Meriton

167 Northumberland Street, Liverpool

Traffic Impact Assessment

Issue | 11 May 2021

Job number 272469-00

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1 Introduction

1.1 Background

Meriton Group engaged Arup to provide a Traffic Impact Assessment (TIA) to support a Stage 2 development application relating to the proposed mixed-use development located at 167 Northumberland Street, Liverpool. This development will consist of the following uses outlined below and has been based on drawing DA-00-0000, revision C provided by Meriton Suites:

- 163 serviced apartments;
- 1,087m^2 of childcare centre floor space (528m^2 internal and 559m^2 external);
- 282m^2 of retail floor space; and
- 2,320 m^2 of commercial floor space.

The site is located within walking distance of the Liverpool Station, bounded by Laurantus Service Way to the west and Northumberland Street to the east. Liverpool Plaza is located in front of the site on the other side of Northumberland Street. There is also a public car park (Bathurst Street car park) to the north of Northumberland Street (three blocks north of the development site).

The development is located within the Liverpool Local Government Area (LGA). The proposal has been assessed against the relevant controls under the Liverpool Local Environmental Plan (LLEP 2008) and Liverpool Development Control Plan.

All relevant information about the subject site has been reviewed and an assessment of the expected traffic and parking impacts arising from the proposed development has been undertaken, with the findings of our assessment discussed below.

This report also provides a response to key concerns raised by community, Transport for New South Wales and Liverpool City Council

1.2 Scope

This transport report supports the Concept DA application for the proposed development at 167 Northumberland Street, Liverpool and outlines the following:

- Existing transport conditions;
- Proposed development;
- Transport Assessment including parking and loading provisions;
- Access arrangements;
- Forecast traffic generation; and
- Pedestrian and cycle linkages.

2 Council and community comments

2.1 Council comments and responses

This section has been prepared to respond to Liverpool City Council (Council) issues raised for Parking, Traffic and Access in the Council letter dated 22 April 2020. The issues raised are noted below in blue with responses to each.

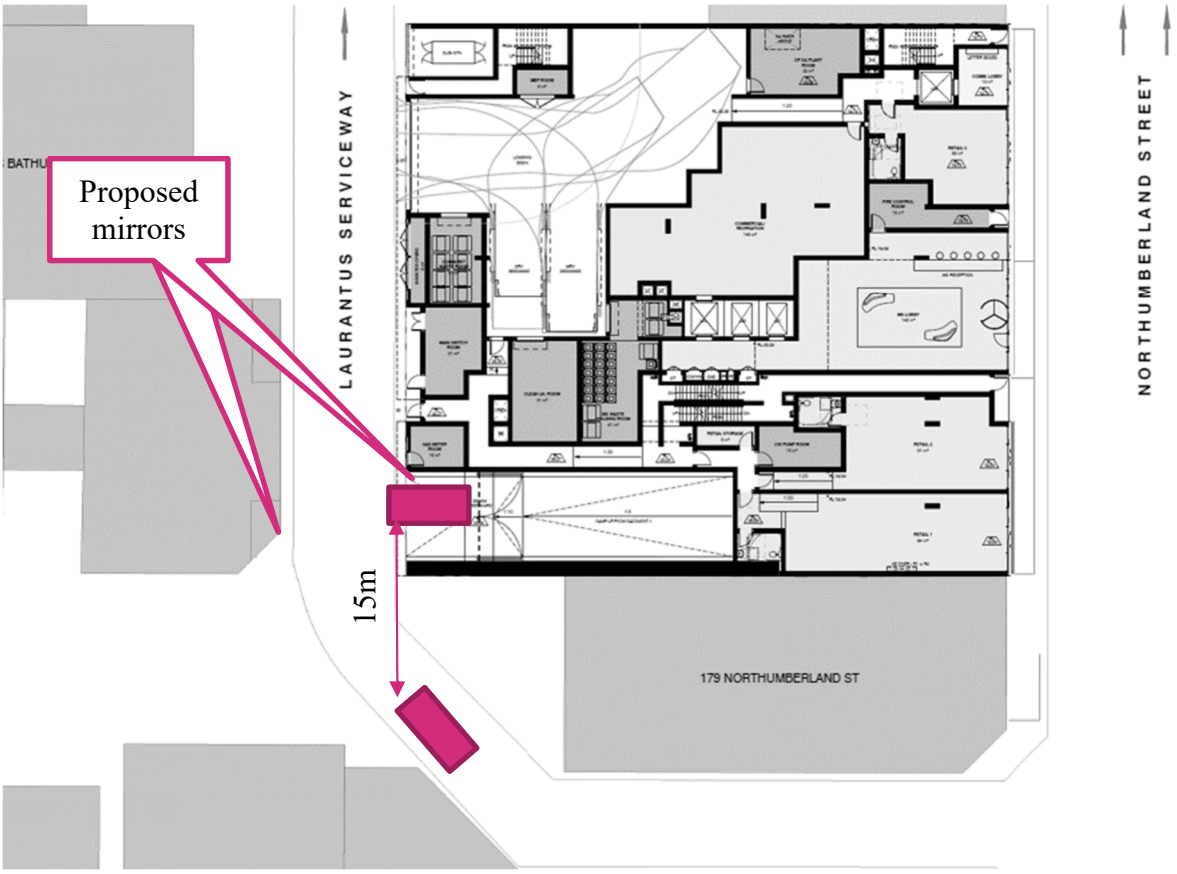
5. The following comments regarding parking, traffic and access associated with the proposed development are required to be adequately addressed:

(i) The proposed location of the entrance to the basement car park (i.e. shown on the ground floor plans) is close to the corner of the service way, which is a safety concern due to limited sight distance. Accordingly, the entrance shall be relocated further away from the corner of the service way

The proposed location of the driveway is in compliance with Figure 3.1 of AS/NZS 2890.1:2004 with relation to its location and has been located so that the site can perform efficiently and optimally.

A vehicle within the laneway is also visible approximately 15m from the driveway which is appropriate for the speeds likely in the laneway. This would meet the inferred distances of 15m for conservative 20km/h speeds as interpolated from Figure 3.2 of AS/NZS 2890.1:2004.

However, given the safety concerns raised by Council, the proponent proposes mirrors on the opposing wall and adjacent wall to assist in visibility between the laneway and driveway.



(ii) Pursuant to Clause 7.3 of LLEP 2008, a total of 104 car parking spaces are required to be provided for the proposed development. The submitted documentation has revealed that the basement car park will only be able to accommodate 44 – 48 car spaces. As such, a written request to vary Clause 7.3 has been submitted by the applicant under Clause 4.6 of LLEP 2008.

Meriton is addressing this separately.

(iii) Council's Traffic Section has reviewed the information provided and considers parking to be insufficient for the proposed development. In this regard, it is considered that the written variation does not justify contravening the development standard in Clause 7.3 of LLEP 2008. Accordingly, the proposal shall provide the required amount of car parking in accordance with Clause 7.3 of LLEP 2008.

Meriton is addressing this separately.

(iv) The application was referred to the Transport for NSW (TfNSW) for comments in accordance with Schedule 3 of the State Environmental Planning Policy (Infrastructure) 2007. TfNSW provided a response on the submitted application which has been attached for your perusal. The concerns raised in the RMS response is required to be adequately addressed by the applicant.

Arup has provided a response and agreed a methodology with Felix Liu of TfNSW in email dated 20 January 2021. This will be conducted in an addendum traffic assessment separately. This is pending review and will updated in a later version of this report.

2.2 Community comments and responses

This section has been prepared to respond to community concerns raised by email in February 2021. The issues raised are noted below in blue with responses to each.

1. The proposed building has been designed for site access to the underground garage and loading dock from Laurantus Service Way, which would mean increased traffic along that service way and given that Northumberland Street can be a busy road at certain times of the day, there will be a bottleneck at both the Laurantus service way entrance and exit locations on Northumberland Street.

The increase of traffic at the access points have been assessed in the traffic assessment section this report as per the Guide to Traffic Generating Developments published by Roads and Traffic Authority. It was found that the access points will continue to operate efficiently and within current acceptable standards. Additional modelling requested by TfNSW will be undertaken to further assess the external road network and determine impacts (if any) from the development.

2. The garage entrance and exit of the apartment building across the service way is also using Laurantus Service Way. This is the same situation for the other Bathurst Street buildings that also connect to Laurantus Service Way. This extra traffic and the bottleneck that will exist on the connection of Laurantus Service Way with Northumberland Street is a concern.

As above, the increase of traffic at the access points have been assessed in the traffic assessment section this report as per the Guide to Traffic Generating Developments published by Roads and Traffic Authority. It has been found that the access points will continue to operate efficiently and within current acceptable standards.

3. Any commercial vehicles that need to access the proposed building loading dock will need to enter Laurantus Service way from Northumberland Street, and navigate to the rear of the proposed building site to gain access to it. If this is a regular occurrence, it will cause delays to any residents that require access to the garage entrances to buildings on Bathurst Street that connect to Laurantus Service way. There is not enough space in that area for large vehicles to easily manoeuvre into any of the existing parking areas of business along the Laurantus Service way, and this situation would not improve in any way with the construction of the 32-storey building.

Swept paths included in this report have been prepared for the loading dock and allow for the entry and exit of large vehicles in a forward's direction from the laneway. Servicing should occur from the lower order road/lane (Laurantus Service way) rather than directly from Northumberland Street. No reversing will occur within the laneway and therefore delays will be expected to be minimal and manageable for residents.

4. Parking is already in short supply in the Liverpool City Centre and available parking is generally metered. The proposal is providing a very small number of spaces for the varied commercial, retail and residential tenants. The unrealistically low number of residential parking provision is based upon an equally unrealistic expectation that residents will not own cars and can rely on public transport of walking.

This is a City Centre and parking is discouraged so that other modes of transport are encouraged. This is a position supported by Council so that the City Centre is accessed through sustainable transport modes. It should be noted that the retail is ancillary to the development, with minimal expectation of customers. The development is also not proposing residential uses and has provided a transport assessment for the provision of how visitors and staff will travel to the site.

5. Businesses and residents to the rear of the proposed development rely on 24/7 clear access provided by Laurantus Service way.

The development is not proposing any drop-off or pick-up at the laneway and all movements will occur to and from the development in a forward's direction. This is considered to be a manageable solution and an improvement to the existing site's laneway operation which requires reversing movements.

6. 24/7 vehicle and pedestrian access needs to be maintained on Laurantus service way throughout construction. No construction worker to be parking and no trucks waiting on Laurantus Service way.

These comments will be considered in the construction management planning aspects by Meriton and Council when contractors are appointed.

7. Northumberland Street, Bathurst Street, Moore Street, and the service way are vital circulation streets in Liverpool and need to be kept clear of construction disruption.

These comments will be considered in the construction management planning aspects by Meriton and Council when contractors are appointed.

8. Many residents and office workers use the laneways to access other facilities in Liverpool. Safe passage with clear sightlines needs to be maintained.

The proposed location of the driveway is in compliance with Figure 3.1 of AS/NZS 2890.1:2004 with relation to its location and has been located so that the site can perform efficiently and optimally.

A vehicle or pedestrian within the laneway is also visible approximately 15m from the driveway which is appropriate for the vehicle speeds likely in the laneway. This would meet the inferred distances of 15m for conservative 20km/h speeds as interpolated from Figure 3.2 of AS/NZS 2890.1:2004.

However, given the safety concerns also raised by Council, the proponent proposes mirrors on the opposing wall and adjacent wall to assist in visibility between the laneway and driveway.

9. Ongoing 24/7 functioning of the service way is vital to many existing businesses and for emergency services. Provisions need to be included to ensure the service way does not become blocked by delivery vehicles, illegally or double-parked vehicles.

The development is not proposing any drop-off or pick-up at the laneway and all vehicle servicing will occur within the development. All movements will occur to and from the development in a forward's direction. This is considered to be a manageable solution and an improvement to the existing site's laneway operation which requires reversing movements.

10. What provision is being made for the residents and tenant vehicles in excess of the minimal number of car spaces being proposed.

No residents are proposed in the development. This report assesses the transport provisions surrounding the site within the context of Liverpool City Centre and it was found that there are adequate alternative modes of transport available to support the development and a mode shift away from private vehicles. This aligns with Council's strategy to move away from private vehicles in the City Centre.

11. I am concerned about pedestrian safety risk, particularly in Laurantus Serviceway, to the rear of the development, due to the increase in vehicles numbers and movements.

The increase of traffic at the access points have been assessed in the traffic assessment section this report as per the Guide to Traffic Generating Developments published by Roads and Traffic Authority. It was found that the access points will continue to operate efficiently and within current acceptable standards.

The proposed location of the driveway is in compliance with Figure 3.1 of AS/NZS 2890.1:2004 with relation to its location and has been located so that the site can perform efficiently and optimally.

A vehicle or pedestrian within the laneway is also visible approximately 15m from the driveway which is appropriate for the vehicle speeds likely in the laneway. This would meet the inferred distances of 15m for conservative 20km/h speeds as interpolated from Figure 3.2 of AS/NZS 2890.1:2004.

However, given the safety concerns also raised by Council, the proponent proposes mirrors on the opposing wall and adjacent wall to assist in visibility between the laneway and driveway.

2.3 Council further comments

Arup was informed on 3 May 2021 that Liverpool City Council is not supporting the quantum of reduced car parking proposed in the traffic impact assessment report issue on 21 April 2021.

As a result, Meriton has undertaken a revised design of the carpark, providing an additional basement to accommodate 32 additional car parking spaces.

In the overall development the proposed project is now including a total of 94 car parking spaces which constitutes a shortfall of only 10 car parking spaces as per the LEP clause 7.3 requirements.

2.3.1 Traffic Impact Assessment updates summary

Section 2.3 provides details of the further design changes undertaken by Meriton to accommodate additional 32 car parking spaces.

The following table provides a summary of the changes and updates to the traffic impact assessment report.

Item	Comments	Reference
1	Proposed Development, description of proposed works No changes	Section 5.1
2	Car parking and loading/servicing Section amended to include reference to three (3) basement levels)	Section 5.3
3	Car parking layout Basement level 3 figure added to the report	Figure 9
4	Car parking spaces provision. Updates to Table 6 to include additional 32 car spaces	Table 6
5	Comments on new car parking provision notes amended	Section 6.1
6	Comments on motorbike parking provision amended to include design changes from additional basement level 3	Section 6.5
7	Amended conclusion	Section 8
8	Section 3.2 TfNSW comments updates based on new revised design	Section 3.2

3 Transport for New South Wales Comments

3.1 TfNSW comments and response

TfNSW has reviewed the submitted application and requests the following additional information for further assessment:

1. *Updated SIDRA modelling considering the following scenarios at key intersections such as Elizabeth Drive/Northumberland Street and Moore Street/Northumberland Street:*
   - *Existing traffic + development traffic*
   - *Existing traffic + background traffic growth in 10 year +development traffic (including any known proposals and developments in the area)*

   An electronic copy of the updated SIDRA model files should be submitted to Council and TfNSW.

   Sidra modelling outputs are provided in Appendix B of the report.
   Traffic conditions; existing and future, are summarised in Section 4 of the report.
2. *It is not clear whether the SIDRA modelling considered the queuing that extends to the adjoining signalised intersections along Elizabeth Street. Elizabeth Street is congested during the AM and PM periods and is not likely to have a level of service A as shown in the SIDRA output summaries within the Traffic Report. This needs to be clarified by the applicant.*

   The following additional intersections were included in the assessment:
   - Elizabeth Street / Hume Highway; and
   - Elizabeth Street / Bathurst Street.
3. *Assumptions of 25% discount have been made in the parking provision. However, there is no data provided to support this discount. Detailed information and data for parking provision discount should be provided to TfNSW for review.*

   Traffic generation for parking provision has been reviewed assuming a 10% discount is a more realistic factor for the area considering the factors mentioned in the parking generation and site context relation to proximity to main public transport hubs.
   The Australian Bureau of Statistics – Census 2016, provides details indicating that travel to working the Liverpool LGA using a private vehicle is approximately of 60%.
   The average distance commuting has been found to be approximately 15-18km.
4. *Assumption of 25% discount has been made in the traffic generation rate for the childcare centre land use. However, there is no data provided to support this discount. Detailed information and data for the proposed traffic generation discount should be provided to TfNSW for review.*

   Traffic generation for childcare centre land has considered a conservative discount of 25% based on reference literature available in the Transport for New South Wales portal, *'Trip generation and parking demand surveys : child care centres : data report'*
   https://www.opengov.nsw.gov.au/download/17483
   The reference material indicates that similar childcare centre facilities located within 400-800m walking distance to nearest dominant stop /

station of fringes of major – medium centres, may consider an accessibility discount factor of 03 – 0.4.

As noted in TfNSW Child Care Planning Guideline 2017, *'the rates of car parking should also be determined relative to the availability, frequency and convenience of public transport. Facilities located in inner urban and high-density areas may require fewer on-site car parking spaces than in lower density areas with limited access to transport, employment and services.*

Liverpool CBD is considered a clear example of urban areas requiring fewer on-site car parking space.

5. *The proposed childcare centre will only provide onsite parking spaces for staff and visitors. The impact of pickup and drop-off activities associated to the childcare centre has not been assessed in the Traffic Report. Further impact assessment of the pickup and drop-off activities should be undertaken.*

~~It is anticipated that the childcare centre would predominately serve the residents of the building.~~

In addition, it is also considered the walking distance from the local residential areas around the Liverpool CBD area to the main public transport hubs, making the site an ideal location halfway between the railway station / bus interchange and the residential areas.

The operation of the proposed childcare centre aligns with the operation of the existing childcare centre in the vicinity located less than 50m from the proposed site.

- Summer Child Care – 95 Moore Street
- Love and Mercy – 159 Northumberland Street

Amendment 21/04/21

It is anticipated that the childcare centre would predominately serve the residents of the local area as stated in Section 7.1 of this report.

6. *The Traffic Report adopted the trip generation of 4.6 vehicle trips per 100m^2 for retail land use. However, the proposed 3,130m^2 for retail falls into the range of 0 – 10,000m^2 GLFA, in accordance with the Table 3.1 of the 2002 TfNSW Guide to Traffic Generating Developments. As such, the trip generation of 12.3 vehicle trips per 100m^2 for retail should be used in the study. Justification for using the lower traffic generation rate should be provided to TfNSW for review.*

Trip generation rates have been reviewed in accordance to the TfNSW guidelines. the trip generation of 12.3 vehicle trips per 100m2 for retail space has been adopted.

7. *The assumption of 50% of PM trips has been adopted for the AM trips for retail without supporting data to be provided. Detailed information and data for this assumption should be provided to TfNSW for review.*

Trip generation AM / PM split has been reviewed in accordance to the TfNSW guidelines. AM peak trips for retail has been amended to mirror the PM peak trips assumptions.

8. *It is not clear whether the proposed development was considered in the Liverpool City Centre traffic and transport study. It is important that appropriate funding mechanisms are in place to mitigate the impact of the additional traffic generation from this development on the Liverpool City Centre road network, including nearby intersections.*

167 Northumberland mixed-use development responds to the needs and initiatives to promote sustainable and strategic growth and aligns with the

Liverpool Council development strategies, *'Connected Liverpool 2050, Local Strategic Planning Statement'*.
The site is located within the city centre area of Liverpool identified in the above-mentioned document as the commercial core / Mixed Use.
The site responds also to the objectives of revitalisation of the city centre as a key Council priority to support economic growth and density concentrated in the city centre area and centres close to public transport.

