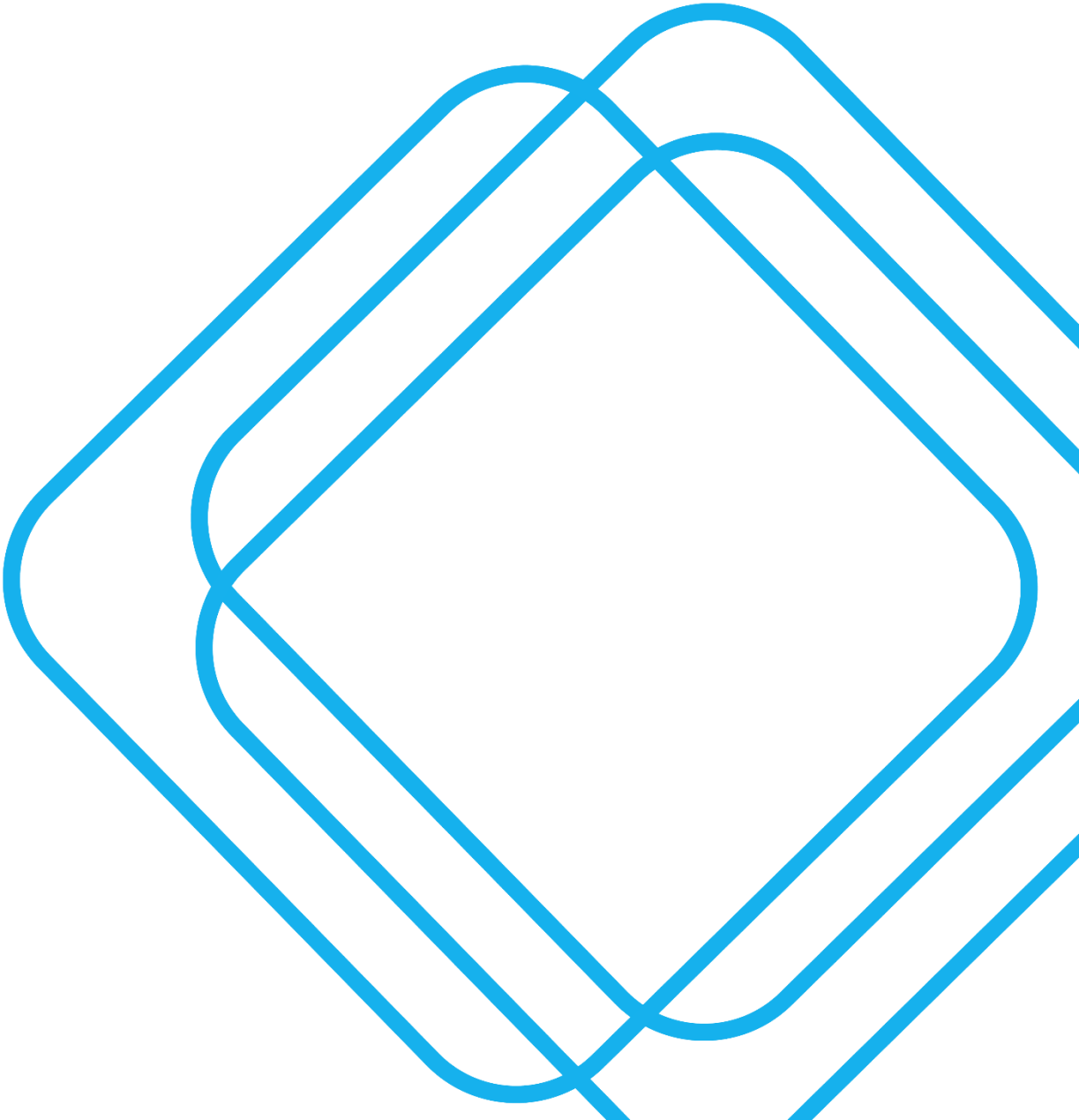
SCT Consulting

EDMONDSON PARK (NORTH) COMMUTER CAR PARK REF

Traffic and Transport Impact Assessment

11 MAY 2022



Quality Assurance

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5.0	9 May 2022	Final report
6.0	11 May 2022	Updated final report

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Appendices

Executive Summary

Transport for NSW is the government agency responsible for the delivery of major transport infrastructure projects in NSW and is the proponent for the proposed Edmondson Park Station (North) Commuter Car Park (the Proposal). The Proposal forms part of the Commuter Car Park Program. This program is designed to improve customer access to the public transport network, encourage a mode shift away from private vehicles, improve the flexibility and reliability of customer's 'first and last mile' of their journey, and contribute to reducing congestion on our road network.

The Proposal aims to provide a multi-storey car park at a vacant site off Soldiers Parade, to the north-west of Edmondson Park Station. The existing Edmondson Park Station provides rail services for the T2 and T5 Lines, bicycle parking areas, an interchange area with sheltered bus stops for three bus services, a taxi rank and kiss and ride stopping area, and at-grade commuter parking spaces.

The NSW Government committed to delivering up to 2,000 additional commuter car parking spaces at Edmondson Park Station. Transport for NSW is providing an additional 1,258 spaces at the Edmondson Park (South) Commuter Car Park, which was completed in early 2022.

The next step is this Proposal, which is the provision of about 900 commuter car parking spaces to the north-east of the Edmondson Park Station. Once the Proposal is open to the public, the existing at-grade car park with about 200 spaces, north of the station, will be decommissioned and closed to the public. The Proposal will therefore provide a net increase of about 700 commuter car spaces in the Edmondson Park Precinct.

Construction impacts and mitigation measures

The following impacts are expected during the construction stage of the Proposal:

- Deliveries to and from site would peak at about 60 trucks per day, during the concrete pours, and would be spread evenly throughout the day (7 to 8 trucks per hour). This peak impact would be for the duration of construction of the car park superstructure, a 20-week period. The combined construction movements (deliveries and worker trips by car) would represent less than a four per cent increase in traffic movements at the surrounding intersections during peak periods and are expected to have minimal impact on public transport or general traffic.
- Demand for parking during construction could be up to 21 spaces. While construction staff will be encouraged to use public transport, wherever practicable, and be advised not to use the commuter car parks, a combination of site parking and the new Edmondson Park Station (South) Commuter Car Park being operational before construction of the Proposal starts, should be sufficient to accommodate any parking demand with minimal disruption to commuters.

It is recommended that the signalised crossing on the north approach of the Soldiers Parade / Henderson Road intersection be constructed early in the construction program to allow workers to safely cross Soldiers Parade during the construction period. If this is not feasible, then consideration for safe crossing of Soldiers Parade by construction staff should be included in the Construction Traffic Management Plan (CTMP). Aside from the development of the CTMP, other mitigation measures to reduce the impacts of the activity during construction include procedures for preparing and implementing Traffic Control Plans (TCPs), procedures for preparing and implementing Pedestrian Management Plans (PMPs) and delivery scheduling outside peak periods.

Operational impacts and mitigation measures

The following impacts are expected during the operational stage of the Proposal:

- The Proposal would provide a net increase in commuter car parking capacity of about 700 spaces. This is expected to reduce informal over-flow parking issues in the station precinct.
- Based on the net increase of about 700 spaces, an additional 306 inbound trips and 255 outbound trips would be generated during the AM and PM peak hours respectively. Analysis of road network performance indicates that all critical intersections around the site are forecast to operate at satisfactory levels of service.

The provision of an unsignalised pedestrian crossing on the Proposal Access Road and a signalised pedestrian crossing on the north approach of the Soldiers Parade / Henderson Road intersection would facilitate safe, formalised pedestrian access between the Proposal and the station. Other mitigation measures to reduce the impacts of the activity during operations include pedestrian fencing in the existing median along Soldiers Parade north of Henderson Road to improve pedestrian safety in the vicinity of the site and Opal Card controlled boom-gate entry/exit to discourage non-commuter parking.

1.0 Background and project description

1.1 Purpose of the assessment

SCT Consulting was commissioned by SNC-Lavalin Atkins on behalf of Transport for New South Wales (Transport for NSW) to prepare a specialist assessment of the Traffic and Transport impacts of the proposed Edmondson Park Station (North) Commuter Car Park (the Proposal).

This specialist assessment forms part of the Review of Environmental Factors (REF), which is being prepared to assess the environmental impacts associated with the construction and operation of the Proposal under the provisions of Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

1.2 Overview of the Proposal

Transport for NSW is proposing to undertake the Proposal to improve customer experience at this location and in surrounding localities. Transport for NSW is the government agency responsible for the delivery of major transport infrastructure projects in NSW and is the proponent for the Proposal.

The Proposal forms part of the Commuter Car Park Program. The NSW Government is committed to delivering accessible public transport infrastructure, which is why Transport for NSW is providing more commuter car parks where they are needed. This program is designed to improve customer access to the public transport network, encourage a mode shift away from private vehicles, improve the flexibility and reliability of customer's 'first and last mile' of their journey, and contribute to reducing congestion on our road network.

The Proposal involves the construction and operation of a multi-storey car park with integration into the existing road and pedestrian network at a vacant site off Soldiers Parade, to the north-west of Edmondson Park Station.

1.2.1 Site description

The Proposal is located in the suburb of Edmondson Park, NSW, about 40 kilometres southwest of the Sydney Central Business District (CBD). The site is within the Liverpool Local Government Area (LGA).

Edmondson Park Station is located on the T2 Inner West and Leppington Line, which provides services to south-west Sydney and the Sydney CBD, and the T5 Cumberland Line, which provides services between Richmond and Campbelltown. The regional location of the Proposal is shown in **Figure 1-1**.

The Proposal is located on a vacant site, off Soldiers Parade, to the north-east of Edmondson Park Station (**Figure 1-2**). The site was completely cleared of vegetation in 2012 during the development of the South West Rail Link (SWRL) and Edmondson Park Station, and is now vegetated in grasses, with small trees along the northern boundary.

The site surrounds include:

- To the north, undeveloped sites identified for mixed use and expansion of the local road network in the Edmondson Park South Concept Plan.
- Soldiers Parade to the west
- To the south is the SWRL corridor. The southern portion of the subject site contains an existing road, which provides access from Soldiers Parade to the Proposal site and a SWRL substation. This road will eventually form part of the local road network and connect the site to properties to the north.
- The eastern portion of the site also contains the existing road that wraps around from the south and currently terminates on the eastern side of the Proposal site. Further to the east is bushland set aside in the Edmondson Park Concept Plan as a regional park and zoned National Parks and Nature Reserves (E1).

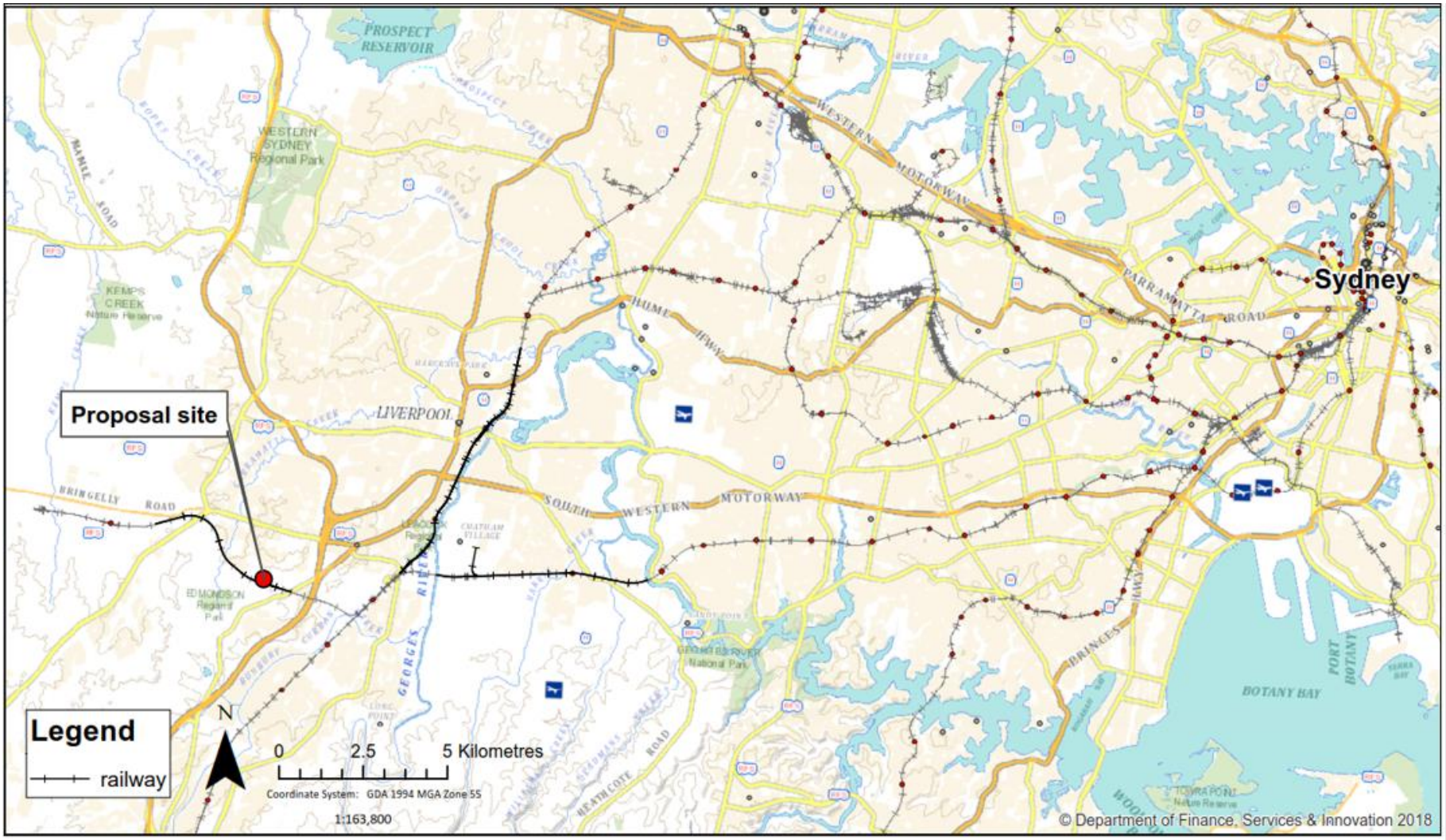


Figure 1-1 Regional context of the Proposal site

Source: SNC-Lavalin Atkins, 2021

Figure 1-2 Proposal site locality map

Source: SNC-Lavalin Atkins, 2021 (base map: NearMap, 2020)

1.2.2 Proposal features

The key features of the Proposal are summarised as follows:

- Clearing, leveling and compaction of the site
- Provision of a ground level plus six levels of commuter car park including:
  - About 900 commuter car parking spaces
  - Lift and stair access
  - Internal circulation ramps connecting the levels
  - Provision for electric vehicle charging stations
  - Transport Park&Ride infrastructure (Opal card operated boom gates).
- Road work to provide pedestrian and vehicle access and egress from the proposed car park, and connection to Edmondson Park Station
- Closed circuit television (CCTV), lighting and wayfinding signage for improved safety and security
- Installation of roof-top solar photovoltaic system, electric vehicle charging spaces, and motorcycle parking
- Ancillary works including services diversion and/or relocation, drainage works, landscaping, installation of lighting, installation of handrails and balustrades.

