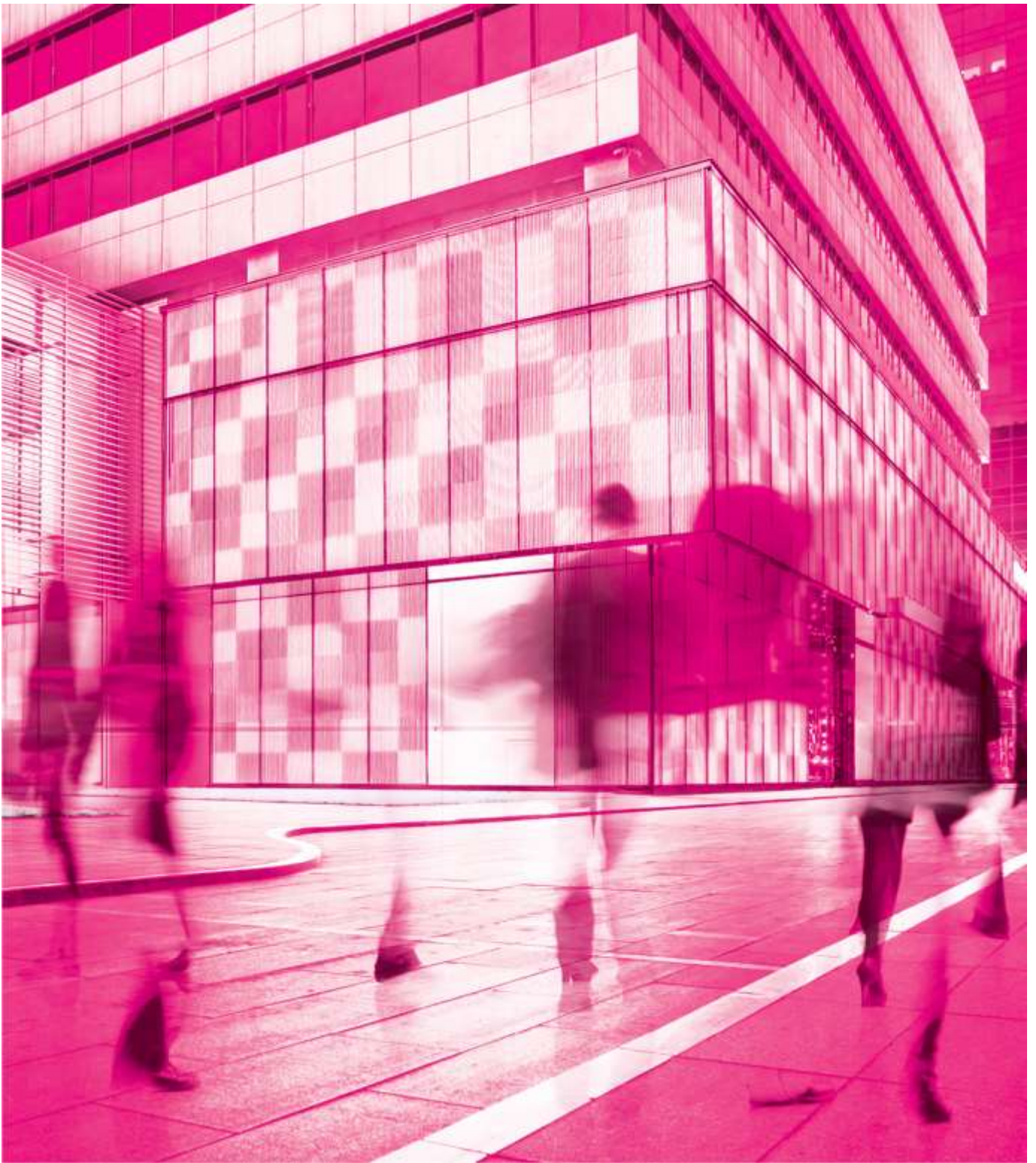




Traffic Impact Assessment;

Liverpool Civic Place Masterplan

For Built
22 April 2020

parking;
traffic;
civil design;
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ptc.

Document Control

Liverpool Civic Place, Traffic Impact Assessment

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1. Executive Summary

ptc. has been engaged by Built to prepare a traffic impact assessment as part of the Stage 1 Development Application (DA) for a new mixed use civic and commercial concept development known as Liverpool Civic Place at 52 Scott Street, Liverpool.

This Concept Proposal seeks approval for a mixed-use concept comprising approximately 50,702m² of Gross Floor Area (GFA). Specifically, the following key components and development parameters:

- North western building envelope - A building envelope accommodating 4 storeys and 5,010m² GFA for the purpose of an information and education facility (public library) use.
- South western building envelope - A building envelope accommodating 14 storeys and 17,748m² of GFA for the purpose of a public administration building use, and either (or a combination of) commercial premises or child care centre uses.
- Eastern building envelope - A building envelope accommodating 24 storeys and 27,944m² of GFA which will accommodate either (or a combination of) commercial premises, retail premises, educational establishments, tourist and visitor accommodation or boarding house (student accommodation) uses.
- A landscaping and public domain concept including the provision of a public through-site link connecting Scott Street to the north through to Terminus Street to the south; and
- Concept building envelope for a three-level shared basement car park across the entire site to accommodate parking for all future uses, and a public car park.

No physical works are proposed as part of this Concept Proposal. The subject application will seek approval for maximum building envelopes, land uses and GFA. It is emphasised that the proposed building envelopes set the maximum vertical and horizontal parameters of building lines and the proposed GFA will be accommodated within the building envelopes. The building envelopes are deliberately designed with sufficient volume to allow for design excellence to be achieved through the detailed building design and articulation.

The car park envelope has been designed to provide access from Scott Street serving only the Council employee car park and the mixed-use development, while access to the public car park and the loading dock serving the Council admin Library building will be located on Terminus Street.

The traffic analysis and modelling has been undertaken based on this access arrangement and demonstrates that the traffic activity associated with the Concept Proposal will be accommodated by the road network, noting that the public car park essentially replaces the existing two-storey public car park, and TfNSW proposes to widen Terminus Street and the associated intersections to providing additional capacity.

A preliminary review of the concept parking layout has been undertaken at a high-level to assess the capability of the design to comply with the relevant Australian Standards. It is highlighted that a detailed assessment will need to be undertaken during the preparation of the Stage 2 DAs. This would involve swept path assessments of B85/B99 vehicles entering and exiting the car parks as well as internal circulation. Swept path assessments of the largest vehicle accessing and exiting the loading docks will also need to be undertaken during the detailed design stage to ensure the feasibility of the design.

2. Introduction

2.1 Project Summary

This Traffic Impact Assessment report is submitted to Liverpool City Council (Council) in support of a Concept Development Application for a Concept Proposal (Concept Proposal) for a new mixed-use precinct known as Liverpool Civic Place at 52 Scott Street, Liverpool (the site). This application sets out a Concept Proposal for the development of the site under Section 4.23 of the Environmental Planning and Assessment Act 1979 (EP&A Act).

This Concept Proposal seeks approval for a mixed-use concept comprising approximately 50,702m² of Gross Floor Area (GFA). Specifically, the following key components and development parameters:

- North western building envelope - A building envelope accommodating 4 storeys and 5,010m² GFA for the purpose of an information and education facility (public library) use.
- South western building envelope - A building envelope accommodating 14 storeys and 17,748m² of GFA for the purpose of a public administration building use, and either (or a combination of) commercial premises or child care centre uses.
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- A landscaping and public domain concept including the provision of a public through-site link connecting Scott Street to the north through to Terminus Street to the south; and
- Concept building envelope for a three-level shared basement car park across the entire site to accommodate parking for all future uses, and a public car park.

No physical works are proposed as part of this Concept Proposal. The subject application will seek approval for maximum building envelopes, land uses and GFA. It is emphasised that the proposed building envelopes set the maximum vertical and horizontal parameters of building lines and the proposed GFA will be accommodated within the building envelopes. The building envelopes are deliberately designed with sufficient volume to allow for design excellence to be achieved through the detailed building design and articulation.

A reference design has also been submitted, which illustrates one of the ways in which a detailed design could be facilitated within the proposed building envelopes. This traffic report assesses the potential traffic impact of the commercial premises, which is the worst-case scenario. However, approval is not sought for the reference design. The final design will be resolved in subsequent staged 'detailed proposal' DAs. Following this, each individual tenant will seek development consent for the fit out and use of their respective tenancy.

2.2 Purpose of this Report

This report presents the following considerations in relation to the Traffic Impact Assessment of the Proposal:

Section 3	A description of the project;
Section 4	A description of the road network serving the development property, and existing traffic volumes through key local intersections;
Section 6	Determination of the traffic activity associated with the development proposal, and the adequacy of the surrounding road network;
Section 7	Discussion of vehicle access arrangement for reference scheme;
Section 8	Assessment of the proposed parking provision in the context of the relevant planning control requirements;
Section 9	Assessment of the proposed car park, vehicular access and internal circulation arrangements in relation to compliance with the relevant standards, and Council policies.

3. Site Analysis

3.1 Site Location and Context

The site is located at 52 Scott Street, within the Liverpool Local Government Area (LGA) as illustrated in Figure 1. The site is located at the southern fringe of the Liverpool CBD. The site is approximately 300m south west of the Liverpool Railway Station and is also in the vicinity of a number of regionally significant land uses and features including Liverpool Hospital, Westfield Liverpool, Western Sydney University Liverpool Campus, the Georges River and Biggie Park public open space as illustrated at Figure 1.