In addition, Liverpool is well-placed to accommodate additional jobs and housing growth following the changes to Liverpool's City Centre planning controls. With its position on the Georges River, and following additional rail and rapid transit connections set out in the State Government's Future Transport 2056 Strategy are complete, there is opportunity to create a high amenity Centre for business related to the new airport

9. *A draft Construction Traffic Management Plan detailing construction vehicle routes, number of trucks, hours of operation, access arrangements and traffic control should be submitted to the Consent Authority for approval prior to the issue of a Construction Certificate.*
   Construction Traffic Management Plan and Operation Traffic Management Plan are not part of the scope of this Traffic Impact Assessment.
   Confirmation is seeking with Liverpool Council if as part of the Development Application DA, a CTMP and OTMP are required for the Stage 2 development application relating to the proposed mixed-use development.
10. *A Green Travel Plan should be prepared to encourage the use of sustainable transport to the site. The Green Travel Plan should:*
    - *Support staff and visitors to prioritise access the site by public and active transport and minimise the proportion of single-occupant car journeys to the site;*
    - *Include a Travel Access Guide – The Travel Access Guide needs to specify matters including, but not limited to, the following:*
      - *Suitable nearby drop-off/pick-up locations;*
      - *Identify areas where drop-off/pick-up is prohibited and instruct staff and visitors to avoid use of these areas;*
      - *Suitable nearby Taxi Zones;*
      - *Public Transport options in the vicinity of the site;*
      - *Pedestrian access to the site;*
      - *Bicycle Parking and cycleway networks to the site;*
      - *Access to the site for vehicles including parking arrangements; and*
      - *Servicing and loading arrangements.*
    - *Establish mode share targets for staff and visitors for occupation and outline robust actions to achieve these targets;*
    - *Appoint a Travel Plan Coordinator to oversee the implementation of the Travel Plan;*
    - *Nominate the party/parties responsible for implementing the actions in the Travel Plan and its ongoing monitoring and review, including the delivery of actions and associated mode share targets; and*
    - *Include an annual monitoring, reporting and review process, supported by a Travel Survey to determine if mode share targets and other actions of the Travel Plan are being achieved.*

Green Travel Plans are generally considered a requirement for a State Significant Development Approval.
Confirmation is seeking with Liverpool Council if as part of the Development Application DA, a green travel plan would be required for the Stage 2 development application relating to the proposed mixed-use development.

3.2 TfNSW Comments and responses 20/04/21

TfNSW has made further comments on the revised 167 Northumberland Street, Liverpool Traffic Impact Assessment report undertaken as part of the development application for the site. Table below provides details of the TfNSW comments and responses addressing the traffic concerns.

Item	TfNSW Comments	Arup Response
1.	The future scenario with and without development traffic should be assessed in the SIDRA modelling. An electronic copy of the updated SIDRA model files should be submitted to Council and TfNSW for review. This information is required to adequately assess what traffic impacts the proposed development has on nearby intersection and whether mitigation is required.	21/04/21 Sidra files provided as requested. Refer Zip file (167 Northumberland SIDRA Files)
2.	The RtS states that "the childcare centre would predominately serve the residents of the building" which is inconsistent with Table 8 showing traffic generation associated with the pickup and drop-off activities. It must be noted that the proposed development is for service apartments and a hotel, which are mainly occupied by tourists and short-term residents. As such, it is expected that a large proportion of the vehicle traffic for the childcare centre pickup and drop-off will be generated external to the proposed hotel and serviced apartment uses. Therefore, the impact assessment of the pickup and drop-off activities should be undertaken.	21/04/21 Section 3.1, Note 5 amended as indicated in Section 7.1, Childcare Centre serves the residents nearby. It is noted the traffic generation reduced rates for the childcare centre were applied (25%) given the likely containment.

Item	TfNSW Comments	Arup Response
3.	The 2 local childcare centres referenced in the RtS are not similar in size and scale of operation as the proposal. A survey on the childcare centre with similar size and scale and within Liverpool Town Centre should be undertaken to determine the parking demand and traffic generation rates for the childcare centre land use.	21/04/21 Reference to the childcare centres located within 50m walking distance from each other on Northumberland Street Liverpool CBD and 600m walking distance from the Liverpool Railway station was noted to demonstrate the demand for this service in the local area and similar operations for pick-ups and drop-offs. Childcare centres with a smaller or bigger scale in operations and size located more than 800m from the railway station and bus interchange are not considered a clear representation of childcare operations within the Liverpool CBD walking distance strategy. Clovel Child Care, 65 Speed Street, Liverpool (800m from railway station) Just Kids Learning, 108 Atkinson St, Liverpool (1.4km from railway station) Play 2 Learn, 49 Nagle Street, Liverpool (950m from railway station) Barakat Family Day Care, 92 Bathurst Street, Liverpool (700m from railway station) Kids Castle Child Care, 17 Copeland Street, Liverpool, (1.3km from railway station)
4.	The response in Point 8 of the RtS does not address the initial question regarding the whether this development was included within Liverpool City Centre Traffic and Transport Study.	21/04/21 The site is located in the Liverpool CBD within the area defined in the 'Liverpool Place Strategy 2018' as 'strategic city centre core'. The project aligns with Liverpool City Council actions plan Develop a parking strategy which reduces car dependency within the Liverpool City Centre and periphery (ref. Priority 1, Action 3 and Section 6.2 – Collaboration Area connectivity). It also falls within the Sustainability opportunities and assets for a walkable, pedestrian-centred missed use precinct with high quality open space, (refer to Figure 8 of the Liverpool Place Strategy 2018) The site is also identified within the Liverpool commercial core mixed use strategic area located 50m from the proposed Transitway on Moore Street. Noted in the 'Connected Liverpool 2050, Local Strategic Planning Statement.

Item	TfNSW Comments	Arup Response
5.	The proposed development does not meet Council's parking requirements of 104 parking spaces and provides only 64 spaces (a shortfall of 40 parking spaces). It is ambitious / unrealistic to expect a 40% mode shift from private vehicle travel mode. The RtS derives the 40% discount assumption from the JTW 2016, which is inappropriate. The percentage of vehicle mode in JTW 2016 refers to the total personal trips, rather than vehicle trips. Additionally, reliance on other sources of parking within the Liverpool CBD is an overall negative outcome as it will increase the time spent by vehicles on the network in an attempt to secure parking. Detailed information and data for parking provision discount should be provided to TfNSW for review.	21/04/21 The Local Strategic Planning Statement, 'a land use vision to 2050' states: 'Liverpool has solidified its position as an innovation leader and Sydney's third CBD' The proposed development aligns with the Liverpool Council parking strategy which reduces car dependency within the Liverpool City Centre and periphery. The development is also noted as serviced apartments located within walking distance to the major public transport hubs, commercial, health, educational and entertainment areas. 11/05/2021 Revised traffic report has been amended. Additional 32 car parking spaces have been accommodated with the inclusion of a third basement level. There is a short fall of only 10 car spaces as per the requirements from the LEP.
6.	The Section 6.2 of the RtS only provides the requirement of accessible parking space provision. However there is no assessment being undertaken to identify if the adequate accessible parking spaces are provided on site.	21/04/21 Accessible parking spaces are illustrated in Figures 7 and 8 of the report. Currently proposed 2 accessible carpark spaces per basement. 11/05/2021 Additional basement level (L3) has been incorporated to the project. Refer to Figure 9
7.	Section 6.3 of the RtS (Bicycle Parking) does not provide sufficient bicycle parking spaces as there is a shortfall of 25 spaces. Given that the emphasis is on shifting from private vehicle to other travel modes, it is expected that such spaces would be provided at a minimum to mitigate vehicle parking shortfall.	21/04/21 Section 6.3 provides details of the bicycle assumptions. Temporary residents of the serviced apartments and visitors are unlikely to cycle as is expected the preferred mode of transportation would be public transport and rental vehicles. Section 6.3 also states that 'the operator of the public domain area would monitor the demand for bicycle parking in the precinct. Should demand exceed supply and cyclists park their bikes informally to street furniture, additional bicycle parking would be provided so as not to detract from the public domain area. The current design does not preclude the future provision of additional visitor bicycle parking spaces. This aligns with the coordination of potential higher demand for bicycle facilities with the Councils strategy for the implementation of a consolidated and safe cycling network around the Liverpool CBD.
8.	Section 6.5 of the RtS (Motorcycle Parking) bases the number of motorbike spaces to be provided on the proposed 64 car parking spaces as opposed to the required 104 car spaces	21/04/21 Section 6.5 to be amended. Current basement design provides a total of 6 motorbike spaces distributed equally in the 2 basement levels. 11/05/2021 Additional basement level (L3) has been incorporated to the project. Motorbike facilities are distributed in three (3) basement levels. The motorbike parking spaces are calculated on the total car spaces required (104 car parking spaces)

4 Existing Condition

4.1 Site location

The site is located within walking distance (650 metres or an 8- minute walk) of Liverpool Station, bounded by Laurantus Service Way to the west and Northumberland Street to the east. The site is zoned B4 Mixed-use.

The key roads surrounding the site include:

- Elizabeth Drive and Moore Street for major east-west accesses
- Bathurst Street and Northumberland Street for major north-south accesses

4.2 Road network and access

The existing site driveway is located on Laurantus Service Way. Laurantus Service Way is a closed-loop laneway servicing a limited number of developments and does not provide a through-route for general traffic beyond these sites. Both Northumberland Street and Laurantus Service Way are one-way local roads as shown in Figure 1.

The subject site area in the context of the surrounding road network is shown in Figure 1.

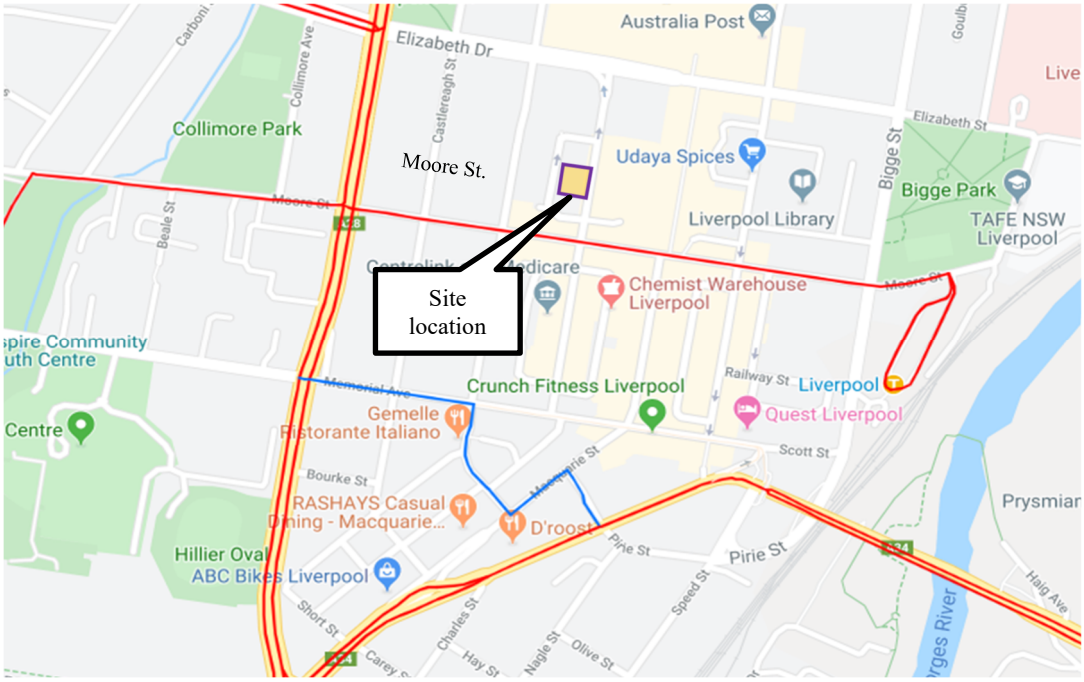


Figure 1: Surrounding road network

4.3 Public transport network

The site is well served by public transport, with Liverpool Station and several bus stops located within 800m (less than 10 minutes' walk).

Liverpool Station services the area and is located within eight minutes' walk of the site. Sydney Trains operates 10 train services per hour each way on the T2, T3 and T5 Line, which operates between Liverpool to Central and Parramatta/Blacktown directly. Pedestrian access to the station is provided on both sides of Northumberland Street.

A number of bus routes with regular services operated by Sydney Buses on nearby roads as shown in Table 1.

Table 1: Bus Routes

Bus route		Bus route	
801	Badgerys Creek to Liverpool	853	Carnes Hill to Liverpool via Hoxton Park Road
802	Liverpool to Parramatta via Green Valley	854	Carnes Hill to Liverpool via Greenway Drive and Hoxton Park Road
803	Liverpool to Miller	855	Rutleigh Park to Liverpool via Austal and Leppington station
804	Parramatta to Liverpool via Hinchinbrook	856	Bringelly to Liverpool
805	Cabramatta to Liverpool via Bonnyrigg Heights	857	Narellan to Liverpool
806	Fairfield to Liverpool via Abbotsbury	865	Casula to Liverpool via Lurnea shops
808	Parramatta to Liverpool via Hinchinbrook	866	Casula to Liverpool
819	Prairiewood to Liverpool (loop services)	869	Ingleburn to Liverpool via Edmondson Park & Prestons
827	Carnes Hill Marketplace to Liverpool via Bonnyrigg Heights	870	Campbelltown to Liverpool
851	Carnes Hill Marketplace to Liverpool via Cowpasture Road	871	Campbelltown to Liverpool via Glenfield
852	Carnes Hill Marketplace to Liverpool via Greenway Drive and Cowpasture Road	872	Campbelltown to Liverpool via Macquarie Fields

4.4 Walking and cycling

Pedestrian connectivity in the area is adequate. The public domain is quite established throughout the area for ease of walking to schools, shopping centres, bus interchanges, workplaces, medical centres, sportsgrounds, cafés, cinemas and theatres. However the shared paths nearby are located on Moore Street and Elizabeth Drive. The local cycling infrastructure (cycle paths) however has not been upgraded or developed to facilitate safe cycling to the site. The lack of cycling may be attributed to several factors, such as heavy traffic and perceived safety.

Figure 2 below shows the cycleway map with these routes in detail.

Figure 2: Cycleways map

4.5 Site Context

The site is well located within walking distance (500m to 2km) to main transportation hubs, shopping centre, hospitals, schools, community and religious centres. Figure 3 illustrate the site location and context.

The following list provides details of places of interest in the vicinity of the site.

- Liverpool Hospital; (15min walk);
- Westfield; (5 min walk);
- Liverpool Boys High School; (20min walk);
- Western Sydney University Liverpool Campus; (20min walk);
- Liverpool Railway Station and Bus Interchange; (10min walk);
- All Saints Catholic Church; (8min walk);
- Liverpool Baptist Church; (8min walk);
- New Life Christian Ministries; (10min walk);
- AlFirdaus Liverpool; (10min walk); and
- MIA Liverpool Islamic Centre; (5min walk).

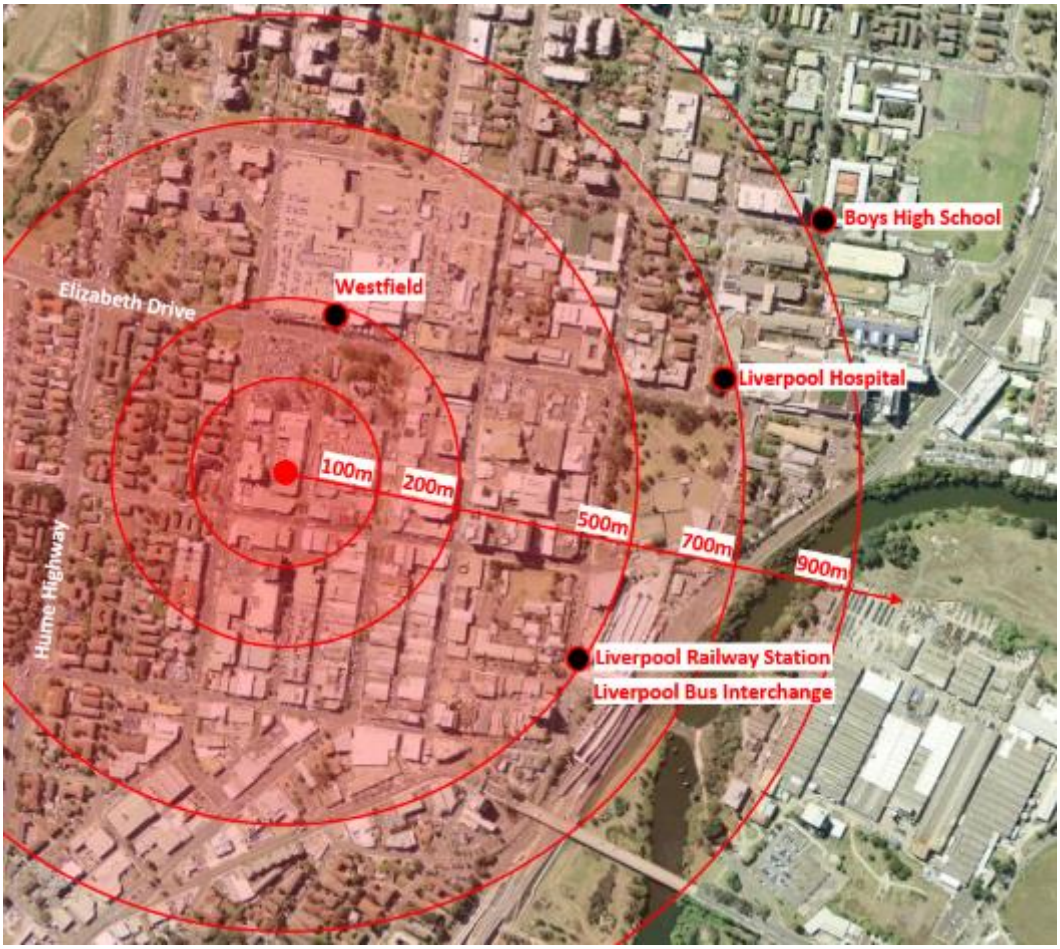


Figure 3 Site Context

4.6 Existing traffic conditions

Peak period traffic counts were conducted on a typical weekday in November 2019 at the following intersections to gain an understanding of the traffic conditions:

- Elizabeth Drive/ Northumberland Street; and
- Moore Street/ Northumberland Street.

Additional intersections have since been assessed in order to understand the impacts of neighbouring intersections. The volumes for these intersections have been extracted from Sydney Coordinated Adaptive Traffic System data (SCATS) from 2019 and uses the same morning and afternoon peak period in order to maintain consistency with the previous traffic surveys undertaken.

- Elizabeth Drive and Hume Highway; and
- Elizabeth Drive Bathurst Street.

The morning peak hour (8 am – 9 am) and evening peak hour (4:45 pm – 5:45 pm) traffic volumes with the turning movement volumes for the key intersections are shown in Figure 4 and Figure 5 respectively.

The results of the traffic surveys are provided in full in Appendix A and note that:

- Two-way traffic flows in Elizabeth Drive are typically in the order of approximately 800 and 1200 vehicles per hour (vph) during the morning and afternoon peak periods respectively;
- One-way traffic flow in Northumberland Street is approximately 400vph during both morning and afternoon peak periods; and
- Two-way traffic flows in Moore Street are typically in the order of approximately 300 and 500vph during the morning and evening peak periods respectively.