The general layout of the Proposal is shown in **Figure 1-3**.

The proposed multi-storey car park involves a ground floor concrete slab and the addition of six suspended levels above. Selection of materials and finishes would be confirmed as part of the detailed design process.

Subject to design and approval, construction is expected to commence in mid 2022 and is expected to be complete in late 2023.

Access to the Proposal is subject to detailed design and consultation with relevant stakeholders. This assessment has assumed that due to the road network configuration, all vehicular access to the Proposal will be from the north, with the Edmondson Park Station (South) Commuter Car Park accommodating commuters from the south who wish to park and ride at the station. This is discussed in more detail in **section 3.2.1**.

Subject to detailed design and consultation with relevant stakeholders, it is planned to provide:

- a pedestrian crossing on the Proposal Access Road
- a signalised pedestrian crossing on the north approach of the Soldiers Parade / Henderson Road intersection
- pedestrian fencing in the existing median along Soldiers Parade north of Henderson Road.

Once the Proposal, with about 900 spaces, is open to the public, the existing at-grade car park with about 200 spaces, north of the station, will be decommissioned and closed to the public. This will provide a net increase of about 700 commuter car spaces in the Edmondson Park precinct.

The existing at-grade car park is zoned for mixed use development. The NSW Government is considering the future use of the site to deliver improved place and town centre outcomes, contributing to the Edmondson Park Masterplan vision for a transit-oriented community at Edmondson Park.

1.2.3 Construction activities

1.2.3.1 Methodology

Subject to approval, construction of the Proposal is expected to commence in mid 2022 and is expected to be complete in late 2023. The construction methodology would be further developed during the detailed design of the Proposal by the nominated Construction Contractor in consultation with Transport for NSW.

The proposed construction activities for the site are identified in **Table 1-1**.

This staging is indicative and is based on the current concept designs and may change once the detailed design methodology is finalised. The staging is also dependent on the Contractor's preferred methodology, program and sequencing of work.

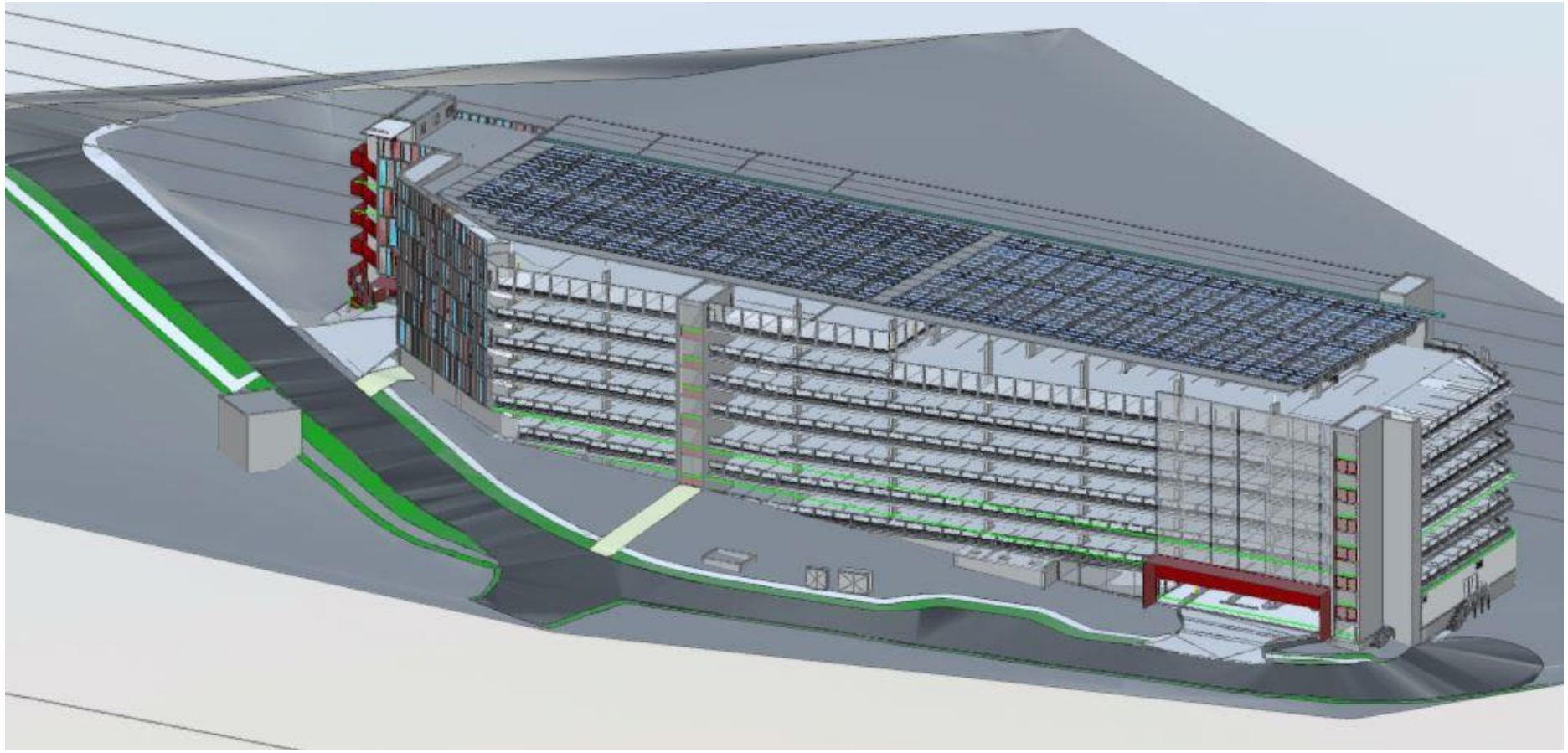


Figure 1-3 Three-dimensional overview of the Proposal looking from the southeast (Note: this is indicative, subject to detailed design)

Source: Transport for NSW, 2022

Table 1-1 Indicative construction staging for key activities

Stage	Activities	Duration (Weeks)	Maximum daily deliveries (trucks)	Maximum daily workforce
Site preparation	– Secure site boundary with temporary fencing and hoarding – Provide traffic and pedestrian controls in the vicinity of the proposal site in accordance with Liverpool City Council requirements – Undertake survey to identify site boundary and mark out existing services and proposed foundations of car park – Clear site of any existing vegetation not being retained, and demolish obsolete kerbs and pavements – Establish site office, amenities and plant/material storage areas – Establish other environmental controls, such as erosion and sediment controls.	4	32	18
Utilities infrastructure	– Locate and excavate storm water drainage and undertake storm water relocation works – Provide necessary services to various points within the car park footprint.	4	32	24
Foundations	– Prepare site for construction of foundations – Construct piles and ensure adequate embedment into appropriate bedrock is achieved – Construct footing beams and pile caps over new piles – Form and pour ground floor slab.	10	40	35
Superstructure	– Construct suspended levels, including stairs, walls and columns one level at a time – Construct block work on each level – Install new lifts – Install electrical, hydraulic and mechanical services infrastructure,	20	60	80
Architectural features/finishes	– Install protective screens around building perimeter – Install vehicular crash barriers – Install balustrades – Install new cladding – Landscape area at ground level – Painting of car park concrete elements – Marking of car park lines, directional arrows etc. and installation of way finding signage – Construct new footpaths, kerbs and accesses within the proposal site to link adjacent infrastructure.	4	32	45

1.2.3.2 Plant and equipment

An indicative list of plant and equipment that would be required is provided below. Additional equipment that would likely to be used would be identified during detailed design by the Construction Contractor.

- trucks
- generator
- bobcat
- hand tools
- mulcher
- chainsaw
- excavator (with auger)
- mobile cranes
- tower cranes
- helicopter (smoothing out concrete)
- rattle gun
- lighting towers
- vibratory roller
- demolition saw
- jack hammer
- grinder
- continuous flight auger rig
- concrete truck and agitator / or piling rig
- concrete pump
- small mobile crane
- handheld soil compactor or wacker rammer
- nail gun
- scissor lift
- paving machine
- coring machine
- grinder
- stump grinder
- elevated working platform.

1.2.3.3 Working hours

The majority of the work required for the Proposal would be undertaken during standard NSW Environment Protection Authority (EPA) construction hours, which are as follows:

- 7.00 am to 6.00 pm Monday to Friday
- 8.00 am to 1.00 pm Saturdays
- no work on Sundays or public holidays.

Work outside of standard hours including at night and on weekends may be required occasionally.

Approval from Transport for NSW would be required for any out of hours work and the affected community would be notified as outlined in TfNSW *Construction Noise and Vibration Strategy* (Transport for NSW, 2019).

1.2.3.4 Earthworks

Excavations and earthworks would generally be required for the following:

- Removal of vegetation and levelling of the existing site
- Piling and excavation for car park foundations and support structures
- Tie-in work in relation to existing roads and pathways
- Other minor civil work, including drainage/stormwater works, and trenching activities for underground service adjustments and relocations.

Excavated material would be reused onsite where possible or disposed of in accordance with relevant legislative requirements.

1.2.3.5 Traffic access and vehicle movements

Due to the surrounding road network and intersection configurations, construction access to the site will be restricted to arriving from north of the site and travelling down Soldiers Parade to access the site via the left-in / left-out (LILO) intersection at Soldiers Parade / Proposal Access Road.

Construction vehicles exiting the site to the south would turn left at the LILO intersection at Soldiers Parade / Proposal Access Road and travel south on Soldiers Parade. Construction vehicles exiting to the north would need to turn left at the LILO intersection, travel south on Soldiers Parade and use the roundabout at the Soldiers Parade / General Boulevard intersection to turn around and head north on Soldiers Parade.

Should construction access be required from the south, a construction access route would need to be developed by the contractor, with suitable traffic control and Traffic Management Plan.

A detailed construction methodology and associated management plans, such as a Construction Environmental Management Plan (CEMP), would be developed during the detailed design phase of the Proposal to manage potential traffic and access impacts.

1.2.4 Operations and Maintenance

The Proposal would operate 24/7 with access security provided by Opal Card operated boom gates.

The operation and maintenance of the Proposal is subject to further discussions with Sydney Trains, Transport for NSW and Liverpool City Council. The car park structure constructed under this Proposal would be maintained by Sydney Trains.

2.0 Existing transport access arrangements

The suburb of Edmondson Park is located within the Liverpool Council LGA, about eight kilometres south-west of the Liverpool City Centre and 40km south-west of the Sydney Central Business District (CBD). Edmondson Park is bounded by Prestons and Horningsea Park to the north, Bardia to the south, Leppington and Denham Court to the west and Casula to the east.

The Edmondson Park Station precinct consists of a train station and bus interchange with two connecting bus routes to the surrounding suburbs. The precinct provides people with the opportunity to access and transfer between transport modes including walking, cycling, train, bus, and private vehicle. The station is located on the western side of Soldiers Parade and is mostly isolated from residential and employment land uses, although several residential, retail and commercial developments, to the south of the station, are under construction.

2.1 Land use context

Edmondson Park is a major land release area in the southwest growth region of Greater Sydney. It was rezoned for urban development in 2008 and is one of the first areas to be planned under the NSW Government's South West Sydney Priority Growth Area (formerly the South West Growth Centre).

Edmondson Park is no longer part of the South West Sydney Priority Growth Area. However, the Department maintains a role in regional infrastructure co-ordination and delivery in the area through a Special Infrastructure Contribution (SIC) requirement, as well as bio-certification offsets. The planning delivery and consent roles are administered by Liverpool and Campbelltown Councils.

Edmondson Park encompasses two key master planned areas, currently being delivered to the south and north of the station. The master plans include a mixed-use town centre directly to the south of the station, with a variety of residential typologies surrounding it with new public open spaces, public and active transport links. The first residential apartment buildings of this precinct are constructed to the south of the station.

The project site is zoned B4 – Mixed Use under the *State Environmental Planning Policy (Precincts – Western Parkland City) 2021*. Land zoning surrounding the site comprises mixed-use to the north and south, and Regional Park to the west as shown in **Figure 2-1**.

In March 2010, the Edmondson Park South Concept Plan (MP10_0118) was lodged by Landcom which established the overall planning framework for Edmondson Park South. On 18 August 2011, the Concept Plan (MP10_0118) was approved by the Planning Assessment Commission.

The planned development at Edmondson Park is the most significant near Edmondson Park Station. The release and rezoning of land are expected to accommodate up to 6,700 dwellings. The number of dwellings is expected to increase at Edmondson Park due to intensification within the Edmondson Park Town Centre North under MP10_0118 MOD 5.

The proposed future Town Centre access arrangements are presented in **Figure 2-2**.