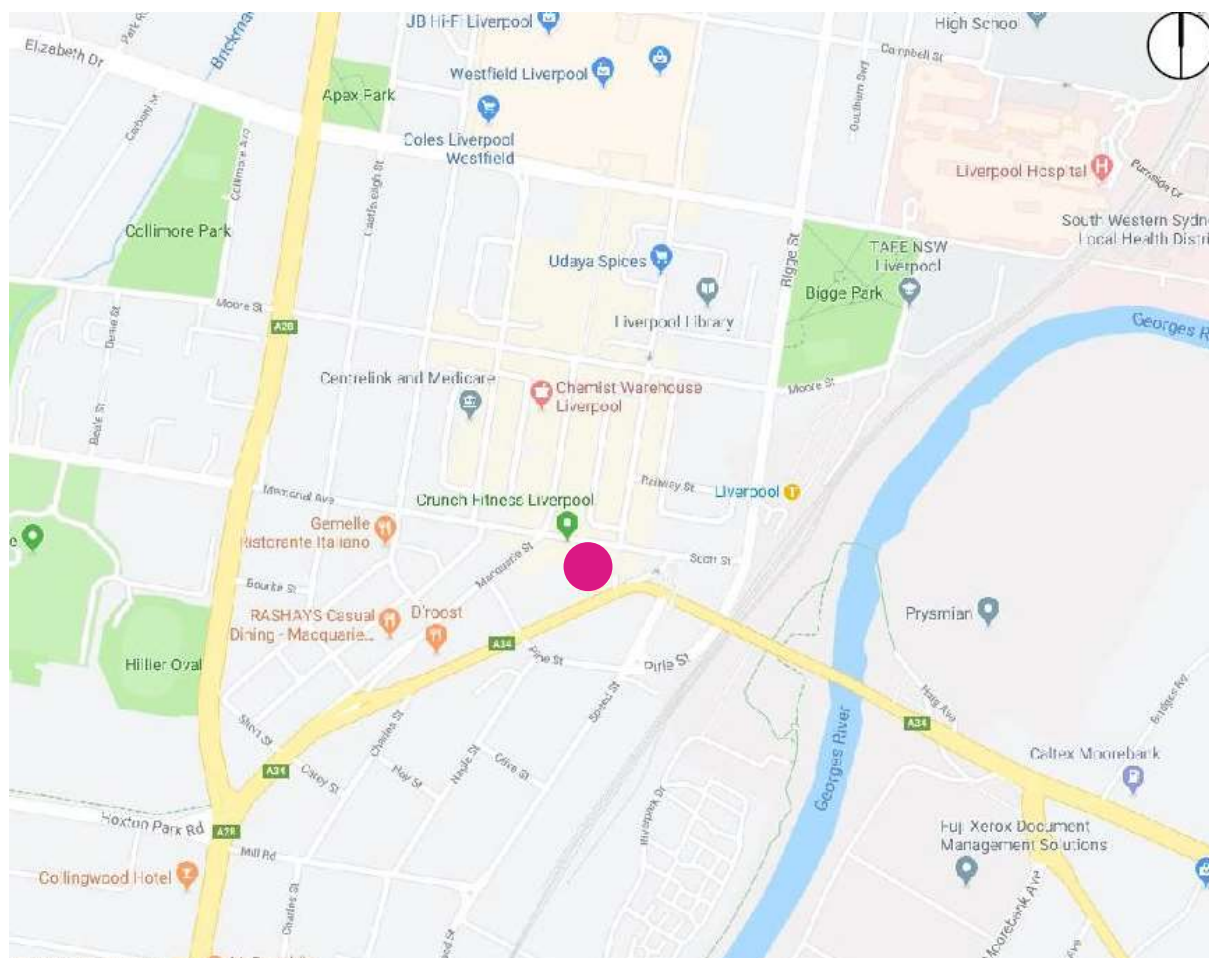


Figure 1 - Site Location

3.2 Site Description

This site is irregular in shape and is comprises the following 12 Lots:

- Lot 1 DP 514817
- Lot 2 DP 229979
- Lot 17 DP 81842
- Lot 3 DP 229979
- Lot 11 DP 522284
- Lot 201 DP1224084
- Lot 100 DP 877435
- Lot 12 DP 65705
- Lot 1 DP 507070
- Lot 22 DP 441010
- Lot 23 DP 441010
- Lot 1 DP 229979

The site comprises a total area of 9,348.33m² and has three road frontages, including a primary frontage to Scott Street (98m frontage) to the north, George Lane (40m frontage) to the east and Terminus Street (115m frontage) to the south.

An aerial photograph of a city block in Sydney, Australia. A large, irregularly shaped area is outlined in red, indicating the proposed development site. The site is bounded by Memorial Avenue to the north, George Street to the east, Scott Street to the south, and Macquarie Street to the west. Other nearby streets include Pirie Street, Terminus Street, and Speed Street. The surrounding area contains various buildings, including residential houses and commercial structures.

Liverpool Civic Place; Built; 22 April 2020;
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3.3 Development Concept Proposal

The proposed Liverpool Civic Place (LCP) seeks approval for a mixed-use concept comprising approximately 50,702m² of Gross Floor Area (GFA). Specifically, the following key components and development parameters:

- North western building envelope - A building envelope accommodating 4 storeys and 5,010m² GFA for the purpose of an information and education facility (public library) use.
- South western building envelope - A building envelope accommodating 14 storeys and 17,748m² of GFA for the purpose of a public administration building use, and either (or a combination of) commercial premises or child care centre uses.
- Eastern building envelope - A building envelope accommodating 24 storeys and 27,944m² of GFA which will accommodate either (or a combination of) commercial premises, retail premises, educational establishments, tourist and visitor accommodation or boarding house (student accommodation) uses.
- A landscaping and public domain concept including the provision of a public through-site link connecting Scott Street to the north through to Terminus Street to the south; and
- Concept building envelope for a three-level shared basement car park across the entire site to accommodate parking for all future uses, and a public car park.

It should be noted that the Developer Building envelope seeks approval for the maximum gross floor area, which will accommodate either commercial premises, retail premises, educational establishments, tourist and visitor accommodation, boarding house (student accommodation uses or a combination.

The details of proposed yield for each land use are tabulated in Table 1.

Table 1 - Proposed Landuse Breakdown

Building	Potential Land Use	Proposed Development (GFA)
Library Building envelope	Library	5,010m ²
Council Building envelope	Council offices	17,748m ²
Developer Building envelope	Commercial, Education, Student Accommodation, Hotel, Retail	27,944m ²
Total		50,702m²

The building envelope plan and potential future design plan are illustrated in Figure 4 and Figure 5.



Figure 4 - Building Envelope Plan

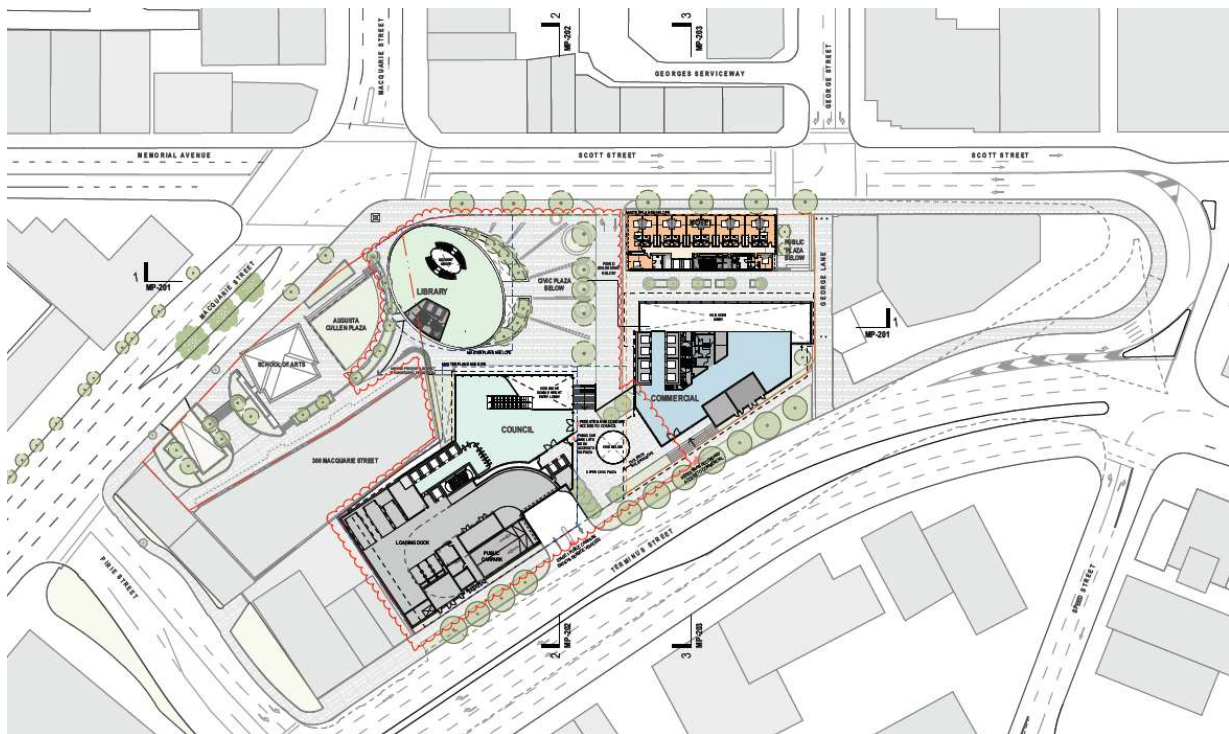


Figure 5 - Potential Future Design

4. Existing Transport Facilities

4.1 Road Hierarchy

The subject site is located within Liverpool City Centre and is primarily serviced by Terminus Street (State Road) and local roads managed by Liverpool City Council.

