in centres and between places
- Provide safe, direct and interconnected pedestrian and cycling links to a variety of destinations and transport nodes

- Encourage active transport through cycle and pedestrian network integrated with the road network and the Blue-Green Infrastructure Framework
- The transport network contributes to achievement of the following modal split targets (listed in Table 5-2).

Table 5-2 Future modal split targets in the Western Sydney Aerotropolis

Precinct	Target mode share		
	Active transport	Public transport	Private vehicle
2026			
Aerotropolis Core	4%	20%	76%
Northern Gateway	3%	16%	81%
Agribusiness	2%	16%	82%
Badgerys Creek	2%	18%	79%
Aerotropolis wide (average)	3%	18%	79%
2036			
Aerotropolis Core	6%	34%	60%
Northern Gateway	5%	31%	64%
Agribusiness	2%	16%	82%
Badgerys Creek	2%	18%	80%
Aerotropolis wide (average)	5%	30%	65%
2056			
Aerotropolis Core	9%	52%	39%
Northern Gateway	7%	43%	50%
Agribusiness	2%	16%	82%
Badgerys Creek	2%	18%	80%
Aerotropolis wide (average)	7%	43%	50%

Source: *The Western Sydney Aerotropolis Precinct Plan*

5.2.6 Road network upgrades

Table 5-3 highlights key road network upgrade projects within Western Sydney. A number of these road upgrades are being delivered under the Western Sydney Infrastructure Plan 2019 (WSIP; Australian Government, 2019). The WSIP is a ten-year program of work delivering new and upgraded roads in Western Sydney. The plan aims to deliver a quality surface transport network ensuring efficient movement of passengers, employees and freight when WSA opens in 2026. It aims to achieve this by providing better road linkages within the western Sydney region to support the region's growing population.

The upgrade Elizabeth Drive aligns with the objectives of the plan as an important transport link between the Western Sydney region to the new Aerotropolis precinct.

Table 5-3 Road infrastructure projects within the region

Project	Description
Elizabeth Drive West Upgrade	<ul style="list-style-type: none"> Proposed upgrade of about 3.6 kilometres of Elizabeth Drive from The Northern Road at Luddenham to near Badgerys Creek Road at Badgerys Creek where it would connect with the future M12 Motorway Subject to a separate REF, which will be determined (approved) by Transport.
Mamre Road Upgrade	<ul style="list-style-type: none"> Planned upgrade between M4 Motorway and Kerrs Road, including widening to four lanes and signalisation of intersections Mamre Road is a key connector between the Western Sydney Employment Area and Western Sydney Aerotropolis
M12 Motorway	<ul style="list-style-type: none"> Motorway connection (under construction) between M7 Motorway and The Northern Road with direct access to Western Sydney Aerotropolis Intended to serve as the major access route to the WSA and connect to Sydney's motorway network The project also includes the Elizabeth Drive Connection, which would modify the existing intersections with the M7 Motorway at Elizabeth Drive to cater for the M12 Motorway connections with Elizabeth Drive Construction of the motorway commenced in 2022 and is planned to be completed in late 2025 prior to the WSA opening in late 2026
M7 Motorway Widening	<ul style="list-style-type: none"> Planned widening with an additional traffic lane in both directions within the existing median of the M7 Motorway, from approximately 140 metres south of the Kurrajong Road overhead bridge at Prestons to the M7 Motorway bridge at Richmond Planned to be constructed between 2023 and 2025

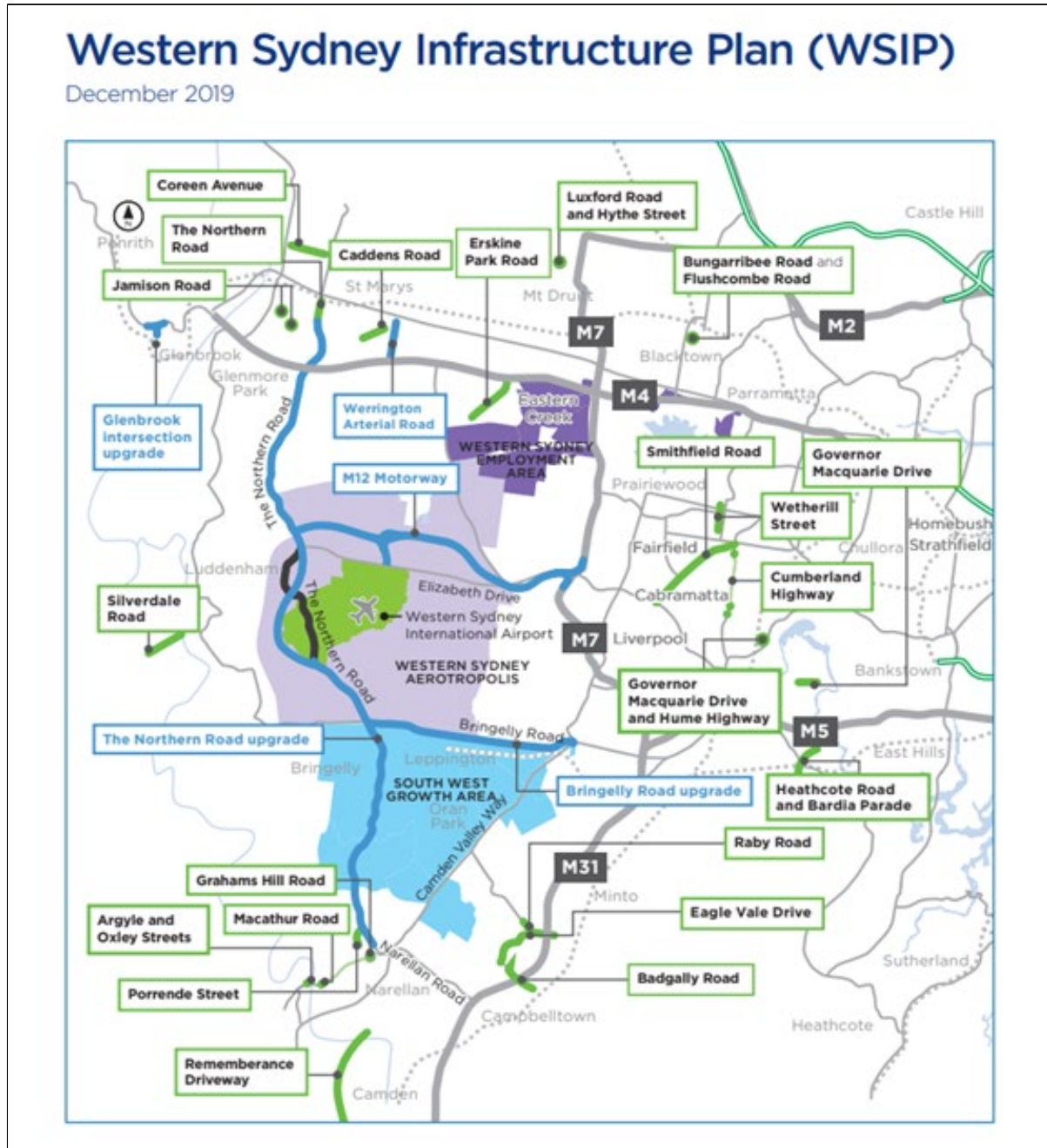


Figure 5-5 Western Sydney Infrastructure Plan

(Source: Australian Government 2019)

5.2.7 Sydney Metro Western Sydney Airport

Sydney Metro Western Sydney Airport (currently under construction) is a new 23 kilometre metro that will link St Marys through to the new WSA and Aerotropolis and will have six new Metro stations:

- St Marys
- Orchard Hills
- Luddenham
- Airport site (two stations)
- Western Sydney Aerotropolis.

Sydney Metro services will provide connections between the Northern Gateway, the WSA and Aerotropolis Core Precinct.

5.2.8 Bus network

The *Western Sydney City Deal – Smart Cities Plan* (Western Sydney City Deal Delivery Office, 2018) outlines the plan for Penrith, Liverpool and Campbelltown to be connected by fast and frequent Rapid Bus services that will provide additional connectivity to the airport and Western Sydney Aerotropolis from 2026. Frequent and local bus services would also provide access to Rapid Bus services.

The Rapid Bus network would support Greater Sydney's integrated transport system by offering customers a fast, frequent and reliable moderate- to high-capacity mode on city-shaping and city-serving corridors. The five initial Aerotropolis precincts will have direct Rapid Bus connections to other metropolitan city clusters such as Campbelltown-Macarthur, Liverpool, Penrith and the WSA.

The Western Sydney Aerotropolis Plan identifies Elizabeth Drive as a Rapid Bus Corridor as shown in Figure 5-6. The proposal aligns with the plan by providing bus jump facilities at each signalised intersection on both directions of Elizabeth Drive, which would support the provision of Rapid Bus services.