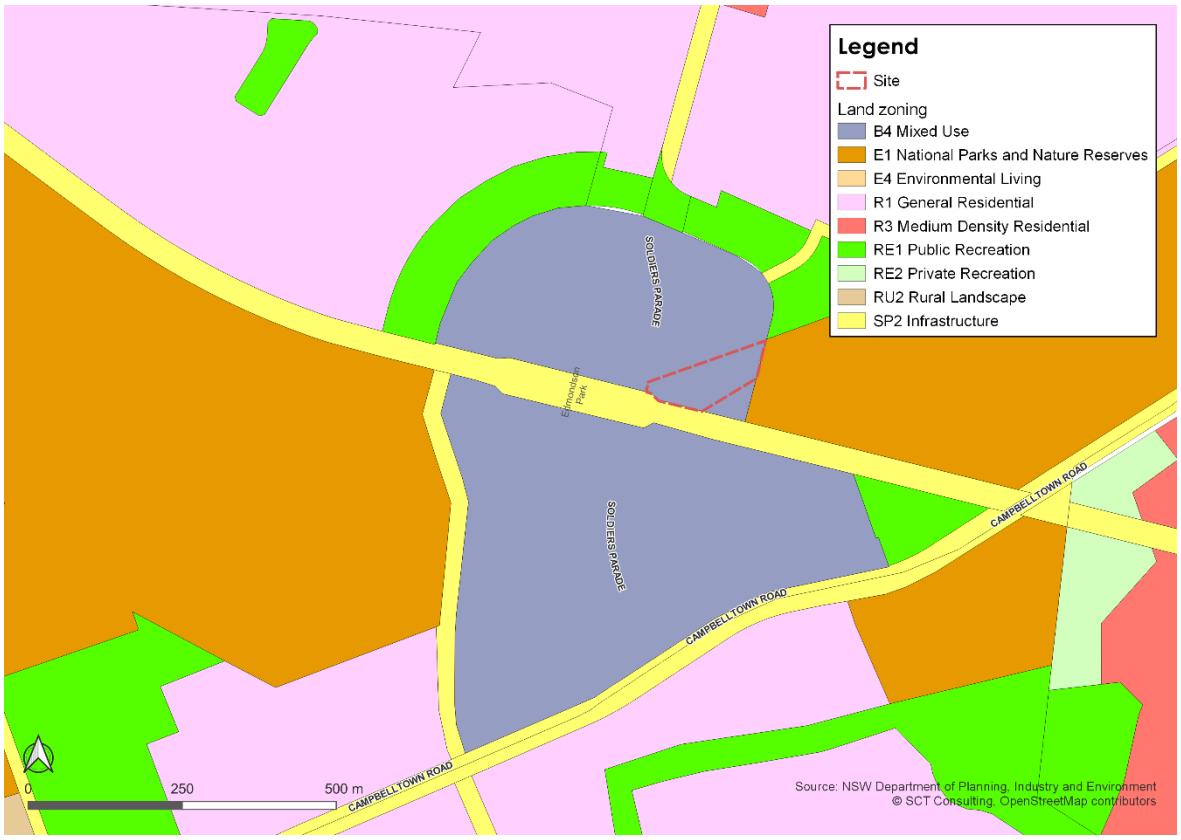


Figure 2-1 Land zoning surrounding the site

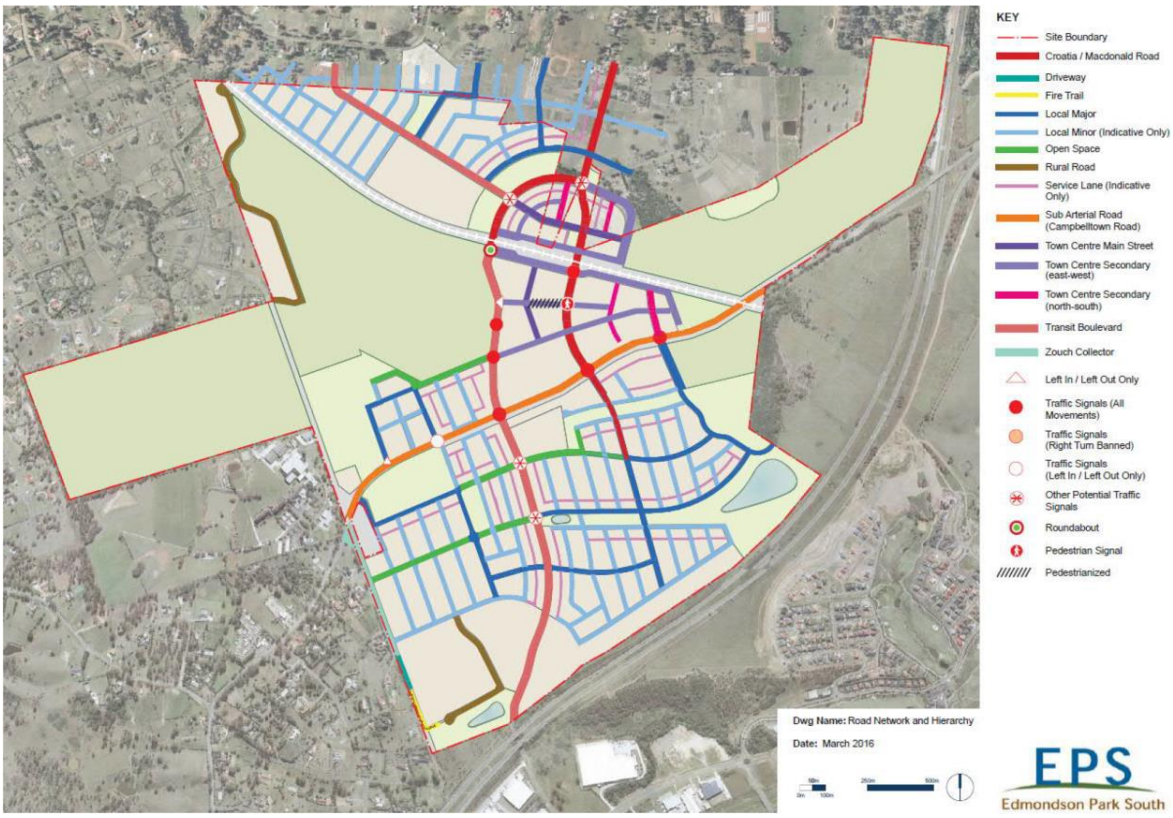


Figure 2-2 Edmondson Park South road network

Source: Robertsday, 2018

2.2 Public transport

Public transport facilities around the site and the walking catchment form the station are shown in **Figure 2-3**.

Figure 2-3 Public transport facilities around the site

2.2.1 Rail services

The site is within a five-minute walk of Edmondson Park Station. The station is served by the T2 Inner West & Leppington Line and the T5 Cumberland Line, providing train services between Richmond, Parramatta and the Sydney CBD.

Edmondson Park Station consists of a single island platform with two tracks. Platform 1 serves trains to the Inner West/CBD (T2 Line) or Richmond (T5 Line), while Platform 2 serves trains to Leppington on the T2 Line and T5 Line. Opal poles are provided at the station entrance on the concourse level.

The number of services departing Platform 1 to the Inner West/CBD and Richmond is presented in **Table 2-1**. Between 6am and 7am, a service departs Platform 1 on average every five to six minutes.

Table 2-1 AM peak hour inbound services

Hour commencing	T2 Line services to Inner West and Sydney CBD	T5 Line services to Richmond	Total services	Average service interval (min:sec)
5.00 am	4	-	4	15:00
6.00 am	9	2	11	5:27
7.00 am	9	2	11	5:27
8.00 am	6	2	8	7:30
AM Peak total	28	6	34	

Source: Transport for NSW timetable, valid from 12 June 2021

2.2.2 Station patronage

A review of Edmondson Park Station Opal data for May and August 2019 indicated an average of 1,900 station entries and exits during the morning weekday peak period (5am to 9am). This four-hour period accounted for 71 per cent (1,770) of all daily station entries during that period as shown in **Table 2-2**. The AM peak hour was recorded in the hour commencing at 7.00 am and represents 42 per cent of the AM peak period.

Table 2-2 Edmondson Park Station entries (May to August 2019)

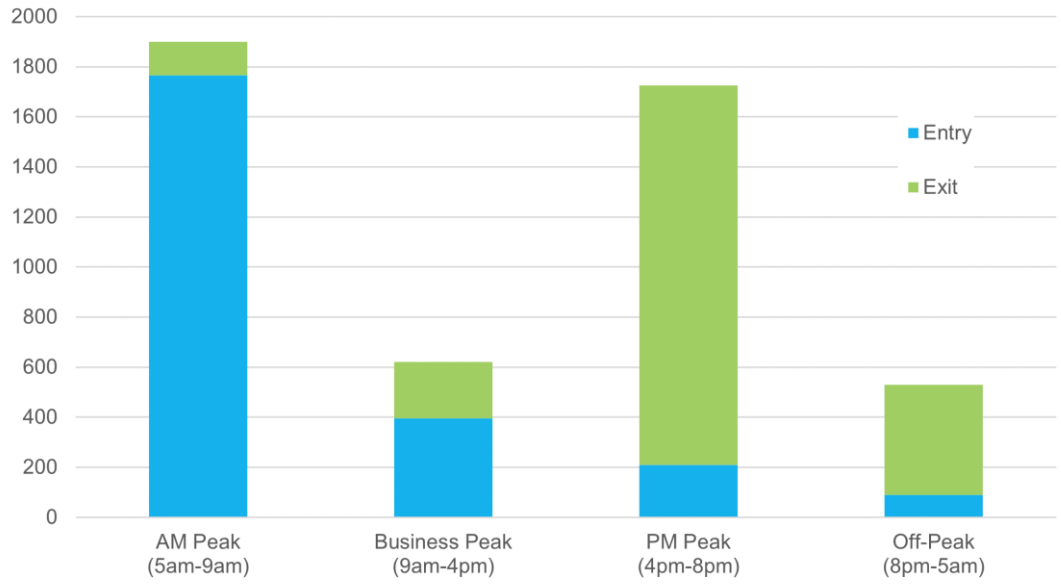
Hour commencing	Average station entries	AM Peak demand profile (%)	Daily demand profile (%)
5.00 am	155	9%	6%
6.00 am	506	28%	20%
7.00 am	733	42%	30%
8.00 am	372	21%	15%
AM Peak total	1,766	100%	71%
Daily Total	2,483		100%

Source: Station Entry/Exit Opal Data (May-August 2019)

Given the station location at the end of the T2 Inner West & Leppington Line and the T5 Cumberland Line, most customers arriving at the station in the morning peak are travelling towards the Sydney CBD, Parramatta or Richmond.

Land use around Edmondson Park Station is under development. There are currently no major trip generators or attractors within 800 metres of the site other than Ed. Square Shopping Centre to the south of the station. This will change over time as the Edmondson Park release area is developed. A consequence of the current land use is that the station demand patterns are very tidal in nature, mostly inbound in the morning and then outbound in the PM peak on the return journey to Edmondson Park (**Figure 2-4**).

Figure 2-4 2019 Edmondson Park Station entry and exit profiles



Source: Station Entry/Exit Opal Data (May-August 2019)

2.2.3 Bus services

The bus interchange facility is located on the south side of the station at the eastern end of Henderson Road (see **Figure 2-3**). The following Interline Bus Services routes currently operate through the Edmondson Park Station interchange:

- Bus Route 859 – operates to the north between Carnes Hill and Edmondson Park Station
- Bus Route 868 – operates to the south between Edmondson Park Station and Ingleburn
- Bus Route 869 – operates between Ingleburn and Liverpool via Edmondson Park and Prestons.

Detailed bus route maps are included in **Appendix A**.

The bus interchange has seating, shelter, flag, timetable, rubbish bin and tactile facilities. Layover facilities are provided for Routes 859 and 868 at the western end of Henderson Road.

Additionally, on-demand services provide flexible public transport services between Edmondson Park Station and the Edmondson Park Estate, to the north of the station, extending up to Camden Valley Way, as outlined in **Figure 2-5**. These trial services began in January 2018. Services to the station operate between 6.00 am and 9.00 am. Services departing the station operate between 4.00 pm and 8.00 pm.

While the signalisation of Henderson Road and Soldiers Parade facilitates bus access to the station, it also encourages general traffic to mix with bus operations and reduces pedestrian connectivity between the station entrance and the proposed town centre development to the south.

The number of buses arriving and departing the Edmondson Park Station during weekdays is provided in **Table 2-3**.

Table 2-3 Edmondson Park Station bus services

Time	Route 859		Route 868		Route 869	
	To Carnes Hill	From Carnes Hill	To Ingleburn	From Ingleburn	To Liverpool	From Liverpool
Before 6 am	-	-	1	-	4	2
6 am – 9 am	5	6	3	4	13	12
9 am – 4 pm	7	7	6	5	15	17
4 pm – 7 pm	5	5	3	4	12	12
After 7 pm	2	1	-	-	9	10
Total	19	19	13	13	53	53

Source: Transport for NSW timetable, valid from 12 July 2021

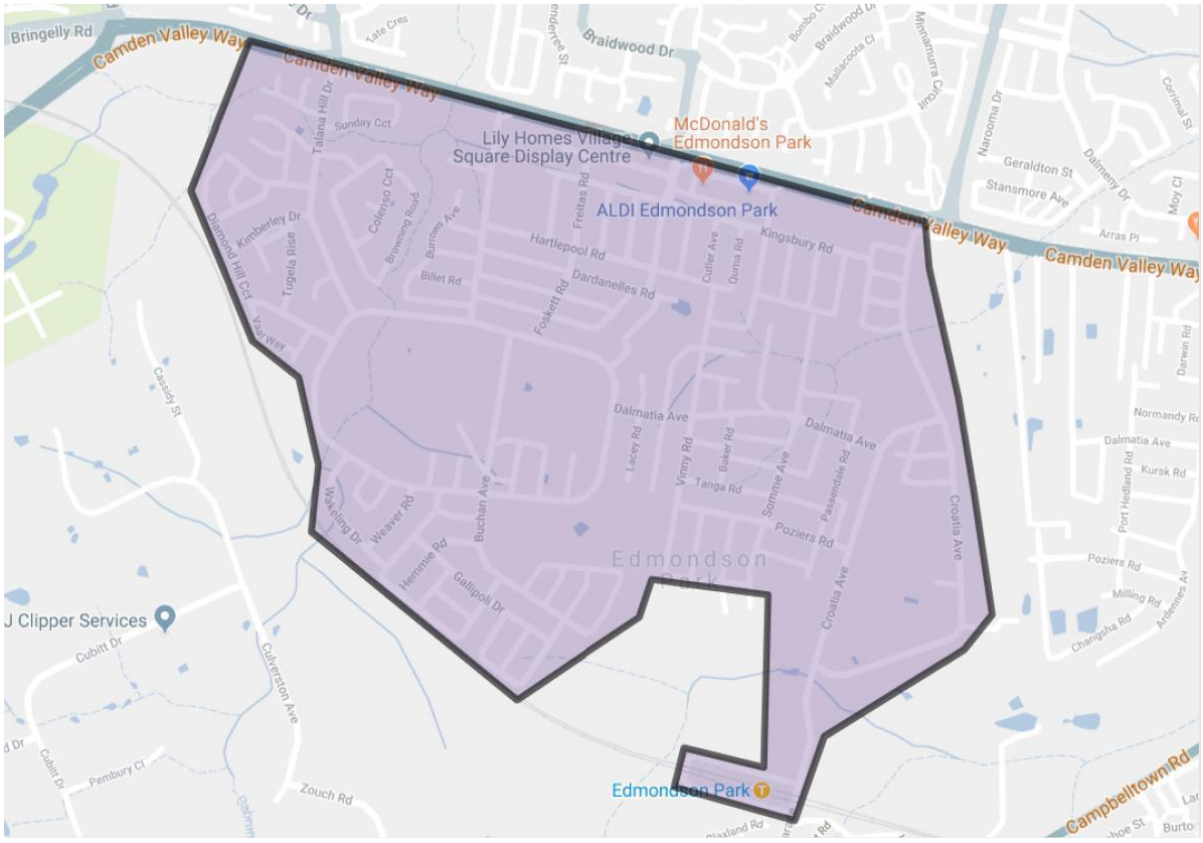


Figure 2-5 On-demand bus services catchment

Source: Futurerail, 2020

2.3 Walking

Pedestrian access to the concourse at Edmondson Park Station is provided via footpaths to the north and south of the station. From the concourse, two sets of stairs located in the paid area provide access to the platform level. Lifts are also available in the paid area.