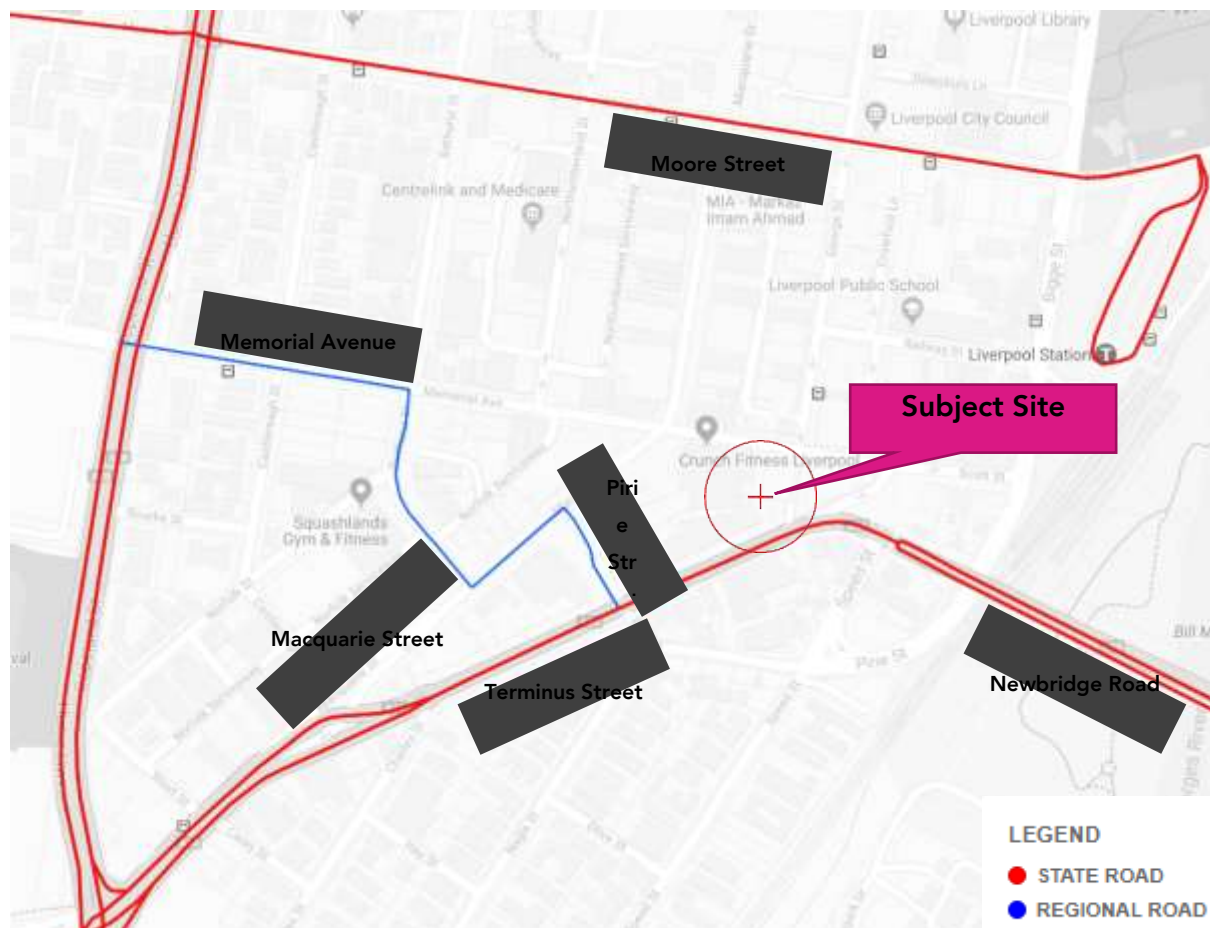


Figure 6 - Road Hierarchy (RMS Road Hierarchy Review)

The NSW administrative road hierarchy comprises the following road classifications, which align with the generic road hierarchy as follows:

State Roads	- Freeways and Primary Arterials (RMS Managed)
Regional Roads	- Secondary or sub arterials (Council Managed, partly funded by the State)
Local Roads	- Collector and local access roads (Council Managed)

Terminus Street

Road Classification	State Road
Alignment	East-West
Number of Lanes	Generally, 2 lanes in each direction
Carriageway Type	Undivided
Carriageway Width	15m
Speed Limit	60 km/h
School Zone	No
Parking Controls	No Stopping & Clearway 6am-10am & 3pm-7pm (Mon-Fri) eastbound, No Parking & Clearway 6am-10am & 3pm-7pm (Mon-Fri) westbound
Forms Site Frontage	Yes



Figure 7 - Terminus Street (Eastbound towards Newbridge Road)

Pirie Street

Road Classification	Regional Road
Alignment	North-South
Number of Lanes	Generally, 2 lanes in each direction
Carriageway Type	Undivided
Carriageway Width	18m
Speed Limit	50 km/h
School Zone	No
Parking Controls	No Stopping both sides
Forms Site Frontage	No



Figure 8 - Pirie Street (Southbound towards Terminus Street)

Macquarie Street

Road Classification	Local / Regional Road
Alignment	North-South
Number of Lanes	Generally, 2 lanes in each direction
Carriageway Type	Varies, divided / undivided
Carriageway Width	17m
Speed Limit	50 km/h
School Zone	No
Parking Controls	No Stopping & 1P parking northbound, No Stopping southbound
Forms Site Frontage	No



Figure 9 - Macquarie Street (Northbound towards Scott Street)

Scott Street

Road Classification	Local Road
Alignment	East-West
Number of Lanes	Generally, 2 lanes westbound, 1 lane eastbound
Carriageway Type	Divided
Carriageway Width	12m
Speed Limit	50 km/h
School Zone	No
Parking Controls	1P Ticket 9am-6pm (Mon-Fri) & 1P 9am-12:30pm Sat eastbound & No Stopping westbound
Forms Site Frontage	Yes



Figure 10 - Scott Street (Westbound towards Macquarie Street)

4.2 Public Transport

The locality has been assessed in the context of available forms of public transport that may be utilised to access the proposed Civic Place. When defining accessibility, the NSW Guidelines to Walking & Cycling (2004) suggests that a walking catchment of 400-800 metres is a comfortable walking distance.

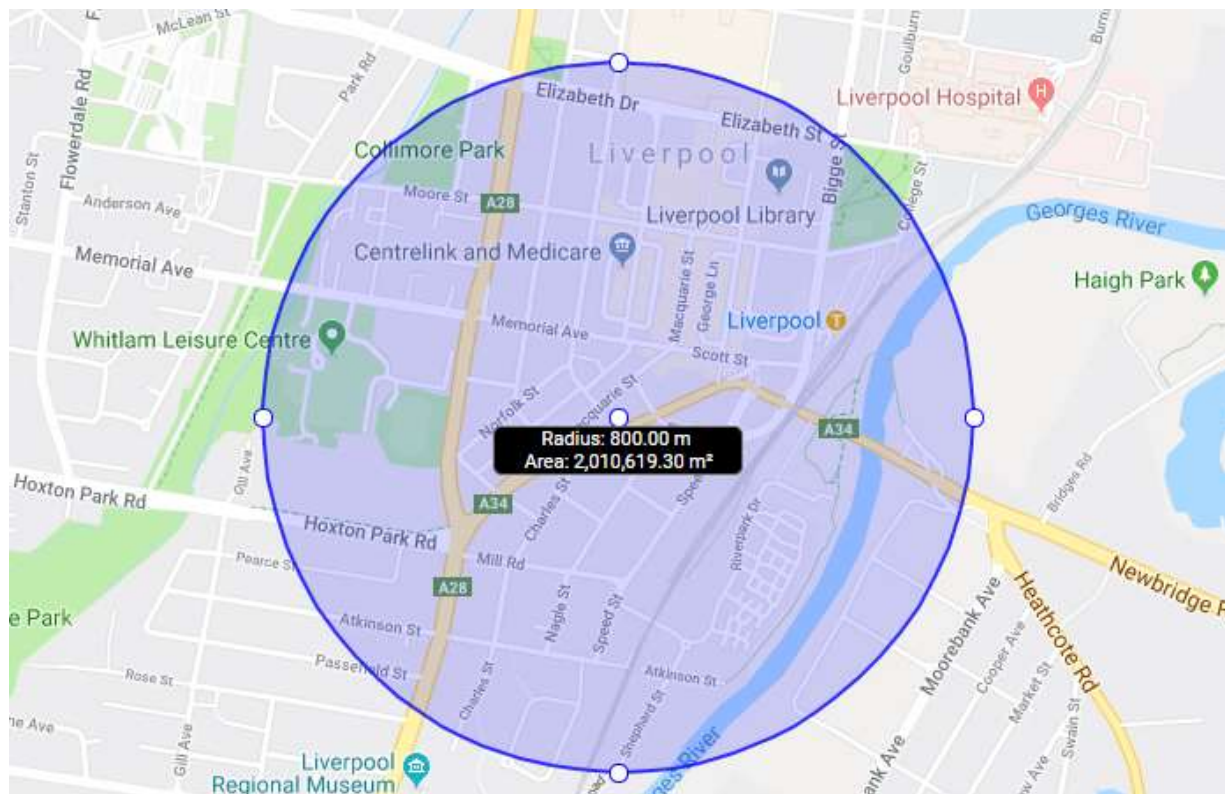


Figure 11 - 800m catchment

4.2.1 Train

Liverpool Railway Station is located within comfortable walking distance to the proposed LCP, located on the T2 Inner West & Leppington Line, T3 Bankstown Line and T5 Cumberland Line, operated by Sydney Trains.