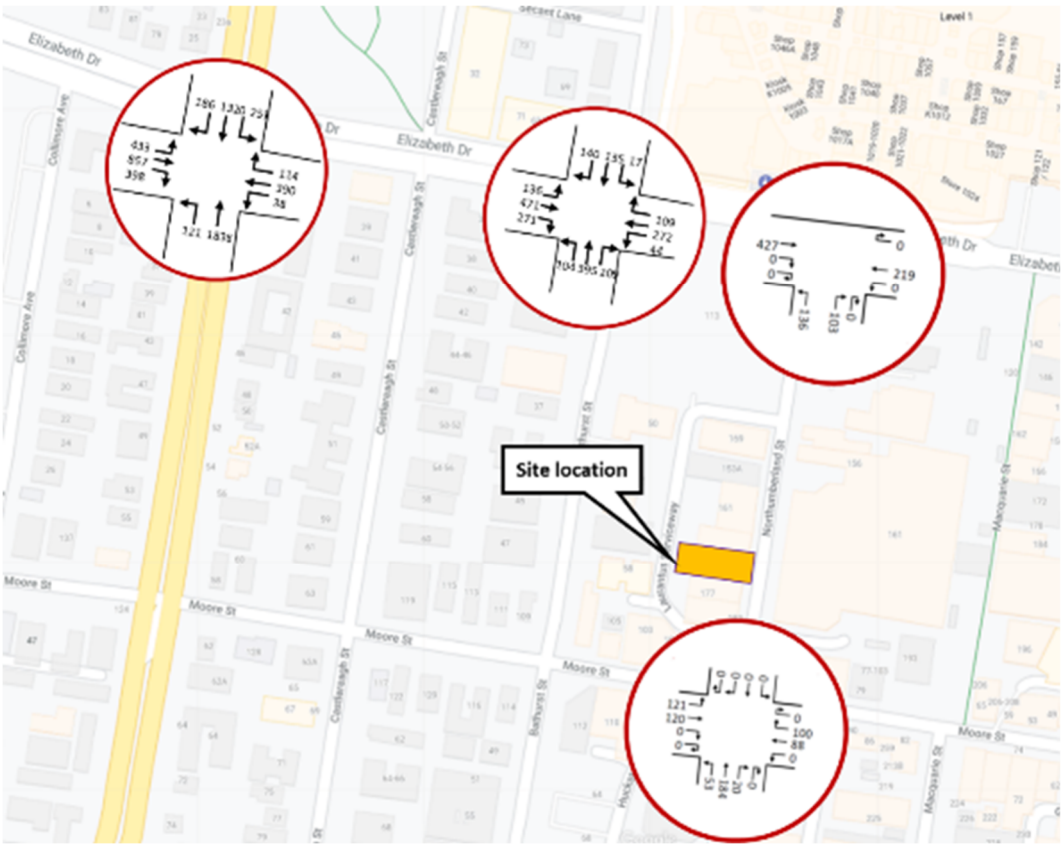


Figure 4: Baseline traffic generation - AM peak hour

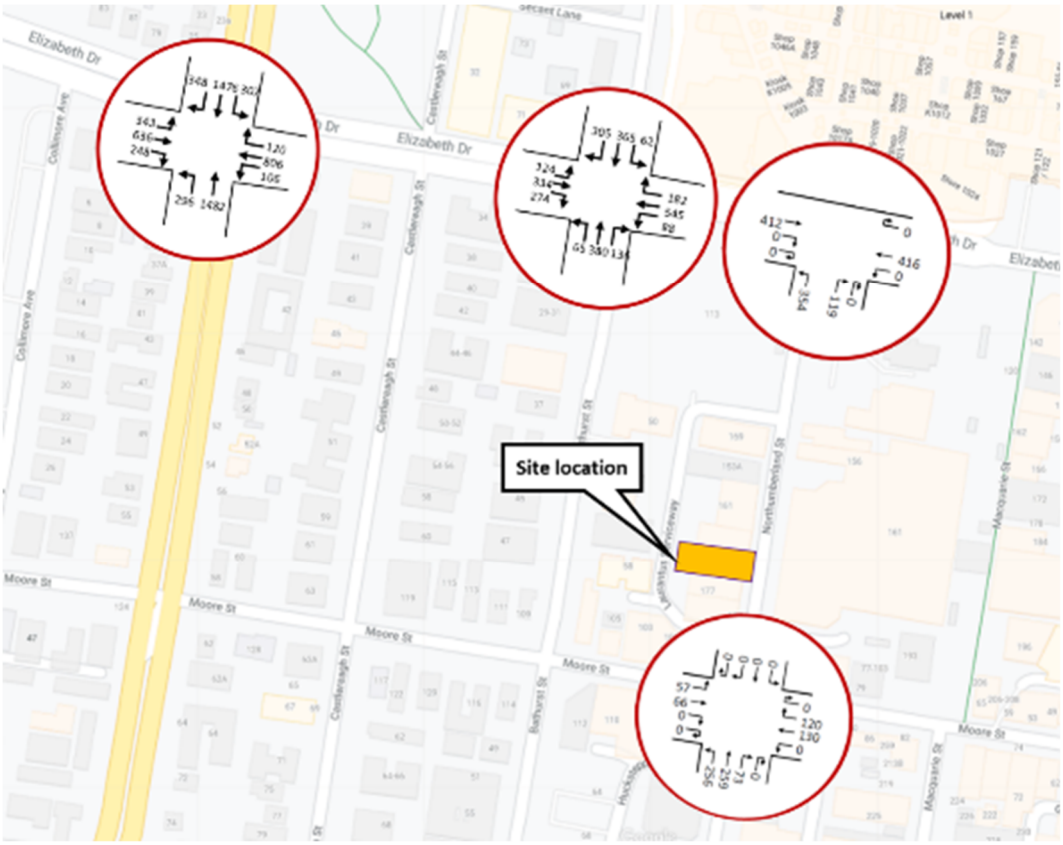


Figure 5: Baseline trip generation - PM peak hour

4.6.1 Existing Intersections Performance

Existing intersection performances have been assessed using SIDRA Intersection 8.0. The analysis is summarised in Table 2. Detailed SIDRA output summaries are provided in Appendix B.

Table 2: SIDRA Intersection Assessment

Intersection		Scenario	Intersection Configuration	AM Peak			PM Peak		
				DoS	Delay	LoS	DoS	Delay	LoS
1	Elizabeth Drive – Northumberland Street	Existing	Signalised	0.17	19	B	0.26	29	C
2	Moore Street – Northumberland Street	Existing	Signalised	0.20	25	B	0.30	27	B
3	Elizabeth Drive – Hume Highway	Existing	Signalised	0.95	54	D	0.84	46	D
4	Elizabeth Drive – Bathurst Street	Existing	Signalised	0.87	61	E	0.85	60	E

As shown in Table 2, the intersections to the east of Bathurst Street (intersection number 1 and 2) are generally operating satisfactorily during the morning and afternoon peak periods in the existing situation. However, the Elizabeth Drive/ Hume Highway intersection is shown to be deteriorating with the Elizabeth Drive/ Bathurst Street intersection nearing capacity which is expected as these intersections experience high volumes of traffic during both peak periods.

4.7 Future traffic conditions

The future performance of the intersections has also been assessed based on a 3% annual growth rate for a 5 year and 10 year horizon. The annual growth rate has been estimated from the Australian Bureau of Statistics for the Liverpool LGA and Liverpool city centre.

These scenarios only consider background growth with no development traffic. The results from the assessment are summarised below in Table 3 and Table 4.

Table 3: SIDRA Intersection Assessment (existing scenario + 5 years with 3% annual growth)

Intersection		Scenario	Intersection Configuration	AM Peak			PM Peak		
				DoS	Delay	LoS	DoS	Delay	LoS
1	Elizabeth Drive – Northumberland Street	Existing	Signalised	0.20	19	B	0.27	29	C
2	Moore Street – Northumberland Street	Existing	Signalised	0.23	26	B	0.35	27	B
3	Elizabeth Drive – Hume Highway	Existing	Signalised	> 1	> 100	F	1	58	E
4	Elizabeth Drive – Bathurst Street	Existing	Signalised	> 1	80	F	> 1	> 100	F

Table 4: SIDRA Intersection Assessment (existing scenario + 10 years with 3% annual growth)

Intersection		Scenario	Intersection Configuration	AM Peak			PM Peak		
				DoS	Delay	LoS	DoS	Delay	LoS
1	Elizabeth Drive – Northumberland Street	Existing	Signalised	0.21	19	B	0.35	31	C
2	Moore Street – Northumberland Street	Existing	Signalised	0.27	26	B	0.41	28	B
3	Elizabeth Drive – Hume Highway	Existing	Signalised	> 1	> 100	F	> 1	> 100	F
4	Elizabeth Drive – Bathurst Street	Existing	Signalised	> 1	> 100	F	> 1	> 100	F

The intersections located at Elizabeth Drive/ Northumberland Street and Northumberland Street/ Moore Street are shown to be continuing to operate at a satisfactory level of service during the AM and PM peak for the 5 and 10 year horizon. However, the Elizabeth Drive/ Hume Highway and Elizabeth Drive/ Bathurst intersections which were previously demonstrated as deteriorating and nearing capacity is shown to reach failure by the 5 year horizon for both peak periods.

5 Proposed development

5.1 Description of proposed works

The proposal includes the construction of a new mixed-use development. The final design will be the subject of a further detailed DA. The concept design indicatively allows for:

- Approximately 12,520m^2 (163 units) serviced apartments;
- 282m^2 of retail premises;
- 2,320m^2 of commercial space; and
- 1,087m^2 of childcare centre floor space (528m^2 internal and 559m^2 external). It has been assumed the childcare centre services 79 children and 12 staff.

The apartment schedule for the serviced apartment mix is outlined below in Table 5.

Table 5: Serviced Apartment schedule

Unit type	Number
Studio	28
1-bedroom	79
2-bedroom	46
3 or more-bedroom	10
Total	**163**

5.2 Proposed site access

Loading and servicing will take place within the ground floor loading area. vehicular access to the site will be via the access driveway on Laurantus Service way as illustrated in Figure 6. Internal ramp systems will provide parking access to the basement levels.

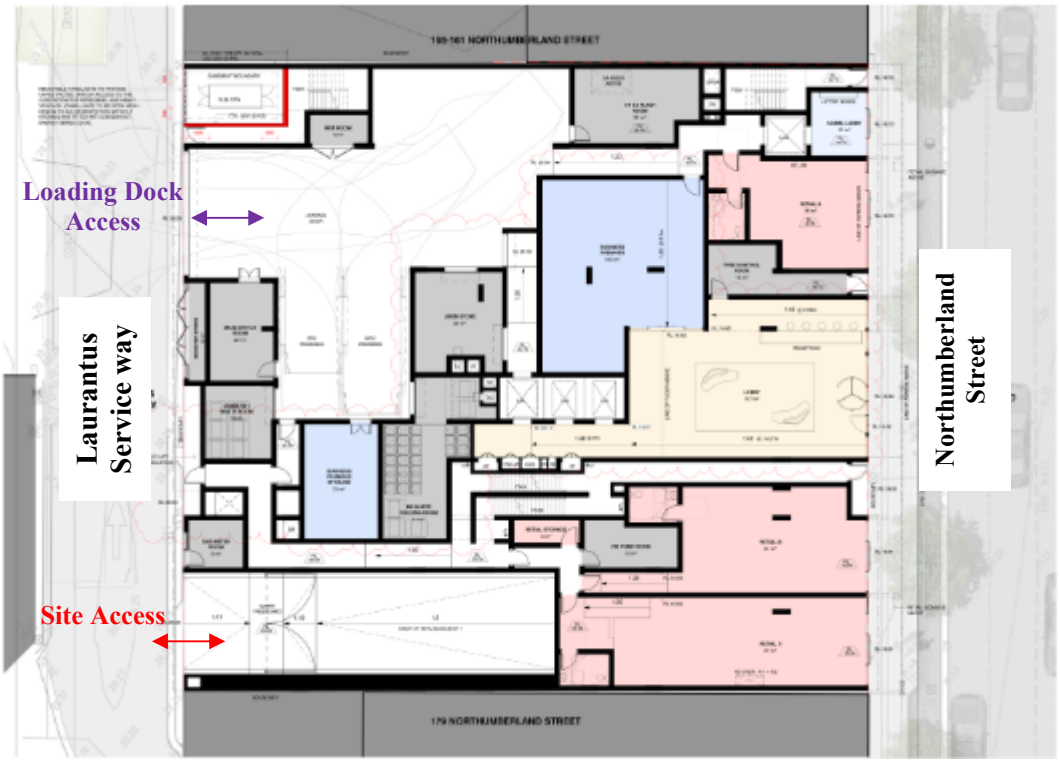


Figure 6: Proposed site access

5.3 Car parking and loading/servicing

Private vehicles

Three (3) levels of car parking are proposed within the site. A swept path analysis was conducted to check compliance with the design standards using approved software. Turning paths, using the standard 99th percentile passenger vehicles were tested on the internal carpark layout, including the ramps, the entry and exits from the carpark and access to the road network. The turning paths show the design complies with standards and drawings are attached in Appendix C. The swept path checks have been based on the ground floor drawing (DA-10-1000-d Level G PLAN) provided by Meriton Suites on the 15th February 2021 and updated on 4th May 2021.

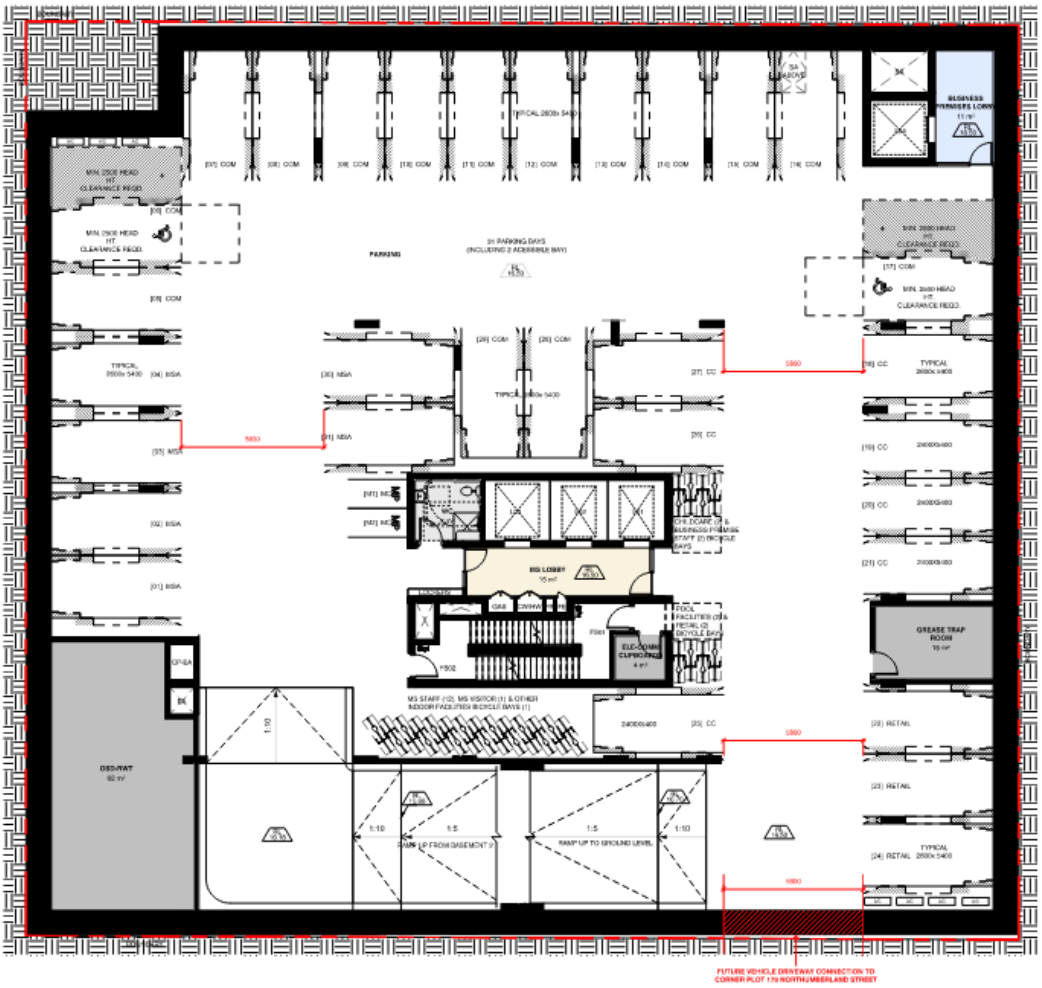


Figure 7: Parking layout – Basement Level 1

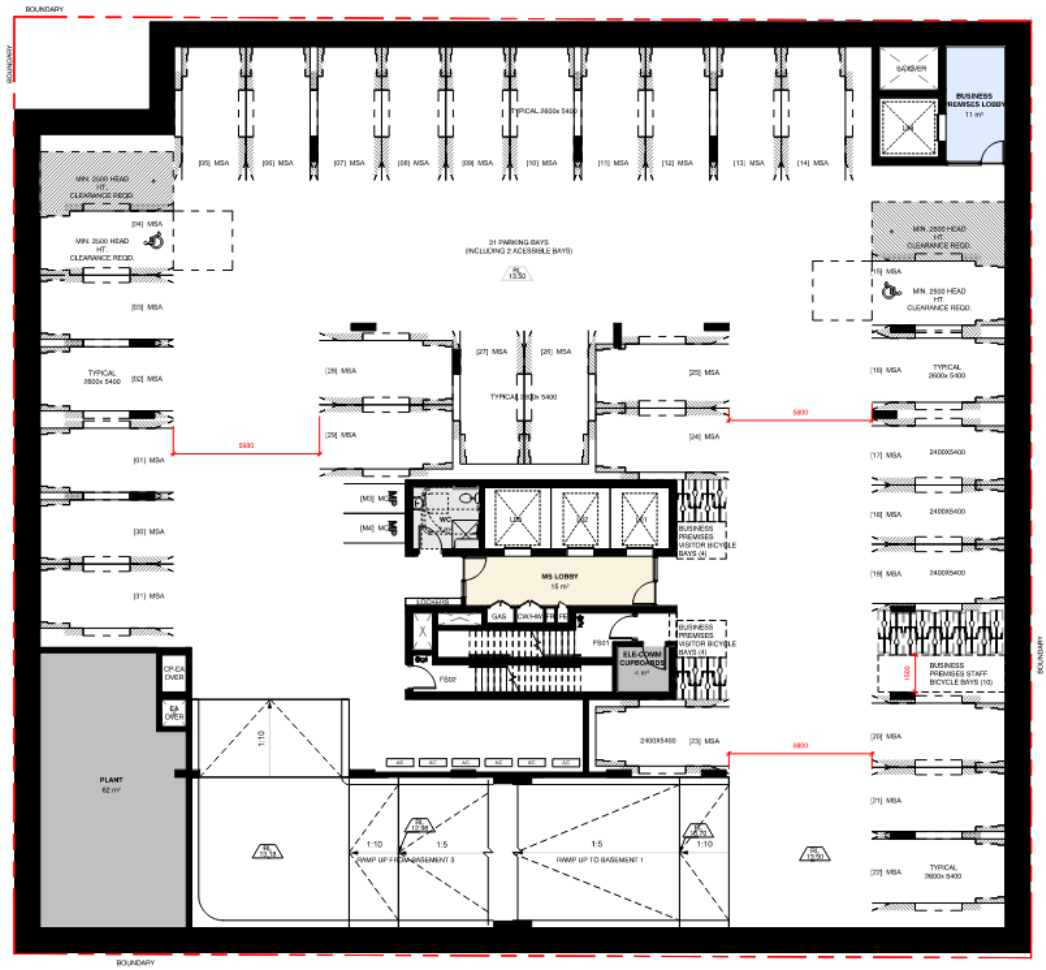


Figure 8: Parking layout – Basement Level 2

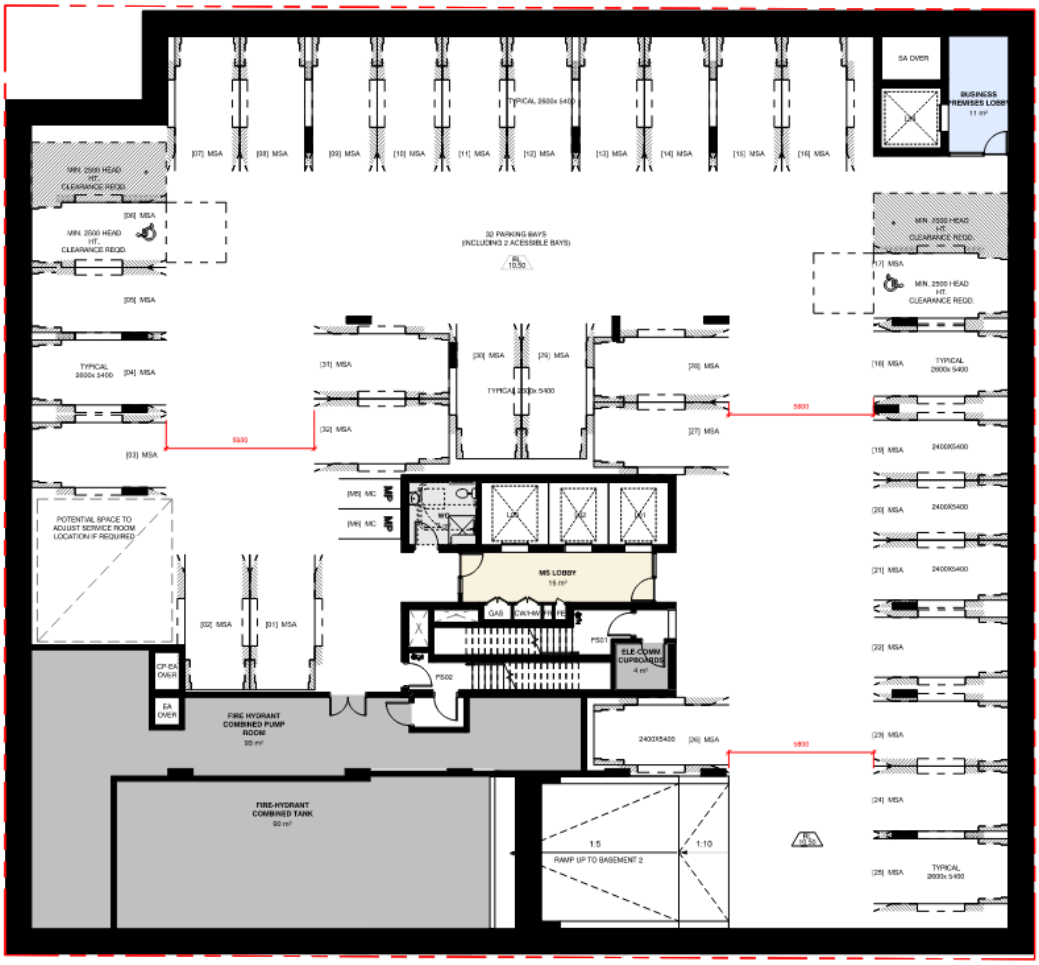


Figure 9 Parking Layout – Basement Level 3

Loading/service vehicles

Loading vehicles are proposed to access the site via Laurantus Service way. The loading/unloading vehicle accesses would be accessible from Laurantus Service way into/out of the loading areas in a forward direction as shown in Figure 10.