Pedestrian access to the existing commuter car parks is provided via footpaths to the north and south of the station along Henderson Road and the northern station access road. Raised pedestrian crossing facilities are provided across these roads, providing a link between the at-grade car parks and the station entrances.

There are two-way shared paths along the western side of Soldiers Parade, with appropriate signage and line markings to ensure safety and guidance for cyclists and pedestrians accessing the station. Additionally, shared pedestrian and cycle paths are provided along both sides of Campbelltown Road between MacDonald Road and Soldiers Parade.

Overall, the pedestrian connectivity to Edmondson Park Station is poor because the surrounding area is largely undeveloped. Pedestrian infrastructure has been implemented to service the immediate vicinity of the site; however, it is expected that once the area develops, that pedestrian connectivity to the station will be improved.

A signalised crossing is provided on the western approach of Henderson Road at Soldiers Parade. However, this is currently the only station pedestrian approach with a formal signalised pedestrian crossing facility. There are currently no east-west pedestrian crossing facilities across Soldiers Parade that would link the Proposal to the station.

2.4 Cycling

Within Edmondson Park Station, 40 bicycle parking spaces are currently provided near the station entrances on the northern and southern access roads fronting the station, which consists of one sheltered bicycle parking area and three unsheltered bicycle parking areas. There are five u-rails at each bicycle parking area.

Shared pedestrian and cycle paths are provided along Campbelltown Road near Edmondson Park Station and there are two-way shared paths along the western side of Soldiers Parade and the eastern side of MacDonald Road between Henderson Road and the northern station access road, with appropriate signage and line markings to ensure safety and guidance for cyclists and pedestrians accessing the site. (**Figure 2-6**). There are currently no cycle facilities serving the Proposal site.

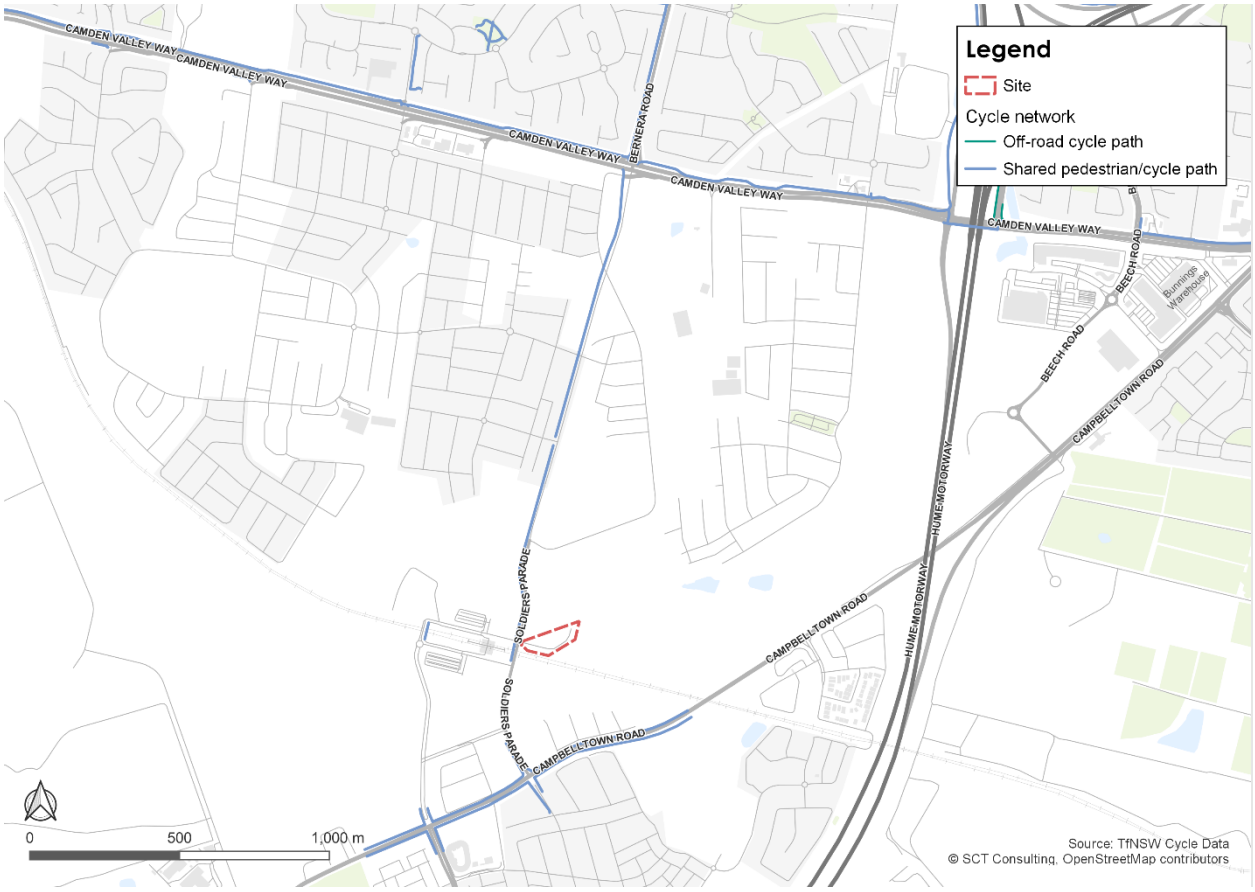


Figure 2-6 Cycle network in the vicinity of the site

2.5 Kiss and ride

A formal kiss and ride area is provided at Edmondson Park Station on the northern station access road with capacity for about 18 cars. Due to the over-subscription of the adjacent park and ride facilities prior to the opening of Edmondson Park Station (South) commuter carpark, it was common for the kiss and ride facility to be blocked with illegally parked commuter vehicles.

2.6 Taxi facilities

A taxi rank is provided on the northern side of Henderson Road, west of Sergeant Street. It has capacity for about six taxis. Due to the over-subscription of park and ride facilities prior to the opening of Edmondson Park Station (South) commuter carpark, it was common for the taxi facility to be blocked with illegally parked commuter vehicles.

2.7 Road access

The existing road network near the Edmondson Park Station precinct includes Soldiers Parade, Campbelltown Road, Camden Valley Way and the Hume Highway. **Figure 2-7** shows the road hierarchy of the existing road network near Edmondson Park Station.

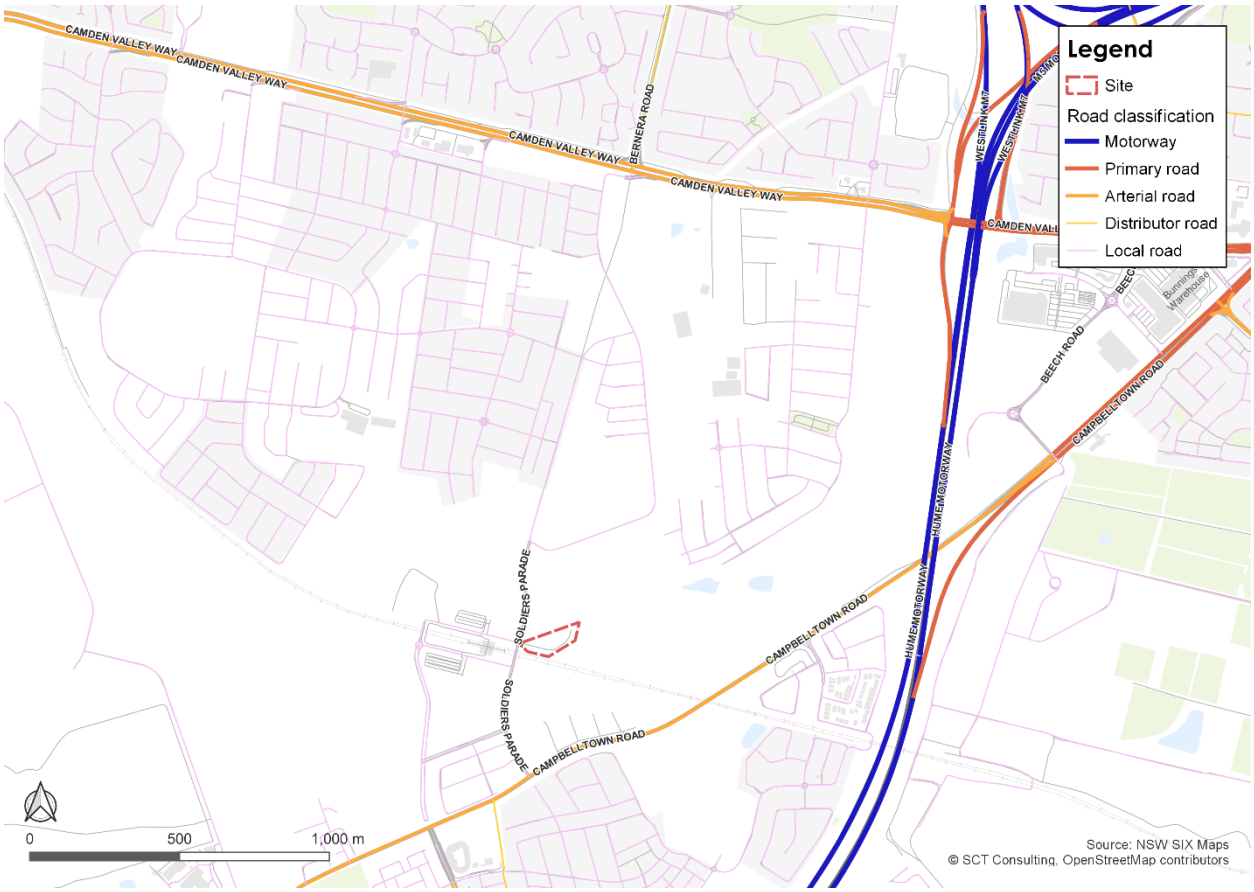


Figure 2-7 Edmondson Park road access network

2.7.1 Soldiers Parade

Soldiers Parade is a north-south local road connecting Edmondson Park to the State Road arterial network at Camden Valley Way to the north and Campbelltown Road to the south. It is the main access road to the station precinct and is located immediately to the east of the station. It generally provides one through traffic lane in each direction with turning lanes for access to and from the station. Near the station and approaching the State Road network, it widens to a dual carriageway.

Average weekday hourly demand profiles for Soldiers Parade are presented in **Figure 2-8**.

Two-way shared paths are provided on the west side of Soldiers Parade, near Edmondson Park Station, with limited crossing opportunities provided along the road. Signalised intersections are provided at the intersection of Soldiers Parade / Henderson Road and Soldiers Parade / Campbelltown Road.

The posted speed limit is 50 km/h. Speed surveys undertaken in December 2019 reveal that during the AM peak period, the 85th percentile speeds were 45-47 km/h. In the PM peak period, the 85th percentile speeds increased to 52-61 km/h.

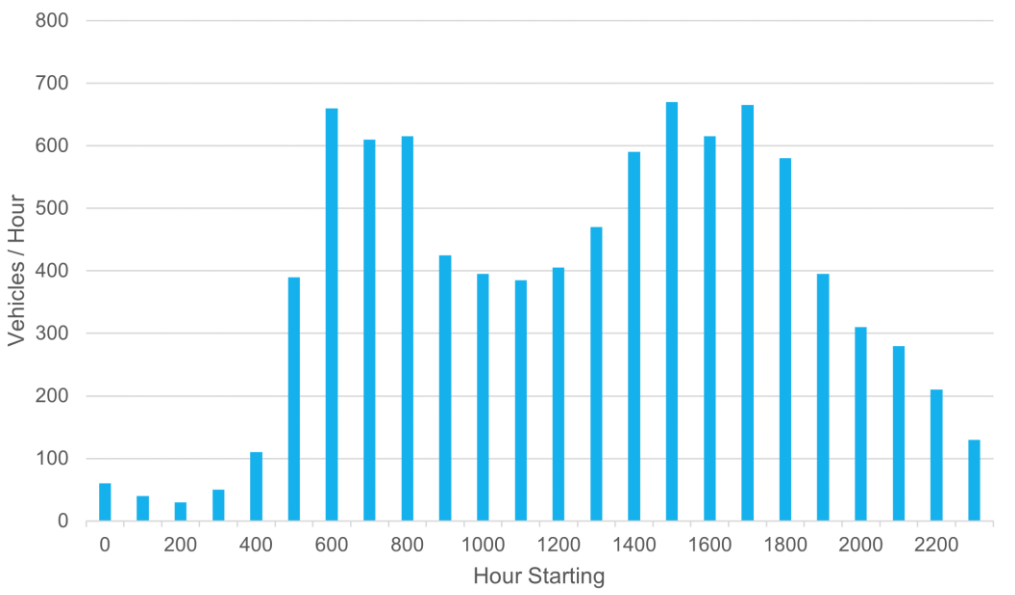


Figure 2-8 Soldiers Parade average weekday hourly demand profile, two-way (December 2019)

Source: Futurerail, 2020

2.7.2 Campbelltown Road

Campbelltown Road is an east-west State Road (MR177), which is currently undergoing a major upgrade. Transport for NSW is upgrading Campbelltown Road between Hume Highway/Camden Valley Way, Casula and Brooks Road, Denham Court. Stage 1 of this upgrade, between East Town Centre Road and the newly realigned MacDonald Road, was completed in 2020. The upgrade:

- Widened Campbelltown Road from one lane in each direction to two, with the potential to add a third lane if needed in the future
- Included major intersection upgrades at Soldiers Parade and MacDonald Road
- Provided off-road shared pedestrian/cyclist paths on both sides of Campbelltown Road
- Installed designated turning lanes and cycle and pedestrian crossings at traffic lights.