Table 2 - Train Service Summary

Train Line	From	To	Frequency (approx.)	Services operate approx. (Weekdays)	Services operate approx. (Weekends)
Inner West & Leppington	Leppington	City	Every 10-20 minutes More frequent during the peak hours	5:21am to 12:35am	3:57am to 12:27am
Inner West & Leppington	City	Leppington	Every 20-30 minutes More frequent during the peak hours	4:58am to 2:32am	5:24am to 2:17am
Bankstown	Liverpool	City	Every 10-15 minutes in the peak hours	3:54am to 12:24am	4:06am to 11:36pm
Bankstown	City	Liverpool	Every 15-20 minutes in the peak hours	6:02am to 2:32am	5:47am to 2:17am
Cumberland	Leppington	Richmond	Every 30 minutes	6:21 am to 12:18am	4:23am to 11:53pm
Cumberland	Richmond	Leppington	Every 30 minutes	7:19am to 12:28am	5:24am to 12:54am

The train services provide high frequency access between Liverpool, the City and neighbouring town centres, particularly during the commuter peak periods. The high frequency services make it a viable alternative mode of transport for prospective residents, visitors and staff.

4.2.2 Bus

The closest bus stops to the proposed LCP is located on Scott Street and George Street, as shown in Figure 12 below.

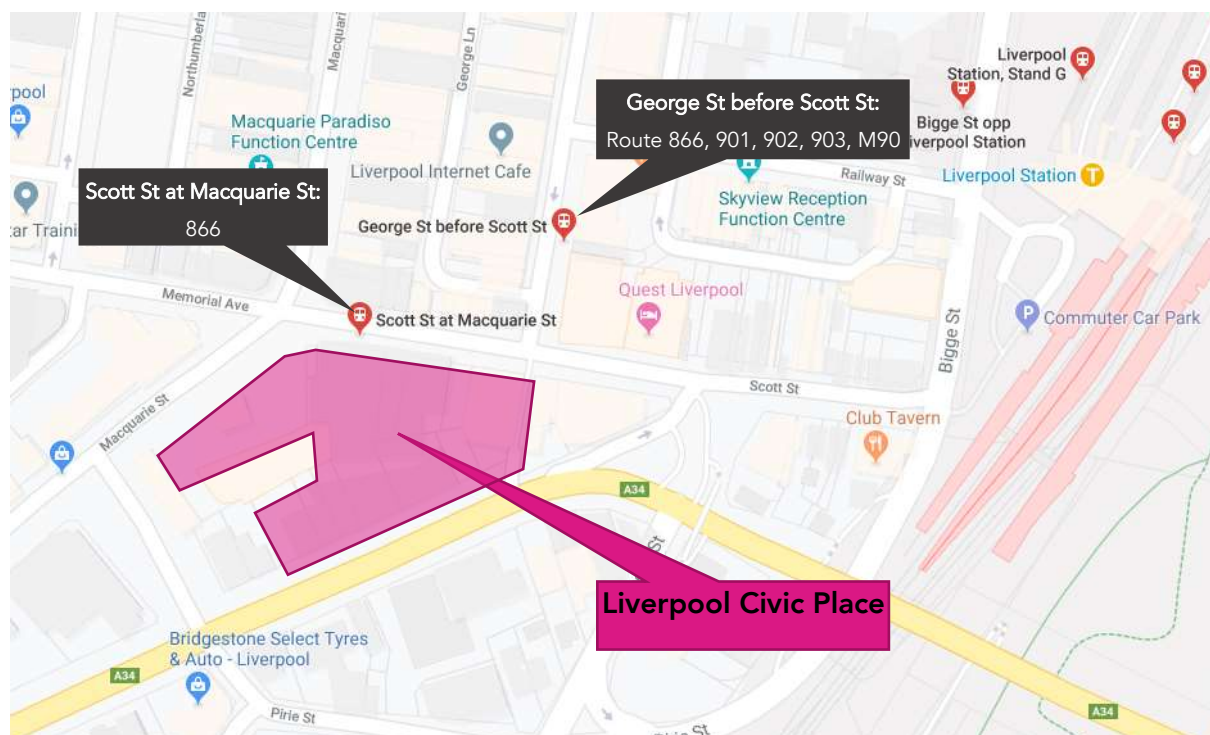


Figure 12 - Nearby Bus Stop Locations & Respective Bus Numbers

Table 3 - Bus Services Summary

Route No.	Coverage	Frequency (approximate)	Stop Location
866	Casula to Liverpool	Approximately every 30 minutes (Mon-Fri) Approximately every 1 hour (Sat, Sun & Public Holidays)	Scott St at Macquarie St
901	Holsworthy to Liverpool	Approximately every 30 minutes (Mon-Fri) Approximately every 1 hour (Sat, Sun & Public Holidays)	George St before Scott St
902	Holsworthy to Liverpool via Moorebank	Approximately every 30 minutes (Mon-Fri) Approximately every 1 hour (Sat, Sun & Public Holidays)	George St before Scott St
903	Liverpool to Chipping Norton (Loop Service)	Approximately every 30-40 minutes (Mon-Fri) Approximately every 1 hour (Sat) Approximately every 2 hours (Sun & Public Holidays)	George St before Scott St
M90	Burwood to Liverpool	Approximately every 10-15 minutes (Mon-Fri) Approximately every 20 minutes (Sat, Sun & Public Holidays)	George St before Scott St

4.3 Active Travel

In addition to public transport, the locality has been assessed for its active transport potential. It is noted that the subject site is adjacent to the Liverpool City Centre which will likely lead to higher rates of walking and cycling trips.

In terms of public infrastructure, the local road network offers a high level of amenity and safety for pedestrians, providing footpaths on either side of most roadways, signalised crossing, supporting signage and appropriate lighting throughout the locality.

In accordance with the RMS Cycleway Finder, the subject site is located within a bicycle network comprising of off-road paths as well as on-road cycle paths (see Figure 13). It is noted however, that there are no dedicated cycleways along the immediate frontage of the site, and the cycling network within the vicinity of the site is disconnected between Liverpool Hospital and the western side of the Liverpool City Centre. Notwithstanding this, the existing cycling infrastructure provides connection to Warwick Farm to the north, and the cycle route along the railway line, towards the south, provides linkage to Casula and Glenfield.

This will encourage and promote cycling as an alternative mode of transport for prospective occupants which is a healthy, low cost and environmentally friendly method of travel.

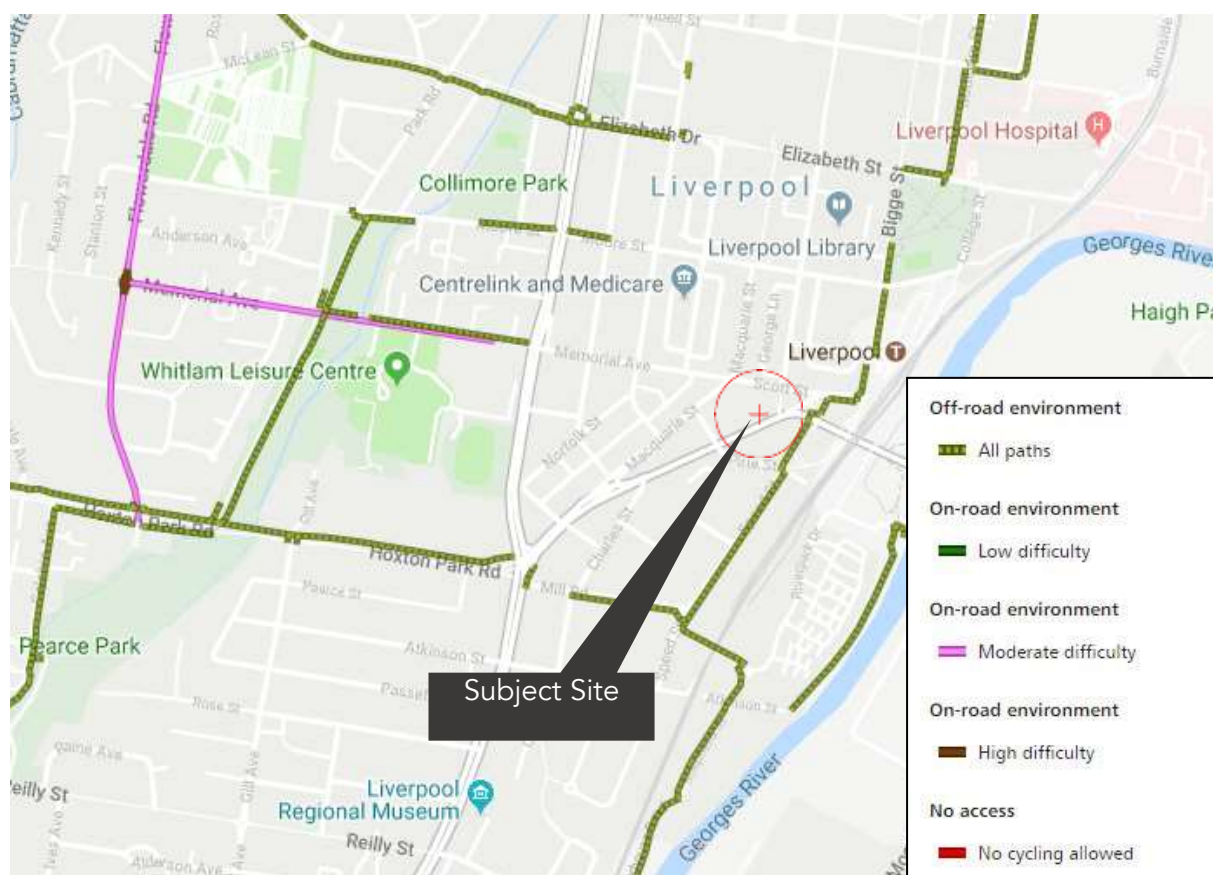


Figure 13 - Cycleways in the locality of the site (Source: NSW Cycleway Finder)

6. Traffic Impact Assessment

As stated in Section 2.1, the subject application will seek approval for maximum building envelopes, land uses and GFA, this study has been undertaken to assess the traffic impact of the worst-case scenario (commercial premises) of the reference design on the local road network and in particular, the performance of the proposed access arrangement. The final design will be resolved in subsequent staged 'detailed proposal' DAs.