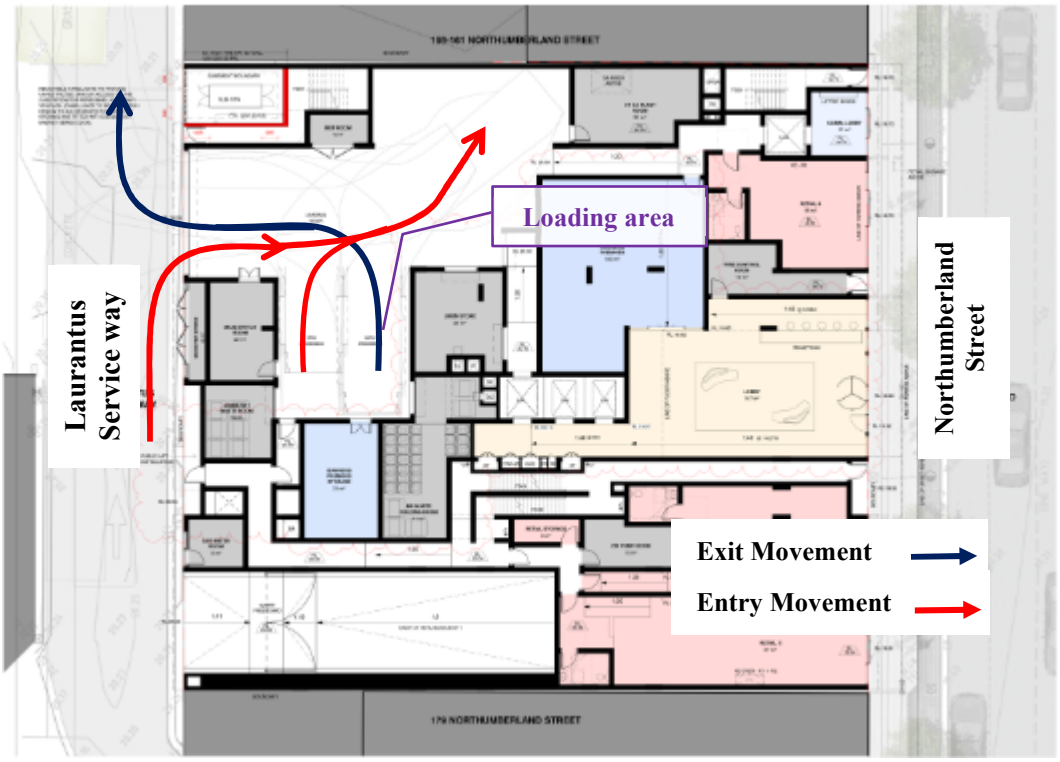


Figure 10: Loading vehicle access

Two (2) loading bays are proposed at ground level for one (1) 8.8m MRV and one (1) 6.4m SRV.

Swept path analysis was undertaken for the 8.8m MRV. Loading bays set-out was carried out in accordance to designs standards requirements for clearance and vehicle envelop. The turning paths show the design complies with standards and drawings are attached in Appendix C.

6 Transport assessment

6.1 On-site car parking

Section 4.4.2 On-site Parking from the Liverpool Development Control Plan 2008 (DCP) – as amended on 6th May 2020 stipulates developments within the Liverpool City Centre and zoned as B4 – mixed use shall refer to Clause 7.3 of the Liverpool Local Environmental Plan 2008 (LLEP) car parking requirements. This clause is outlined below and provides the requirements for the ground floor level, retail and other uses (commercial and childcare).

- Clause 2 (a) – at least one car parking space is provided for every 200m^{2}of any new gross floor area that is on the ground floor level of the building;

In respect to any other part of the building –

- Clause 2 (b)(i) – at least one car parking space for every 100m^2 of any new gross floor area that is to be used for the purposes of retail premises, and
- Clause 2(b)(ii) – at least one car parking space for every 150m^2 of any new gross floor area that is to be used for any other purpose.

Furthermore, Clause (3) of this section (of the LLEP) states that '*development consent may be granted to a development with less or no on-site car parking if the consent authority is satisfied that the provision of car parking on-site is not feasible.'*

A summary of the car parking rates and provision is outlined in Table 6.

Table 6: Car parking rates and provision for the mixed-use development

Type	No / GFA*	Car Parking Rate	Space required**	Spaces Provided
Ground floor requirements (LLEP Clause 7.3 2(a))				
Service Apartments	237m^2	1 space for each 200m^2 GFA (LLEP, 2008)	1	**1**
Retail***	282m^2		**2**	**3**
Commercial	171m^2		**1**	**1**
Other building requirements (LLEP Clause 7.3 2(b))				
Serviced Apartments	12,283m^2	1 space for each 150m^2 GFA (LLEP, 2008)	82	68
Commercial	2,149 m^2	1 space for each 150 m^2 GFA (LLEP, 2008)	14	14
Childcare	528m^2	1 space for each 150m^2 GFA (LLEP, 2008)	4	7
Total			**104**	**94 (excludes service vehicle spaces)**

*The no./ GFA has been based on drawing DA-00-0000, revision D provided by Meriton Suites.

** The fraction will be rounded up to the nearest whole space.

*** The entire retail premises floor area is accounted for on the ground floor level.

By applying the rates to each component of the development, 104 parking spaces would normally be required. In response, 94 parking spaces are provided on three (3) basement levels which results in a total of 10 fewer parking spaces. This is deemed acceptable for the following reasons:

- The site is centrally located within the Liverpool City Centre, and therefore has excellent access to nearby facilities including public transport. The subject site is located within a desirable distance from numerous bus services operate in the vicinity of the site. In addition, Liverpool Railway Station services the area and is located within eight minutes' walk of the site, hence, the development has the potential to be a premier Transit - Oriented Development. Therefore, suitable and convenient public transport options are available for serviced apartment guests, staff and visitors.
- In the DCP, walking is encouraged as opposed to the use of private vehicles for local trips. In addition, the DCP encourages the design of buildings, car parks and pedestrian areas are designed to promote safe pedestrian access and encourage the use of public transport.
- Reduction of on-site parking spaces is proposed to actively discourage parking in circumstances where there is excellent public transport availability, particularly given the constrained surrounding road network.
- Reduced parking in such areas is consistent with current State Government policy and will deliver a more sustainable transport outcome.
- The site is co-located or in proximity to other uses where parking is appropriately provided (for example business centres, schools, public open space, car parks).
- The childcare centre is anticipated to predominately serve the residents on site,
- In order to realise the Greater Sydney Commission vision of 30-minute city[1], the site is in a prime location to access two of these future cities with access via the Council led FAST corridor to the future Western Sydney Aerotropolis and the existing Sydney Trains direct link to Parramatta.
- As a result of the measures to be implemented by the future development to encourage alternate modes of transport (active and public transport) as well as a reduction allowance for car pooling, it is assumed that approximately 10% mode shift away from the private vehicle can be achieved compared to the current mode share for people working in the area. By applying this reduction factor to 104 parking spaces, 94 parking spaces will ultimately be required.
- There are opportunities for a mode shift away from private vehicle travel, with the site located less than 10 minutes' walk distance from major bus routes and Liverpool Station.
- There is also numerous restricted on-street parking available within walking distance of the site along Northumberland Street on both sides of the street. The Bathurst Street carpark to the north of the proposed development (three blocks away from the development to the north) is also available for public use.

[1] - A Metropolis of Three Cities, Connecting People, Greater Sydney Region Plan, October 2017

In summary, while the proposed development does not provide the required number of parking spaces, the on-site parking provision is considered acceptable for the reasons outlined above.

6.2 Accessible parking space

The Liverpool DCP outlines the minimum provision for accessible car parking spaces:

- 2% of the total demand generated by a development

These spaces will ultimately need to be accommodated on-site. They need to be designed and appropriately signposted for use by persons with disabilities.

6.3 Bicycle parking

Part 1 of the LDCP as amended on the 1 February 2021 states that the minimum amount of bicycle parking spaces and associated facilities are to be provided in line with Table 7 below. It should be noted that bicycle parking facilities have the same classification as the Austroads Guidelines outlined below:

- Class A – high security facilities are suitable for all-day or night parking. This includes fully enclosed individual lockers. Refer to AS 2890.3
- Class B – medium security facilities are appropriate for all-day parking in many areas. These facilities include a lockable shelter/enclosure fitted with Class 3 facilities. Refer to AS 2890.3
- Class C – low security facilities are appropriate for short-medium stay parking in highly visible areas. This includes bicycle rails/racks where the wheels and frame can be locked to the rack (traditional 'toaster' racks where the front wheel only is secured is not an appropriate facility).

Employee bicycle parking is classified as a Class A or B facility with visitor and customer parking classified as a Class C facility.

As part of the assessment the following assumptions have been made:

- Serviced apartments have been classified as visitor accommodation with 20 staff employed; and
- The Commercial premises have been assumed as business premises.

Table 7: Bicycle parking rates (Source: Part 1 DCP, Table 13)

Type	No / Net Lettable Area (NLA) *	Car Parking Rate	Spaces required	Spaces Provided
Serviced Apartment (visitor accommodation)				
Employee	20 staff	1 space per 10 staff	**2**	**12**
Visitor	229 bedrooms	1 space per 20 bedrooms/ sites	**11**	**1**
Pool facilities				
Employee	0 staff	1 space per 10 staff	**0**	**1**
Visitor	120 sqm	1 space per 15m^2 of pool	**8**	**1**

Type	No / Net Lettable Area (NLA) *	Car Parking Rate	Spaces required	Spaces Provided
Other Indoor Facilities				
Employee	0 staff	1 space per 10 staff	**0**	**0**
Visitor/ customer	206sqm	2 plus 1 per 100sqm GFA	**4**	**1**
Business Premises				
Employee	1940sqm	1 space per 10 staff or 1 space per 200m^2 GFA	**10**	**12**
Visitor/ customer	1940sqm	2 plus 1 space per 100m^2 GFA	**21**	**8**
Retail				
Employee	1 staff	1 per 10 staff or 1 per 200m^2 GFA (whichever greater)	**1**	**1**
Visitor/ customer	238sqm	2 plus 1 per 100m^2 GFA	**4**	**1**
Childcare				
Employee	12 staff	1 space per 10 staff	**2**	**2**
Visitor	1 centre	2 spaces per centre	**2**	**0**
Total			**65**	**40**

* The fraction will be rounded up to the nearest whole space.

By applying the rates to each component of the development, 65 bicycle parking spaces would normally be required. In response, 40 bicycle parking spaces are provided on two basement levels which results in 25 less bicycle parking spaces. This is deemed acceptable for the following reasons:

- The site located less than 10 minutes' walk distance from major bus routes and Liverpool Station.
- The site is well located within walking distance (500m to 2km) to main, shopping centres, hospitals, schools, community and religious centres;
- The provision of bicycle parking is to ensure the quantity of parking available is enough to meet demand, which is expected to increase as alternatives modes of transportation and suitable cycling routes are developed in the area;
- The serviced apartments are likely to received customers and visitors working in the Liverpool CBD area consisting in short walking distance to their places of work or entertainment;
- The serviced apartments are also likely to receive costumers and visitors working in the job centres near Liverpool CBD accessible by a well-served public transport network;
- It is expected that between 1% and 2% of total visitors will arrive by bicycle. The majority of bike users would be workers within the precinct. Temporary residents of the serviced apartments and visitors are unlikely to cycle as is expected the preferred mode of transportation would be public transport and rental vehicles. Based on this mode share range, approximately 40 bicycle

spaces are to be provided – lower than Council's requirement (65 spaces). This is considered appropriate for the scale of development proposed; and

- The operator of the public domain area would monitor the demand for bicycle parking in the precinct. Should demand exceed supply and cyclists park their bikes informally to street furniture, additional bicycle parking would be provided so as not to detract from the public domain area. The current design does not preclude the future provision of additional visitor bicycle parking spaces.

6.4 Bicycle Design Criteria

For multi-storey developments, the DCP stipulates that bicycle parking and cycling facilities shall be located on the ground floor, or first basement level close to entry/exit points, to ensure they are secure and easily accessible by staff and tenants. For visitors or customers, bicycle parking is required to be located adjacent to the main entry point. In developments with multiple entry/exit points, the share of bicycle parking can be divided between each entry point, as per expected demand and design of the development.

Furthermore, the design of buildings must ensure:

- Areas between bicycle parking and the street have a courtesy ramp, if stairs are the primary means of access,
- Paths between the entry point and bicycle parking and cycling facilities shall be wide enough to accommodate a person walking a bicycle (particularly around corners);
- The provision of bicycle parking and end of trip facilities seeks to meet the needs of likely users and ensure requirements to install bicycle parking do not impose an unreasonable cost burden on developers;
- Paths adjacent to a driveway are visually or physically separated and marked; and
- Bicycle cages or lockers within basement car parks are not located in, or create, concealed spaces.

End-of-trip facilities (showers and change rooms) are to be provided at the rate of 1 per 10 employee bicycle spaces. Where less than 4 facilities are proposed, they should be unisex. End-of-trip facilities are optional for residential uses or for visitors to other developments. The facilities should be located adjacent to the employee bicycle parking. This may be near the main entrance/lobby of the building, or in some instances the service entry.

6.5 Motorcycle parking

Parking spaces for motorbikes are to be included in the allocation of car parking under the DCP. In all buildings that provide onsite parking, the area equal to 1 car parking space is to be provided as separate parking for motorbikes for every 20 car parking spaces provided. With the requirement of 104 car parking spaces and provision of 94 on-site parking spaces, this results in a requirement of 6 spaces, (2

on each basement level), which are placed amongst the basement car parking levels.

6.6 Loading/unloading facilities

The DCP stipulates for developments which are not classified as residential the requirements for loading/ unloading facilities are "*sufficient service and delivery vehicle parking adequate to provide for the needs of the development*". Two (2) loading bays are proposed at ground level for one (1) 8.8m MRV and one (1) 6.4m SRV as noted in Section 3.3 of this report. Such a number of loading bays is considered sufficient for modern loading facilities which are often heavily managed and use consolidated delivery methods.

A minimum height clearance of 4.5m is required for the loading area. For details of the swept path compliance, refer to Section 3.3 and Appendix C. The cross section of the loading dock plan is displayed below in Figure 11 and has been based on the drawing provided by PTW on the 25th February 2021.

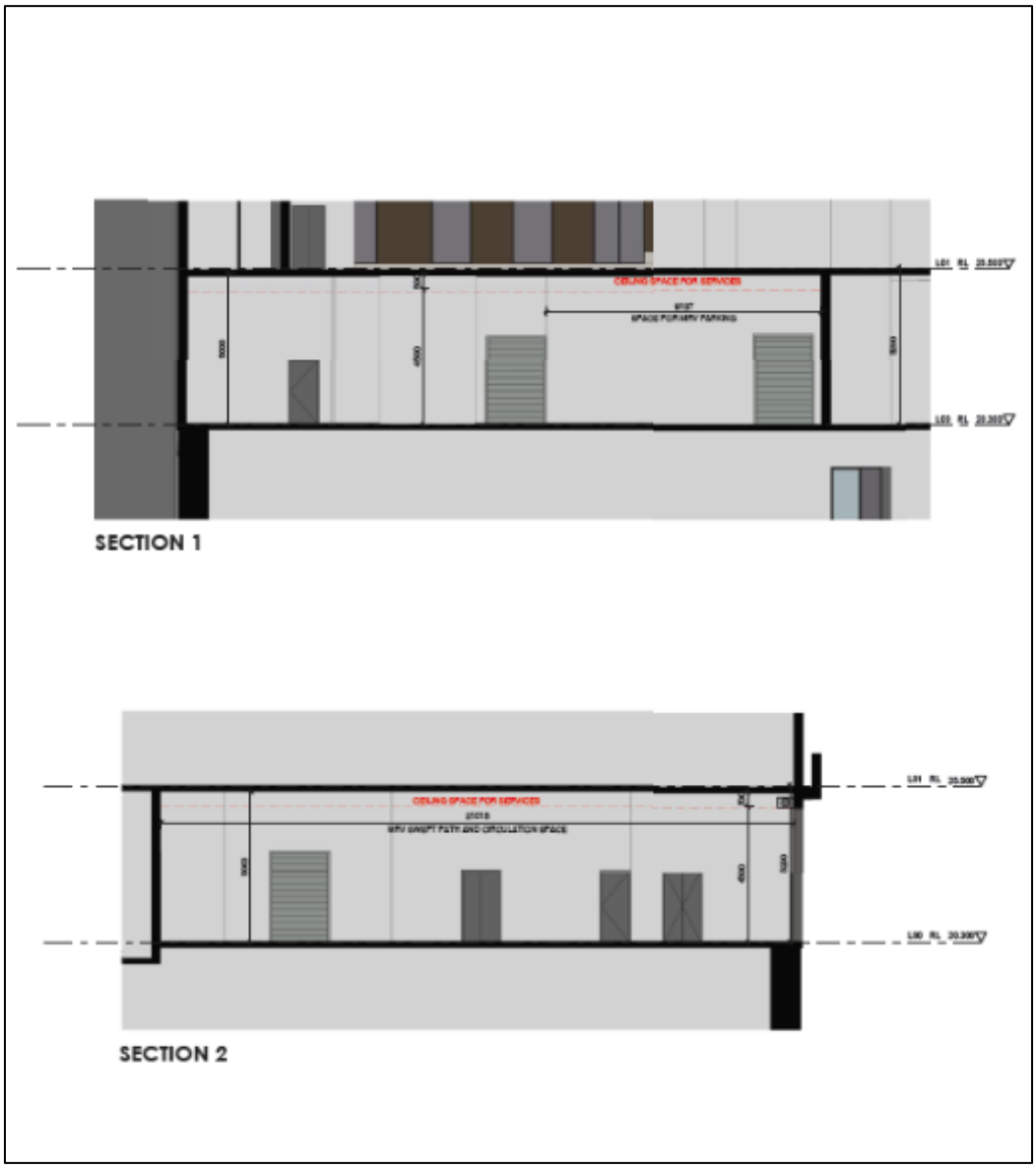


Figure 11: Loading dock cross section

7 Road network impacts

7.1 Traffic generation

Serviced apartment

Consulting the 2002 TfNSW Guide to Traffic Generating Developments, there are no comparable rates for hotels and serviced apartments. It states that *original RTA research indicated a large variance in the traffic generation rates of hotels*. Therefore, Arup undertook a survey of a Meriton Hotel within a CBD location (North Sydney). This site is comparable in size, containing 203 rooms including 101 suites and 102 serviced apartments and will likely serve a similar purpose to the proposed development within the Liverpool City Centre. The survey observed a total of 18 vehicles over a peak hour, comprising 13 taxis/Ubers and 5 vehicles parking within the basement car park. This is equivalent to a peak hour traffic generation rate of 0.09 / vehicles room for the AM peak.