The posted speed limit on Campbelltown Road is 70 km/h.

2.7.3 Camden Valley Way

Camden Valley Way is an east-west State Road located to the north of Edmondson Park. It is a major transport route for communities in Sydney's South West Growth Centre, linking the Hume Highway and the Westlink M7 and M5 Motorway interchanges at Prestons with Camden, Narellan and Liverpool. The road comprises four lanes, divided by a large median. It is signed at 70 km/h. Camden Valley Way operates as a public transport corridor servicing bus route 851, 852, 855, 856, 857, 864, and 867.

2.7.4 Hume Motorway

The Hume Motorway is an eight-lane, divided, classified road providing connections to the wider classified road network. It is a major north-south link providing access to the M5 Motorway as well as the Westlink M7. The road is signed at 110 km/h. There is currently no direct access from the Hume Motorway to the study area. The nearest motorway access is via Campbelltown Road and Camden Valley Way.

2.8 Park and ride

The following park and ride spaces are available in the vicinity of Edmondson Park Station:

- At-grade commuter car park (north of station): 195 spaces
- Temporary replacement car park while the Edmondson Park Station (South) Commuter Car Park was under construction (north of station): 180 spaces
- Edmondson Park Station (South) Commuter Car Park: Multi-level car park with a total of 1,474 spaces providing a net increase of 1,258 spaces on the previous at-grade car park located on the site
- On-street parking: 120 spaces.

The Edmondson Park Station (South) Commuter Car Park was completed in early 2022. While it was under construction, a temporary replacement car park was provided to the north. However, it is proposed that this temporary car park, will be removed once the Edmondson Park Station (South) Commuter Car Park is operational. The existing at-grade commuter car park, north of the station, is also proposed to be decommissioned and closed to public after the Proposal is open to the public.

Kerbside parking is currently available along both sides of Soldiers Parade about 80m to the south of the southern car park entry. Angled parking is provided on the west side of Soldiers Parade, about 150m to the north of the northern car parking entry. Furthermore, several parking spaces have been line-marked on MacDonald Road as a temporary measure to provide additional parking spaces.

Prior to the opening of Edmondson Park Station (South) commuter carpark, the commuter car parking facilities were historically over-subscribed, which led to parking overspill into adjacent roads and illegal parking practices within the precinct.

A site visit in December 2019 revealed up to 217 vehicles parked informally or illegally. Anecdotal evidence suggests that the reasons for this parking behaviour may include:

- The additional commute time involved in transfers to other stations if unsuccessful in finding a space at Edmondson Park
- Lack of alternate parking capacity at adjacent stations (e.g. Leppington)
- Lack of information on real-time parking availability at other stations.

Number plate surveys, undertaken in 2018 (shown in **Figure 2-9**), reveal that from a sample of 802 vehicles using the commuter car park:

- 24 percent originated from Edmondson Park
- 82 percent originated from 15 local suburbs, with the weighted average travel distance for 82 percent of trips was just 3.9 km
- 84 percent of users originated north of the station
- 16 percent of users originated south of the station.

2.9 Access mode share

Another consequence of the current land use context is that the access mode share is mostly park and ride. This is a consequence of:

- Poor active transport links between the station and the existing residential catchments within 5 km of the station. This should improve soon with the development of the town centre to the immediate south of the station and then to the north of the station.
- The quality of bus services connecting the station to the larger residential catchments to the north of Camden Valley Way.

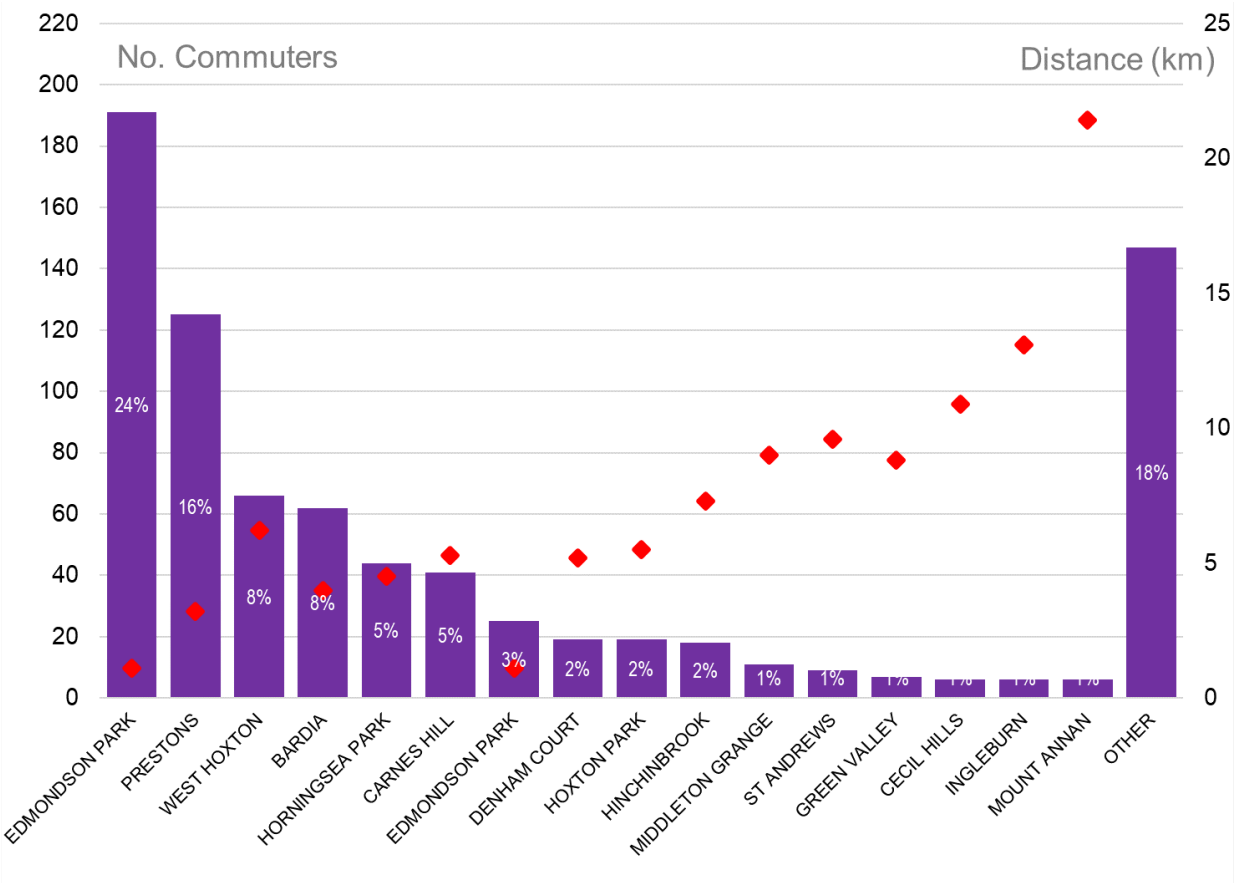


Figure 2-9 Edmondson Park number plate survey findings (2018)

Source: Futurerail, 2020

2.10 Road network performance

The performances of key intersections providing access to Edmondson Park were assessed using the SIDRA Network 8.0 software package. Intersection performance is measured in terms of the following:

– Degree of Saturation (DoS): The ratio of arrival (demand) flow rate to capacity during a given flow period. Acceptable intersection performance requires DoS < 1.0.

– Level of Service (LoS): An index of the operational performance of traffic for a given intersection during a given flow period (refer **Table 2-4**). Acceptable intersection performance normally requires a minimum of LoS D.

– Average Vehicle Delay in seconds: The delay experienced by a vehicle traversing a signalised intersection

Table 2-4 provides a summary of the LoS performance bands.

Table 2-4 Level of Service index

Level of Service	Average delay per vehicle (sec)	Performance explanation
A	Less than 14.5	Good operation
B	14.5 to 28.4	Good with acceptable delays and spare capacity
C	28.5 to 42.4	Satisfactory
D	42.5 to 56.4	Operating near capacity
E	56.5 to 70.4	At capacity, at signals, incidents will cause excessive delays. Roundabouts require other control methods.
F	70.5 or greater	

Source: Guide to Traffic Generating Developments; RMS, 2002

As can be seen in **Figure 1-2**, the network in the vicinity of the Edmondson Park Station is currently under development, with Buchan Avenue being constructed to intersect with Soldiers Parade. **Table 2-5** presents the results of the key intersections in 2019 before Buchan Avenue and the Edmondson Park Station (South) Commuter Car Park are operational.

The intersection of Soldiers Parade, the northern station access road and the Proposal Access Road is median-divided with the east and west halves of the intersection operating independently of each other as left-in / left-out (LILO) intersections. The performance of the Soldiers Parade / northern station access road intersection is reported here as the Proposal Access Road is not currently operational.

The SIDRA models used were the same as those used in the *Edmondson Park Station (South) Commuter Car Park REF* (Transport for NSW, May 2020) and were based on the traffic data available at the time. The analysis is based on background traffic volumes prior to COVID-19 to best reflect baseline 'business as usual' traffic conditions at the site. The base models developed were not a fully calibrated representation of the worse-case prevailing conditions at each site, rather they represent the base case for a series of 'change model' assessments.

The results indicate that the intersections were all performing at satisfactory levels of service (LoS C or better) with reserve capacity to accommodate future growth.

Table 2-5 Existing intersection performance (2019) – with Buchan Ave and Edmondson Park Station (South) Commuter Car Park still to be constructed

Intersection	Control type	AM Peak			PM Peak		
		Delay (sec)	LoS	DoS	Delay (sec)	LoS	DoS
Soldiers Parade / northern station access road	Give way	4.4	A	0.25	4.4	A	0.24
Soldiers Parade / Henderson Road	TCS	21.4	B	0.62	21.6	B	0.55
Soldiers Parade / Campbelltown Road	TCS	39.3	C	0.80	35.0	C	0.89

Delay = worst movement for give-way intersections and DoS = degree of saturation of worst movement for give-way movements

Table 2-6 presents the results of the key intersections with Buchan Avenue constructed to Soldiers Parade and the Edmondson Park Station (South) Commuter Car Park operational with a net increase of 1,258 parking spaces on the site.

Buchan Avenue is planned to operate as a LILO intersection with Soldiers Parade, and while the traffic modelling for the *Edmondson Park Station (South) Commuter Car Park REF* (Transport for NSW, May 2020) assumed all the additional 2,000 parking spaces were in the Edmondson Park Station (South) Commuter Car Park, this has been revised to a net increase of 1,258 parking spaces in the Edmondson Park Station (South) Commuter Car Park and a net additional 700 spaces through the Proposal.

The results indicate that the intersections should all perform at satisfactory levels of service (LOS C or better) with reserve capacity to accommodate future growth. These results establish a future base to assess the impacts of the Proposal.

Table 2-6 Future base intersection performance – with Buchan Ave constructed and Edmondson Park Station (South) Commuter Car Park operational

Intersection	Control type	AM Peak			PM Peak		
		Delay (sec)	LoS	DoS	Delay (sec)	LoS	DoS
Soldiers Parade / Buchan Avenue	Give way	8.4	A	0.52	9.4	A	0.43
Soldiers Parade / northern station access road	Give way	4.4	A	0.25	4.4	A	0.24
Soldiers Parade / Henderson Road	TCS	42.4	C	0.87	38.1	C	0.84
Soldiers Parade / Campbelltown Road	TCS	41.2	C	0.82	37.4	C	0.91

Delay = worst movement for give-way intersections and DoS = degree of saturation of worst movement for give-way movements

3.0 Environmental Impact Assessment

3.1 Construction impacts

3.1.1 Parking

The activities associated with the peak construction period of the Proposal are expected to require a maximum daily workforce of up to 80 workers per day. Despite the station having convenient access to the T2 Inner West & Leppington Line and the T5 Cumberland Line, it is expected that some percentage of the workforce may choose to travel to the site daily, by car.

Based on a peak workforce of 80 workers, and assuming 40 per cent of workers choose to travel to the site daily by car, with a car occupancy rate of 1.5 workers per vehicle, the increased demand for parking could be up to 21 spaces. This peak impact would be for the duration of construction of the Proposal superstructure, a 20-week period.

While construction staff will be encouraged to use public transport, wherever practicable, and advised not to use the commuter car parks, a combination of site parking and the new Edmondson Park Station (South) Commuter Car Park being operational before construction of the Proposal starts, should be sufficient to accommodate any parking demand with minimal disruption to commuters.

3.1.2 Road network performance

Construction traffic would access the site via the LILO intersection at Soldiers Parade / Proposal Access Road.

Deliveries to and from the site would peak at about 60 trucks per day, during the concrete pours and would be spread evenly throughout the day (about 7 to 8 trucks per hour). This peak impact would be for the duration of construction of the Proposal superstructure, a 20-week period.