The proposed access arrangement has considered the Terminus Street road reservation and will not preclude the future widening.

The assessment has included the following:

- Traffic generation potential
- Traffic distribution
- Traffic Modelling
- Traffic Impact on the nearby intersections and road network.

6.1 Development Traffic Generation

The LCP will comprise a mixed-use development including a library, Council Administration building and either (or a combination of) commercial premises, retail premises, educational establishments, tourist and visitor accommodation, boarding house (student accommodation) or child care centre uses. It will also include a public car park to replace the existing two storey car park.

This section provides an estimate of the traffic generation of the Concept Proposal in accordance with Roads and Maritime *Guide to Traffic Generating Development v2.2 (2002)* and references the traffic generation of the Warren Serviceway Public Car Park, which is located within Liverpool CBD to the north of current Liverpool Council administration building. Warren Serviceway Car Park is a Council owned car park with approx. 704 parking spaces for public use, with a nested area for Council employees / fleet vehicles.

The Warren Serviceway Car Park has been selected as a comparable car park for the purposes of forecasting the traffic generation associated with the public car park and Administration components of the LCP. The car park is currently operated by Council and accommodates various users in dedicated areas with separate access control, including a nested area for Council staff, police station staff and employees of the adjacent businesses in the City Centre, as well as casual parking area for public parking.

This is a similar range of user groups that would be utilising the LCP Car Park. As such, the Warren Serviceway Car Park is considered a more appropriate site to determine the trip generation rates for its close proximity and similar function to the proposed LCP.

The record of arrival and departure dataset from the Warren Serviceway Car Park ticket control system on Tuesday 26 March 2019 was used to determine the trip generation rates for different land uses.

6.1.1 Mixed use envelope (commercial) / Council Office/ Library

The Roads and Maritime *Guide to Traffic Generating Development v2.2 (2002)* and the subsequent technical direction *TDT2013/04a (2013)* has set out the vehicle trip generation rates for commercial and office, which are as follows:

- Morning peak hour vehicle trips = 1.6 per 100 sqm GFA
- Evening peak hour vehicle trips = 1.2 per 100 sqm GFA

When RMS undertook Traffic Generation and Parking Generation Survey study in 2010 for updating the *Guide to Traffic Generating Development v2.2 (2002)*, the suggested vehicle trip generation rates were derived from ten sites within both Sydney Urban area and regional areas, which largely have unconstrained parking provision. When applied to the Concept Proposal floor areas, the morning peak trip generation results comprise:

- Library = 5,010m² x 1.6 per 100m² = 80 trips
- Council Admin = 17,748m² x 1.6 per 100m² = 284 trips
- Mixed-use commercial Building = 27,944m² x 1.6 per 100m² = 447 trips

It is evident that when the unrestrained trip generation rates are applied to the floor areas, this results in a higher traffic activity than the number of parking spaces proposed within the development. A restrained parking provision is appropriate and aligned with the CBD location of the site given the high accessibility to alternative travel modes. Therefore, for the purpose of determining a more applicable trip generation rate, data collected from the Warren Serviceway Car Park has been used.

It is noted that Liverpool Library currently has opening hours between 9:30am and 8:00pm and the opening hour will be retained in future operation, which is outside the commuter peak periods. As such, trips made to and from the library during the commuter peak hours (particularly the AM peak) will most likely be associated with the library staff. Therefore, the rate calculated for the commercial and council office spaces has been applied to the library.

Figure 15 illustrates the arrival and departure traffic data associated with the nested parking spaces (229 spaces) and Figure 16 provides the trip rates per parking space. The total number of nested parking spaces have been used for the assessment as these spaces are reserved for CBD employees, police, Liverpool Council and Library staff. It is noted that the other commercial spaces have been omitted from the assessment as these spaces accommodate a wide range of random user types such as tradies and part time employees who are not necessarily travelling to the Liverpool CBD during commuter peak hours.

The results in the following figures are also consistent with the typical travel pattern during commuter peak hours. The figures indicate that peak entry is during 8:00am whilst peak exit is during 5:00pm.

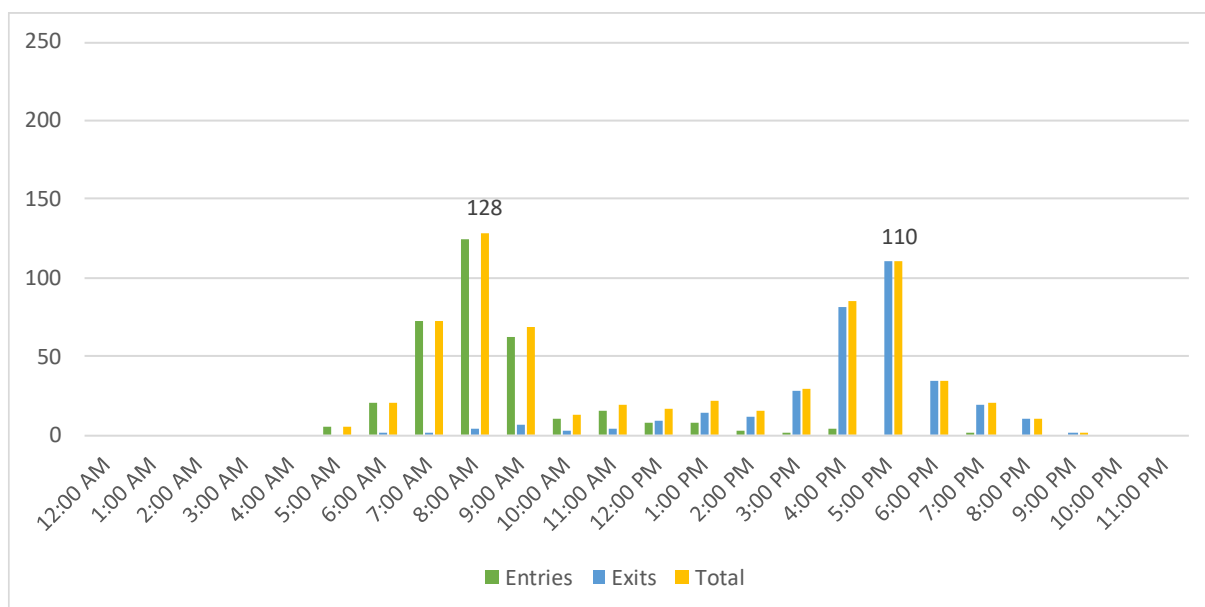


Figure 15 - Weekday Trips (Private Spaces)

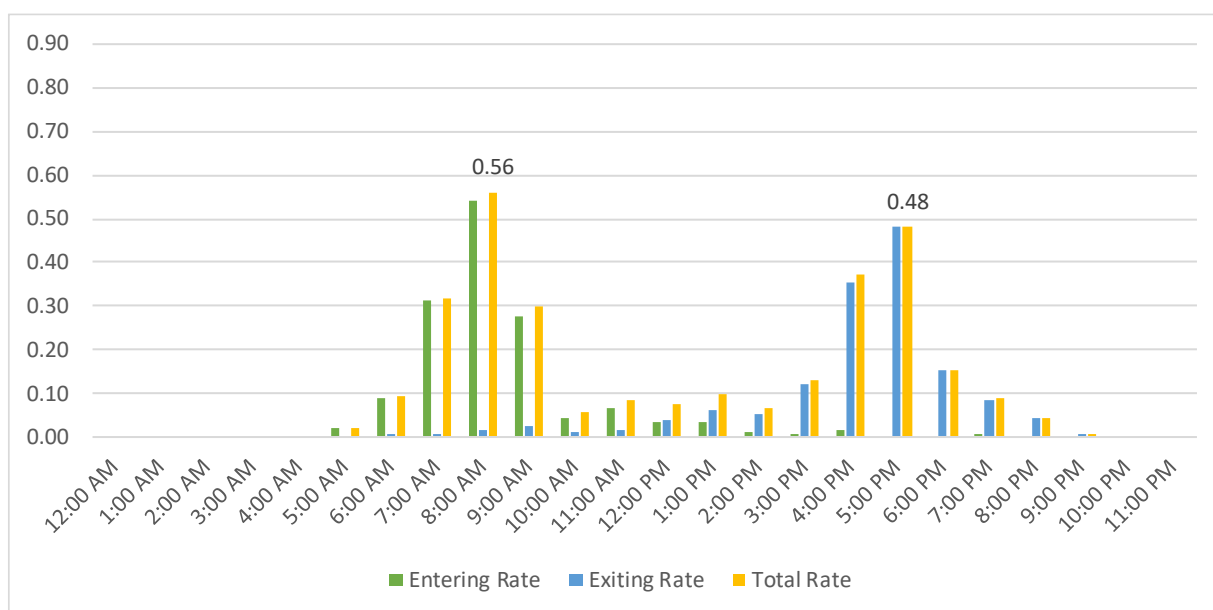


Figure 16 - Weekday Trip Rate per Space (Private Spaces)

6.1.2 Public Car Park

Based on a replacement of the existing public car park within the site, the traffic assessment for the public car park within the Concept Proposal LCP assumes a provision of 200 car parking spaces for public use. It is noted that the purpose of a public car park will alter the traffic generation outcome, i.e. if the car park is intended to be used by all-day workers within the CBD, the peak hour trip generation will be comparatively high, while the daily turnover may be relatively low. If the car park is intended for visitors (for retail and general business etc.) the arrival and departure peaks may not be as pronounced, but turnover through the day will be higher. This can be determined through the pricing structure.

However, neither the Roads and Maritime Guide to Traffic Generating Development v2.2 (2002) nor any Council development controls set out the vehicle trip generation rate for public car park. For the purpose of this assessment, we refer to data collected from Liverpool Council's Warren Serviceway Car Park.