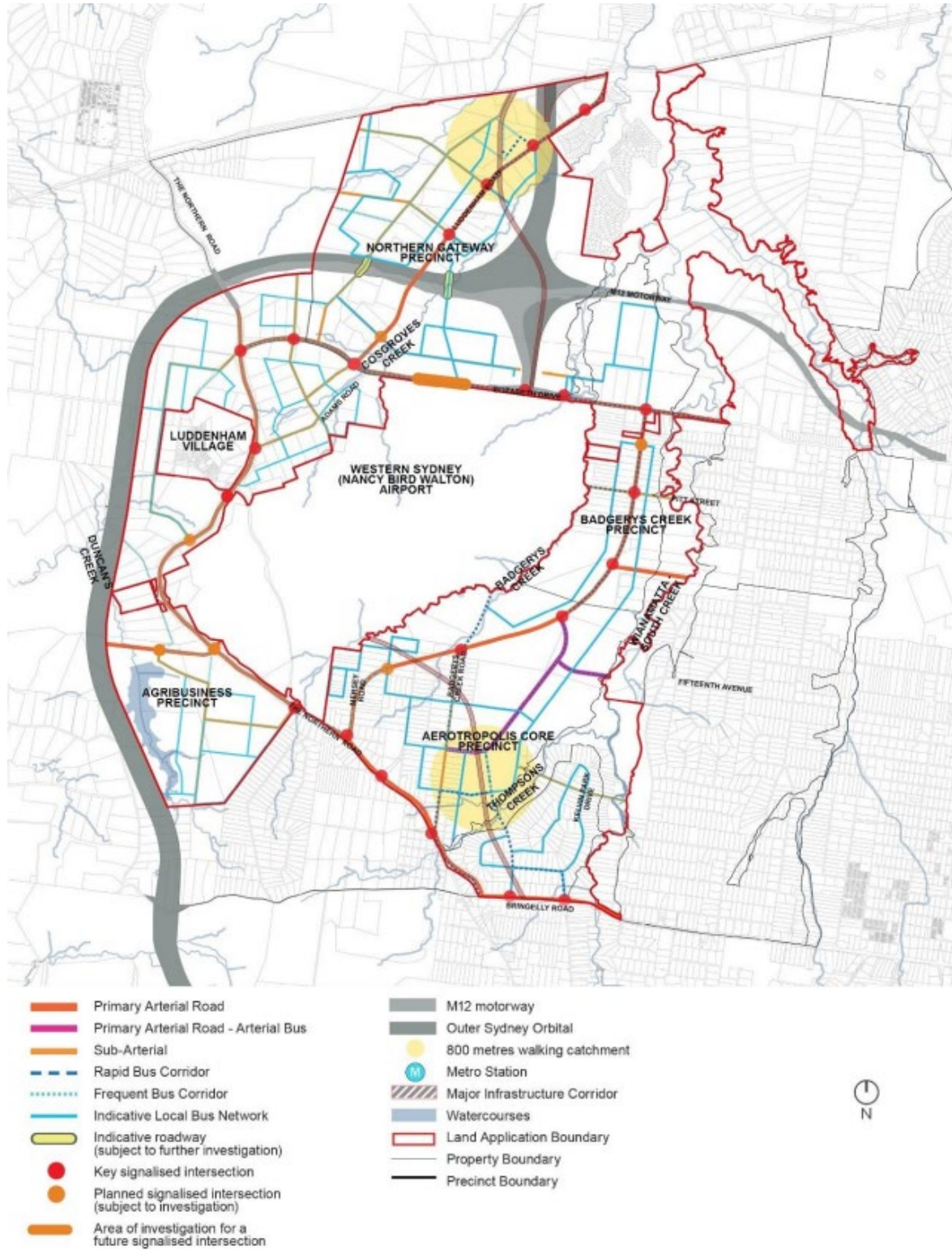


Figure 5-6 Western Sydney Aerotropolis Transport Network

Source: Western Sydney Aerotropolis Precinct Plan

5.2.9 Active transport

The Western Sydney Aerotropolis Plan identifies Elizabeth Drive as a part of the off-road principal regional cycle path network as shown in Figure 5-7. The proposal aligns with the plan by providing shared walking and cycling paths along both sides of Elizabeth Drive with cycle crossing facilities at every intersection.

The shared walking and cycling paths on Elizabeth Drive delivered as part of the proposal would to the planned shared paths on the M12 Motorway.

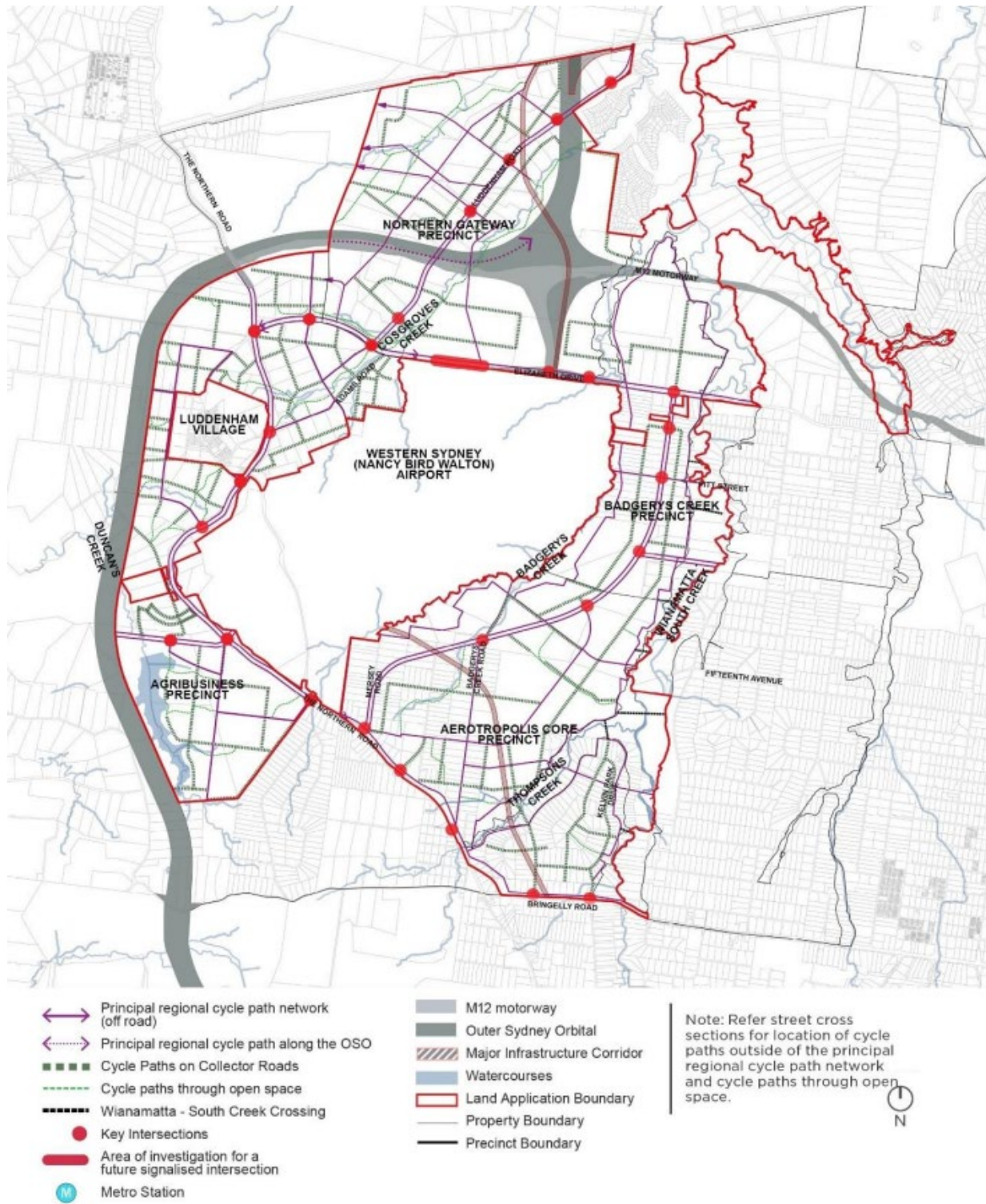


Figure 5-7 Western Sydney Aerotropolis Active Transport Network

Source: Western Sydney Aerotropolis Precinct Plan

6.0 Operational impact assessment

The operational traffic assessment has addressed:

- Traffic impacts for two design years, 2030 and 2040, of the weekday peak for both the do-nothing and the proposal scenarios
- Impacts of the increase in background traffic due to forecast levels of development, particularly with regard to the WSA and associated land use changes.

6.1 Road network performance

6.1.1 Network performance

Table 6-1 compares the forecast performance statistics for the study area with and without the proposed upgrades in 2030 and 2040. The assessment includes the full Elizabeth Drive upgrades between The Northern Road and M7 Motorway.