The above rate has been adopted for the purposes of this study for both the AM and PM peak being:

- AM and PM peak hour rate - 0.09 vehicle trips / room

It should also be noted that car parking will only be provided to guests if requested and paid for in addition to standard stay rates.

Childcare Centre

The standard TfNSW rates have been applied for the traffic generation of the childcare component which is 0.8 vehicle trips per child in the AM peak hour and 0.7 vehicle trips per child in the PM peak hour.

The childcare centre serves the residents nearby who will likely walk up. Therefore, a reduced rate of vehicle trip generation by 25% has been applied given the likely containment.

Retail

The retail trip generation rate of 12.3 vehicle trips per 100m^2 published in the TfNSW Guide to Traffic Generating Developments has been utilised for the PM peak.

Commercial

The commercial trip generation rate of 2 vehicle per 100m^2 published in the TfNSW Guide to Traffic Generating Developments, (Section 3.5) has been utilised for the AM and PM peak.

7.1.1 Directional Split

The following in/out proportions for the respective peak hours are used:

- Serviced Apartment AM– 80% (out), 20% (in)
- Serviced Apartment PM – 20% (out), 80% (in)

- Retail and Childcare – 50% (out), 50% (in)
- Commercial – 60% (out), 40% (in)

The total traffic generation of the proposed development has been summarised in Table 8 below.

Table 8: Total Traffic Generation of the proposed Development

Land Use	No. / GFA*	Traffic Generation Rates		Traffic Volumes					
		AM	PM	AM	PM	AM		PM	
						In	Out	In	Out
Serviced apartment									
Serviced Apartment	163 rooms	0.09 trips / room	0.09 trips / room	15	15	3	12	12	3
Non- Residential									
Retail Premises	282m^2	6.2 trips per 100m^2 (50% of PM trips)	12.3 trips per 100m^2	17	35	9	9	18	18
Commercial Premises	2,320 m^2	2 trips per 100m^2	2 trips per 100m^2	46	46	18	28	18	28
Childcare Centre	79 Children	0.6 vehicle trips per child*	0.53 vehicle trips per child**	47	42	24	23	21	21
Total				**125**	**138**	**54**	**72**	**69**	**70**

* The no./ GFA has been based on drawing DA-00-0000, revision C provided by Meriton Suites.
** Childcare trip generation rates reduced by 25% due to containment.

Therefore, given these rates, it is anticipated that the proposed development will generate a total of 125 trips in the AM peak hour and 138 trips in the PM peak hour. When considering the directional distribution, the volumes equate to less than one vehicle trip approximately every 2 minutes being generated on average during peak periods. The volumes are minor in nature and will have negligible impacts on the operation of key intersections. It should be noted that the trip generation for the commercial premises is likely to be lower than the volumes displayed in the table due to a combination of the shift in worker preference to avoid travelling to work during peak hours and the increase in working from home. Accordingly, the traffic impacts of the proposed development are considered supportable on traffic planning grounds.

It should be noted that a reduced car parking provision is proposed for the development (64 parking bays). The reduced car parking spaces is able to accommodate the trips generated for the proposed development.

7.2 Walking and cycling access

There are no proposed changes to the current external walking network. The current network is deemed both adequate and appropriate for the proposed site development.

Bicycle parking spaces will be provided as a component of the proposed development, with the complementary end of trip facilities such as lockers and showers. Provision of these facilities will encourage active travel, such as cycling as a viable mode of transport to the site. This will further contribute to a reduced car mode share of trips.

8 Conclusion

This assessment has described the potential traffic and transport impacts of the proposed mixed-use development at 167 Northumberland Street, Liverpool.

Key findings of the review are as follows:

- The development is located within a 10-minute walk of Liverpool Station and has the potential to be a premier Transit-Oriented Development;
- The surrounding intersections are generally operating satisfactorily during the morning and afternoon peak periods in the existing situation;
- The proposed development will likely result in negligible impact in peak hour links flows in the area given the existing traffic generation;
- A total of 94 on-site parking bays (including serviced apartment parking spaces, retail spaces, accessible parking, and childcare parking spaces) are proposed for the development. The provision of on-site parking spaces is considered acceptable for the reasons outlined in Section 6.1;
- Two loading bays are proposed for the development on the ground level. The loading areas have been designed to accommodate an 8.8m medium rigid vehicle and a 6.4m small rigid vehicle;
- 40 bicycle parking spaces are provided on three basement levels which results in 25 less bicycle parking spaces. This is deemed acceptable as the site is located less than 10 minutes' walk distance from major bus routes and Liverpool Station, main, shopping centres, hospitals, schools, community and religious centres;
- The serviced apartments are likely to received customers and visitors working in the Liverpool CBD area consisting in short walking distance to their places of work or entertainment;
- The serviced apartments are also likely to receive costumers and visitors working in the job centres near Liverpool CBD accessible by a well-served public transport network; and
- Secure bicycle parking will be provided in accordance with the DCP as a component of the proposed development. The local cycling infrastructure (cycle paths) however has not been upgraded or developed to facilitate safe cycling to the site. The lack of cycling may be attributed to several factors, such as heavy traffic and perceived safety in the area.

In summary, the proposed development is considered to have a minimal impact on the local transport network.

Appendix A

Traffic Survey

A1

Job No. : N5418

Client : Arup

Suburb : Liverpool

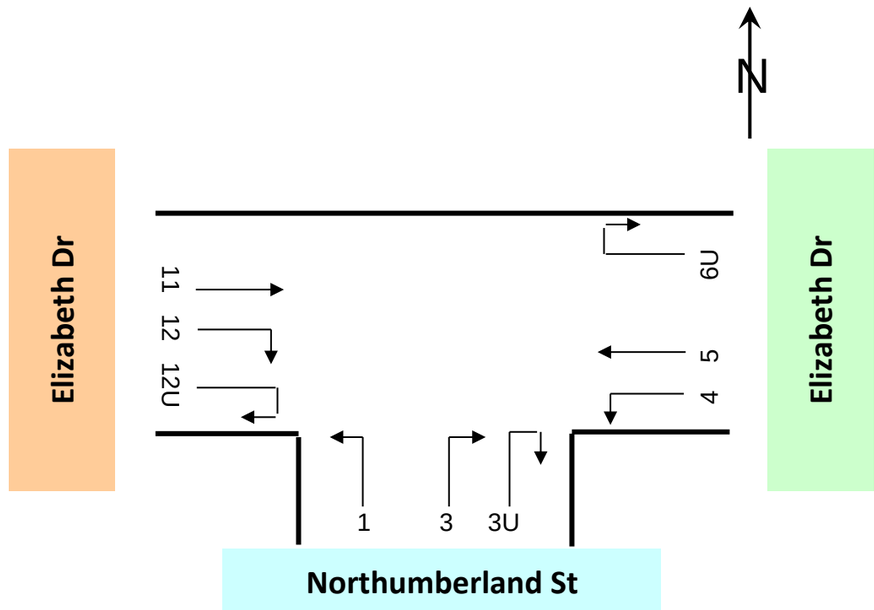
Location : 1. Elizabeth Dr / Northumberland St

Day/Date : Thu, 7th November 2019

Weather : Fine

Description : Classified Intersection Count

: Peak Hour Summary



	Approach	Northumberland St			Elizabeth Dr				Elizabeth Dr			Grand Total
	Time Period	Lights	Heavies	Total	Lights	Heavies	Total		Lights	Heavies	Total	
AM	8:00 to 9:00	216	23	**239**	216	3	**219**		399	28	**427**	**885**
PM	16:45 to 17:45	447	26	**473**	415	1	**416**		392	20	**412**	**1,301**

Approach	Northumberland St			Elizabeth Dr				Elizabeth Dr			Grand Total
Time Period	Lights	Heavies	Total	Lights	Heavies	Total		Lights	Heavies	Total	
7:00 to 8:00	103	18	**121**	158	3	**161**		343	14	**357**	**639**
7:15 to 8:15	115	22	**137**	178	3	**181**		407	21	**428**	**746**
7:30 to 8:30	140	22	**162**	185	1	**186**		455	19	**474**	**822**
7:45 to 8:45	184	22	**206**	201	3	**204**		376	26	**402**	**812**
8:00 to 9:00	216	23	**239**	216	3	**219**		399	28	**427**	**885**
AM Totals	**319**	**41**	**360**	**374**	**6**	**380**		**742**	**42**	**784**	**1,524**
16:00 to 17:00	445	24	**469**	394	4	**398**		360	20	**380**	**1,247**
16:15 to 17:15	450	23	**473**	379	4	**383**		380	18	**398**	**1,254**
16:30 to 17:30	464	27	**491**	398	2	**400**		367	21	**388**	**1,279**
16:45 to 17:45	447	26	**473**	415	1	**416**		392	20	**412**	**1,301**
17:00 to 18:00	460	24	**484**	390	0	**390**		356	17	**373**	**1,247**
PM Totals	**905**	**48**	**953**	**784**	**4**	**788**		**716**	**37**	**753**	**2,494**

Job No. : N5418

Client : Arup

Suburb : Liverpool

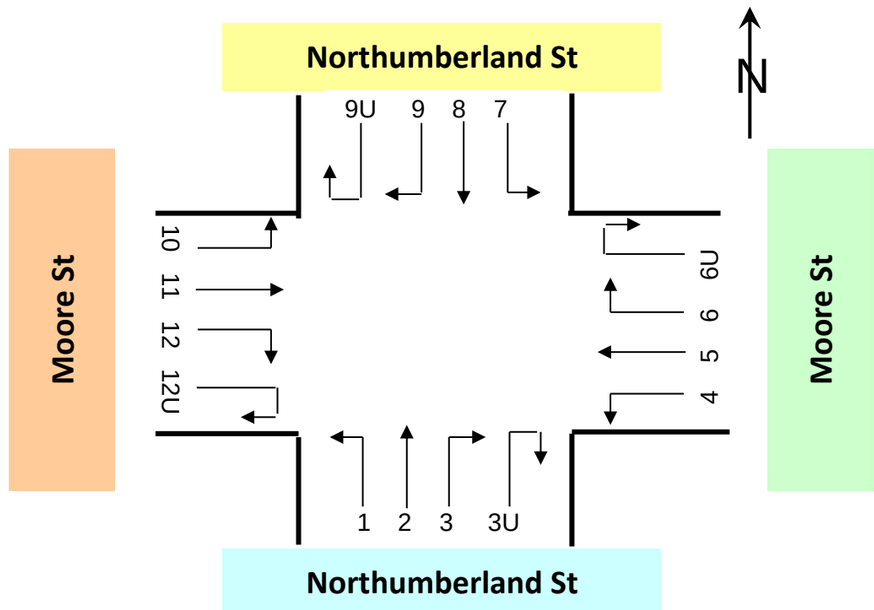
Location : 2. Moore St / Northumberland St

Day/Date : Thu, 7th November 2019

Weather : Fine

Description : Classified Intersection Count

: Peak Hour Summary



	Approach	Northumberland St			Moore St			Northumberland St			Moore St			Grand Total
	Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
AM	8:00 to 9:00	247	10	**257**	149	39	**188**	0	0	**0**	204	37	**241**	**686**
PM	16:30 to 17:30	616	5	**621**	195	55	**250**	0	0	**0**	94	38	**132**	**1,003**

Approach	Northumberland St			Moore St			Northumberland St			Moore St			Grand Total
Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
7:00 to 8:00	102	5	**107**	68	46	**114**	0	0	**0**	72	45	**117**	**338**
7:15 to 8:15	131	4	**135**	74	46	**120**	0	0	**0**	88	39	**127**	**382**
7:30 to 8:30	163	5	**168**	91	39	**130**	0	0	**0**	115	41	**156**	**454**
7:45 to 8:45	201	9	**210**	126	40	**166**	0	0	**0**	153	37	**190**	**566**
8:00 to 9:00	247	10	**257**	149	39	**188**	0	0	**0**	204	37	**241**	**686**
AM Totals	**349**	**15**	**364**	**217**	**85**	**302**	**0**	**0**	**0**	**276**	**82**	**358**	**1,024**
16:00 to 17:00	540	3	**543**	221	50	**271**	0	0	**0**	110	40	**150**	**964**
16:15 to 17:15	591	3	**594**	207	51	**258**	0	0	**0**	105	34	**139**	**991**
16:30 to 17:30	616	5	**621**	195	55	**250**	0	0	**0**	94	38	**132**	**1,003**
16:45 to 17:45	585	3	**588**	194	56	**250**	0	0	**0**	88	35	**123**	**961**
17:00 to 18:00	556	2	**558**	187	58	**245**	0	0	**0**	95	30	**125**	**928**
PM Totals	**1,096**	**5**	**1,101**	**408**	**108**	**516**	**0**	**0**	**0**	**205**	**70**	**275**	**1,892**

Appendix B

Sidra Outputs

B1

MOVEMENT SUMMARY

Site: 101 [Hume Hwy & Elizabeth Dr AM (0800-0900)]

Network: N101 [AM Existing]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Hume Hwy (S)														
1	L2	121	2.0	121	2.0	0.127	16.3	LOS B	1.8	12.7	0.54	0.70	0.54	46.3
2	T1	1838	2.0	1838	2.0	0.943	74.2	LOS F	33.5	238.3	1.00	1.09	1.24	27.3
Approach		1959	2.0	1959	2.0	0.943	70.6	LOS F	33.5	238.3	0.97	1.07	1.20	28.0
East: Elizabeth Dr (E)														
4	L2	38	2.0	38	2.0	0.398	45.2	LOS D	3.3	23.4	1.00	0.79	1.00	29.7
5	T1	390	2.0	390	2.0	0.398	26.0	LOS B	3.3	23.6	0.79	0.63	0.79	37.1
6	R2	114	2.0	114	2.0	0.849	90.6	LOS F	5.5	39.1	1.00	0.87	1.17	19.1
Approach		542	2.0	542	2.0	0.849	40.9	LOS C	5.5	39.1	0.85	0.69	0.88	30.5
North: Hume Hwy (N)														
7	L2	251	2.0	251	2.0	0.618	38.5	LOS C	17.6	125.1	0.82	0.78	0.82	28.1
8	T1	1320	2.0	1320	2.0	0.618	34.0	LOS C	17.8	126.5	0.83	0.75	0.83	38.5
9	R2	186	2.0	186	2.0	0.952	105.2	LOS F	5.0	35.7	1.00	1.02	1.59	22.1
Approach		1757	2.0	1757	2.0	0.952	42.2	LOS C	17.8	126.5	0.84	0.78	0.91	34.6
West: Elizabeth Dr (W)														
10	L2	433	2.0	433	2.0	0.514	35.9	LOS C	13.5	96.2	0.76	0.81	0.76	37.1
11	T1	857	2.0	857	2.0	0.722	43.8	LOS D	19.5	138.7	0.93	0.82	0.93	25.2
12	R2	398	2.0	398	2.0	0.931	85.5	LOS F	17.4	124.2	0.98	0.96	1.25	24.9
Approach		1688	2.0	1688	2.0	0.931	51.6	LOS D	19.5	138.7	0.90	0.85	0.96	28.2
All Vehicles		5946	2.0	5946	2.0	0.952	54.1	LOS D	33.5	238.3	0.90	0.89	1.02	30.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	50	35.3	LOS D	0.1	0.1	0.92	0.92
P2	East Full Crossing	50	69.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	50	69.3	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	50	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		200	60.8	LOS F			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Elizabeth Dr & Bathurst St AM (0800-0900)]

Network: N101 [AM Existing]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Bathurst St (S)														
1	L2	104	2.0	104	2.0	0.828	52.0	LOS D	4.0	28.3	1.00	0.88	1.25	22.7
2	T1	395	2.0	395	2.0	0.828	59.1	LOS E	16.2	115.7	0.98	0.92	1.09	30.5
3	R2	209	2.0	209	2.0	0.504	60.2	LOS E	8.2	58.3	0.93	0.82	0.93	20.5
Approach		708	2.0	708	2.0	0.828	58.4	LOS E	16.2	115.7	0.97	0.88	1.06	27.1
East: Elizabeth Dr (E)														
4	L2	44	2.0	44	2.0	0.465	86.5	LOS F	2.2	15.9	0.97	0.89	1.50	17.5
5	T1	272	2.0	272	2.0	0.465	45.3	LOS D	4.5	32.1	0.88	0.70	0.89	7.5
6	R2	109	2.0	109	2.0	0.744	46.5	LOS D	2.8	19.6	1.00	0.82	1.11	26.0
Approach		425	2.0	425	2.0	0.744	49.8	LOS D	4.5	32.1	0.92	0.75	1.01	15.3
North: Bathurst St (N)														
7	L2	17	2.0	17	2.0	0.487	49.1	LOS D	0.8	6.0	1.00	0.72	1.00	24.1
8	T1	135	2.0	135	2.0	0.487	63.9	LOS E	5.0	35.9	0.98	0.77	0.98	29.3
9	R2	140	2.0	140	2.0	0.410	76.6	LOS F	3.0	21.7	0.98	0.77	0.98	17.3
Approach		292	2.0	292	2.0	0.487	69.2	LOS E	5.0	35.9	0.98	0.77	0.98	23.7
West: Elizabeth Dr (W)														
10	L2	136	2.0	136	2.0	0.874	102.2	LOS F	6.8	48.7	1.00	0.93	1.68	17.3
11	T1	471	2.0	471	2.0	0.874	64.6	LOS E	21.4	152.2	1.00	0.97	1.11	9.7
12	R2	271	2.0	271	2.0	0.569	46.7	LOS D	8.8	62.9	1.00	0.84	1.00	28.1
Approach		878	2.0	878	2.0	0.874	64.9	LOS E	21.4	152.2	1.00	0.92	1.17	17.2
All Vehicles		2303	2.0	2303	2.0	0.874	60.7	LOS E	21.4	152.2	0.97	0.86	1.08	21.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	50	49.2	LOS E	0.2	0.2	0.92	0.92
P2	East Full Crossing	50	69.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	50	69.3	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	50	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		200	64.2	LOS F			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Elizabeth Dr & Northumberland St AM (0800-0900)]

Network: N101 [AM Existing]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Northumberland St														
1	L2	136	12.5	136	12.5	0.167	40.3	LOS C	1.9	14.9	0.66	0.65	0.66	15.2
3	R2	103	5.8	103	5.8	0.121	36.9	LOS C	1.3	9.6	0.59	0.65	0.59	18.4
Approach		239	9.6	239	9.6	0.167	38.9	LOS C	1.9	14.9	0.63	0.65	0.63	16.6
East: Elizabeth St														
5	T1	219	1.4	219	1.4	0.056	8.3	LOS A	1.1	7.5	0.35	0.28	0.35	20.9
Approach		219	1.4	219	1.4	0.056	8.3	LOS A	1.1	7.5	0.35	0.28	0.35	20.9
West: Elizabeth St														
11	T1	427	6.6	427	6.6	0.170	12.7	LOS A	5.0	36.7	0.56	0.48	0.56	22.8
Approach		427	6.6	427	6.6	0.170	12.7	LOS A	5.0	36.7	0.56	0.48	0.56	22.8
All Vehicles		885	6.1	885	6.1	0.170	18.7	LOS B	5.0	36.7	0.53	0.48	0.53	19.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P11	South Stage 1	50	69.3	LOS F	0.2	0.2	0.96	0.96
P12	South Stage 2	50	69.3	LOS F	0.2	0.2	0.96	0.96
P1B	South Slip/Bypass Lane Crossing	50	69.3	LOS F	0.2	0.2	0.96	0.96
P2	East Full Crossing	50	69.3	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	50	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		250	69.3	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 102 [Moore St & Northumberland St AM (0800-0900)]