Figure 17 illustrates the entering and exiting traffic data collected at the Warren Serviceway Car park site through the car park access control system. The volume is based on the short-term parking spaces, which are available for casual parking (single ticket usage).

Figure 18 illustrates the casual parking area will generate maximum rates of 0.80 trips per parking space during the morning and 0.56 trip per parking space during the evening, however it is noted that the peak trips are not aligned with the road network peak. During the morning network peak, the car park generated 0.61 trips per parking space and 0.33 trips per parking space during the PM network peak

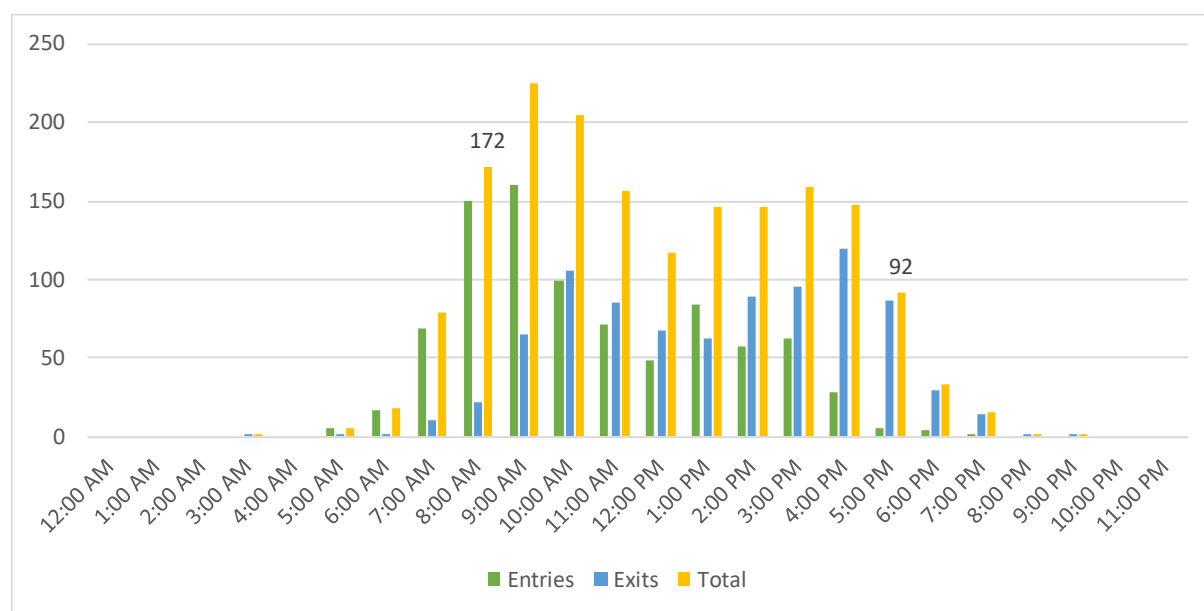


Figure 17 - Weekday Arrivals and Departures (Public Spaces)

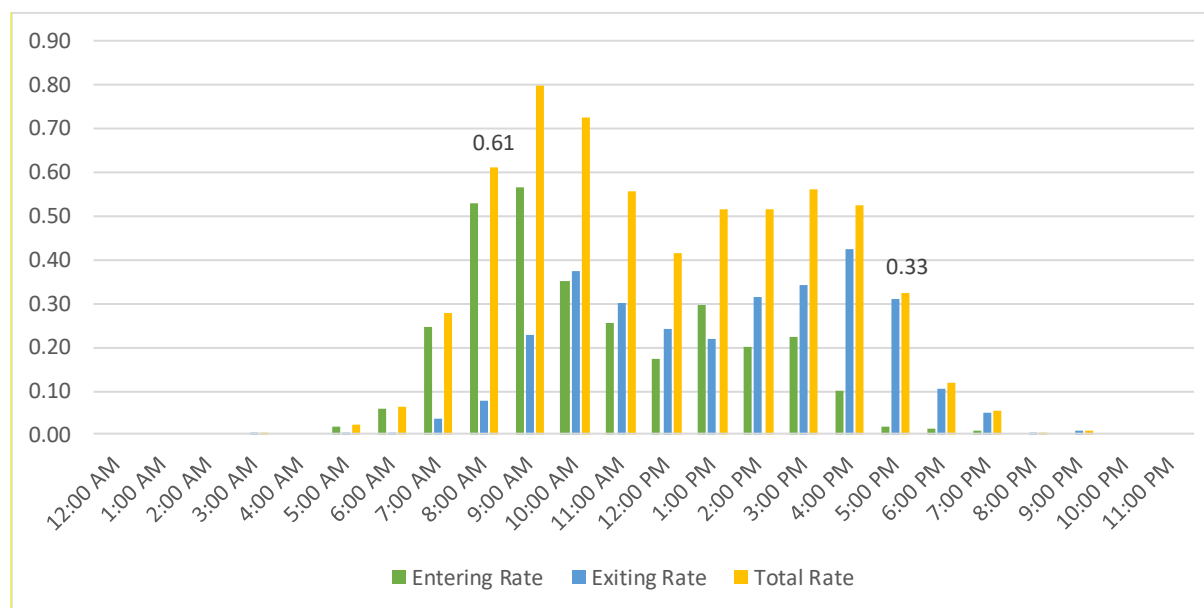


Figure 18 - Weekday Trip Rate per Space (Public Spaces)

6.1.3 Development Vehicle Trip Generation Summary

Having regard to the above, the future generation of the proposed site during the morning and evening peak periods is summarised in Table 4.

Table 4 - Traffic generation

Land Use	Parking Spaces	Vehicle trip rates		Vehicle trip generation	
		AM	PM	AM	PM
Council Admin.	132	0.56	0.48	74	63
Commercial	128	0.56	0.48	72	61
Public parking	200	0.61	0.33	122	65
Library	Included in Council Admin and Public Car Parks				
Total	460	-	-	267	190

6.2 Traffic Distribution

Two scenarios have been assessed as part of the SIDRA analysis:

- Existing Conditions
- Post-Development – Two-way access on Scott Street (Council Admin Building and Developer Building) and Terminus Street (Public Car Park and service vehicles), plus the RMS widening scheme on Terminus Street.

The distribution of entry and exit trips has been adopted from the car park survey data, as follows:

Table 5 - Percentage Entry / Exit Movements

Land Use	Morning Peak		Evening Peak	
	Entry %	Exit %	Entry %	Exit %
Council Admin.	97%	3%	0%	100%
Commercial	97%	3%	0%	100%
Public parking	87%	13%	5%	95%
Library	Included in Council Admin and Public Car Parks			

Table 6 - Inbound and Outbound Trips

Land Use	Access	AM		PM	
		Entry	Exit	Entry	Exit
Council Admin, Commercial	Scott Street Access	141	5	0	125
Public Parking	Terminus Street Access	106	16	4	62

The traffic distribution has been separated into northbound, eastbound, southbound and westbound trips and have been based on the data provided by the website of profile id (profile.id.com.au), which utilises the Census of Population and Housing 2016 data (Australian Bureau of Statistics). The census data provides information in regard to the residential locations of workers by Local Government Areas (LGA).

The following assumptions have been made based on the census data:

Inbound

- Approximately 37.8% of employees working in Liverpool live within the Liverpool LGA. When considering that the larger residential precinct of Liverpool is in the western area of LGA, approximately 40% of inbound vehicles will travel to the site via Hoxton Park Road;
- Approximately 20% of employees working in Liverpool live within the southern neighbouring LGAs such as Campbelltown and Camden. Therefore, approximately 20% of inbound vehicles will be via Hume Highway;
- Approximately 25% of employees live in the northern neighbouring LGAs such as Fairfield and Bankstown. Approximately 30% of inbound vehicles will travel from the north; and
- Approximately 5% of employees live in the eastern LGAs such as the Sutherland Shire LGA. Therefore 10% of inbound vehicles will travel from the east.

Outbound

- When considering that the primary users of the development will be employees, it has been assumed that majority of outbound vehicles will return to their original destination.

These assumptions are represented in Figure 19.

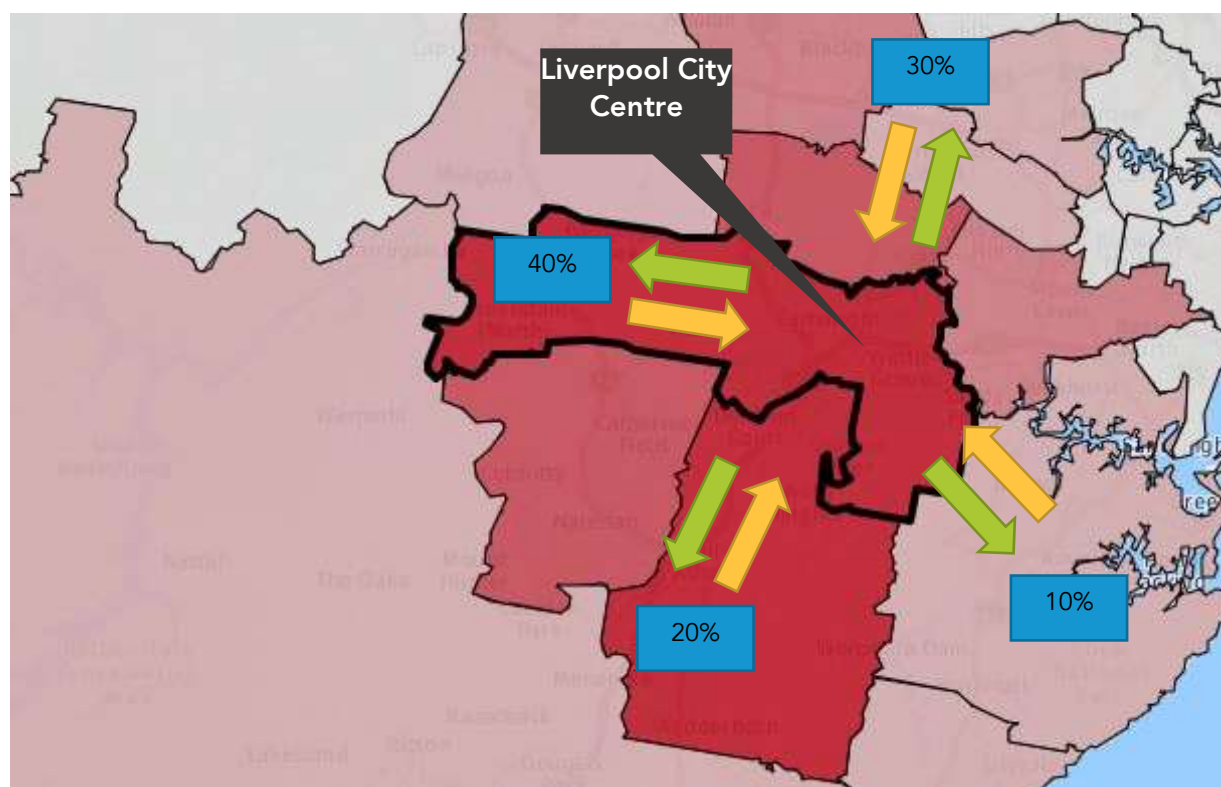


Figure 19 - Residential locations of workers in Liverpool 2016 (Source: profile id.)