Analysis of the network performance indicates the following:

- Traffic demands remain relatively consistent between the 'do-nothing' and Elizabeth Drive upgrades scenarios in 2030 and 2040
- VKT increases during the peak hours by up to 16 per cent in 2030 and by up to 31 per cent hours in 2040 with Elizabeth Drive upgrades compared to do-nothing scenarios indicating an improved network performance
- A reduction in the VHT during the peak hours by up to 27 per cent in 2030 and by up to 28 per cent in 2040 with Elizabeth Drive upgrades compared to do-nothing scenarios indicating an improved network performance
- An increase in the average speeds along the corridor during the peak hours by up to 58 per cent in 2030 and by up to 81 per cent in 2040 with Elizabeth Drive upgrades compared to do-nothing scenarios
- In 2040 do-nothing scenarios, 10.9 per cent of vehicles in the AM peak period and 10.3 per cent of vehicles in the PM peak period of the forecast demand were unable to enter the network. This percentage drops to only 0.5 per cent of vehicles in the AM peak and 2.6% of vehicles in the PM peak with Elizabeth Drive upgrades. It is anticipated that real time signal coordination and the Intelligent Transport Systems (ITS) would further reduce the congestion on the road network when those systems are fully deployed.

Elizabeth Drive upgrades would generally improve traffic conditions in the study area in both 2030 and 2040, particularly in the PM peak hour. The upgrades are expected to reduce delays, increase the average speed across the network and accommodate the majority of the future traffic demands.

Table 6-1 Study area network statistics 2030 and 2040*

Attribute	Peak (2hrs)	2030			2040		
		Do nothing	ED upgrades	Change	Do nothing	ED upgrades	Change
Total traffic demand (vehicles)	AM	40,361	40,188	-	50,981	51,027	-
	PM	40,715	39,949	-2%	51,677	51,411	-1%
VKT (km)	AM	164,153	178,210	9%	164,734	212,655	29%
	PM	156,900	181,987	16%	162,884	213,786	31%
VHT (hours)	AM	3,404	3,241	-5%	4,729	4,853	3%
	PM	4,684	3,440	-27%	7,112	5,152	-28%
Total vehicles entering the network	AM	39,317	40,184	2%	45,433	50,757	12%
	PM	39,050	39,945	2%	46,358	50,097	8%
Average trip speed (km/h)	AM	48.2	55	14%	34.8	43.8	26%
	PM	33.5	52.9	58%	22.9	41.5	81%
Total unreleased trips **	AM	1,044	3	-1,040	5,548	270	-5,278
	PM	1,665	3	-1,662	5,319	1,314	-4,006

* Refer to Figure 3-1 for the extents of the study area

** Unreleased trips refer to traffic that is being held outside the extents of the study area due to congested entry points. Those trips are included in the traffic demand but not included in other network statistics for failing to join the traffic in the network

It should be noted that the future traffic demands were derived from the Sydney Motorway Planning Model (SMPM) for the do-nothing and Elizabeth Drive upgrade scenarios. Those traffic demands would not be identical in both scenarios.

6.1.2 Midblock performance

The peak hour directional traffic flow within the proposal are summarised in Table 6-2 and Table 6-3. VCR for the peak direction traffic volumes were calculated assuming a capacity of 2,400 vehicles per lane per hour.

Significant congestion occurs for vehicles entering / exiting the side roads in the do-nothing scenarios, resulting in reduced volumes along Elizabeth Drive. Furthermore, there are a number of unreleased trips in the model at the end of the modelling period as shown in Table 6-1. Those unreleased trips were unable to travel along side roads or Elizabeth Drive. This indicates that the network is already operating at maximum capacity and therefore VCR assessment was not calculated for the do-nothing scenarios as the results would not reflect the level of congestion on the network.

In the do-nothing scenarios, delays are expected for local traffic conflicting with major through traffic movements along Elizabeth Drive. Travel times on Elizabeth Drive are expected to increase as the level of congestion increases. Long delays in the do-nothing scenarios could result in social impacts as future residents spend more time travelling by car, and impose limitations to future growth in the area due to its restricted accessibility via a constrained road network.

Increases in travel times on Elizabeth Drive could also reduce the attractiveness of the proposed Western Sydney Aerotropolis area to commercial businesses and could have an adverse impact on the function of Elizabeth Drive as a key freight route.

The results indicate that there would be sufficient capacity on Elizabeth Drive to accommodate the 2030 and 2040 future demands.

Table 6-2 Traffic volumes in 2030 with the proposal

Road Segment	Direction	2030 (The proposal)			
		AM		PM	
		Traffic Volumes (veh)	VCR	Traffic Volumes (veh)	VCR
M12 Motorway off-ramp to Duff Road	Eastbound	2,540	0.53	1,760	0.37
	Westbound	1,400	0.29	2,430	0.51
Duff Road to Range Road	Eastbound	2,270	0.47	1,540	0.32
	Westbound	1,320	0.28	2,280	0.48
Mamre Road to Devonshire Road	Eastbound	1,780	0.37	1,470	0.31
	Westbound	1,100	0.23	1,840	0.38
Devonshire Road to Western Road	Eastbound	1,450	0.30	1,240	0.26
	Westbound	1,080	0.23	1,410	0.29
Western Road to Martin Road	Eastbound	1,250	0.26	1,060	0.22
	Westbound	940	0.20	1,300	0.27

Table 6-3 Traffic volumes in 2040 with the proposal

Road Segment	Direction	2040 (The proposal)			
		AM		PM	
		Traffic Volumes (veh)	VCR	Traffic Volumes (veh)	VCR
M12 Motorway off-ramp to Duff Road	Eastbound	2,540	0.53	1,760	0.37
	Westbound	1,400	0.29	2,430	0.51
Duff Road to Range Road	Eastbound	2,270	0.47	1,540	0.32
	Westbound	1,320	0.28	2,280	0.48
Mamre Road to Devonshire Road	Eastbound	1,780	0.37	1,470	0.31
	Westbound	1,100	0.23	1,840	0.38
Devonshire Road to Western Road	Eastbound	1,450	0.30	1,240	0.26
	Westbound	1,080	0.23	1,410	0.29
Western Road to Martin Road	Eastbound	1,250	0.26	1,060	0.22
	Westbound	940	0.20	1,300	0.27

6.1.3 Intersection performance

The modelled future performance for the intersections within the proposal are shown in Table 6-4. The intersections within the proposal are not signalised in the do-nothing scenarios and therefore the LoS is based on the worst movement. With the proposal, those intersections would be signalised and, therefore, the LoS is representative of the overall performance.

In the 2030 and 2040 do-nothing scenarios, all intersections are expected to operate with LoS F except for the intersection of Elizabeth Drive and Mamre Road which shows a satisfactory LoS B in the 2030 and 2040 conditions and the intersection of Elizabeth Drive and Western Road which is expected to operate at LoS C in 2030 PM peak and 2040 AM peak.

With the network already operating at maximum capacity in the 2030 and 2040 do-nothing scenarios, the level of congestion at those intersections is likely to be higher than what the results show. Due to the limitations of the traffic model, the results reflect the performance of intersections for the released trips only. The performance at the intersections in the do-nothing scenarios would likely be worse if all traffic was able to enter the network and was assessed.

With the proposal, the six intersections are anticipated to operate satisfactorily (LoS D or better) during both peaks in the 2030 conditions. In the 2040 conditions, the intersections of Elizabeth Drive/Range Road, Elizabeth Drive/Devonshire Road/Salisbury Avenue are expected to operate with LoS E in one of the two peaks.

The intersections of Elizabeth Drive / Range Road and Elizabeth Drive / Devonshire Road / Salisbury Avenue are expected to operate at LoS E during the PM peak in 2040 conditions with the proposal. The intersection of Elizabeth Drive / Martin Road is expected to operate at LoS E/F during the peak hours in 2040 with the proposal albeit with less than half of the expected delays without the upgrades.

It is anticipated that real time signal coordination and the Intelligent Transport Systems (ITS) would further reduce the congestion on the road network when those systems are fully deployed. The proposal also provides a wider median to allow for a third lane on both directions of Elizabeth Drive to increase the capacity in the future if needed.

Table 6-4 Intersection Performance in 2030 and 2040

Intersection with Elizabeth Drive	Peak	2030 (Do nothing)		2030 (The proposal)		2040 (Do nothing)		2040 (The proposal)	
		Delay (s)	LoS	Delay (s)	LoS	Delay (s)	LoS	Delay (s)	LoS
Duff Road	AM	>250	F	19	B	>250	F	34	C
	PM	>250	F	21	B	160	F	22	B
Range Road	AM	232	F	36	C	>250	F	57	E
	PM	>250	F	31	C	>250	F	49	D
Mamre Road	AM	28	B	35	C	14	B	45	D
	PM	229	F	34	C	242	F	39	C
Devonshire Road / Salisbury Ave	AM	>250	F	31	C	>250	F	54	D
	PM	76	F	29	C	>250	F	65	E
Western Road	AM	125	F	20	B	39	C	30	C
	PM	36	C	25	B	>250	F	33	C
Martin Road	AM	297	F	35	C	>250	F	60	E
	PM	>250	F	47	D	>250	F	114	F

6.1.4 Heavy vehicle traffic

It is expected that the WSA and the associated developments would be a significant attractor of heavy vehicle traffic.