Due to the low traffic volumes on Soldiers Parade, which currently peak at around 650 vehicles per hour (two-way), the site access point will perform at acceptable levels of service under the combined impact of deliveries (about 7-8 trucks per hour) and workforce trips (about 21 cars per hour). The combined construction movements represent less than four per cent increase in intersection traffic during peak periods.

3.1.3 Taxi operations

Construction of the site is unlikely to impact taxi operations due to the taxi rank being located remote from the worksite.

3.1.4 Kiss and Ride activity

Construction of the site is unlikely to impact kiss and ride operations as the kiss and ride facility is located remote from the worksite.

3.1.5 Substation access

The site is located on existing land to the northeast of the Edmondson Park Station owned by Transport for NSW. The substation can be accessed via the LILO intersection at Soldiers Parade / Proposal Access Road. Provisions to ensure unrestricted access to the substation at all times would be addressed under a Construction Traffic Management Plan (CTMP).

3.1.6 Pedestrian access

Currently, there is no east-west access along Soldiers Parade in the vicinity of the site. However, subject to detailed design and consultation with relevant stakeholders, it is proposed to provide:

- A pedestrian crossing on the Proposal Access Road. This would be an unsignalised marked crossing that would be located about 45 metres from the Soldiers Parade road reserve boundary to provide for safe sight distance at the crossing.
- A signalised pedestrian crossing on the north approach of the Soldiers Parade / Henderson Road intersection
- Pedestrian fencing in the existing median along Soldiers Parade, north of Henderson Road, to stop unsafe, informal crossing of Soldiers Parade.

It is proposed that pedestrians can walk between the site and Edmondson Park Station via these pedestrian crossings, as shown in **Figure 3-1**. It is recommended that the signalised crossing of Soldiers Parade be constructed early in the construction program to allow workers to safely cross Soldiers Parade during the construction period. If this is not feasible, then consideration for safe crossing of Soldiers Parade by construction staff should be included in the Construction Traffic & Pedestrian Management Plan.

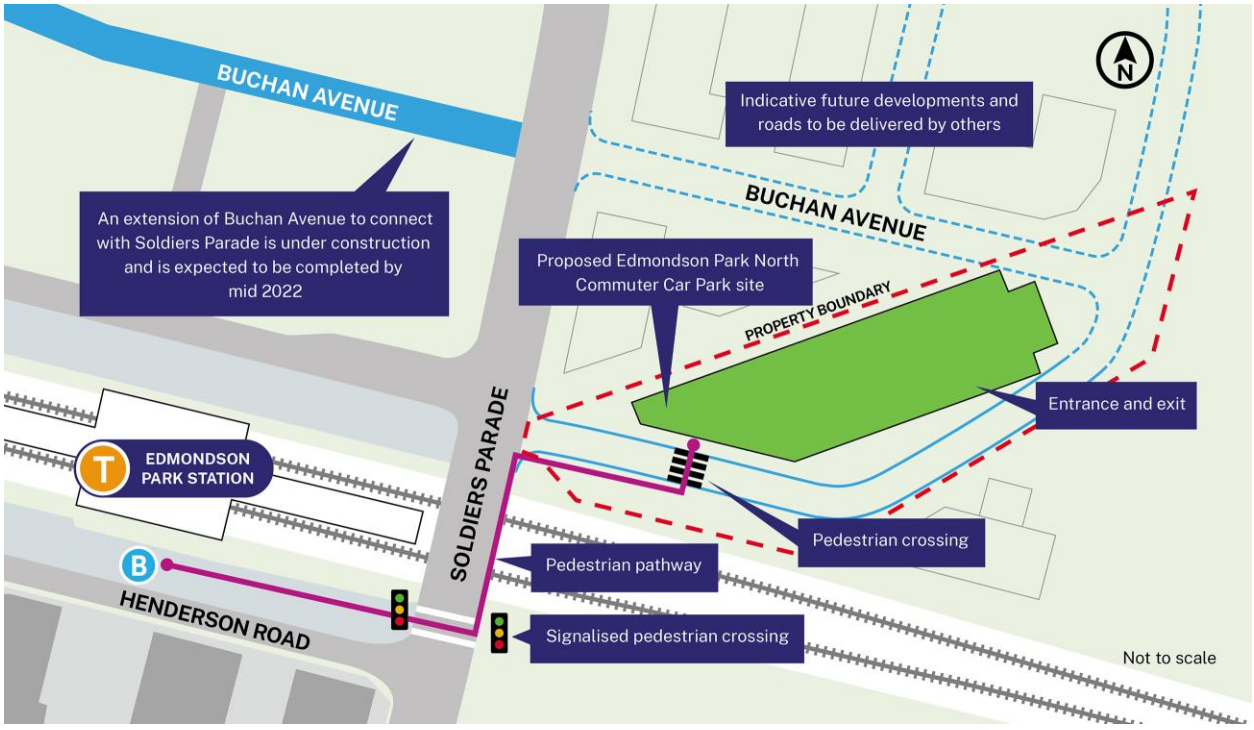


Figure 3-1 Proposed pedestrian route

Source: Transport for NSW, 2022

3.1.7 Bus operations

Construction of the site is unlikely to impact bus stop operations as the bus stops are located remote from the worksite.

Up to 60 trucks per day would pass through Soldiers Parade during the concrete pours. These would be spread evenly throughout the day (7 to 8 trucks per hour) and so would not significantly impact bus operations on Soldiers Parade.

3.2 Operational impacts

3.2.1 Access to the Proposal

3.2.1.1 Interim access arrangement

Access to and from the site is subject to detailed design and consultation with relevant stakeholders but this assessment has assumed that due to the road network configuration, all vehicles accessing the Proposal will be from the north, with the Edmondson Park Station (South) Commuter Car Park accommodating commuters from the south who wish to park and ride at the station. This is due to the Buchan Avenue / Soldiers Parade intersection operating as a LILO intersection and so traffic from the south has no route to access the Proposal, as shown in **Figure 3-2**. Vehicles accessing the site would travel south on Soldiers Road to access the LILO intersection at Soldiers Parade / Proposal Access Road.

Vehicles exiting the site to the north would turn left at the LILO intersection, travel south on Soldiers Parade and use the roundabout at Soldiers Parade / General Boulevard intersection to turn around and head north on Soldiers Parade.

Figure 3-2 Interim access routes

Source: SCT Consulting. 2022

3.2.1.2 Ultimate access arrangement

Ultimate access to and from the site is also subject to detailed design and consultation with relevant stakeholders but based on the currently available information on the future road network in the precinct, the ultimate access routes were assumed to be as shown in **Figure 3-3**.

Vehicles accessing from the north would travel south on Soldiers Road to access the LILO intersection. While vehicles from the south could theoretically use the planned extension of MacDonald Road to access the Proposal, they would be travelling past the larger Edmondson Park Station (South) Commuter Car Park and would therefore be likely to use that instead.

Vehicles exiting to the north could now use the planned signalised intersection at Soldiers Parade / MacDonald Road extension to head north in addition to still having the option to turn left at the LILO intersection, travel south on Soldiers Parade and use the roundabout at Soldiers Parade / General Boulevard intersection to turn around and head north on Soldiers Parade.

The ultimate access arrangement has been tested in the 2026 cumulative scenario, which includes broader precinct development, and is described and reported in **Section 3.2.7**.

Figure 3-3 Ultimate access routes

Source: SCT Consulting. 2022

3.2.2 Parking

Once the Proposal, with about 900 spaces, is open to the public, the existing at-grade car park with 200 spaces, north of the station, will be decommissioned and closed to public. The Proposal would provide a net increase in commuter car parking capacity at the station of about 700 spaces. This is expected to reduce informal over-flow commuter parking issues throughout the precinct.

Consideration is being given to the introduction of a parking management system to provide real-time advice to users on the availability of parking spaces across the precinct, thereby reducing unnecessary circulation between different commuter car park products on offer.

To encourage a more sustainable electric fleet, electric vehicle charging stations will be installed as part of the Proposal.

The site would be equipped with Opal Card controlled boom-gate access points.

3.2.3 Pedestrian access

As described in section 3.1.6, a pedestrian crossing is to be provided on the Proposal Access Road, which would lead to a signalised pedestrian crossing on the north approach of the Soldiers Parade / Henderson Road intersection. This would provide a safe, formalised route between the commuter car park and the station.

Pedestrian fencing would be provided in the existing median along Soldiers Parade, north of Henderson Road, to stop unsafe, informal crossing of Soldiers Parade between the commuter car park and the station.

3.2.4 Traffic generation

For this assessment, a worse-case scenario was tested that the 923 parking spaces proposed in the concept design for the multi-storey car park would generate 923 additional trips to the site during the AM peak period (5.00 am to 9.00 am) and 923 additional trips from the site in the PM peak period (3.00 pm to 7.00 pm)

The review of 2019 Opal data for the Edmondson Park site, revealed:

- The AM peak hour for station entries is 7.00 am to 8.00 am. The AM peak hour accounts for 42 percent of the four-hour AM peak period
- The PM peak hour for station exits is 6.00 pm to 7.00 pm. The PM peak hour accounts for 35 percent of the four-hour PM peak period.

Therefore, the 923 parking spaces would generate:

- 388 inbound trips during the AM peak hour
- 323 outbound trips during the PM peak hour.

As described in the access arrangement section, all trips to and from the Proposal would be from the north.

3.2.5 Boom gate requirements

An estimate of boom gate requirements for the car park was undertaken based on a 15-min peak within the AM and PM peak hours. It is assumed that the boom-gates will service all 923 parking spaces and that the site will generate a total of 388 inbound trips during the AM peak hour and 323 outbound trips during the PM peak hour.

A peak flow factor of 0.95 was applied to the peak hour, with the 15-min peak equating to 26% of the peak hour. Therefore, the peak 15-min demand flows for the 923 spaces are:

- 101 inbound trips during the AM 15-min peak
- 84 outbound trips during the PM 15-min peak.

Boom gate service rates were estimated to be four vehicles per minute[1], which equates to a capacity of up to 60 cars per boom gate per 15-min peak. Based on the peak 15-min peak demands for the site, the number of boom gates required to service arrivals and departures in the peak periods is two entry and two exit boom gates. The concept design plans provide two entry and two exit boom gates, so no queueing is forecast.

[1] This estimate was based on a first principles estimate of 15 seconds per vehicle based on boom gate opening and closing time of 5 seconds, Opal pass validation of 5 seconds and car deceleration and acceleration time of 5 seconds.

3.2.6 Road network performance

Table 3-1 presents the performance results of the key intersections under the **interim access arrangements**, as described in Section 3.2.1.1, compared to the future base scenario without the project.

In the 'with project' scenario, traffic generated by the Proposal was added to the future base traffic volumes in the 'without project' scenario, while traffic generated by the existing at-grade car park, north of the station, was removed. This was to reflect the planned decommissioning of the existing at-grade car park once the Proposal is open to the public. This equated to a net increase on the road network of:

– 306 inbound trips during the AM peak hour

– 255 outbound trips during the PM peak hour.

The results indicate that the intersections are forecast to perform at satisfactory levels of service (LoS D or better) with some reserve capacity to accommodate future growth.

Table 3-1 Future intersection performance with and without the project (interim access arrangements)

Intersection	Scenario	AM Peak			PM Peak		
		Delay (sec)	LoS	DoS	Delay (sec)	LoS	DoS
Soldiers Parade / Buchan Avenue	Without project	8.4	A	0.52	9.4	A	0.43
	With project	8.4	A	0.70	11.3	A	0.50
Soldiers Parade / northern station access road	Without project	4.4	A	0.25	4.4	A	0.24
	With project	4.4	A	0.25	4.4	A	0.42
Soldiers Parade / Proposal Access Road	Without project	-	-	-	-	-	-
	With project	5.4	A	0.28	6.4	A	0.25
Soldiers Parade / Henderson Road	Without project	42.4	C	0.87	38.1	C	0.84
	With project	45.8	D	0.80	53.2	D	0.91
Soldiers Parade / Campbelltown Road	Without project	41.2	C	0.82	37.4	C	0.91
	With project	40.6	C	0.82	36.8	C	0.93

Delay = worst movement for give-way intersections and DoS = degree of saturation of worst movement for give-way movements

In the PM peak period, under the interim access arrangements, there is a significant U-turn movement that occurs at the Soldiers Parade / General Boulevard roundabout for the 323 exiting vehicles that want to head north.

A sensitivity test was undertaken at the Soldiers Parade / General Boulevard intersection, using forecast 2026 cumulative traffic volumes for the east and west approaches. While these east and west forecast volumes are not expected to be generated by the wider precinct while the interim access arrangements are in place, this was modelled as a worst-case scenario.

Table 3-2 presents the performance results of the Soldiers Parade / General Boulevard intersection under the interim access arrangements. The roundabout is forecast to operate at LoS A during the PM peak with the longest queue occurring on the north approach (30m). This level of queuing is considered acceptable, as it does not reach the upstream intersection.

Table 3-2 Soldiers Parade / General Boulevard: Future PM peak performance under interim access arrangements

Intersection	Scenario	PM Peak		
		Delay (sec)	LoS	DoS
Soldiers Parade / General Boulevard	With project (interim access arrangements)	10.8	A	0.49

3.2.7 Cumulative impacts

In 2018, Landcom and the Office of Strategic Lands (OSL) prepared a Transport Management and Accessibility Plan (TMAP) for Concept Plan MOD 5 for the Edmondson Park Town Centre. The concept plan comprises an area of about 413 hectares, which forms the southern sub-precinct of the Edmondson Park Release Area. It is located north-west of the M5 Motorway and lies within both the Liverpool and Campbelltown LGAs.

The TMAP included the latest land use forecasts for the Town Centre, including:

- Increasing the minimum yield within the Edmondson Park Town Centre North (the Town Centre north of the SWRL) from 440 to 3,286 dwellings
- Introducing a maximum gross floor area (140,389 m^2) for the Station Precinct equivalent to the floor-space ratio permissible under the *State Environmental Planning Policy (Precincts – Western Parkland City) 2021*
- Amending the school site to allow for a minimum site area of 2ha and an additional 4ha if required by the Department of Education.