The volume of additional vehicles travelling to and from the site during the AM and PM peaks have been tabulated below.

Table 7 - Volume of additional vehicles travelling to and from each direction

	Inbound	Outbound	Inbound	Outbound
North	74	6	1	56
South	49	4	1	37
East	25	2	0	19
West	99	8	1	75
TOTAL	247	20	4	187

Note: The trip numbers are rounded to one trip.

6.3 Traffic Modelling

For the purpose of assessing the traffic impacts of the proposed Liverpool Civic Place on the surrounding road network, we have been developed the intersection modelling by utilising SIDRA Intersection software. The following intersections have been included in traffic modelling:

- Scott Street / George Street
- Scott Street / Macquarie Street / Memorial Avenue
- Macquarie Street / Pirie Street
- Terminus Street / Pirie Street
- Terminus Street / Scott Street

SIDRA provides a number of performance indicators, outlined below:

- Degree of Saturation – The total usage of the intersection expressed as a factor of 1 with 1 representing 100% use/saturation (e.g. 0.8=80% saturation)
- Average Delay – The average delay encountered by all vehicles passing through the intersection. It is often important to review the average delay of each approach as a side road could have a long delay time, while the large free flowing major traffic will provide an overall low average delay
- Level of Service (LoS) – This is a categorization of average delay, intended for simple reference.
- 95% Queue Lengths (Q95) – is defined to be the queue length in metres that has only a 5-percent probability of being exceeded during the analysis time period. It transforms the average delay into measurable distance units.

Level of Service is a good indicator of overall performance for individual intersections, with each level summarised in Table 8.

Table 8 - Level of Service Definitions

Level of Service	Average Delay (secs/vehicle)	Traffic Signals, Roundabout	Give Way & Stop Signs
A	<14	Good operation	
B	15 to 28	Good with acceptable delays & spare capacity	Acceptable delays & spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity & accident study required
E	57 to 70	At capacity. At signals, incidents would cause excessive delays. Roundabouts require other control mode	At capacity, requires other control mode
F	>70	Extra capacity required	Extreme delay, major treatment required

The Base model was developed based on the traffic volumes and signal information extracted from the intersection movement counts for the existing condition.

The SIDRA results for the existing conditions and post-development scenario are summarised in the following sections. Detailed SIDRA results can be seen in Attachment 1.

6.3.1 Existing Conditions

Table 9 - Results Summary of Intersection Performance - Existing

Intersection	Period	Level of Service	Degree of Saturation	Average Delay (sec)	95% Queue Length (m)
Scott Street / George Street	AM Peak	B	0.241	27.7	48.0
	PM Peak	B	0.342	24.3	78.3
Macquarie Street/ Memorial Avenue/ Scott Street	AM Peak	B	0.350	23.5	75.4
	PM Peak	B	0.677	19.7	49.6
Macquarie Street / Pirie Street	AM Peak	B	0.375	19.7	78.7
	PM Peak	B	0.547	25.0	114.2
Terminus Street / Newbridge Road/ Speed Street	AM Peak	B	0.827	18.5	298.8
	PM Peak	D	0.934	45.4	460.0
Terminus Street / Pirie Street	AM Peak	C	0.870	29.9	171.4
	PM Peak	B	0.451	25.2	91.7
Terminus Street/ Scott Street	AM Peak	A	0.106	2.7	2.8
	PM Peak	A	0.095	2.2	1.4

All intersections within the study are currently operated in LOS D or better with acceptable delay, except for the intersection of Terminus Street and Newbridge intersection currently operating at capacity during PM peak period. Significant queuing is identified on the eastern approach of Newbridge Road on both AM and PM peak periods. The queuing length of 185 metres is also identified on the western approach, which is nearly filled up by queuing vehicles.

6.3.2 Post Concept Proposal Conditions

Table 10 - Results Summary of Intersection Performance – Post-development

Intersection	Period	Level of Service	Degree of Saturation	Average Delay (sec)	95% Queue Length (m)
Scott Street / George Street	AM Peak	B	0.275	26.7	58.4
	PM Peak	B	0.327	24.5	73.8
Macquarie Street/ Memorial Avenue/ Scott Street	AM Peak	B	0.379	26.4	81.3
	PM Peak	C	0.799	26.4	65.3
Macquarie Street / Pirie Street	AM Peak	B	0.420	24.1	85.8
	PM Peak	B	0.611	28.8	114.2
Terminus Street / Newbridge Road/ Speed Street	AM Peak	B	0.827	15.9	298.8
	PM Peak	D	0.934	44.8	460.0
Terminus Street / Pirie Street	AM Peak	C	0.916	27.8	114.4
	PM Peak	B	0.510	23.6	101.9
Terminus Street/ Scott Street	AM Peak	A	0.116	5.6	3.4
	PM Peak	A	0.118	5.6	2.6
Scott Street Access	AM Peak	A	0.144	6.9	0.1
	PM Peak	A	0.269	6.9	4.0

The SIDRA results indicate that the Scott Street and Terminus Street Accesses will operate with acceptable delay and queuing in both AM and PM peaks. The George Street and Scott Street intersection will operate in similar level of delay and queuing as the existing conditions.

It is noted that the average delay and queuing for the eastern leg of the Macquarie Street/ Memorial Avenue/ Scott Street intersection will increase during the post-development scenario. The average delay and queuing distance will be approximately 26 seconds and 65m respectively during the PM peak which may impact the proposed access driveway along Scott Street with remained acceptable Level of Service. It should also be noted that the future detailed DAs may propose combination of land uses, including education/hotel/student housing, etc, which will generate less traffic. As such, the intersection will even have less traffic impacts.

7. Vehicular Access Arrangement

The Concept Proposal design includes a three-level shared basement car park across the entire site with vehicles access located from Scott Street and Terminus Street in an arrangement whereby only the public car park and Council/Library loading area will be accessible from the Terminus Street access. This has been proposed to retain consistent traffic activity on Terminus Street when compared with the existing public car park, and to reduce the traffic activity on the proposed Scott Street access, which is proposed as a shared zone.

7.1 Scott Street Access

The Scott Street access will accommodate one travel lane for each direction for vehicle arrival and departure. This driveway will provide the access for passenger vehicles to the Council Admin car park, the commercial development and also provide the access of service vehicles to the commercial loading dock. Right turn movement from car park access into Scott Street will be prohibited due to the heavy right turn movements from George Street during peak periods.

Access to the Council Admin car park will be controlled by a boomgate requiring an access card (or similar) to restrict this access to authorised users only.

7.2 Terminus Street Access

This access will provide an entry/exit to the public car park, the child care centre drop-off spaces and the loading area associated with the Council Admin building and the Library.

Access to the public car park will be controlled by an Access Control System (boomgates or similar) which will be linked to a payment system. This will prevent use of this access by Council employees, as the system will require payment on exit.

7.3 Access Considerations

7.3.1 Council's Vision

The Liverpool Civic Place is a key strategic project in line with Liverpool City Council's ongoing Delivery and Operational Plan. The project was initiated by Council to act as a catalyst in activating the southern end of the Liverpool CBD.

The key drivers of the Liverpool Civic Place project include:

- Activating the southern end of Liverpool CBD
- Provision of a new civic place encompassing new state of the art library, council chambers and offices
- Provision of additional facilities for the South Western Sydney Campus of University of Wollongong

The key objectives of the project are:

- To deliver a mixed-use development incorporating a combination of Civic and commercial uses, together with hotel and retail facilities
- To provide a civic identity/focus and to anchor/activate the southern end of Liverpool CBD

- To create a generous public space with an active ground plane connecting along Scott Street to Liverpool Railway Station.

To achieve these aims, the project will be designed as a major pedestrian oriented development with activation along the Scott Street frontage and providing strong pedestrian connections to public transport and the CBD.

7.3.2 Urban Design Vision

The vision for the development of the Liverpool Civic Place is to provide a diverse, active, safe and accessible Civic Centre on the southern side of Liverpool City Centre.

The project seeks to create a vibrant Council office, integrated with a library, commercial offices, casual accommodation and retail spaces. The vision is to create a place of inclusion and opportunity that is extending and activating the southern part of the Liverpool CBD

A central plaza and landscaped open space will be provided on the northern side of the project to cater to diverse needs of the community, council staff, workers, tourists and anticipated visitors, each with a distinct character to provide a variety of experience. The central plaza is to be designed with high amenity to optimise greater community interaction and engagement and also to be major connection links to Liverpool CBD, in particular to the retail frontage along George Street and Macquarie Street.