The forecast heavy vehicle traffic volumes along Elizabeth Drive in 2030 and 2040 are shown in Table 6-5. The proportion of heavy vehicles on Elizabeth Drive in 2040 is relatively high, indicating the continued reliance on Elizabeth Drive as a key heavy vehicle route. However, the proportion of heavy vehicles remains reasonably consistent between the do-nothing and the proposal scenarios.

Table 6-5 Heavy vehicles percentage in 2030 and 2040

Direction	2030 (do nothing)		2030 (proposal)		2040 (do nothing)		2040 (proposal)	
	AM	PM	AM	PM	AM	PM	AM	PM
Eastbound	13%	14%	13%	14%	20%	14%	14%	12%
Westbound	17%	11%	16%	10%	15%	10%	13%	11%

It should be noted that the future traffic demands including the percentage of heavy vehicles were derived from the Sydney Motorway Planning Model (SMPM) for the do-nothing and Elizabeth Drive upgrade scenarios. The traffic demands would be close but not identical in both scenarios.

6.1.5 Average speed

Table 6-6 presents the modelled average speeds along Elizabeth Drive during peak hours with the proposal. The results show improved average speeds of up to 31% in 2030 and up to 35% in 2040. Improved average speeds along the corridor indicates a reduction in congestion.

The results show a reduction of average speeds at two locations (-1%) in 2030 scenarios and six locations in 2040 scenarios (-5% to -13%) with the proposal. As discussed in Table 6-1, the results for the do-nothing scenarios reflect the network performance for the released trips only. The network performance in the do-nothing scenarios would likely be worse if all traffic was able to enter the network and was assessed.

Table 6-6 Average speeds in 2030 and 2040

Road Segment on Elizabeth Drive	Peak	Direction	2030			2040		
			Do nothing	Proposal	% Diff	Do nothing	Proposal	% Diff
M12 Motorway off-ramp to Duff Road	AM	Eastbound	73	74	1%	73	69	-6%
		Westbound	50	72	31%	46	71	35%
Duff Road to Range Road		Eastbound	68	67	-1%	69	61	-13%
		Westbound	62	65	5%	63	70	10%
Mamre Road to Devonshire Road		Eastbound	59	80	26%	60	76	21%
		Westbound	72	74	3%	70	74	5%
Devonshire Road to Western Road		Eastbound	57	67	15%	49	65	25%
		Westbound	69	81	15%	78	74	-5%

Road Segment on Elizabeth Drive	Peak	Direction	2030			2040		
			Do nothing	Proposal	% Diff	Do nothing	Proposal	% Diff
Western Road to Martin Road		Eastbound	78	80	3%	77	79	3%
		Westbound	60	80	25%	60	78	23%
M12 Motorway off-ramp to Duff Road		Eastbound	73	74	1%	73	69	-6%
		Westbound	50	72	31%	46	71	35%
Duff Road to Range Road		Eastbound	68	67	-1%	69	61	-13%
		Westbound	62	65	5%	63	70	10%
Mamre Road to Devonshire Road	PM	Eastbound	59	80	26%	60	76	21%
		Westbound	72	74	3%	70	74	5%
Devonshire Road to Western Road		Eastbound	57	67	15%	49	65	25%
		Westbound	69	81	15%	78	74	-5%
Western Road to Martin Road		Eastbound	78	80	3%	77	79	3%
		Westbound	60	80	25%	60	78	23%

6.2 Road safety

With the projected increase in future traffic demands, and without improving the existing conditions, the potential for vehicle crashes is likely to increase, especially at major intersections along Elizabeth Drive. Signalising the key intersections as part of the proposal would help ease the expected traffic congestion resulting in improved safety conditions.

In the do-nothing scenario, access to and from local and private roads are expected to be more difficult with increased volumes of through traffic on Elizabeth Drive. Motorists may take greater risks to turn onto Elizabeth Drive as gaps in the flow of traffic would be less frequent. The proposal has been designed to formalise property access which would improve road safety conditions.

The proposal aligns with several national and state road safety strategies.

National Road Safety Strategy 2021-2030

The *National Road Safety Strategy 2021-2030* aims to identify initiatives to improve the safety of Australia's roads. The strategy aims to reduce the annual number of road crash fatalities and serious road crash injuries by at least 50 per cent by the end of 2030. The proposal would provide the opportunity to reduce crashes, as it would increase capacity for traffic through additional lanes, introduce a central median, a signalised intersection, and walking and cycling facilities including a shared path. By improving road safety, the proposal would directly support the aims of this strategy.

Road Safety Plan 2021

The *2026 Road Safety Action Plan: Toward zero trauma on NSW roads* (Transport for NSW, 2022) sets the direction for road safety in NSW. The NSW Government has set a vision to achieve zero fatalities and serious injuries by 2050. Targets have also been established to halve fatalities on NSW roads, and reduce serious injuries by 30 per cent, by 2030.

The proposal supports the priorities set out in this plan as it would provide a better standard of road and road safety improvements. These include:

- Separation of carriageways through the provision of a central median
- Widening and sealing road shoulders
- Providing a new road surface
- Formalising walking and cycling facilities
- Provision of six new signalised intersections of Elizabeth Drive and Martin Road, Western Road, Salisbury Avenue / Devonshire Road, Mamre Road, Range Road and Duff Road.

6.3 Impacts on property access

To improve the safety features of the road, the construction of a central median is proposed on Elizabeth Drive as part of the proposal, and property owners would need to use the existing and proposed U-turn facilities to access properties in the opposite direction of travel which would slightly increase the travel time. The travel time assessment carried out provides high level information on the potential impacts of the proposal on the travel time needed for local access.

Ifraan College is currently accessed via one of two access points on Duff Road. The access point closer to the Duff Road and Elizabeth Drive intersection would be changed into left in and left out only. This would likely prevent queuing on Duff Road to the Elizabeth Drive and Duff Road intersection by school traffic.

To mitigate the loss of this direct property access, the proposal would provide several U-turn facilities to be used primarily for local property access. The following U-turn facilities would be constructed as part of the proposal:

- Martin Road: A proposed provision for a U-turn function on the northern approach to be constructed as part of the proposal to facilitate travelling eastbound on Elizabeth Drive
- Western Road: A proposed provision for a U-turn function on the northern approach to be constructed as part of the proposal to facilitate travelling eastbound on Elizabeth Drive. The facility would facilitate the access from the westbound direction to the existing businesses between Clifton Avenue and Salisbury Avenue presented as Section 2 in Figure 6-1 below
- Salisbury Avenue: A proposed roundabout on the northern approach to be constructed as part of the proposal to facilitate travelling eastbound on Elizabeth Drive. The facility would facilitate the access from the westbound direction to the existing businesses east of Salisbury Avenue presented as Section 3 in Figure 6-1 below
- Range Road: A proposed provision for a U-turn function on the northern approach to be constructed as part of the proposal to facilitate travelling eastbound on Elizabeth Drive.

The Aimsun microsimulation traffic model undertaken for the study area does not include local access points and therefore the road was divided into sections between the U-turn facilities as shown in Figure 6-1 to estimate the travel time between those sections.

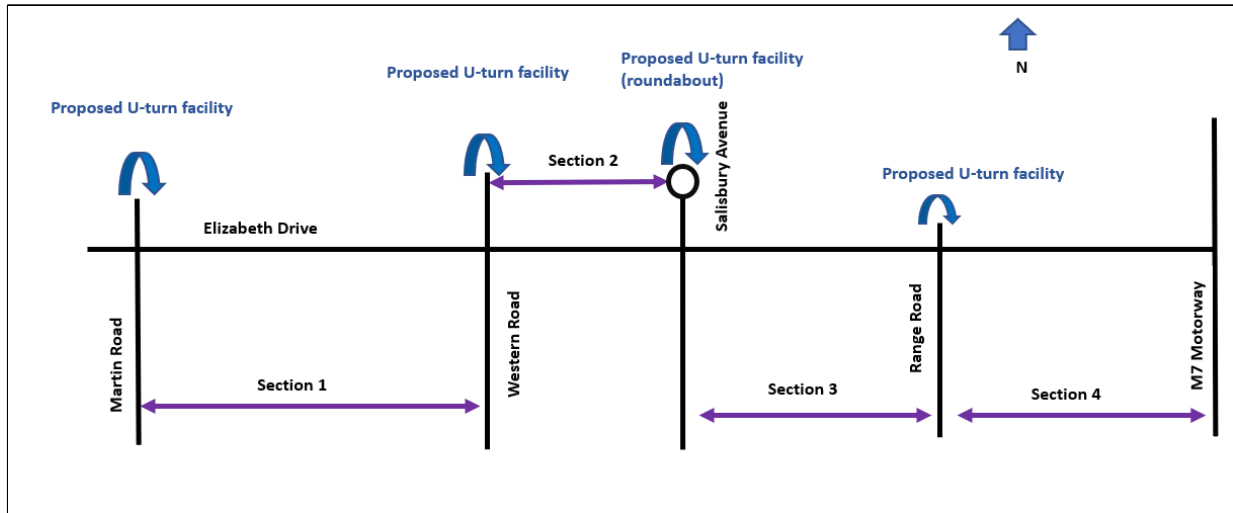


Figure 6-1 Travel time sections

Table 6-7 presents the expected travel time between the U-turn facilities in both directions.