The 2026 demand forecasts from the TMAP are presented in **Figure 3-4**. The TMAP traffic forecasts assume a significant shift of Town Centre access movements away from Soldiers Parade to the Town Centre bypass of MacDonald Road and Bernera Road. This assumption is reflected in the proposed intersection layouts. For example, the southbound approach of Soldiers Parade has a single right turn lane at Campbelltown Road. Conversely, the southbound approach of MacDonald Road and Bernera Road has a dual right turn at Campbelltown Road.

The traffic generated by the proposed 923 parking spaces at the Proposal and the removal of the 195 parking spaces at the north at-grade commuter car park were combined with the 2026 TMAP traffic forecasts and the cumulative impacts on network operations assessed. In this scenario, the intersection of Buchan Avenue extension and Soldiers Parade is modelled as median-divided with the east and west halves of the intersection operating independently of each other as LILO intersections.

Table 3-3 presents the performance results of the key intersections under the 2026 cumulative scenario, with the ultimate access arrangements, as described in **Section 3.2.1.2**. The network appears to be operating at an acceptable level of service (LoS D or better) under the combined Town Centre and commuter car park traffic loads.

Table 3-3 2026 cumulative intersection performance (with project and future network and precinct development)

Intersection	Control type	AM Peak			PM Peak		
		Delay (sec)	LoS	DoS	Delay (sec)	LoS	DoS
Soldiers Parade / Buchan Avenue	Give way	9.6	A	0.53	10.3	A	0.30
Soldiers Parade / northern station access road	Give way	4.4	A	0.22	4.4	A	0.49
Soldiers Parade / Proposal Access Road	Give way	4.9	A	0.27	5.1	A	0.13
Soldiers Parade / Henderson Road	TCS	50.3	D	0.93	49	D	0.92
Soldiers Parade / Campbelltown Road	TCS	38.8	C	0.82	34.2	C	0.77

Delay = worst movement for give-way intersections and DoS = degree of saturation of worst movement for give-way movements

3.3 Decommissioning impacts

As noted previously, once the Proposal is open to the public, the existing at-grade car park with 200 spaces, north of the station, will be decommissioned and closed to the public.

Decommissioning will likely involve the removal of lights and installation of fencing around the site to prevent access. The volume of traffic generated by the decommissioning of the at-grade car park is likely to be less than that generated during the construction and operation phases of the Proposal. Therefore, the impacts are also expected to be less, and no additional mitigation measures would be required.

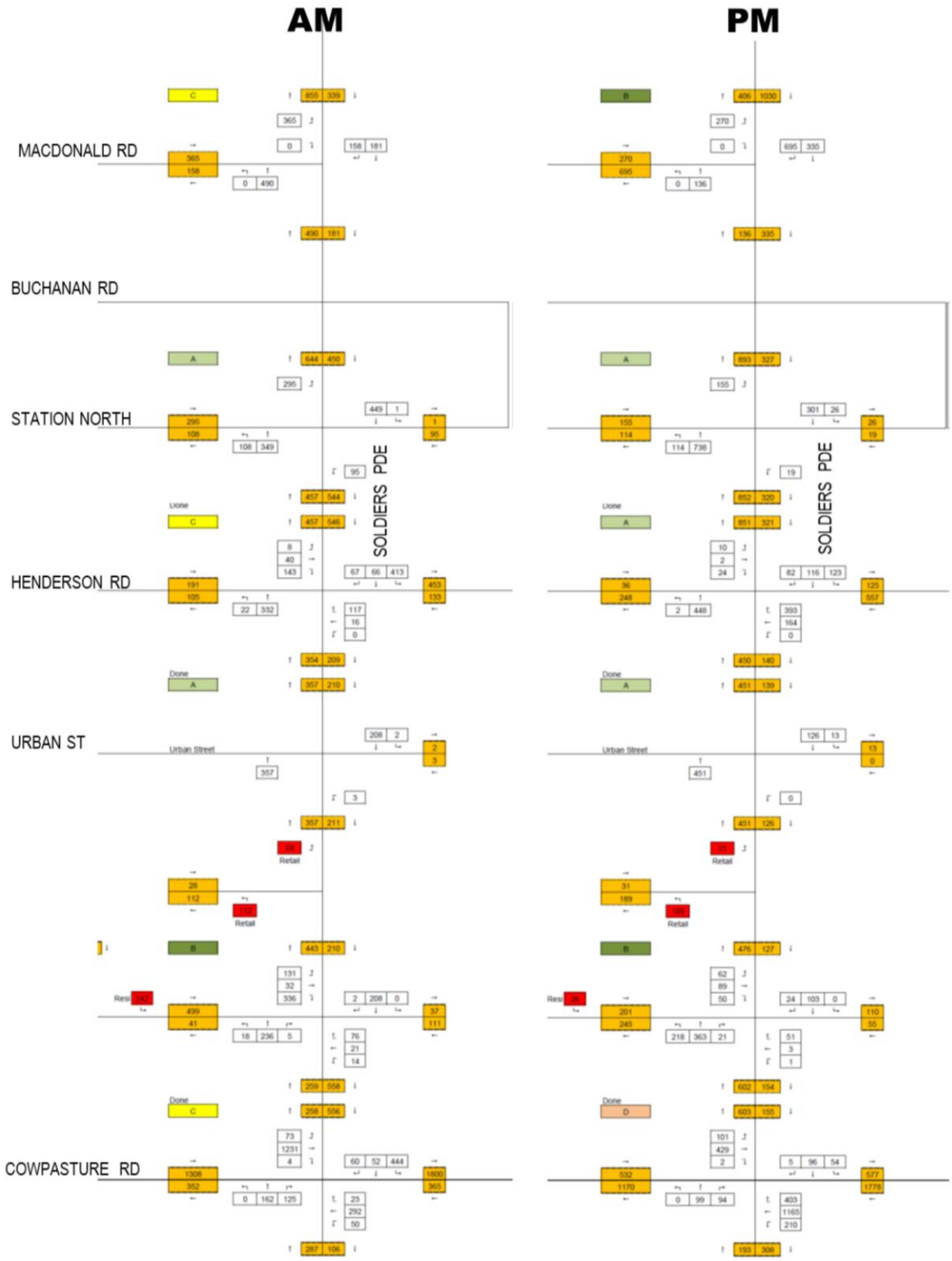


Figure 3-4 MOD5 Edmondson Park South 2026 peak hour traffic forecasts

Source: TMAP.AECOM, Aug 2018

4.0 Mitigation measures

4.1 Construction

The key mitigation measures being considered to reduce the impacts of the activity during construction include:

- Development of a Construction Traffic Management Plan (CTMP)
- Procedures for preparing and implementing Traffic Control Plans (TCPs)
- Procedures for preparing and implementing Pedestrian Management Plans (PMPs)
- Delivery scheduling outside peak periods.

4.2 Operations

The key mitigation measures being considered to reduce the impacts of the activity during operations include:

- During detailed design, an unsignalised pedestrian crossing on the Proposal Access Road and a signalised pedestrian crossing on the north approach of the Soldiers Parade / Henderson Road intersection are to be provided. The unsignalised marked crossing is to be located 45 metres from the Soldiers Parade road reserve boundary to provide for safe sight distance at the crossing.
- During detailed design, pedestrian fencing in the existing median along Soldiers Parade north of Henderson Road is to be provided to improve pedestrian safety in the vicinity of the site
- Opal Card controlled boom-gate entry/exit to discourage non-commuter parking.

5.0 Summary of design inputs

5.1 Assumptions

The following assumptions have been made in this traffic and transport assessment:

- The Edmondson Park Station (South) Commuter Car Park will be providing 1,258 additional parking spaces, while the Proposal will be providing 923 parking spaces. The existing at-grade commuter car park to the north of Edmondson Park Station will be decommissioned once the Proposal is open to the public.
- The Buchan Avenue / Soldiers Parade intersection will be median-divided with the east and west halves of the intersection operating independently of each other as LILO intersections. Based on this intersection configuration, the traffic accessing the Edmondson Park Station (South) Commuter Car Park from the north will turn right at Henderson Road and the traffic accessing the Proposal will all arrive on Soldiers Parade from the north.
- All intersection models are based on classified survey data collected in December 2019. This is not reflective of the annual seasonal peak. The intersection analysis was undertaken to establish a base case to assess the impacts of the proposed activities and was based on the traffic data available at the time. These base case models are not a fully calibrated representation of the worse-case prevailing conditions at each site; they represent the base case for a series of ‘change model’ assessments.
- Based on a peak workforce of 80, and assuming 40 per cent choose to travel to the site daily by car, with a car occupancy rate of 1.5 workers per vehicle, the increased demand for parking could be up to 21 spaces. This peak impact would be for the duration of construction of the Proposal superstructure, a 20-week period.
- Deliveries to and from the sites would peak at 60 trucks per day, per site, during the concrete pours and would be spread evenly throughout the day (7 to 8 trucks per hour). This peak impact would be for the duration of construction of the Proposal superstructures, a 20-week period.
- A worst-case scenario is that the Proposal generates 923 trips to the site during the AM peak period (5.00 am to 9.00 am) and 923 trips from the site in the PM peak period (3.00 pm to 7.00 pm). The AM peak hour for station entries is 7.00 am to 8.00 am, which accounts for 42 per cent of the four-hour AM peak period. The PM peak hour for station exits is 6.00 pm to 7.00 pm, which accounts for 35 percent of the four-hour PM peak period.

- An estimate of boom gate requirements was undertaken based on a 15-min peak within the AM and PM peak hours identified. A peak flow factor of 0.95 was applied to the peak hour. The 15-min peak equated to 26 per cent of the peak hour.
- Boom gate service rates were assumed to be four vehicles per minute (15 seconds per vehicle).
- Future traffic growth up to 2026 is based on outputs from the TMAP for Concept Plan MOD 5 for the Edmondson Park Town Centre that was prepared by Landcom and the Office of Strategic Lands (OSL). The TMAP traffic forecasts assume a significant shift of Town Centre access movements away from Soldiers Parade to the Town Centre bypass of MacDonald Road and Bernera Road.

5.2 Design Standards

The Proposal would be designed in accordance with the following standards and guidelines:

- *Disability Standards for Accessible Public Transport 2002* (issued under the Commonwealth Disability Discrimination Act 1992)
- National Construction Code
- Relevant Australian Standards
- Asset Management Branch (AMB) Standards
- TfNSW *Commuter Car Parks urban design guidelines*
- TfNSW *Creativity Guidelines for transport systems*
- TfNSW *Sustainable Design Guidelines – Version 4.0* (Transport for NSW 2019)
- *Guidelines for the Development of Public Transport Interchange Facilities* (Ministry of Transport, 2008).
- Crime Prevention Through Environmental Design (CPTED) principles
- Other Transport for NSW policies and guidelines
- Relevant council standards.

5.3 Sustainability in design

Transport for NSW is committed to minimising the impact on the natural environment and is committed to the principals of sustainability through the development and use of the TfNSW *Sustainable Design Guidelines version 4.0* (Transport for NSW, 2019) (Sustainable Design Guidelines).

The concept development has been undertaken in accordance with the Sustainable Design Guidelines, which seek to deliver sustainable development practices by embedding sustainability initiatives into the planning, design, construction, operations and maintenance of transport infrastructure projects. The development of the guidelines has been influenced by the TfNSW *Environment and Sustainability Policy*. The guidelines incorporate the following key aims:

- Minimising impacts on the environment, whether through transport operations, infrastructure delivery or maintenance
- Procuring, delivering and promoting sustainable transport options that achieve value for money and reduced life cycle costs
- Developing, expanding and managing the transport network that is sustainable and climate resilient.

6.0 Conclusion

6.1 Construction

The traffic and transport assessment has highlighted the following potential impacts during the construction stage:

– Deliveries to and from site would peak at about 60 trucks per day, during the concrete pours, and would be spread evenly throughout the day (about 7 to 8 trucks per hour). This peak impact would be for the duration of construction of the car park superstructure, a 20-week period. The combined construction movements (deliveries and worker trips by car) would represent less than a four per cent increase in traffic movements at the surrounding intersections during peak periods and are expected to have minimal impact on public transport or general traffic.

– Demand for parking during construction could be up to 21 spaces. While construction staff will be encouraged to use public transport, wherever practicable, and be advised not to use the commuter car parks, a combination of site parking and the new Edmondson Park Station (South) Commuter Car Park being operational before construction of the Proposal starts, should be sufficient to accommodate any parking demand with minimal disruption to commuters.

To facilitate east-west pedestrian access across Soldiers Parade, it is recommended that the signalised crossing on the north approach of the Soldiers Parade / Henderson Road intersection be constructed early in the construction program to allow workers to safely cross Soldiers Parade during the construction period. If this is not feasible, then consideration for safe crossing of Soldiers Parade by construction staff should be included in the Construction Traffic Management Plan (CTMP).

The key mitigation measures being considered to reduce the impacts of the activity during construction include:

– Development of a CTMP

– Procedures for preparing and implementing Traffic Control Plans (TCPs)

– Procedures for preparing and implementing Pedestrian Management Plans (PMPs)

– Delivery scheduling outside peak periods.

6.2 Operations

The traffic and transport assessment has highlighted the following potential impacts during the operations stage:

– The Proposal would provide a net increase in commuter car parking capacity of about 700 spaces. This is expected to reduce informal over-flow parking issues in the station precinct.

– Based on the net increase of about 700 spaces, an additional 306 inbound trips and 255 outbound trips would be generated during the AM and PM peak hours respectively. Analysis of road network performance indicates that all critical intersections around the site are forecast to operate at satisfactory levels of service.

The key mitigation measures being considered to reduce the impacts of the activity during operations include:

– During detailed design, an unsignalised pedestrian crossing on the Proposal Access Road and a signalised pedestrian crossing on the north approach of the Soldiers Parade / Henderson Road intersection are to be provided. The unsignalised marked crossing is to be located 45 metres from the Soldiers Parade road reserve boundary to provide for safe sight distance at the crossing.

– During detailed design, pedestrian fencing in the existing median along Soldiers Parade north of Henderson Road is to be provided to improve pedestrian safety in the vicinity of the site

– Opal Card controlled boom-gate entry/exit to discourage non-commuter parking.