Network: N101 [AM Existing]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Northumberland St														
1	L2	53	9.4	53	9.4	0.125	50.3	LOS D	1.8	13.9	0.81	0.71	0.81	15.3
2	T1	184	2.2	184	2.2	0.197	47.7	LOS D	3.2	23.1	0.83	0.66	0.83	13.0
3	R2	20	5.0	20	5.0	0.046	49.2	LOS D	0.7	4.9	0.79	0.68	0.79	15.2
Approach		257	3.9	257	3.9	0.197	48.4	LOS D	3.2	23.1	0.83	0.67	0.83	13.7
East: Moore St														
5	T1	88	30.7	88	30.7	0.195	9.9	LOS A	2.8	20.6	0.40	0.45	0.40	24.1
6	R2	100	12.0	100	12.0	0.195	14.1	LOS A	2.8	20.6	0.42	0.54	0.42	16.7
Approach		188	20.7	188	20.7	0.195	12.1	LOS A	2.8	20.6	0.41	0.50	0.41	20.6
West: Moore St														
10	L2	121	8.3	121	8.3	0.104	12.4	LOS A	1.8	13.9	0.37	0.59	0.37	17.2
11	T1	120	22.5	120	22.5	0.106	9.0	LOS A	1.8	15.3	0.37	0.31	0.37	26.3
Approach		241	15.4	241	15.4	0.106	10.7	LOS A	1.8	15.3	0.37	0.45	0.37	22.1
All Vehicles		686	12.5	686	12.5	0.197	25.2	LOS B	3.2	23.1	0.55	0.55	0.55	16.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	50	69.3	LOS F	0.2	0.2	0.96	0.96
P2	East Full Crossing	50	69.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	50	69.3	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	50	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		200	69.3	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Hume Hwy & Elizabeth Dr AM (0800-0900)]

Network: N101 [AM Base + 5 year (3PC growth)]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)
Design Life Analysis (Final Year): Results for 5 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Hume Hwy (S)														
1	L2	139	2.0	139	2.0	0.152	17.2	LOS B	2.1	15.1	0.57	0.71	0.57	45.8
2	T1	2114	2.0	2114	2.0	1.127	191.9	LOS F[11]	60.5	430.7	1.00	1.64	1.92	14.3
Approach		2253	2.0	2253	2.0	1.127	181.1	LOS F[11]	60.5	430.7	0.97	1.58	1.84	14.9
East: Elizabeth Dr (E)														
4	L2	44	2.0	44	2.0	0.422	41.6	LOS C	3.5	24.7	0.96	0.77	0.96	31.0
5	T1	449	2.0	447	2.0	0.422	22.2	LOS B	3.5	24.7	0.72	0.58	0.72	39.3
6	R2	131	2.0	131	2.0	0.824	89.0	LOS F[11]	6.2	44.3	1.00	0.86	1.13	19.3
Approach		623	2.0	622[N1]	2.0	0.824	37.6	LOS C	6.2	44.3	0.79	0.65	0.82	31.8
North: Hume Hwy (N)														
7	L2	289	2.0	289	2.0	0.733	42.4	LOS C	22.0	156.9	0.89	0.84	0.89	26.6
8	T1	1518	2.0	1518	2.0	0.733	37.8	LOS C	22.2	157.9	0.90	0.82	0.90	37.0
9	R2	214	2.0	214	2.0	1.095	182.6	LOS F[11]	8.0	56.9	1.00	1.22	2.05	14.7
Approach		2021	2.0	2021	2.0	1.095	53.8	LOS D[11]	22.2	157.9	0.91	0.86	1.02	30.7
West: Elizabeth Dr (W)														
10	L2	498	2.0	498	2.0	0.591	37.4	LOS C	16.3	116.1	0.80	0.83	0.80	36.5
11	T1	986	2.0	986	2.0	0.931	73.1	LOS F[11]	33.7	239.9	1.00	1.09	1.25	18.2
12	R2	458	2.0	458	2.0	1.109	168.5	LOS F[11]	30.1	214.1	0.98	1.20	1.75	15.6
Approach		1941	2.0	1941	2.0	1.109	86.4	LOS F[11]	33.7	239.9	0.94	1.05	1.25	20.6
All Vehicles		6838	2.0	6836[N1]	2.0	1.127	103.6	LOS F[11]	60.5	430.7	0.93	1.13	1.34	20.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	55	35.0	LOS D	0.1	0.1	0.92	0.92
P2	East Full Crossing	55	69.3	LOS F[12]	0.2	0.2	0.96	0.96
P3	North Full Crossing	55	69.3	LOS F[12]	0.2	0.2	0.96	0.96
P4	West Full Crossing	55	69.3	LOS F[12]	0.2	0.2	0.96	0.96
All Pedestrians		220	60.7	LOS F[12]			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.

MOVEMENT SUMMARY

Site: 101 [Elizabeth Dr & Bathurst St AM (0800-0900)]

Network: N101 [AM Base + 5 year (3PC growth)]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)
Design Life Analysis (Final Year): Results for 5 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Bathurst St (S)														
1	L2	120	2.0	120	2.0	1.013	94.4	LOS F[11]	7.4	53.0	1.00	1.07	1.71	11.4
2	T1	454	2.0	454	2.0	1.013	117.0	LOS F[11]	27.0	192.5	1.00	1.27	1.57	20.2
3	R2	240	2.0	240	2.0	0.597	62.3	LOS E[11]	9.7	69.1	0.95	0.83	0.95	20.1
Approach		814	2.0	814	2.0	1.013	97.5	LOS F[11]	27.0	192.5	0.99	1.11	1.41	18.8
East: Elizabeth Dr (E)														
4	L2	51	2.0	51	2.0	0.516	102.7	LOS F[11]	3.3	23.6	1.00	0.83	1.54	15.6
5	T1	313	2.0	313	2.0	0.516	46.4	LOS D[11]	4.8	34.4	0.98	0.78	1.01	7.3
6	R2	125	2.0	125	2.0	0.856	52.0	LOS D[11]	3.5	24.7	1.00	0.89	1.30	24.4
Approach		489	2.0	489	2.0	0.856	53.6	LOS D[11]	4.8	34.4	0.98	0.82	1.14	14.5
North: Bathurst St (N)														
7	L2	20	2.0	20	2.0	0.536	49.3	LOS D[11]	1.0	6.8	1.00	0.73	1.03	24.0
8	T1	155	2.0	155	2.0	0.536	63.8	LOS E[11]	5.9	41.7	0.98	0.78	0.99	29.3
9	R2	161	2.0	161	2.0	0.440	75.9	LOS F[11]	3.5	24.9	0.98	0.77	0.98	17.4
Approach		336	2.0	336	2.0	0.536	68.7	LOS E[11]	5.9	41.7	0.99	0.78	0.99	23.8
West: Elizabeth Dr (W)														
10	L2	156	2.0	156	2.0	0.979	126.6	LOS F[11]	7.5	53.7	0.58	0.91	1.48	14.9
11	T1	542	2.0	542	2.0	0.979	89.0	LOS F[11]	26.0	185.0	0.99	1.09	1.27	7.4
12	R2	312	2.0	312	2.0	0.655	47.6	LOS D[11]	10.3	73.7	1.00	0.85	1.00	27.9
Approach		1010	2.0	1010	2.0	0.979	82.1	LOS F[11]	26.0	185.0	0.93	0.99	1.22	14.5
All Vehicles		2648	2.0	2648	2.0	1.013	79.9	LOS F[11]	27.0	192.5	0.96	0.97	1.23	17.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	55	42.5	LOS E[12]	0.2	0.2	0.92	0.92
P2	East Full Crossing	55	69.3	LOS F[12]	0.2	0.2	0.96	0.96
P3	North Full Crossing	55	69.3	LOS F[12]	0.2	0.2	0.96	0.96
P4	West Full Crossing	55	69.3	LOS F[12]	0.2	0.2	0.96	0.96
All Pedestrians		220	62.6	LOS F[12]			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.

MOVEMENT SUMMARY

Site: 101 [Elizabeth Dr & Northumberland St AM (0800-0900)]

Network: N101 [AM Base + 5 year (3PC growth)]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)
Design Life Analysis (Final Year): Results for 5 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Northumberland St														
1	L2	156	12.5	156	12.5	0.192	40.4	LOS C	2.2	17.2	0.66	0.66	0.66	15.2
3	R2	118	5.8	118	5.8	0.139	36.9	LOS C	1.5	11.1	0.59	0.65	0.59	18.4
Approach		275	9.6	275	9.6	0.192	38.9	LOS C	2.2	17.2	0.63	0.66	0.63	16.6
East: Elizabeth St														
5	T1	252	1.4	252	1.4	0.065	8.4	LOS A	1.2	8.7	0.35	0.29	0.35	20.9
Approach		252	1.4	252	1.4	0.065	8.4	LOS A	1.2	8.7	0.35	0.29	0.35	20.9
West: Elizabeth St														
11	T1	491	6.6	491	6.6	0.196	13.1	LOS A	5.9	44.0	0.58	0.50	0.58	22.5
Approach		491	6.6	491	6.6	0.196	13.1	LOS A	5.9	44.0	0.58	0.50	0.58	22.5
All Vehicles		1018	6.1	1018	6.1	0.196	18.9	LOS B	5.9	44.0	0.54	0.49	0.54	19.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P11	South Stage 1	55	69.3	LOS F [12]	0.2	0.2	0.96	0.96
P12	South Stage 2	55	69.3	LOS F [12]	0.2	0.2	0.96	0.96
P1B	South Slip/Bypass Lane Crossing	55	69.3	LOS F [12]	0.2	0.2	0.96	0.96
P2	East Full Crossing	55	69.3	LOS F [12]	0.2	0.2	0.96	0.96
P4	West Full Crossing	55	69.3	LOS F [12]	0.2	0.2	0.96	0.96
All Pedestrians		275	69.3	LOS F [12]			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

12 Level of Service is worse than the Pedestrian Level of Service Target specified in the Parameter Settings dialog.

MOVEMENT SUMMARY

Site: 102 [Moore St & Northumberland St AM (0800-0900)]

Network: N101 [AM Base + 5 year (3PC growth)]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)
Design Life Analysis (Final Year): Results for 5 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Northumberland St														
1	L2	61	9.4	61	9.4	0.148	51.5	LOS D	2.1	16.2	0.83	0.72	0.83	15.1
2	T1	212	2.2	212	2.2	0.233	49.0	LOS D	3.8	27.0	0.85	0.68	0.85	12.8
3	R2	23	5.0	23	5.0	0.054	50.2	LOS D	0.8	5.7	0.80	0.69	0.80	15.0
Approach		296	3.9	296	3.9	0.233	49.6	LOS D	3.8	27.0	0.84	0.69	0.84	13.5
East: Moore St														
5	T1	101	30.7	101	30.7	0.229	10.0	LOS A	3.3	24.3	0.40	0.46	0.40	24.0
6	R2	115	12.0	115	12.0	0.229	14.4	LOS A	3.3	24.3	0.43	0.55	0.43	16.5
Approach		216	20.7	216	20.7	0.229	12.4	LOS A	3.3	24.3	0.42	0.51	0.42	20.5
West: Moore St														
10	L2	139	8.3	139	8.3	0.119	12.2	LOS A	2.1	15.8	0.37	0.59	0.37	17.4
11	T1	138	22.5	138	22.5	0.121	8.7	LOS A	2.1	17.5	0.37	0.31	0.37	26.5
Approach		277	15.4	277	15.4	0.121	10.5	LOS A	2.1	17.5	0.37	0.45	0.37	22.4
All Vehicles		789	12.5	789	12.5	0.233	25.7	LOS B	3.8	27.0	0.56	0.56	0.56	16.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	55	69.3	LOS F[12]	0.2	0.2	0.96	0.96
P2	East Full Crossing	55	69.3	LOS F[12]	0.2	0.2	0.96	0.96
P3	North Full Crossing	55	69.3	LOS F[12]	0.2	0.2	0.96	0.96
P4	West Full Crossing	55	69.3	LOS F[12]	0.2	0.2	0.96	0.96
All Pedestrians		220	69.3	LOS F[12]			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

12 Level of Service is worse than the Pedestrian Level of Service Target specified in the Parameter Settings dialog.

MOVEMENT SUMMARY

Site: 101 [Hume Hwy & Elizabeth Dr AM (0800-0900)]

Network: N101 [AM Base + 10 year (3PC growth)]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)
Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Hume Hwy (S)														
1	L2	157	2.0	157	2.0	0.177	17.9	LOS B	2.5	17.7	0.59	0.72	0.59	45.3
2	T1	2389	2.0	2389	2.0	1.298	335.6	LOS F[11]	90.1	641.9	1.00	2.14	2.55	9.0
Approach		2547	2.0	2547	2.0	1.298	316.0	LOS F[11]	90.1	641.9	0.97	2.05	2.43	9.5
East: Elizabeth Dr (E)														
4	L2	49	2.0	48	2.0	0.444	41.3	LOS C	3.8	26.8	0.95	0.77	0.95	31.1
5	T1	507	2.0	496	2.0	0.444	22.0	LOS B	4.0	28.2	0.72	0.59	0.72	39.4
6	R2	148	2.0	145	2.0	0.849	89.7	LOS F[11]	6.9	49.4	1.00	0.87	1.14	19.2
Approach		705	2.0	689[N1]	2.0	0.849	37.6	LOS C	6.9	49.4	0.80	0.66	0.83	31.8
North: Hume Hwy (N)														
7	L2	326	2.0	326	2.0	0.841	48.3	LOS D[11]	27.9	198.4	0.96	0.90	0.99	24.5
8	T1	1716	2.0	1716	2.0	0.841	43.7	LOS D[11]	27.9	198.7	0.97	0.90	1.00	35.0
9	R2	242	2.0	242	2.0	1.238	296.6	LOS F[11]	12.0	85.1	1.00	1.42	2.52	9.9
Approach		2284	2.0	2284	2.0	1.238	71.1	LOS F[11]	27.9	198.7	0.97	0.96	1.16	26.4
West: Elizabeth Dr (W)														
10	L2	563	2.0	563	2.0	0.668	39.0	LOS C	19.4	138.0	0.84	0.85	0.84	35.9
11	T1	1114	2.0	1114	2.0	1.052	139.0	LOS F[11]	52.8	375.9	1.00	1.40	1.65	11.0
12	R2	517	2.0	517	2.0	1.300	298.0	LOS F[11]	46.8	333.0	0.98	1.47	2.31	9.9
Approach		2194	2.0	2194	2.0	1.300	150.8	LOS F[11]	52.8	375.9	0.96	1.28	1.60	13.7
All Vehicles		7730	2.0	7715[N1]	2.0	1.300	171.6	LOS F[11]	90.1	641.9	0.95	1.38	1.67	14.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	60	35.1	LOS D	0.2	0.2	0.92	0.92
P2	East Full Crossing	60	69.3	LOS F[12]	0.2	0.2	0.96	0.96
P3	North Full Crossing	60	69.3	LOS F[12]	0.2	0.2	0.96	0.96
P4	West Full Crossing	60	69.3	LOS F[12]	0.2	0.2	0.96	0.96
All Pedestrians		240	60.7	LOS F[12]			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.

MOVEMENT SUMMARY

Site: 101 [Elizabeth Dr & Bathurst St AM (0800-0900)]

Network: N101 [AM Base + 10 year (3PC growth)]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)
Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Bathurst St (S)														
1	L2	135	2.0	135	2.0	1.126	174.4	LOS F[11]	11.5	82.2	1.00	1.22	2.09	7.5
2	T1	513	2.0	513	2.0	1.126	195.3	LOS F[11]	39.5	281.5	1.00	1.60	1.99	13.8
3	R2	272	2.0	272	2.0	0.674	63.5	LOS E[11]	11.2	79.8	0.97	0.84	0.97	19.8
Approach		920	2.0	920	2.0	1.126	153.3	LOS F[11]	39.5	281.5	0.99	1.32	1.70	13.5
East: Elizabeth Dr (E)														
4	L2	57	2.0	57	2.0	0.554	105.7	LOS F[11]	3.6	25.8	0.46	0.64	1.02	15.3
5	T1	354	2.0	354	2.0	0.554	47.6	LOS D[11]	5.6	39.7	0.95	0.79	0.99	7.1
6	R2	142	2.0	142	2.0	0.967	71.9	LOS F[11]	4.8	34.4	1.00	1.00	1.57	20.0
Approach		553	2.0	553	2.0	0.967	59.9	LOS E[11]	5.6	39.7	0.91	0.83	1.14	13.3
North: Bathurst St (N)														
7	L2	22	2.0	22	2.0	0.606	49.8	LOS D[11]	1.1	7.8	1.00	0.75	1.09	23.9
8	T1	176	2.0	176	2.0	0.606	64.5	LOS E[11]	6.7	47.6	0.99	0.80	1.00	29.2
9	R2	182	2.0	182	2.0	0.532	77.7	LOS F[11]	4.0	28.6	1.00	0.78	1.00	17.2
Approach		380	2.0	380	2.0	0.606	70.0	LOS E[11]	6.7	47.6	1.00	0.79	1.01	23.5
West: Elizabeth Dr (W)														
10	L2	177	2.0	176	2.0	1.123	170.4	LOS F[11]	11.2	79.7	1.00	1.11	1.99	9.3
11	T1	612	2.0	610	2.0	1.123	192.2	LOS F[11]	26.0	185.0	1.00	1.54	1.82	3.5
12	R2	352	2.0	351	2.0	0.757	41.8	LOS C	11.4	81.5	1.00	0.86	1.02	29.8
Approach		1141	2.0	1137[N1]	2.0	1.123	142.4	LOS F[11]	26.0	185.0	1.00	1.26	1.60	8.6
All Vehicles		2994	2.0	2989[N1]	2.0	1.126	121.3	LOS F[11]	39.5	281.5	0.98	1.14	1.47	12.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	60	43.6	LOS E[12]	0.2	0.2	0.92	0.92
P2	East Full Crossing	60	69.3	LOS F[12]	0.2	0.2	0.96	0.96
P3	North Full Crossing	60	69.3	LOS F[12]	0.2	0.2	0.96	0.96
P4	West Full Crossing	60	69.3	LOS F[12]	0.2	0.2	0.96	0.96
All Pedestrians		240	62.9	LOS F[12]			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

MOVEMENT SUMMARY

Site: 101 [Elizabeth Dr & Northumberland St AM (0800-0900)]

Network: N101 [AM Base + 10 year (3PC growth)]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)
Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Northumberland St														
1	L2	177	12.5	177	12.5	0.211	39.8	LOS C	2.5	19.4	0.66	0.66	0.66	15.3
3	R2	134	5.8	134	5.8	0.153	36.3	LOS C	1.7	12.5	0.59	0.65	0.59	18.6
Approach		311	9.6	311	9.6	0.211	38.3	LOS C	2.5	19.4	0.63	0.66	0.63	16.8
East: Elizabeth St														
5	T1	285	1.4	285	1.4	0.074	8.8	LOS A	1.4	10.1	0.36	0.30	0.36	20.4
Approach		285	1.4	285	1.4	0.074	8.8	LOS A	1.4	10.1	0.36	0.30	0.36	20.4
West: Elizabeth St														
11	T1	555	6.6	517	6.8	0.208	13.5	LOS A	6.2	46.1	0.58	0.50	0.58	22.2
Approach		555	6.6	517[N1]	6.8	0.208	13.5	LOS A	6.2	46.1	0.58	0.50	0.58	22.2
All Vehicles		1151	6.1	1113[N1]	6.3	0.211	19.2	LOS B	6.2	46.1	0.54	0.49	0.54	19.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P11	South Stage 1	60	69.3	LOS F[12]	0.2	0.2	0.96	0.96
P12	South Stage 2	60	69.3	LOS F[12]	0.2	0.2	0.96	0.96
P1B	South Slip/Bypass Lane Crossing	60	69.3	LOS F[12]	0.2	0.2	0.96	0.96
P2	East Full Crossing	60	69.3	LOS F[12]	0.2	0.2	0.96	0.96
P4	West Full Crossing	60	69.3	LOS F[12]	0.2	0.2	0.96	0.96
All Pedestrians		300	69.3	LOS F[12]			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

12 Level of Service is worse than the Pedestrian Level of Service Target specified in the Parameter Settings dialog.

MOVEMENT SUMMARY

Site: 102 [Moore St & Northumberland St AM (0800-0900)]