Table 6-7 Travel time between U-turn facilities

Section	Peak	2030			2040		
		Do nothing	The proposal	Difference	Do nothing	The proposal	Difference
Section 1 EB	AM	0:01:29	0:01:34	+0:00:06	0:01:38	0:01:48	+0:00:10
Section 1 WB		0:01:27	0:01:43	+0:00:16	0:01:28	0:02:54	+0:01:26
Section 2 EB		0:01:07	0:01:17	+0:00:10	0:02:48	0:01:24	-0:01:24
Section 2 WB		0:00:58	0:00:59	+0:00:01	0:00:54	0:01:07	+0:00:12
Section 3 EB		0:02:29	0:02:32	+0:00:03	0:02:31	0:03:41	+0:01:11
Section 3 WB		0:02:03	0:02:25	+0:00:22	0:02:16	0:02:26	+0:00:10
Section 4 EB		0:03:18	0:03:17	-0:00:01	0:03:08	0:04:19	+0:01:10
Section 4 WB		0:03:07	0:03:25	+0:00:19	0:03:12	0:03:45	+0:00:33
Total EB		0:08:22	0:08:40	+0:00:20	0:10:05	0:11:12	+0:03:55
Total WB		0:07:35	0:08:32	+0:00:58	0:07:51	0:10:12	+0:02:21
Section 1 EB	PM	0:01:23	0:01:45	+0:00:22	0:15:04	0:01:51	-0:13:13
Section 1 WB		0:01:27	0:01:54	+0:00:27	0:01:26	0:03:10	+0:01:44
Section 2 EB		0:01:13	0:01:10	-0:00:02	0:12:58	0:01:39	-0:11:18
Section 2 WB		0:00:56	0:01:06	+0:00:10	0:00:53	0:01:17	+0:00:24
Section 3 EB		0:08:44	0:02:23	-0:06:21	0:06:40	0:02:59	-0:03:41
Section 3 WB		0:04:15	0:02:31	-0:01:44	0:04:25	0:02:59	-0:01:26
Section 4 EB		0:03:56	0:03:54	-0:00:02	0:04:09	0:04:21	+0:00:12
Section 4 WB		0:10:17	0:03:29	-0:06:48	0:11:04	0:04:08	-0:06:56

Section	Peak	2030			2040		
		Do nothing	The proposal	Difference	Do nothing	The proposal	Difference
Total EB		0:15:15	0:09:12	-0:06:47	0:38:51	0:10:50	-0:28:25
Total WB		0:16:55	0:09:01	-0:09:09	0:17:48	0:11:34	-0:10:30

The results indicate that in general, with the central median restricting direct access to properties from the opposite side of Elizabeth Drive, the proposal would increase travel time needed to access those properties in 2030 and 2040 conditions. A maximum increase of about 104 seconds is estimated for property access between Western Road and Martin Road (Section 1) when travelling in the westbound direction in 2040 scenarios.

6.3.1 Travel time

The highest increase in modelled time is recorded between Western Road and Martin Road westbound (Section 1) during the 2040 PM peak. However, this increase is expected to be largely attributed to more trips being released into the network in the Elizabeth Drive upgrade scenarios (99.9% of the traffic demands) compared to only 89% in the congested do-nothing scenarios as previously discussed in Table 6-1. Due to the limitations of the traffic model, only released trips are calculated in the network statistics and travel time analysis.

In 2040, the proposal is anticipated to reduce travel time for vehicles travelling between the M7 Motorway and Martin Road (Section 1 to Section 4) by nearly four minutes in the eastbound and more than two minutes in the westbound direction during the AM peak. In the 2040 PM peak, the proposal is anticipated to reduce travel time between M7 Motorway to Martin Road by more than 28 minutes on the eastbound direction and more than 10 minutes in the westbound direction.

It should be noted that the anticipated benefits are likely to exceed those reported in the tables as the road network would be operating with maximum capacity in the do-nothing scenarios in 2030 and 2040.

6.4 Impacts on active transport

The proposal would improve the provision for active transport by providing shared walking and cycling paths on both sides of Elizabeth Drive, with cycling crossing facilities at the six new signalised intersections on Elizabeth Drive also proposed. The shared walking and cycling paths would improve the connectivity for cyclists on the network by connecting the proposed shared path to the new shared path along the future M12 Motorway.

6.5 Impacts on off-street parking

The proposal would require the full and partial acquisition of a number of lots, which would impact off-street parking facilities at social infrastructure and businesses adjacent to Elizabeth Drive. A summary of the potential permanent impacts to existing off-street parking supply is provided in Table 7-2.

The proposal would impact a number of private properties including land that is informally used for parking. In some locations, the proposal would also require changes to the parking area access. At the Australia Post Kemp's Creek LPO, access would be reconfigured to be via adjacent lots. The largest loss of off-street parking would be at the Bill Anderson Reserve, where about half of the existing parking spaces would be acquired. During detailed design, Transport would consult with affected businesses and property owners to identify suitable alternative parking arrangements (refer to Section 8.0).

6.6 Cumulative impact assessment

As identified in Section 3.0, operational traffic modelling has considered both Elizabeth Drive upgrades. As such, cumulative benefits and impacts on road network performance have been considered in the assessment of road network performance in Section 6.1. Other cumulative benefits of the Elizabeth Drive upgrades would include the following:

- The Elizabeth Drive upgrades would connect the WSA, the Western Sydney Aerotropolis industrial and commercial developments, and new residential and employment hubs
- The Elizabeth Drive upgrades would collectively improve conditions for cyclists and pedestrians in the region by providing shared walking and cycling paths, which are connected to the wider cycling network, and cycling crossings facilities.

As discussed in Section 5.2.6, several major road infrastructure upgrades are being constructed as part of the Western Sydney Infrastructure Plan (WSIP) and are currently in different design, construction and operation stages. The Northern Road upgrades and Bringelly Road upgrades from The Northern Road to Camden Valley Way have been completed and open to traffic. The M12 Motorway is currently under construction and is expected to open by the end of 2025 before the opening of the WSA in 2026.

By the time construction of the Elizabeth Drive upgrades is completed, those road projects would be open to traffic. The upgraded road network is anticipated to ease traffic congestion and reduce travel times.

Intelligent Transport Systems (ITS) proposed along Elizabeth Drive and the adjacent projects would provide better network coordination and incident management across the region which would help provide further improvements to the travel time on the network.

7.0 Construction impact assessment

A qualitative traffic impact assessment has been carried out to assess the construction impacts from the proposal. The assessment highlights the following:

- Construction footprint
- The proposed construction work
- Hours of operation, site access and haulage routes
- Impacts on traffic routes, walking and cycling facilities and public transport.

7.1 Construction footprint

The construction footprint for the proposal is shown in Figure 1-1. The construction footprint includes both the area of permanent work and any temporary work, such as access, ancillary sites, temporary basins, and fencing.

The following four temporary construction ancillary facilities would be established to support construction of the proposal:

- Western Road (construction ancillary facility 1) – located 200 metres south of the Elizabeth Drive and Western Road intersection on the western side
- Bill Anderson Reserve (construction ancillary facility 2) – located on the southern side of the Elizabeth Drive within Bill Anderson Reserve
- Salisbury Avenue (construction ancillary facility 3) – located 100 metres north of the Elizabeth Drive and Salisbury Avenue intersection on the eastern side
- Mamre Road (construction ancillary facility 4) – located 500 metres north of the Elizabeth Drive and Mamre Road intersection on the eastern side.

7.2 Construction hours of operation

Construction would largely be carried out during standard construction working hours in accordance with the Interim Construction Noise Guideline (DECC, 2009) and the Transport Guidelines on Noise Management and Noise Mitigation:

- Monday to Friday: 7am to 6pm
- Saturday: 8am to 1pm
- Sundays and public holidays: no work.

Construction activities that involve impulsive or tonal noise emissions would be limited to the following hours in accordance with the Construction Noise and Vibration Guideline (Transport for NSW, 2016):

- Monday to Friday: 8am to 5pm
- Saturday: 9am to 1pm
- Sundays and public holidays: no work.