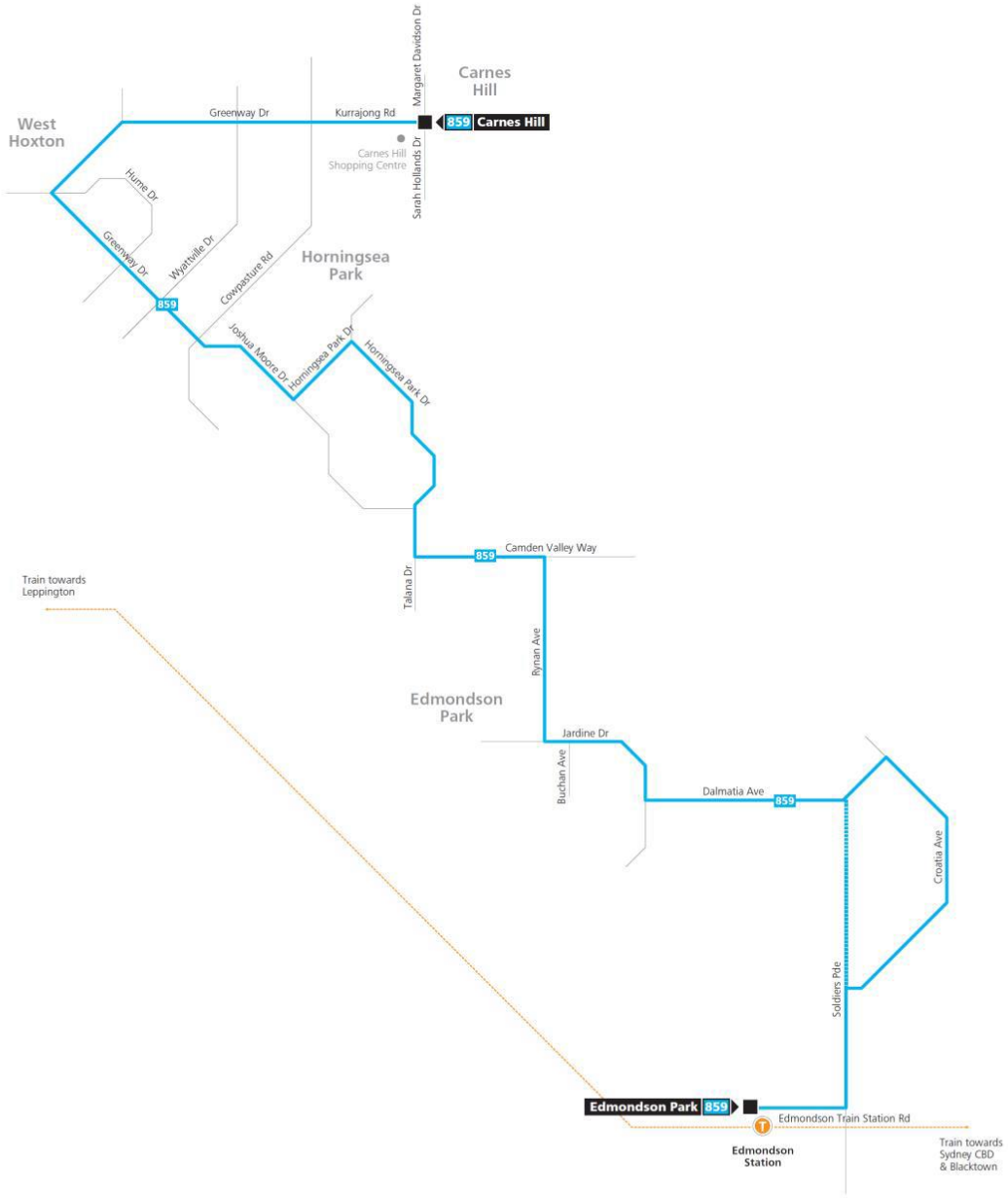
6.3 Decommissioning

Once the Proposal is open to the public, the existing at-grade car park with 200 spaces, north of the station, will be decommissioned and closed to the public. Decommissioning will likely involve the removal of lights and installation of fencing around the site to prevent access. The volume of traffic generated by the decommissioning of the at-grade car park is likely to be less than that generated during the construction and operation phases of the Proposal. Therefore, the impacts are also expected to be less, and no additional mitigation measures would be required.

APPENDIX A

Existing bus routes

Route 859

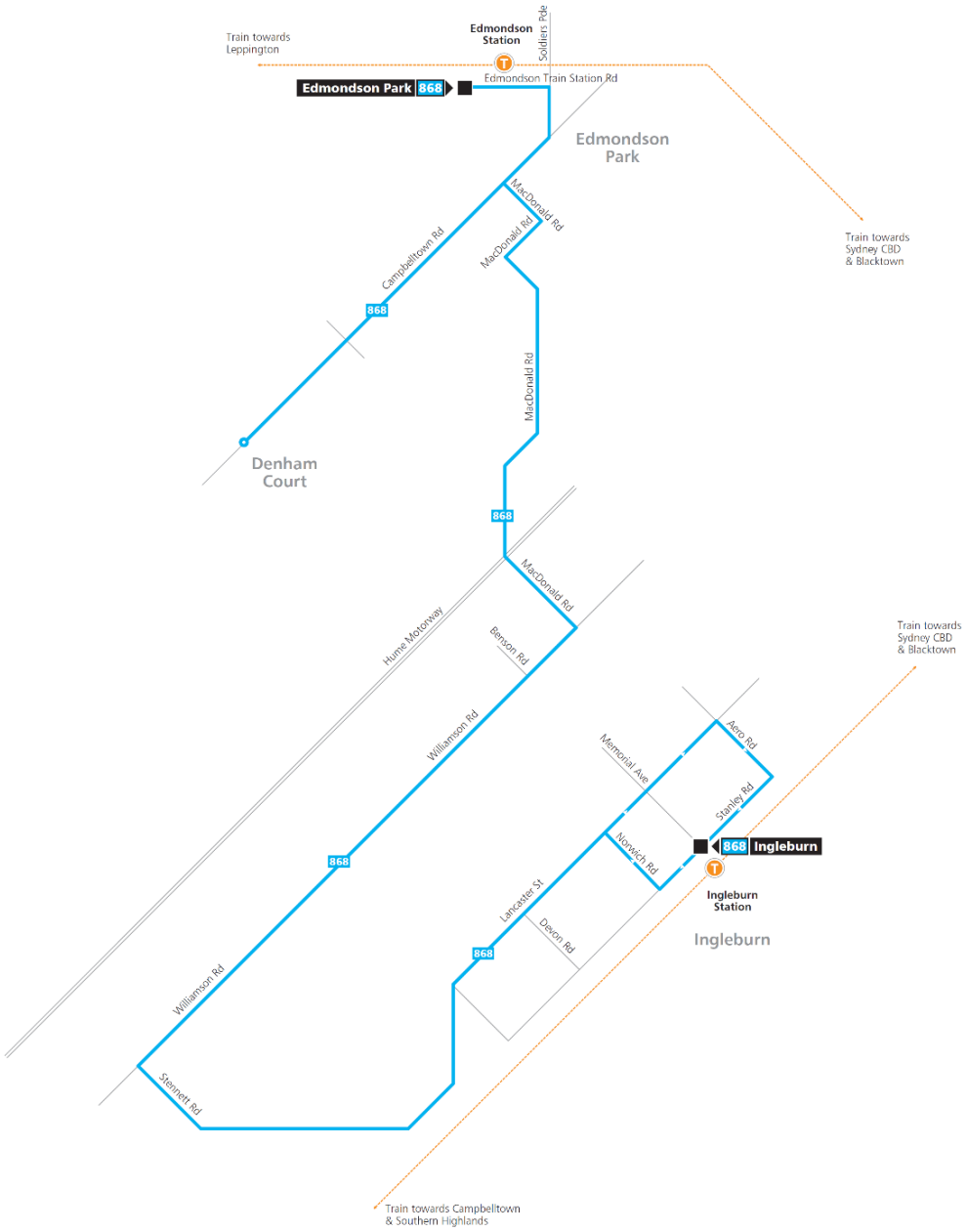


Legend

- Bus route
- 859 Bus route number
- Bus route start/finish
- Train line/station

Diagrammatic Map Not to Scale
North

Route 868

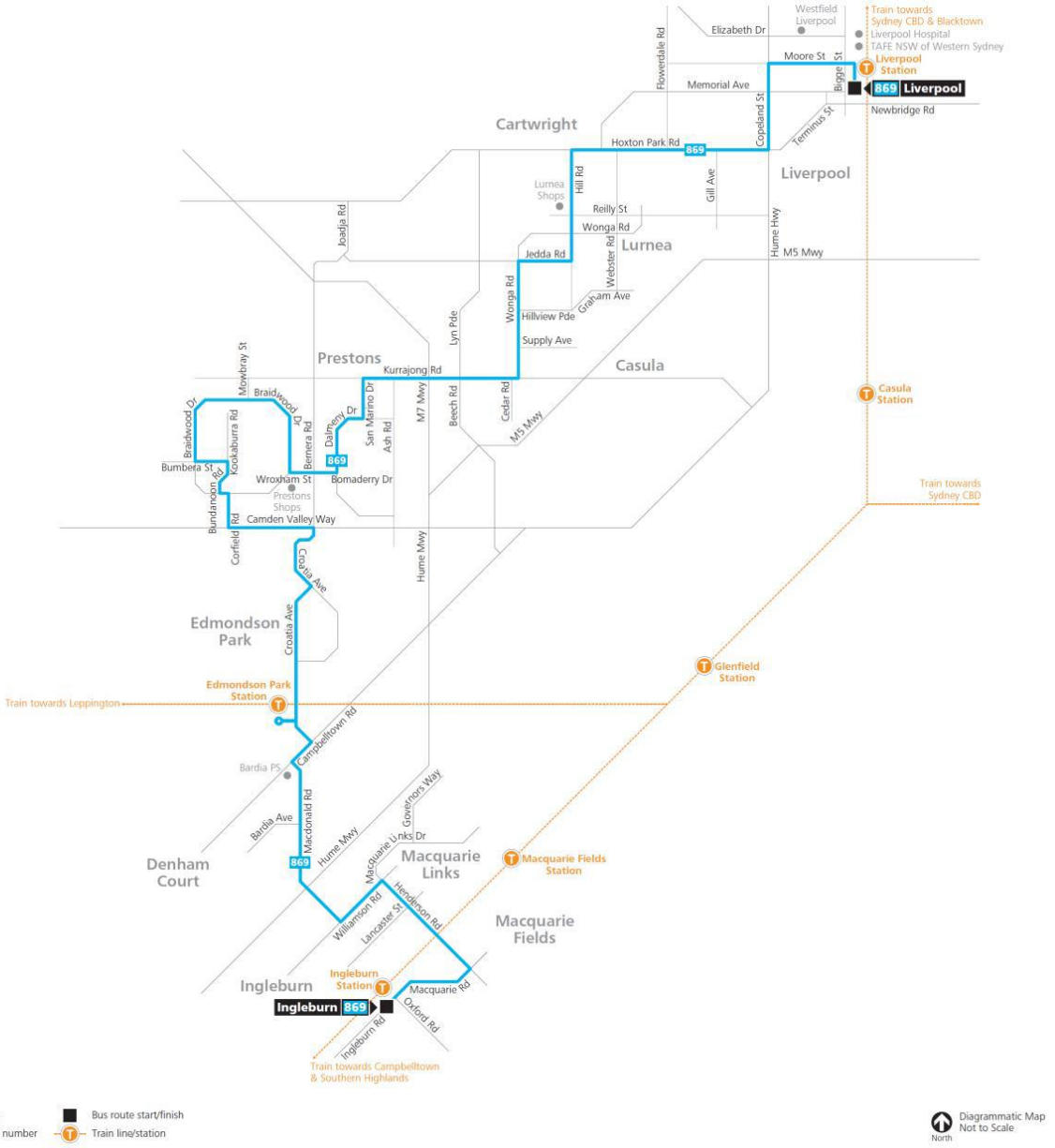


Legend

- Bus route
- 868 Bus route number
- Bus route start/finish
- Train line/station

Diagrammatic Map Not to Scale
North

Route 869


Cartwright
Liverpool
Lurnea
Prestons
Casula
Edmondson Park
Denham Court
Macquarie Links
Macquarie Fields
Ingleburn
Elizabeth Dr
Westfield Liverpool
Train towards Sydney CBD & Blacktown
Liverpool Hospital
TAFE NSW of Western Sydney
Liverpool Station
Moore St
Memorial Ave
Flowerdale Rd
Biggs St
869 Liverpool
Newbridge Rd
Copeland St
Terminus St
Hoxton Park Rd
869
Hill Rd
Lurnea Shops
Reilly St
Wonga Rd
Gill Ave
Hume Hwy
M5 Mwy
Kadja Rd
Jedda Rd
Webster Rd
Graham Ave
Wonga Rd
Hillview Pde
Supply Ave
Lyn Pde
Moxbray St
Braidwood Dr
Kurrajong Rd
Braidwood Dr
Bernera Rd
Dalmeny Dr
San Marino Dr
Ash Rd
M7 Mwy
Beech Rd
Cedar Rd
M5 Mwy
Bumbera St
Kookaburra Rd
869
Wroxham St
Bomaderry Dr
Prestons Shops
Bundanoon Rd
Camden Valley Way
Corfield Rd
Croatia Ave
Hume Mwy
Croatia Ave
Casula Station
Train towards Sydney CBD
Glenfield Station
Edmondson Park Station
Train towards Leppington
Campbelltown Rd
Bardia PS
Bardia Ave
Macdonald Rd
869
Hume Mwy
Governors Way
Macquarie Links Dr
Macquarie Fields Station
Henderson Rd
Williamson Rd
Lancaster St
Ingleburn Station
Ingleburn 869
Macquarie Rd
Oxford Rd
Ingleburn Rd
Train towards Campbelltown & Southern Highlands
Legend
Bus route
Bus route start/finish
869 Bus route number
Train line/station
Diagrammatic Map Not to Scale
North

APPENDIX B

SIDRA analysis outputs

[Drafting note: SIDRA outputs to be included in final report]

SCT
Consulting