Network: N101 [AM Base + 10 year (3PC growth)]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)
Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Northumberland St														
1	L2	69	9.4	69	9.4	0.172	52.7	LOS D	2.5	18.6	0.84	0.73	0.84	14.9
2	T1	239	2.2	239	2.2	0.271	50.4	LOS D	4.4	31.1	0.86	0.70	0.86	12.5
3	R2	26	5.0	26	5.0	0.063	51.1	LOS D	0.9	6.5	0.81	0.69	0.81	14.8
Approach		334	3.9	334	3.9	0.271	50.9	LOS D	4.4	31.1	0.85	0.70	0.85	13.2
East: Moore St														
5	T1	114	30.7	114	30.7	0.266	9.9	LOS A	3.7	27.9	0.40	0.46	0.40	24.2
6	R2	130	12.0	130	12.0	0.266	14.3	LOS A	3.7	27.9	0.43	0.55	0.43	16.6
Approach		244	20.7	244	20.7	0.266	12.2	LOS A	3.7	27.9	0.42	0.51	0.42	20.5
West: Moore St														
10	L2	157	8.3	157	8.3	0.133	11.9	LOS A	2.4	17.7	0.37	0.60	0.37	17.6
11	T1	156	22.5	156	22.5	0.136	8.5	LOS A	2.3	19.6	0.37	0.31	0.37	26.8
Approach		313	15.4	313	15.4	0.136	10.2	LOS A	2.4	19.6	0.37	0.45	0.37	22.6
All Vehicles		892	12.5	892	12.5	0.271	26.0	LOS B	4.4	31.1	0.56	0.56	0.56	16.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	60	69.3	LOS F[12]	0.2	0.2	0.96	0.96
P2	East Full Crossing	60	69.3	LOS F[12]	0.2	0.2	0.96	0.96
P3	North Full Crossing	60	69.3	LOS F[12]	0.2	0.2	0.96	0.96
P4	West Full Crossing	60	69.3	LOS F[12]	0.2	0.2	0.96	0.96
All Pedestrians		240	69.3	LOS F[12]			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

12 Level of Service is worse than the Pedestrian Level of Service Target specified in the Parameter Settings dialog.

MOVEMENT SUMMARY

Site: 101 [Hume Hwy & Elizabeth Dr PM (1645-17:45)]

Network: N101 [PM Existing]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Hume Hwy (S)														
1	L2	296	2.0	296	2.0	0.373	23.4	LOS B	6.3	44.7	0.72	0.77	0.72	42.4
2	T1	1482	2.0	1482	2.0	0.840	54.8	LOS D	22.6	161.2	0.98	0.93	1.06	31.8
Approach		1778	2.0	1778	2.0	0.840	49.6	LOS D	22.6	161.2	0.94	0.90	1.00	33.2
East: Elizabeth Dr (E)														
4	L2	106	2.0	106	2.0	0.765	62.1	LOS E	8.8	62.5	1.00	0.89	1.17	24.6
5	T1	806	2.0	806	2.0	0.765	39.6	LOS C	10.7	76.2	0.98	0.86	1.03	31.0
6	R2	120	2.0	120	2.0	0.819	89.2	LOS F	5.7	40.7	1.00	0.85	1.13	19.3
Approach		1032	2.0	1032	2.0	0.819	47.7	LOS D	10.7	76.2	0.98	0.86	1.06	28.3
North: Hume Hwy (N)														
7	L2	307	2.0	307	2.0	0.652	35.6	LOS C	19.6	139.5	0.81	0.79	0.81	29.3
8	T1	1476	2.0	1476	2.0	0.652	31.5	LOS C	19.9	141.9	0.82	0.75	0.82	39.5
9	R2	348	2.0	348	2.0	0.838	83.8	LOS F	8.3	59.4	1.00	0.92	1.22	25.3
Approach		2131	2.0	2131	2.0	0.838	40.6	LOS C	19.9	141.9	0.85	0.78	0.88	35.1
West: Elizabeth Dr (W)														
10	L2	343	2.0	343	2.0	0.390	31.9	LOS C	9.7	68.7	0.69	0.78	0.69	38.6
11	T1	636	2.0	636	2.0	0.506	43.4	LOS D	11.4	81.1	0.86	0.74	0.86	25.4
12	R2	248	2.0	248	2.0	0.841	79.5	LOS F	9.8	69.8	0.99	0.89	1.15	26.0
Approach		1227	2.0	1227	2.0	0.841	47.5	LOS D	11.4	81.1	0.84	0.78	0.87	29.3
All Vehicles		6168	2.0	6168	2.0	0.841	45.8	LOS D	22.6	161.2	0.89	0.83	0.94	32.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	50	38.2	LOS D	0.1	0.1	0.92	0.92
P2	East Full Crossing	50	69.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	50	69.3	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	50	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		200	61.5	LOS F			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Elizabeth Dr & Bathurst St PM (1645-17:45)]

Network: N101 [PM Existing]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Bathurst St (S)														
1	L2	65	2.0	65	2.0	0.818	54.8	LOS D	3.1	22.1	1.00	0.86	1.27	22.1
2	T1	380	2.0	380	2.0	0.818	58.9	LOS E	15.3	108.8	0.98	0.91	1.08	30.5
3	R2	136	2.0	136	2.0	0.747	80.7	LOS F	6.3	44.7	1.00	0.85	1.12	16.8
Approach		581	2.0	581	2.0	0.818	63.6	LOS E	15.3	108.8	0.99	0.89	1.11	26.7
East: Elizabeth Dr (E)														
4	L2	88	2.0	88	2.0	0.676	86.0	LOS F	4.6	32.4	1.00	0.84	1.03	17.5
5	T1	545	2.0	545	2.0	0.641	40.2	LOS C	9.0	64.3	0.94	0.79	0.94	8.3
6	R2	182	2.0	182	2.0	0.552	41.1	LOS C	4.6	33.0	1.00	0.81	1.00	27.7
Approach		815	2.0	815	2.0	0.676	45.3	LOS D	9.0	64.3	0.96	0.80	0.96	15.8
North: Bathurst St (N)														
7	L2	62	2.0	62	2.0	0.830	52.5	LOS D	2.6	18.3	1.00	0.87	1.30	22.8
8	T1	365	2.0	365	2.0	0.830	59.5	LOS E	14.7	104.7	0.97	0.91	1.10	30.4
9	R2	305	2.0	305	2.0	0.833	84.9	LOS F	7.3	52.1	1.00	0.90	1.23	16.1
Approach		732	2.0	732	2.0	0.833	69.5	LOS E	14.7	104.7	0.98	0.91	1.17	24.0
West: Elizabeth Dr (W)														
10	L2	124	2.0	124	2.0	0.848	98.5	LOS F	6.1	43.3	1.00	0.97	1.78	17.7
11	T1	334	2.0	334	2.0	0.848	60.0	LOS E	14.6	104.2	0.98	0.93	1.10	10.3
12	R2	274	2.0	274	2.0	0.831	53.3	LOS D	9.2	65.4	1.00	0.87	1.08	26.2
Approach		732	2.0	732	2.0	0.848	64.0	LOS E	14.6	104.2	0.99	0.91	1.21	18.4
All Vehicles		2860	2.0	2860	2.0	0.848	60.0	LOS E	15.3	108.8	0.98	0.87	1.11	21.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	50	45.3	LOS E	0.2	0.2	0.92	0.92
P2	East Full Crossing	50	69.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	50	69.3	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	50	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		200	63.3	LOS F			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Elizabeth Dr & Northumberland St PM (1645-17:45)]

Network: N101 [PM Existing]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Northumberland St														
1	L2	354	4.5	354	4.5	0.258	26.2	LOS B	5.1	37.3	0.54	0.65	0.54	19.4
3	R2	119	8.4	119	8.4	0.069	24.4	LOS B	1.4	10.3	0.55	0.64	0.55	22.6
Approach		473	5.5	473	5.5	0.258	25.7	LOS B	5.1	37.3	0.54	0.65	0.54	20.2
East: Elizabeth St														
5	T1	416	0.2	416	0.2	0.232	29.1	LOS C	5.3	37.2	0.68	0.56	0.68	9.5
Approach		416	0.2	416	0.2	0.232	29.1	LOS C	5.3	37.2	0.68	0.56	0.68	9.5
West: Elizabeth St														
11	T1	412	4.9	412	4.9	0.259	33.1	LOS C	6.9	50.3	0.81	0.68	0.81	13.4
Approach		412	4.9	412	4.9	0.259	33.1	LOS C	6.9	50.3	0.81	0.68	0.81	13.4
All Vehicles		1301	3.6	1301	3.6	0.259	29.2	LOS C	6.9	50.3	0.67	0.63	0.67	15.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P11	South Stage 1	50	69.3	LOS F	0.2	0.2	0.96	0.96
P12	South Stage 2	50	69.3	LOS F	0.2	0.2	0.96	0.96
P1B	South Slip/Bypass Lane Crossing	50	69.3	LOS F	0.2	0.2	0.96	0.96
P2	East Full Crossing	50	69.3	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	50	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		250	69.3	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 102 [Moore St & Northumberland St PM (1645-17:45)]

Network: N101 [PM Existing]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Northumberland St														
1	L2	256	0.0	256	0.0	0.292	28.3	LOS B	6.8	47.6	0.65	0.72	0.65	21.0
2	T1	259	0.8	259	0.8	0.141	22.8	LOS B	3.2	22.3	0.59	0.49	0.59	20.1
3	R2	73	1.4	73	1.4	0.084	25.7	LOS B	1.7	12.2	0.57	0.67	0.57	21.5
Approach		588	0.5	588	0.5	0.292	25.6	LOS B	6.8	47.6	0.61	0.61	0.61	20.7
East: Moore St														
5	T1	130	32.3	130	32.3	0.297	28.4	LOS B	6.3	48.5	0.67	0.62	0.67	14.5
6	R2	120	11.7	120	11.7	0.297	32.9	LOS C	6.3	48.5	0.69	0.67	0.69	9.0
Approach		250	22.4	250	22.4	0.297	30.5	LOS C	6.3	48.5	0.68	0.65	0.68	12.1
West: Moore St														
10	L2	57	15.8	57	15.8	0.079	29.1	LOS C	1.4	11.5	0.61	0.66	0.61	9.7
11	T1	66	39.4	66	39.4	0.098	25.9	LOS B	1.7	15.9	0.62	0.49	0.62	16.0
Approach		123	28.5	123	28.5	0.098	27.4	LOS B	1.7	15.9	0.61	0.57	0.61	13.3
All Vehicles		961	9.8	961	9.8	0.297	27.1	LOS B	6.8	48.5	0.63	0.61	0.63	17.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	50	69.3	LOS F	0.2	0.2	0.96	0.96
P2	East Full Crossing	50	69.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	50	69.3	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	50	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		200	69.3	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Hume Hwy & Elizabeth Dr PM (1645-17:45)]

Network: N101 [PM Base + 5 year (3PC growth)]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)
Design Life Analysis (Final Year): Results for 5 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Hume Hwy (S)														
1	L2	340	2.0	340	2.0	0.423	23.8	LOS B	7.5	53.0	0.73	0.78	0.73	42.3
2	T1	1704	2.0	1704	2.0	0.958	82.1	LOS F[11]	33.4	237.8	0.99	1.13	1.30	25.8
Approach		2045	2.0	2045	2.0	0.958	72.4	LOS F[11]	33.4	237.8	0.95	1.07	1.20	27.5
East: Elizabeth Dr (E)														
4	L2	122	2.0	119	2.0	0.888	73.1	LOS F[11]	11.7	83.2	1.00	1.00	1.35	22.3
5	T1	927	2.0	905	2.0	0.888	51.4	LOS D[11]	14.3	102.0	1.00	0.98	1.22	27.2
6	R2	138	2.0	135	2.0	1.004	118.2	LOS F[11]	7.6	54.1	1.00	1.03	1.50	15.8
Approach		1187	2.0	1159[N1]	2.0	1.004	61.4	LOS E[11]	14.3	102.0	1.00	0.99	1.26	24.6
North: Hume Hwy (N)														
7	L2	353	2.0	353	2.0	0.739	37.0	LOS C	23.9	170.4	0.86	0.83	0.86	28.6
8	T1	1697	2.0	1697	2.0	0.739	32.9	LOS C	24.3	172.8	0.87	0.80	0.87	38.9
9	R2	400	2.0	400	2.0	0.964	106.6	LOS F[11]	11.2	79.6	1.00	1.07	1.50	21.9
Approach		2451	2.0	2451	2.0	0.964	45.5	LOS D[11]	24.3	172.8	0.89	0.85	0.97	33.4
West: Elizabeth Dr (W)														
10	L2	394	2.0	394	2.0	0.449	32.9	LOS C	11.5	82.0	0.71	0.79	0.71	38.2
11	T1	731	2.0	731	2.0	0.665	46.6	LOS D[11]	16.0	114.0	0.92	0.81	0.92	24.3
12	R2	285	2.0	285	2.0	0.967	100.3	LOS F[11]	13.3	95.0	0.99	1.01	1.39	22.7
Approach		1411	2.0	1411	2.0	0.967	53.6	LOS D[11]	16.0	114.0	0.88	0.84	0.96	27.5
All Vehicles		7093	2.0	7066[N1]	2.0	1.004	57.5	LOS E[11]	33.4	237.8	0.92	0.93	1.08	28.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	55	38.7	LOS D	0.2	0.2	0.92	0.92
P2	East Full Crossing	55	69.3	LOS F[12]	0.2	0.2	0.96	0.96
P3	North Full Crossing	55	69.3	LOS F[12]	0.2	0.2	0.96	0.96
P4	West Full Crossing	55	69.3	LOS F[12]	0.2	0.2	0.96	0.96
All Pedestrians		220	61.6	LOS F[12]			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.

MOVEMENT SUMMARY

Site: 101 [Elizabeth Dr & Bathurst St PM (1645-17:45)]

Network: N101 [PM Base + 5 year (3PC growth)]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)
Design Life Analysis (Final Year): Results for 5 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Bathurst St (S)														
1	L2	75	2.0	75	2.0	1.657	624.2	LOS F [11]	15.0	106.8	1.00	1.32	3.61	2.6
2	T1	437	2.0	437	2.0	1.657	647.3	LOS F [11]	60.0	427.3	1.00	2.34	3.54	5.0
3	R2	156	2.0	156	2.0	0.581	58.1	LOS E [11]	5.2	36.9	0.97	0.89	1.22	21.0
Approach		668	2.0	668	2.0	1.657	506.8	LOS F [11]	60.0	427.3	0.99	1.88	3.00	5.2
East: Elizabeth Dr (E)														
4	L2	101	2.0	101	2.0	0.717	78.6	LOS F [11]	5.4	38.4	1.00	0.83	1.10	18.7
5	T1	627	2.0	627	2.0	0.717	37.3	LOS C	8.1	57.4	1.00	0.84	1.01	8.8
6	R2	209	2.0	209	2.0	0.996	114.1	LOS F [11]	11.7	83.4	1.00	1.02	1.43	14.4
Approach		937	2.0	937	2.0	0.996	58.9	LOS E [11]	11.7	83.4	1.00	0.88	1.11	13.0
North: Bathurst St (N)														
7	L2	71	2.0	71	2.0	1.623	610.9	LOS F [11]	13.5	96.2	1.00	1.49	3.55	2.7
8	T1	420	2.0	420	2.0	1.623	618.8	LOS F [11]	56.9	405.4	1.00	2.31	3.47	5.2
9	R2	351	2.0	351	2.0	0.463	62.0	LOS E [11]	6.9	49.3	0.93	0.81	0.93	20.1
Approach		842	2.0	842	2.0	1.623	386.1	LOS F [11]	56.9	405.4	0.97	1.61	2.42	6.1
West: Elizabeth Dr (W)														
10	L2	143	2.0	143	2.0	0.774	111.7	LOS F [11]	7.7	54.8	1.00	0.88	1.08	16.2
11	T1	384	2.0	384	2.0	0.751	53.6	LOS D [11]	15.8	112.6	0.99	0.87	0.99	11.3
12	R2	315	2.0	315	2.0	0.851	68.6	LOS E [11]	14.3	101.8	1.00	0.91	1.12	22.6
Approach		842	2.0	842	2.0	0.851	69.0	LOS E [11]	15.8	112.6	0.99	0.89	1.06	17.5
All Vehicles		3289	2.0	3289	2.0	1.657	236.3	LOS F [11]	60.0	427.3	0.99	1.27	1.82	7.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	55	32.1	LOS D	0.1	0.1	0.92	0.92
P2	East Full Crossing	55	69.3	LOS F [12]	0.2	0.2	0.96	0.96
P3	North Full Crossing	55	69.3	LOS F [12]	0.2	0.2	0.96	0.96
P4	West Full Crossing	55	69.3	LOS F [12]	0.2	0.2	0.96	0.96
All Pedestrians		220	60.0	LOS E [12]			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.

MOVEMENT SUMMARY

Site: 101 [Elizabeth Dr & Northumberland St PM (1645-17:45)]

Network: N101 [PM Base + 5 year (3PC growth)]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)
Design Life Analysis (Final Year): Results for 5 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Northumberland St														
1	L2	407	4.5	407	4.5	0.269	28.2	LOS B	5.3	38.2	0.56	0.66	0.56	18.7
3	R2	137	8.4	137	8.4	0.084	26.6	LOS B	1.7	12.5	0.58	0.66	0.58	21.7
Approach		544	5.5	544	5.5	0.269	27.8	LOS B	5.3	38.2	0.57	0.66	0.57	19.5
East: Elizabeth St														
5	T1	478	0.2	478	0.2	0.219	26.3	LOS B	5.1	35.6	0.64	0.54	0.64	10.3
Approach		478	0.2	478	0.2	0.219	26.3	LOS B	5.1	35.6	0.64	0.54	0.64	10.3
West: Elizabeth St														
11	T1	474	4.9	454	4.9	0.269	33.0	LOS C	7.9	57.5	0.83	0.71	0.83	13.5
Approach		474	4.9	454[N1]	4.9	0.269	33.0	LOS C	7.9	57.5	0.83	0.71	0.83	13.5
All Vehicles		1496	3.6	1477[N1]	3.7	0.269	28.9	LOS C	7.9	57.5	0.67	0.63	0.67	15.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P11	South Stage 1	55	69.3	LOS F[12]	0.2	0.2	0.96	0.96
P12	South Stage 2	55	69.3	LOS F[12]	0.2	0.2	0.96	0.96
P1B	South Slip/Bypass Lane Crossing	55	69.3	LOS F[12]	0.2	0.2	0.96	0.96
P2	East Full Crossing	55	69.3	LOS F[12]	0.2	0.2	0.96	0.96
P4	West Full Crossing	55	69.3	LOS F[12]	0.2	0.2	0.96	0.96
All Pedestrians		275	69.3	LOS F[12]			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

12 Level of Service is worse than the Pedestrian Level of Service Target specified in the Parameter Settings dialog.

MOVEMENT SUMMARY

Site: 102 [Moore St & Northumberland St PM (1645-17:45)]

Network: N101 [PM Base + 5 year (3PC growth)]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)
Design Life Analysis (Final Year): Results for 5 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Northumberland St														
1	L2	294	0.0	294	0.0	0.349	27.6	LOS B	7.8	54.7	0.65	0.72	0.65	21.3
2	T1	298	0.8	298	0.8	0.158	21.9	LOS B	3.6	25.2	0.58	0.48	0.58	20.5
3	R2	84	1.4	84	1.4	0.094	24.7	LOS B	1.9	13.8	0.56	0.67	0.56	21.9
Approach		676	0.5	676	0.5	0.349	24.7	LOS B	7.8	54.7	0.61	0.61	0.61	21.0
East: Moore St														
5	T1	150	32.3	150	32.3	0.352	30.4	LOS C	7.6	58.5	0.70	0.65	0.70	14.0
6	R2	138	11.7	138	11.7	0.352	35.0	LOS C	7.6	58.5	0.73	0.70	0.73	8.6
Approach		288	22.4	288	22.4	0.352	32.6	LOS C	7.6	58.5	0.71	0.67	0.71	11.5
West: Moore St														
10	L2	66	15.8	66	15.8	0.093	30.6	LOS C	1.7	13.7	0.63	0.67	0.63	9.4
11	T1	76	39.4	76	39.4	0.116	27.4	LOS B	2.0	18.9	0.64	0.51	0.64	15.4
Approach		141	28.5	141	28.5	0.116	28.9	LOS C	2.0	18.9	0.63	0.58	0.63	12.8
All Vehicles		1105	9.8	1105	9.8	0.352	27.3	LOS B	7.8	58.5	0.64	0.62	0.64	17.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	55	69.3	LOS F[12]	0.2	0.2	0.96	0.96
P2	East Full Crossing	55	69.3	LOS F[12]	0.2	0.2	0.96	0.96
P3	North Full Crossing	55	69.3	LOS F[12]	0.2	0.2	0.96	0.96
P4	West Full Crossing	55	69.3	LOS F[12]	0.2	0.2	0.96	0.96
All Pedestrians		220	69.3	LOS F[12]			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