To minimise disruption to daily traffic and disturbance to surrounding landowners and businesses, it would be necessary to carry out some work outside of these hours. The following activities are likely to take place outside standard construction working hours:

- Delivery of construction materials and equipment
- Delivery of large components such as precast bridge components/girders
- Intersection work and tie in activities with existing roads
- Switching of traffic, including traffic management work

- Installation and adjustment of barriers and construction signage
- Operation of construction ancillary facilities to support the above work.

7.3 Construction work

Construction of the proposal would involve the following general activities:

- Site establishment including set up of construction ancillary facilities
- Utility adjustments, relocations and replacements, where required
- Demolition of existing buildings/structures
- Property adjustments (eg adjustments to fencing, property accesses)
- Vegetation removal
- Earthworks and drainage work
- Adjustments to existing farm dams within the construction footprint, including dewatering and re-shaping where required
- Bridge work over Badgerys Creek, South Creek and Kemps Creek, including installation of temporary diversion (if required) and temporary creek crossing, construction of new twin bridge structures and demolition/removal of the existing bridges
- Elizabeth Drive upgrade roadwork, including intersections with local roads and walking and cycling infrastructure
- Landscaping and finishing work.

7.4 Construction traffic generation

It is estimated that construction of the proposal would generate 200 light vehicles per day (generally associated with workers) and 70 heavy vehicles per day.

Construction traffic would be distributed across the construction ancillary facilities and along the proposal alignment, depending on the stage of construction and progression of construction activities. Heavy vehicle movements would mainly be related to earthworks or spoil movement but would also include other movements such as girder delivery and plant delivery.

For the purposes of the assessment, it is assumed that each vehicle would generate two movements per day (enter and exit the site), as per the following estimated breakdown:

- 200 light vehicles would arrive at site before the start of weekday standard construction working hours at 7am (outside the AM peak hour of 7-8am)
- 200 light vehicles would depart site after standard construction working hours end at 6pm (outside the PM peak hour of 4-5pm)
- 70 heavy vehicles per day (140 two-way movements), spread evenly across the day resulting in 10 to 15 vehicle movements per hour.

For the purpose of this assessment, it has been assumed that up to 10 light vehicle movements (5 vehicles entering and 5 vehicles exiting) could be generated during the road network peak hours (7-8am and 4-5pm).

A comparison of the estimated construction traffic volumes and existing traffic volumes on Elizabeth Drive during the AM and PM peak hours is included in Table 7-1.

Table 7-1 Elizabeth Drive East construction peak hour vehicle movements

Peak hour	Construction vehicle movements per hour		Existing two way traffic volumes on Elizabeth Drive ^[1]	Percentage change
	Light vehicles	Heavy vehicles	Total vehicles	
AM	10	15	2,340	1%
PM	10	15	2,350	1%

[1] Traffic volume between M12 Motorway off-ramp and Duff Road on Elizabeth Drive East

The additional 25 construction vehicle movements (10 light vehicles and 15 heavy vehicles) generated during the AM and PM peak hours would represent an increase to peak hourly traffic volumes along Elizabeth Drive of about one percent. These traffic volume increases are minor and expected to be manageable given that they are within the realm of daily traffic variations typically experienced across Sydney's road network including Elizabeth Drive.

The majority of light vehicle movements are likely to arrive and/or depart the construction sites outside the AM and PM peak hours and during the hours of 6-7am and 6-7pm. At these times, traffic volumes on Elizabeth Drive are less than during the peak hours. Therefore, the addition of the construction vehicle movements (200 vehicle movements per hour) during these hours, would result in similar road network performance as during the existing peak hours.

Overall, it is expected that the road network would have the capacity to accommodate these additional movements generated by construction activities during and outside the peak hour hours.

7.5 Construction vehicle access and traffic management

Initially, construction traffic would access construction ancillary facilities via the existing Elizabeth Drive alignment. Temporary access roads connecting construction ancillary facilities to construction sites would be established along the new Elizabeth Drive alignment early in the construction program to minimise impacts on the ongoing operation of the existing Elizabeth Drive.

Temporary reduced speed limits and lane closures on the existing Elizabeth Drive would be required during construction. Final construction methods and sequencing would be refined to minimise traffic and transport impacts during detailed design; however, traffic restrictions would be unavoidable during some construction activities.

It is likely that a sizable proportion of the existing heavy vehicle movements on Elizabeth Drive is attributed to the ongoing construction activities of WSA. With the completion of WSA in 2026, a reduction in the numbers of those heavy vehicles is expected. Overlapping construction activities between WSA and the proposal is expected to be limited in duration and is likely to coincide with the early construction work of the proposal.

Most construction work would be carried out during standard working hours and would have some impact on traffic operations. Work may also be undertaken outside of standard working hours under a Road Occupancy Licence (ROL) to avoid impacts during peak traffic periods. Where practical, heavy vehicle movements would be outside the traffic peak hours to minimise impacts on the existing road network operation during construction. Potential traffic impacts arising from the construction of the proposal include:

- Increased travel time due to reduced speed limits around construction sites
- Increased travel time due to increased truck and construction machinery movements
- Temporary lane closure and altered property accesses during construction. Property access would be maintained as far as practicable throughout construction.

Measures to manage potential construction traffic impacts are listed in Section 8.0.

7.6 Construction site access

Ingress to and egress from highway construction presents a challenge to traffic flow due to the acceleration and deceleration of construction vehicles. The design has considered this and nominated access points that aim to minimise traffic delay. The Contractor should review the proposed accesses and incorporate them in the construction Traffic Management Plans (TMP). The review of the access locations should consider that adequate acceleration/deceleration space is provided, sight distances are achieved, and warning signs are provided.

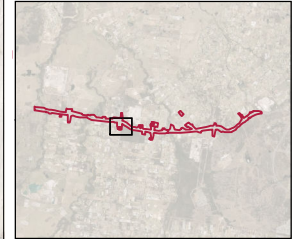
Construction site access points have been placed to align construction traffic flow with existing traffic flows. The placement of site access points at the extremities of each site also ensures that construction traffic can be minimized during the work. Site access would be provided every 200-250m as left in-left out only.

7.7 Haulage routes

Elizabeth Drive and its connecting roads – The Northern Road, the M7 Motorway and the proposed M12 Motorway, are classified as heavy vehicle routes as per the NSW Combined Higher Mass Limits (HML) and Restricted Access Vehicle (RAV) network. These roads can be utilised during construction for transportation of materials onto site for all construction activities as well as disposal of spoil. At this time, spoil sites have not been identified.

Figure 7-1 to Figure 7-3 present the planned haulage routes during construction.

FIGURE 7-1:
INDICATIVE CONSTRUCTION
HAULAGE ROUTES -
ANCILLARY FACILITY 1



- Legend**
- Construction footprint
 - Construction ancillary facility
 - Drainage line
- Haulage Route Options**
- ➔ Site 1 - Option 1
 - ➔ Site 1 - Option 2
 - ➔ Site 1 - Option 3

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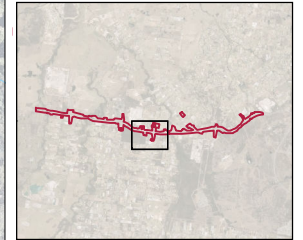
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FIGURE 7-2:
INDICATIVE CONSTRUCTION
HAULAGE ROUTES -
ANCILLARY FACILITIES 2 AND 3



Legend

- Construction footprint
- Construction ancillary facility

~ Drainage line

Haulage Route Options

- ➔ Site 2 - Option 1
- ➔ Site 3 - Option 1
- ➔ Site 3 - Option 2

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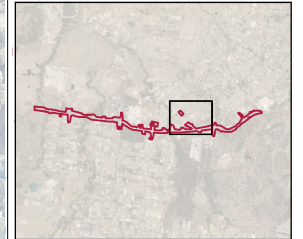
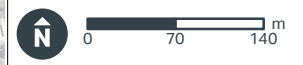
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FIGURE 7-3:
INDICATIVE CONSTRUCTION
HAULAGE ROUTES -
ANCILLARY FACILITY 4



- Legend**
- Construction footprint
 - Construction ancillary facility
 - ~ Watercourse
 - Drainage line
- Haulage Route Options**
- ➔ Site 4 - Option 1
 - ➔ Site 4 - Option 2
 - ➔ Site 4 - Option 3

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7.8 Property access

Property access would be maintained as far as practicable during the construction period; however, temporary disruptions to private property access would be required to facilitate certain construction activities. Planned disruptions to property access would be subject to engagement with the affected property owner, with alternative access arrangements provided where possible. The proposal would not affect access to the WSA construction site.

7.9 Temporary alternative routes for traffic

By the time the proposal commences construction in 2026, the M12 Motorway would be open to traffic which is expected by end of 2025. This will form a convenient detour route for vehicle traffic. For a vehicle wishing to travel from The Northern Road up to the M7/M12 Motorways interchange, two routes shown on Figure 7-4 would be available:

- Route 1 (via Elizabeth Drive, with roadwork): total travel distance of about 12 kilometres
- Route 2 (via the new M12 Motorway, no roadwork): total travel distance of about 15 kilometres .