12 Level of Service is worse than the Pedestrian Level of Service Target specified in the Parameter Settings dialog.

MOVEMENT SUMMARY

Site: 101 [Hume Hwy & Elizabeth Dr PM (1645-17:45)]

Network: N101 [PM Base + 10 year (3PC growth)]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)
Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Hume Hwy (S)														
1	L2	385	2.0	385	2.0	0.478	24.3	LOS B	8.7	61.9	0.76	0.79	0.76	42.0
2	T1	1927	2.0	1927	2.0	1.083	159.2	LOS F[11]	51.8	369.2	1.00	1.50	1.75	16.5
Approach		2311	2.0	2311	2.0	1.083	136.8	LOS F[11]	51.8	369.2	0.96	1.38	1.59	18.3
East: Elizabeth Dr (E)														
4	L2	138	2.0	134	2.0	0.999	102.3	LOS F[11]	16.0	113.6	1.00	1.14	1.57	17.8
5	T1	1048	2.0	1019	2.0	0.999	83.5	LOS F[11]	20.5	145.7	1.00	1.13	1.47	20.3
6	R2	156	2.0	152	2.0	1.129	204.7	LOS F[11]	11.9	84.8	1.00	1.25	1.95	9.9
Approach		1342	2.0	1304[N1]	2.0	1.129	99.5	LOS F[11]	20.5	145.7	1.00	1.15	1.53	17.9
North: Hume Hwy (N)														
7	L2	399	2.0	399	2.0	0.927	65.9	LOS E[11]	34.1	242.5	1.00	1.03	1.20	19.8
8	T1	1919	2.0	1919	2.0	0.927	55.3	LOS D[11]	41.8	297.5	0.99	1.02	1.13	31.5
9	R2	452	2.0	452	2.0	1.090	178.5	LOS F[11]	16.9	120.5	1.00	1.28	1.93	15.0
Approach		2770	2.0	2770	2.0	1.090	76.9	LOS F[11]	41.8	297.5	0.99	1.06	1.27	25.4
West: Elizabeth Dr (W)														
10	L2	446	2.0	446	2.0	0.507	33.9	LOS C	13.5	96.1	0.74	0.81	0.74	37.8
11	T1	827	2.0	827	2.0	1.136	209.2	LOS F[11]	41.2	293.2	1.00	1.66	2.04	7.7
12	R2	322	2.0	322	2.0	1.094	161.5	LOS F[11]	20.2	144.1	0.99	1.18	1.75	16.1
Approach		1595	2.0	1595	2.0	1.136	150.6	LOS F[11]	41.2	293.2	0.92	1.32	1.62	13.7
All Vehicles		8018	2.0	7981[N1]	2.0	1.136	112.7	LOS F[11]	51.8	369.2	0.97	1.22	1.48	19.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	60	38.7	LOS D	0.2	0.2	0.92	0.92
P2	East Full Crossing	60	69.3	LOS F[12]	0.2	0.2	0.96	0.96
P3	North Full Crossing	60	69.3	LOS F[12]	0.2	0.2	0.96	0.96
P4	West Full Crossing	60	69.3	LOS F[12]	0.2	0.2	0.96	0.96
All Pedestrians		240	61.6	LOS F[12]			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.

MOVEMENT SUMMARY

Site: 101 [Elizabeth Dr & Bathurst St PM (1645-17:45)]

Network: N101 [PM Base + 10 year (3PC growth)]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)
Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Bathurst St (S)														
1	L2	85	2.0	85	2.0	1.791	743.6	LOS F[11]	17.8	127.1	1.00	1.37	3.85	2.2
2	T1	494	2.0	494	2.0	1.791	765.7	LOS F[11]	73.4	522.8	1.00	2.53	3.79	4.3
3	R2	177	2.0	177	2.0	0.701	62.9	LOS E[11]	5.9	42.2	0.99	0.95	1.36	19.9
Approach		755	2.0	755	2.0	1.791	598.7	LOS F[11]	73.4	522.8	1.00	2.03	3.23	4.5
East: Elizabeth Dr (E)														
4	L2	114	2.0	114	2.0	0.967	99.8	LOS F[11]	7.4	52.8	1.00	1.01	1.48	15.9
5	T1	708	2.0	708	2.0	0.967	78.3	LOS F[11]	11.9	85.0	1.00	1.09	1.46	4.6
6	R2	237	2.0	237	2.0	1.081	168.3	LOS F[11]	11.9	85.0	1.00	1.16	1.73	10.3
Approach		1060	2.0	1060	2.0	1.081	100.7	LOS F[11]	11.9	85.0	1.00	1.10	1.52	8.3
North: Bathurst St (N)														
7	L2	81	2.0	81	2.0	1.793	761.8	LOS F[11]	16.4	116.6	1.00	1.58	3.87	2.2
8	T1	475	2.0	475	2.0	1.793	768.6	LOS F[11]	71.3	507.4	1.00	2.54	3.80	4.3
9	R2	397	2.0	397	2.0	0.686	65.7	LOS E[11]	8.6	61.1	0.98	0.85	1.00	19.3
Approach		952	2.0	952	2.0	1.793	475.2	LOS F[11]	71.3	507.4	0.99	1.75	2.64	5.1
West: Elizabeth Dr (W)														
10	L2	161	2.0	161	2.0	1.530	577.2	LOS F[11]	22.3	158.5	1.00	1.08	3.18	3.9
11	T1	434	2.0	434	2.0	1.060	147.8	LOS F[11]	26.0	185.0	1.00	1.33	1.59	4.6
12	R2	356	2.0	356	2.0	1.156	223.9	LOS F[11]	26.0	185.0	1.00	1.33	2.06	9.2
Approach		952	2.0	952	2.0	1.530	249.0	LOS F[11]	26.0	185.0	1.00	1.29	2.04	6.0
All Vehicles		3718	2.0	3718	2.0	1.793	335.7	LOS F[11]	73.4	522.8	1.00	1.50	2.28	5.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	60	32.4	LOS D	0.1	0.1	0.92	0.92
P2	East Full Crossing	60	69.3	LOS F[12]	0.2	0.2	0.96	0.96
P3	North Full Crossing	60	69.3	LOS F[12]	0.2	0.2	0.96	0.96
P4	West Full Crossing	60	69.3	LOS F[12]	0.2	0.2	0.96	0.96
All Pedestrians		240	60.1	LOS F[12]			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.

MOVEMENT SUMMARY

Site: 101 [Elizabeth Dr & Northumberland St PM (1645-17:45)]

Network: N101 [PM Base + 10 year (3PC growth)]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)
Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Northumberland St														
1	L2	460	4.5	460	4.5	0.347	26.7	LOS B	7.2	52.7	0.58	0.67	0.58	19.2
3	R2	155	8.4	155	8.4	0.088	23.5	LOS B	1.8	13.2	0.54	0.65	0.54	22.9
Approach		615	5.5	615	5.5	0.347	25.9	LOS B	7.2	52.7	0.57	0.67	0.57	20.2
East: Elizabeth St														
5	T1	541	0.2	541	0.2	0.348	32.3	LOS C	8.0	55.8	0.73	0.62	0.73	8.8
Approach		541	0.2	541	0.2	0.348	32.3	LOS C	8.0	55.8	0.73	0.62	0.73	8.8
West: Elizabeth St														
11	T1	536	4.9	493	5.0	0.320	36.1	LOS C	8.7	63.8	0.85	0.72	0.85	12.7
Approach		536	4.9	493[N1]	5.0	0.320	36.1	LOS C	8.7	63.8	0.85	0.72	0.85	12.7
All Vehicles		1691	3.6	1649[N1]	3.7	0.348	31.0	LOS C	8.7	63.8	0.70	0.67	0.70	14.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P11	South Stage 1	60	69.3	LOS F[12]	0.2	0.2	0.96	0.96
P12	South Stage 2	60	69.3	LOS F[12]	0.2	0.2	0.96	0.96
P1B	South Slip/Bypass Lane Crossing	60	69.3	LOS F[12]	0.2	0.2	0.96	0.96
P2	East Full Crossing	60	69.3	LOS F[12]	0.2	0.2	0.96	0.96
P4	West Full Crossing	60	69.3	LOS F[12]	0.2	0.2	0.96	0.96
All Pedestrians		300	69.3	LOS F[12]			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

12 Level of Service is worse than the Pedestrian Level of Service Target specified in the Parameter Settings dialog.

MOVEMENT SUMMARY

Site: 102 [Moore St & Northumberland St PM (1645-17:45)]

Network: N101 [PM Base + 10 year (3PC growth)]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network User-Given Cycle Time)
Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Northumberland St														
1	L2	333	0.0	333	0.0	0.410	27.6	LOS B	8.9	62.6	0.66	0.73	0.66	21.3
2	T1	337	0.8	337	0.8	0.176	21.6	LOS B	4.0	28.5	0.58	0.49	0.58	20.6
3	R2	95	1.4	95	1.4	0.105	24.3	LOS B	2.2	15.5	0.56	0.67	0.56	22.1
Approach		764	0.5	764	0.5	0.410	24.5	LOS B	8.9	62.6	0.61	0.62	0.61	21.1
East: Moore St														
5	T1	169	32.3	169	32.3	0.404	31.7	LOS C	8.9	68.5	0.72	0.67	0.72	13.6
6	R2	156	11.7	156	11.7	0.404	36.5	LOS C	8.9	68.5	0.75	0.72	0.75	8.3
Approach		325	22.4	325	22.4	0.404	34.0	LOS C	8.9	68.5	0.74	0.69	0.74	11.2
West: Moore St														
10	L2	74	15.8	74	15.8	0.107	31.4	LOS C	2.0	15.7	0.64	0.67	0.64	9.2
11	T1	86	39.4	86	39.4	0.134	28.3	LOS B	2.3	21.8	0.65	0.52	0.65	15.1
Approach		160	28.5	160	28.5	0.134	29.7	LOS C	2.3	21.8	0.64	0.59	0.64	12.5
All Vehicles		1249	9.8	1249	9.8	0.410	27.7	LOS B	8.9	68.5	0.65	0.63	0.65	17.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	60	69.3	LOS F[12]	0.2	0.2	0.96	0.96
P2	East Full Crossing	60	69.3	LOS F[12]	0.2	0.2	0.96	0.96
P3	North Full Crossing	60	69.3	LOS F[12]	0.2	0.2	0.96	0.96
P4	West Full Crossing	60	69.3	LOS F[12]	0.2	0.2	0.96	0.96
All Pedestrians		240	69.3	LOS F[12]			0.96	0.96

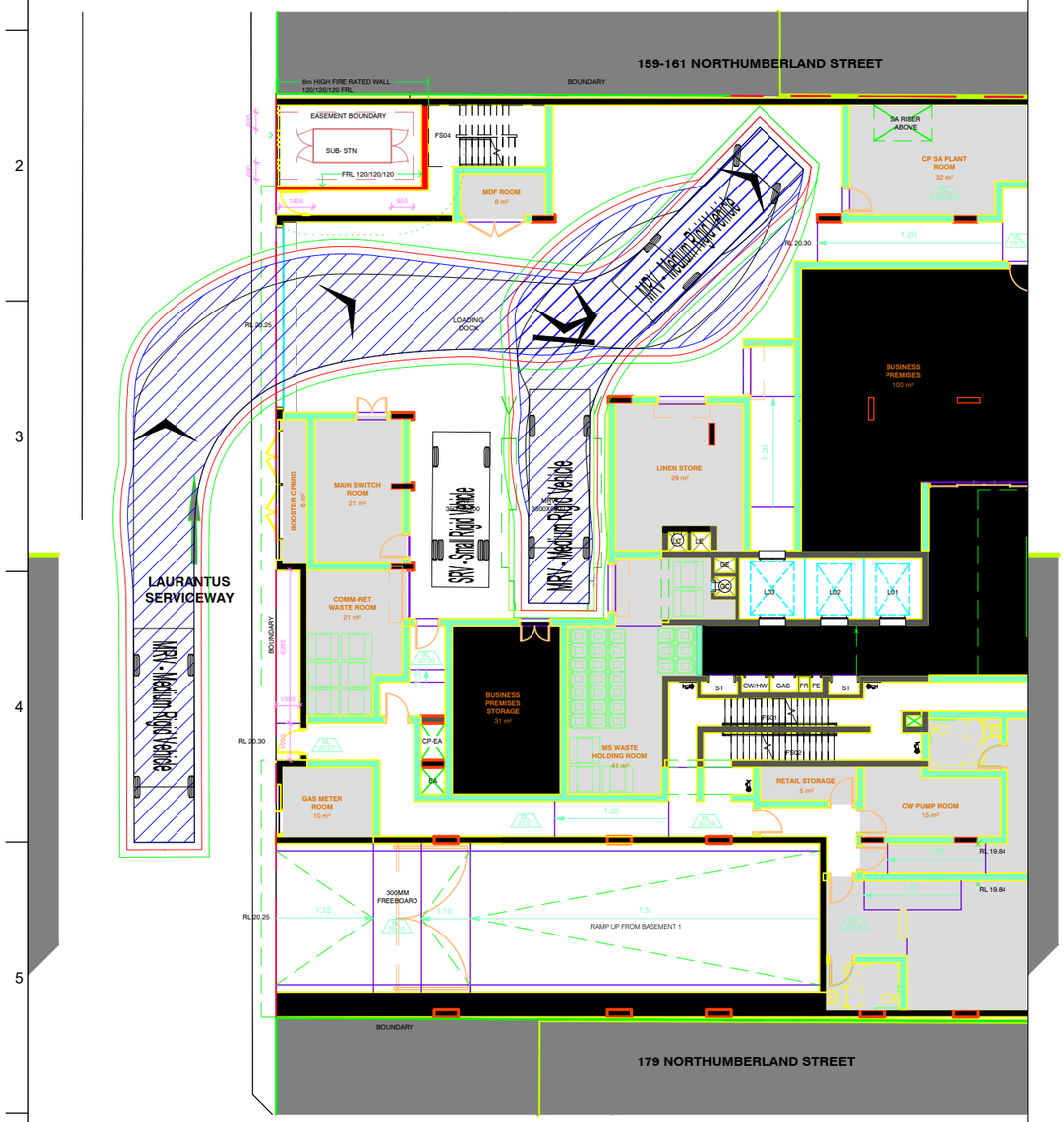
Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

12 Level of Service is worse than the Pedestrian Level of Service Target specified in the Parameter Settings dialog.

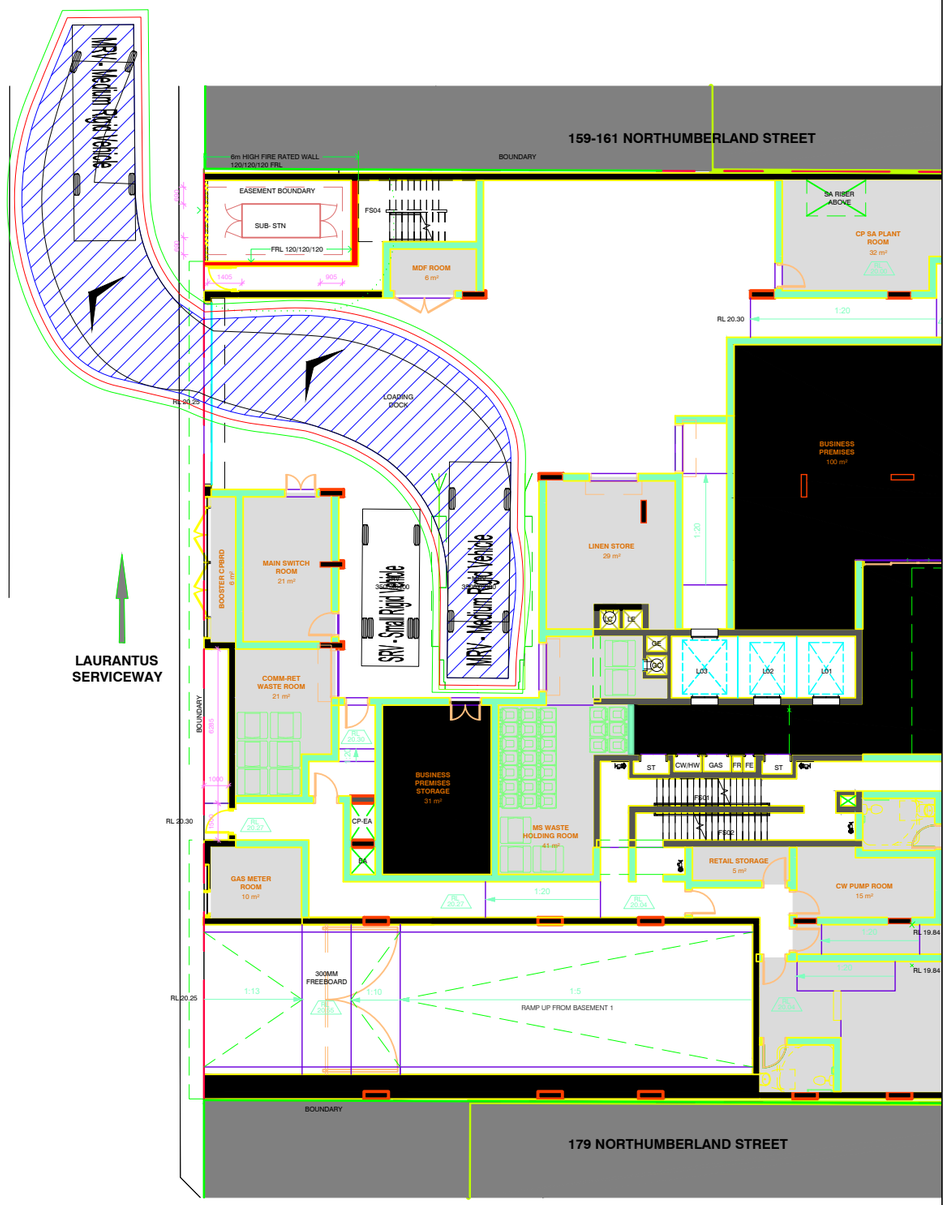
Appendix C

Swept Path Analysis

C1



MRV Entry

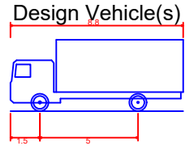


MRV Exit

Legend

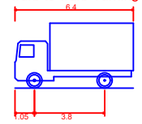
- Body Envelope
- 300mm Envelope
- 600mm Envelope
- Wheel Envelope

Design Vehicle(s)



MRV - Medium Rigid Vehicle

Overall Length	8.800m
Overall Width	2.500m
Overall Body Height	3.633m
Min Body Ground Clearance	0.428m
Track Width	2.500m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	10.000m



SRV - Small Rigid Vehicle

Overall Length	6.400m
Overall Width	2.330m
Overall Body Height	3.500m
Min Body Ground Clearance	0.398m
Track Width	2.330m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	7.100m

Issue	Date	By	Chkd	Appd
E	04/03/21	AN	JT	JT
D	17/01/20	LK	JT	JT
C	13/12/19	LK	JT	JT
B	12/12/19	LK	JT	JT
A	09/12/19	LK	JT	JT

For Information

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Client
Meriton Group

Job Title
167 Northumberland Street
Liverpool

Drawing Title
Turning Paths
8.8m MRV Truck
Ground Level

Scale at A3 1:250

Discipline Transport

Drawing Status

Job No	Drawing No	Issue
272469-00	SKT001	D