The alternative route (Route 2) would be 3 kilometres longer than Route 1 and would have one additional signalised intersection. However, Route 2 is a dual carriageway, and it has a higher posted speed than Elizabeth Drive. The M12 Motorway has 100 kilometre per hour posted speed, which is 40 kilometres per hour higher than the posted speed of 60 kilometres per hour proposed during the construction of the proposal.

7.10 Walking and cycling facilities

It is not expected construction work would impact any existing pedestrian access routes or crossings. Currently there are no formal footpaths along Elizabeth Drive and any pedestrian movement is restricted to grass verges. Pedestrian and cyclist access would be maintained throughout construction. Where that is not feasible or necessary, temporary alternative access arrangements would be provided following consultation with affected landowners and the local road authority.

Construction work would impact on-road cyclists. As a consequence, the M12 Motorway has been identified as an alternative route for cyclists to avoid construction work. Shared paths are planned in the design of the M12 Motorway as shown in Figure 7-5.



FIGURE 7-5: TEMPORARY ALTERNATIVE ROUTES FOR CYCLISTS

- Legend**
- Route 1
 - Motorway
 - Primary road
 - Local road



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The alternative routes for traffic and cycling would be documented in the Traffic Management Plan (TMP) for the proposal.

7.11 Public transport

The proposal is not expected to disrupt public transport. All existing bus services would be maintained during construction, with potential for minor delays to bus services due a reduction in speed limits during construction. Through the implementation of a community engagement plan, the community, including public transport operators, would be informed of upcoming activities that may affect the operation of public transport.

7.12 Impacts on off-street parking

The proposal would require the temporary loss of off-street parking at a number of businesses and social infrastructure adjacent to Elizabeth Drive. It is anticipated these parking impacts would be temporary in nature and reinstated after the completion of construction activities.

During detailed design, Transport would undertake a detailed parking assessment, which would include consultation with affected businesses and property owners to identify suitable alternative parking arrangements. Alternative parking arrangements would include the provision of accessible parking where required. A summary of the estimated loss of parking is provided in Table 7-2.

Access would be maintained to the parking areas in Table 7-2 during the construction period and in consultation with property owners.

Table 7-2 Off-street impacts to parking supply

Location	Temporary parking impact during construction (indicative)	Permanent parking impact during construction and operation (indicative)
Animal Welfare League NSW	-	Removal of all parking spaces (including 13 marked parking spaces and 1 accessible parking space). Proposed reinstatement of one row of angled parking after construction, prior to operation. The exact number would be confirmed in consultation with property owner
Private parking area at 1605 Elizabeth Drive	-	Removal of all parking spaces (including informal parking area with space for approximately 8 vehicles)
Roladuct Spiral Tubing Group	-	Removal of all parking spaces (of about 815 square metres in size)
Kemps Creek Mitre 10	Temporary removal of about 13 spaces	-
United Petroleum	-	Acquisition of the entire lot including all parking areas
Australia Post Kemps Creek LPO and First Class Cafe	Temporary removal of about 5 spaces	No permanent removal of parking spaces, however parking access would be relocated in consultation with the landowner/s
Apex Petroleum and Kemps Creek Auto Repairs	Temporary removal of about 7 spaces	-
Nando's Meat Market and Tobacconist	Temporary removal of about 5 spaces	-
Bill Anderson Reserve	Temporary removal of about 14 spaces	About 2130 square metres of the existing parking area would be acquired, resulting in a reduction of in over half the existing parking space

Location	Temporary parking impact during construction (indicative)	Permanent parking impact during construction and operation (indicative)
Ampol IGA X-press Kemps Creek	Temporary removal of about 5 spaces	-
Christadelphian Heritage College	Temporary removal of entire parking area on Devonshire Road, which is approximately 1320 square metres	Acquisition of about 660 square metres of the lot, including the driveway (which would be reinstated) and about 200 square metres of the informal parking area on Devonshire Road

7.13 Pedestrian, cyclist and road user safety

During the construction of the proposal, the introduction of additional heavy vehicles on the road network has the potential to result in safety impacts on pedestrians, cyclists and other road users, especially where there is an increased likelihood of interaction with pedestrians and cyclists.

The majority of the construction footprint does not include formal pedestrian and cyclist facilities (footpaths), including in areas where indicative haulage routes are proposed. This may indicate a low level of pedestrian activity; however, pedestrians may still use grass verges and other areas to access bus stops, community facilities and other attractors. Impacts to walking and cycling facilities are discussed in Section 7.10.

Key locations where pedestrian and cyclist safety issues may potentially arise include:

- Construction ancillary facility access and egress points where construction vehicles could interface with pedestrians and cyclists.
- Locations of increased vulnerable user demand such as near schools and recreational facilities. This would be particularly relevant at construction ancillary facility 2 at Bill Anderson Reserve and where pedestrians may be present accessing open space areas.

Safe pedestrian and cyclist access would be maintained throughout construction. Where that is not feasible or necessary, temporary alternative access arrangements would be provided following consultation with affected landowners and the local road authority.

Transport has extensive experience in managing construction related traffic safety issues on road upgrade projects, including in busy pedestrian areas. Measures to manage road user safety during construction would be implemented and included in the TMP for the proposal. This could include site specific traffic control measures, temporary alternative access arrangements, measures to consult and inform the local community of impacts on the local road network, and measures to ensure drivers are aware of areas of increased road safety risk, or other appropriate measures.

7.14 Emergency services access

As identified in Section 7.4, the construction traffic would have a minimal impact on road network performance during peak hours. As such, there is not anticipated to be any substantial change to emergency vehicle travel times.

Furthermore, access for emergency vehicles would be maintained at all times during construction. The construction footprint would be arranged so that emergency vehicle access to nearby buildings and the surrounding area would be maintained, or alternative arrangements are in place as determined in consultation with relevant emergency services. Ongoing consultation would be carried out with emergency service providers in relation to changed traffic conditions.

7.15 Cumulative impact assessment

7.15.1 Surrounding projects

By the time the proposal is expected to commence construction in 2026, it is expected that the adjacent construction of the M12 Motorway and Sydney Metro WSA, and nearby construction of the M7 Motorway widening, would be complete.

The WSA is planned to open in 2026 and therefore any overlapping construction activities with Elizabeth Drive upgrades would be limited in duration and is likely to coincide with the enabling construction activities of the proposal.

When the construction of WSA is completed it is likely that there would be an expected reduction in associated heavy vehicle movements in the study area and on surrounding road network.

7.15.2 Elizabeth Drive West Upgrade

It is expected that the proposal would be constructed at the same time as the Elizabeth Drive West Upgrade. The number of construction vehicles generated by the Elizabeth Drive West proposal is estimated to be 200 light vehicles and 70 heavy vehicles per day (i.e., the same as the proposal). Therefore, the combined traffic volumes generated by construction of the proposal and the Elizabeth Drive West Upgrade would be:

- 400 light vehicles would arrive at sites across the construction footprints for the projects before the start of standard weekday construction working hours at 7am (outside the AM peak hour of 7pm to 8am)
- 400 light vehicles would depart sites across the construction footprints after the end of standard weekday construction working hours ends at 6pm (outside the PM peak hour of 4pm to 5pm)
- 140 heavy vehicles per day (280 two-way movements), spread evenly across the day resulting in up to 30 vehicle movements per hour.

A comparison of the estimated construction traffic volumes and existing traffic volumes on Elizabeth Drive during the AM and PM peak hours is included in Table 7-3.

Table 7-3 Cumulative Elizabeth Drive East construction peak hour vehicle movements

Peak hour	Cumulative construction vehicle movements		Existing two way traffic volumes (vehicles)		Percentage change
	Light vehicles	Heavy vehicles	Elizabeth Drive East ^[1]	Elizabeth Drive West ^[2]	
AM	20	30	2,340	1040	2-5%
PM	20	30	2,350	990	2-5%

[1] Volume between M12 Motorway off-ramp and Duff Road on Elizabeth Drive East

[2] Volume between Badgerys Creek and Luddenham Road on Elizabeth Drive West (source: Elizabeth Drive – West Upgrade Traffic and Transport Assessment Report)

The additional 50 construction vehicles generated during the AM and PM peak hours would represent an increase of two percent. These traffic volume increases are minor and expected to be manageable given that they are within the realm of daily traffic variations typically experienced across Sydney's road network including Elizabeth Drive.

The peak construction traffic volumes would occur during the worker arrival and departure hours of 6-7am and 6-7pm. Table 7-4 shows the combined construction traffic volumes during these hours, including consideration of the directional distribution of these vehicle movements.

The following assumptions have been made when considering the cumulative assessment of the combined construction traffic impacts associated with the proposal and the Elizabeth Drive West project:

- 50 percent of the heavy vehicles would travel to/from the east and 50 percent of heavy vehicles would travel to/from the west
- 65 percent of light vehicles would travel to/from the east and 35 percent of light vehicles would travel to/from the west, based on the existing directional split of traffic volumes on Elizabeth Drive.

Vehicles traveling to/from the east would use the busiest sections of Elizabeth Drive to connect with areas such as Fairfield and Liverpool and/or the surrounding road network including the M7 Motorway. Similarly, vehicles travelling to/from the west would use the less busy sections of Elizabeth Drive to access Penrith and its surrounds and/or the surrounding road network including The Northern Road.

These assumptions have been considered for both the Elizabeth Drive East project and the Elizabeth Drive West projects.

Table 7-4 Combined construction traffic volumes during the worker arrival and departure hours

Origin or destination	Maximum additional vehicle movements per hour in AM (6 7am) and PM (6 7pm)		Notes
	Light vehicles	Heavy vehicles	
To/from east	260	0	260 vehicles from the west in the AM period (6-7am) and to the west in the PM period (6-7pm)
To/from west	140	0	140 vehicles from the west in the AM period (6-7am) and to the west in the PM period (6-7pm)

Table 7-4 shows that the combined construction traffic volumes during the worker arrival and departure hours of 6-7am and 6-7pm would result in 260 vehicle movements using the busiest sections of Elizabeth Drive to the east and 140 vehicle movements using the less busy sections of Elizabeth Drive to the west. Given that the traffic volumes on Elizabeth Drive during these hours are less than during the peak hours, these construction vehicle movements would result in similar road network performance as during the existing peak hours. Overall, it is expected that the road network would have the capacity to accommodate these additional movements generated by construction activities during and outside the peak hour hours.

8.0 Safeguards and management measures

Table 8-1 lists the safeguards and measurement measures that would be implemented to control and minimise the construction impacts during the construction phases.

Table 8-1 Safeguards and management measures

Impact	Environmental Safeguards	Responsibility	Timing	Reference
Traffic and transport	<p>A TMP will be prepared and implemented as part of the CEMP. The TMP will be prepared in accordance with the Transport's Traffic Control at Work Sites Manual (Transport for NSW, 2020) and QA Specification G10 Control of Traffic (Transport for NSW, 2020). The TMP will include:</p> <ul style="list-style-type: none"> • Confirmation of haulage routes • Measures to maintain access to local roads and properties • Site specific traffic control measures (including signage) to manage and regulate traffic movement • Measures to maintain pedestrian and cyclist access • Requirements and methods to consult and inform the local community of impacts on the local road network • Access to construction sites including entry and exit locations and measures to prevent construction vehicles queuing on public roads • A response plan for any construction traffic incident • Consideration of other developments that may be under construction to minimise traffic conflict and congestion that may occur due to the cumulative increase in construction vehicle traffic • Monitoring, review and amendment mechanisms 	Contractor	Detailed design / pre-construction	Additional safeguard
Traffic and transport – Access to properties	<p>Disruptions to property access and traffic will be notified to landowners at least five days prior in accordance with the relevant community consultation processes outlined in the TMP. Where access is not feasible, temporary alternative access arrangements will be provided following consultation with affected landowners and the relevant local council</p>	Contractor / Transport	Detailed design	Additional safeguard

Impact	Environmental Safeguards	Responsibility	Timing	Reference
Local road condition	Pre-construction and post construction road condition reports for local roads likely to be used during construction will be prepared. Any damage resulting from construction (not normal wear and tear) will be repaired unless alternative arrangements are made with the relevant road authority. Copies of road condition reports will be provided to the local council	Contractor	Pre and post construction	Additional safeguard
Pedestrian and cyclist access	Pedestrian and cyclist access will be maintained during construction. Where that is not feasible or necessary, temporary alternative access arrangements will be provided following consultation with affected landowners and the local Council	Contractor	Construction	Additional safeguard
Public Transport changes	The community, including public transport operators, will be informed of upcoming activities that may affect the operation of public transport	Contractor	Pre and post construction	Additional safeguard
Off-street parking	A detailed parking assessment will be carried out during detailed design. This will include consultation with affected businesses and property owners to identify suitable alternative parking arrangements	Contractor	Detailed design	Additional safeguard

9.0 Conclusion

This traffic and transport assessment has been prepared to support the REF for the proposal. Specifically, this report has been prepared to assess the potential impacts of construction and operation of the proposal and to identify appropriate safeguards and management measures to address the impacts identified.

Elizabeth Drive is the main east-west corridor between Liverpool and surrounding suburbs. Between The Northern Road and Badgerys Creek, Elizabeth Drive is predominantly a two-lane undivided road, with no footpath and no median.

Future projected and planned growth in this region of Western Sydney is expected with the planned development of the WSA. It is projected that an expansion of industrial and commercial precincts would be prompted in response to the development of the Western Sydney Aerotropolis precinct as well as related planned land releases for residential precincts and employment zones in the area. The development of the WSA is expected to transform Elizabeth Drive from a rural road to a heavily trafficked urban corridor, estimated to be able to accommodate between 24,000 and 55,000 vehicles per day.

Upgrading Elizabeth Drive would provide a crucial piece of infrastructure allowing increased movement and connectivity to growth areas with employment lands.

The proposal aligns with various key planning frameworks aimed at supporting the economic development of the Western Parkland City and the wider Western Sydney region including:

- The Future Transport Strategy 2056 (Transport for NSW, 2022)
- Metropolis of Three Cities – The Greater Sydney Region Plan (Greater Sydney Commission, 2018)
- Western City District Plan (Greater Sydney Commission, 2018)
- NSW Freight and Ports Plan 2018-2023 (Transport for NSW, 2018)
- Western Sydney Aerotropolis Precinct Plan (NSW Department of Planning and Environment, 2023).

The proposal would connect people in the Western Parkland City to the nearest metropolitan centre in Liverpool. With the proposed upgrades, Elizabeth Drive would have the characteristics of a city-serving corridor and align with the 30-minutes concept.

The proposal is one of two adjacent planned upgrades of Elizabeth Drive between The Northern Road, Luddenham and Duff Road, Cecil Hills. The upgrade has been split into two proposals (Elizabeth Drive upgrades), including the Elizabeth Drive East Upgrade (this proposal) and the Elizabeth Drive West Proposal (subject to a separate REF).

Traffic models were prepared for the opening year 2030 and also for 2040 to assess the network performance in the do-nothing scenarios and with Elizabeth Drive upgrades. Results show that in the do-nothing scenarios, the network would operate at maximum capacity in 2030 and 2040 resulting in unsatisfactorily congestion levels and increased travel time. It is also expected that increased congestion could lead to deterioration in the safety conditions especially at the intersections operating under priority control.

The operational traffic assessment found that with Elizabeth Drive upgrades, network performance and travel times along Elizabeth Drive would improve. The network would also have sufficient capacity to accommodate future traffic demands.

The proposal would require the loss of off-street parking spaces at a number of commercial properties and public areas. This would require additional consultation with property owners to minimise the impacts of the changes.

Several major road infrastructure upgrades are being constructed as part of the Western Sydney Infrastructure Plan (WSIP) and are currently in different design, construction and operation stages. By the time the construction of Elizabeth Drive upgrades are complete, those road projects would be completed and open to traffic. The combined road upgrades in the area would relieve the pressure on the network and are anticipated to ease congestion and reduce travel times.

Impacts on traffic during construction on Elizabeth Drive would be temporary. The construction of the proposal would generate 200 light vehicles per day associated with workers and 70 heavy vehicles per day. Overall, it is expected that the road network would have the capacity to accommodate these additional movements generated by construction activities during and outside the peak hour hours.

Traffic impacts would occur as a result of the movement of construction and service vehicles along Elizabeth Drive and access roads, for the haulage of construction materials. Travel along Elizabeth Drive and access to existing properties along the road would be maintained throughout the construction phase. There would be a temporary loss of a small number of off-street parking spaces at properties adjacent Elizabeth Drive, particularly at the businesses between Clifton Avenue and Mamre Road and Kemps Creek shops. These impacts would be temporary in nature, and reinstated after the completion of construction works.

By the time Elizabeth Drive Upgrades are anticipated to commence construction in 2026, it is expected that the adjacent construction of the M12 Motorway and Sydney Metro Western Sydney Airport would be complete. The Northern Road upgrades and Bringelly Road upgrades are now complete and open to traffic. The expected increase of heavy vehicles due to the construction of the Elizabeth Drive upgrades is likely be offset by the expected reduction of the heavy vehicle movements associated with the completion of the WSA.

A number of safeguards and management measures would be implemented to control and minimise the construction impacts during the construction phase, including:

- Preparation and implementation of a TMP as part of the CEMP
- Maintaining property access during construction and providing landowners with adequate advance notifications of any planned disruptions to their property access
- Preparation of pre and post-construction road condition reports
- Maintaining pedestrian access during construction and the identification of an alternative route for cyclists to avoid construction work where possible
- Informing the community, including public transport operators of upcoming activities that may affect the operation of public transport
- Installation of ITS systems including CCTV cameras and VMS.

10.0 References

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