7.3.3 Liverpool City Centre Transport Strategy

The Liverpool City Centre Transport Strategy was prepared in 2017 in order to support the intended increase in land use densities throughout the Liverpool CBD. The overall approaches identified in this Strategy include:

- Encouraging the use of public transport through the provision of improved bus and train operations;
- Encouraging the use of walking and cycling;
- Promoting business and other economic activity through the provision of short stay parking close to the business core of the central city;
- Facilitating long stay commuter parking through the provision of parking garages remote from the CBD but within walking / shuttlebus distance;
- Seeking to improve traffic circulation and reduce congestion within the central city through a package of street and intersection intervention, and
- Seeking to improve access to the primary road network through selective intersection upgrades and improvements.

A number of specific actions have also been identified in the Strategy providing a guidance to the design of the proposed Liverpool Civic Place, which include:

- Improving walking and cycling access to Liverpool Station by upgrading connection facilities along with the retail frontage (Penn's Railway Arcade at George Street and Stathis Arcade at Macquarie Street) and footpaths along Railway Street;
- Implementing wayfinding system to direct pedestrians and cyclists throughout Liverpool City Centre.
- Pedestrianising the southern end of Macquarie Street;
- Linking the city centre into Liverpool's strategic bike route network and providing bike parking facilities at popular destinations.

7.3.4 Pedestrian safety and amenity

The masterplan of the Liverpool Civic Place is to be designed to provide high pedestrian amenity on the northern side of the development site. The pedestrian connectivity and safety are key considerations in the design.

With regard to the traffic activity on the shared path, the following graphs illustrate the scenarios that have been tested, which comprise:

- Single Access from Scott Street (Council Employees only)
- Single Access from Scott Street (as above with the Stage 2 commercial development)
- Single Access from Scott Street (as above with the Public Car Park)

The final graph illustrates the traffic comparison on the shared zone resulting from the second access from Terminus Street.

The results indicate that with the provision of a Terminus Street access for the public car park, the remaining traffic activity on the Shared Zone is suitably low for a shared zone environment, peaking at 150 vehicle movements during the morning peak hour, which equates to a vehicle every 24 seconds. In reality, the bunching of vehicles caused by the surrounding traffic signals will group vehicles, providing longer gaps between vehicle groups.

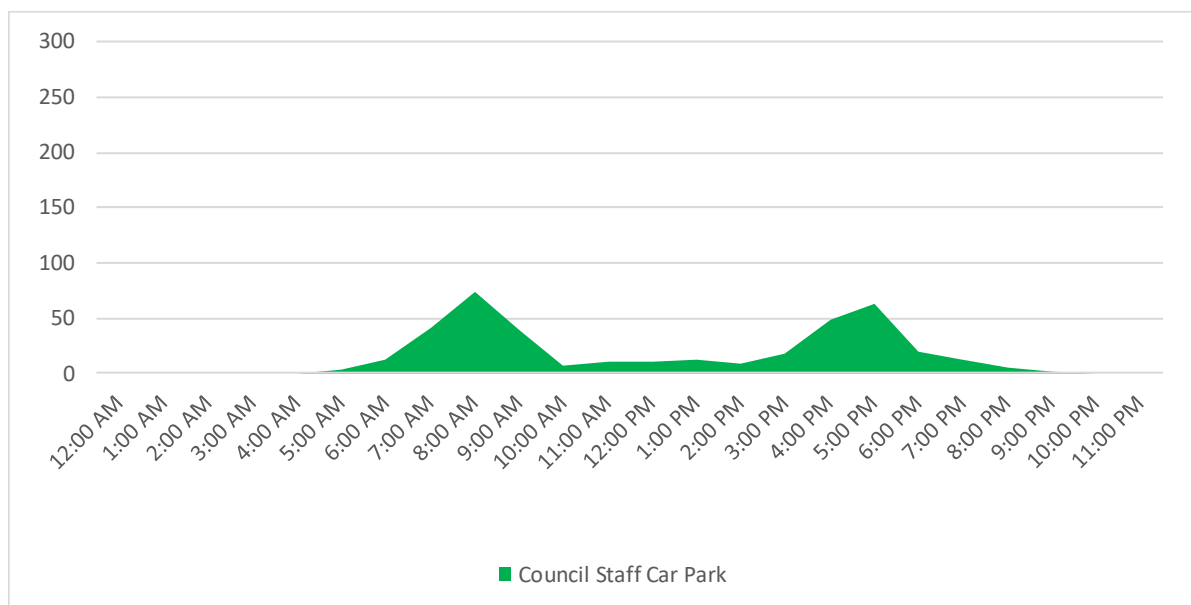


Figure 20 - Single Access from Scott Street (Council Employees only)

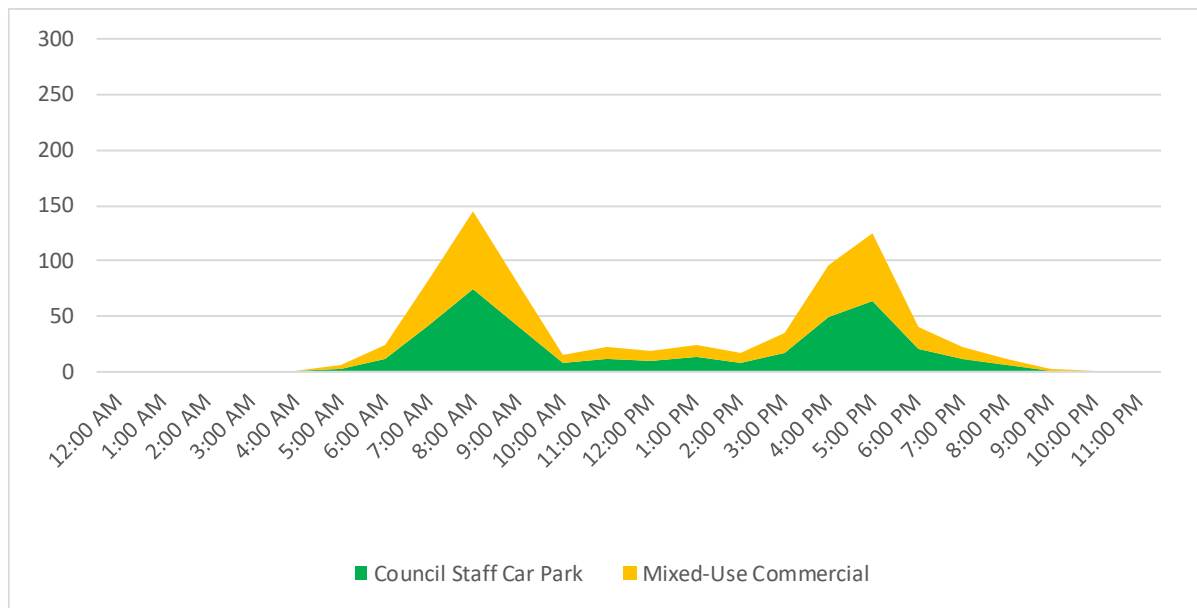


Figure 21 - Single Access from Scott Street (as above with the Stage 2 commercial development)

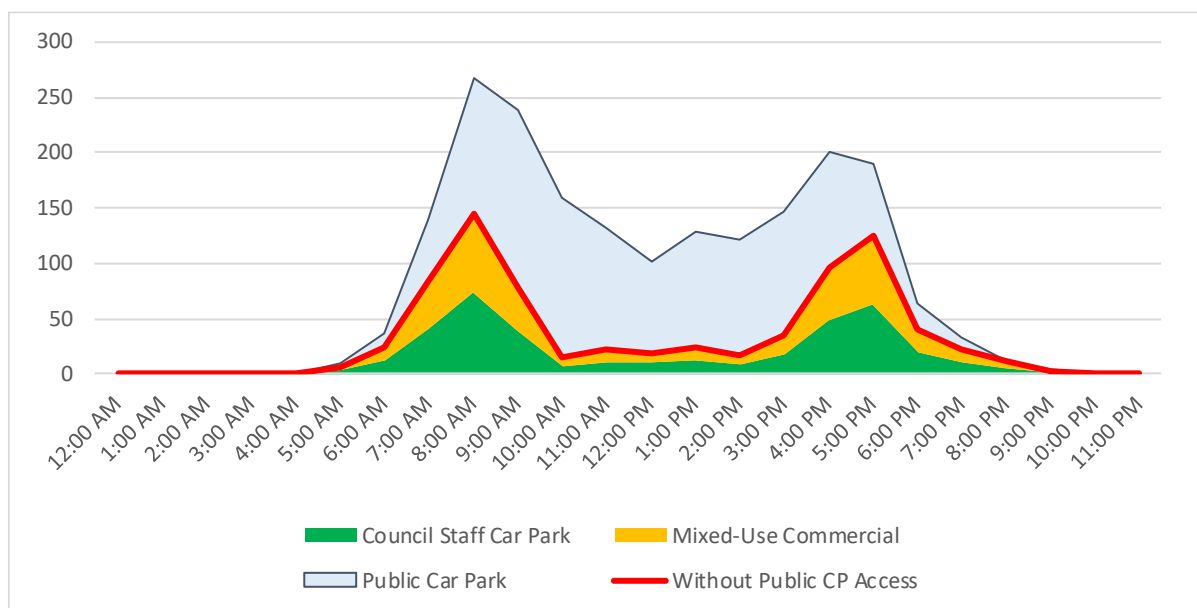


Figure 22 - Single Access from Scott Street (as above with the Public Car Park)

8. Parking Provision

8.1 Planning Policy

The proposed development is subject to the parking provision rates stipulated in the following planning documents:

- Liverpool Development Control Plan (DCP) 2008 Part 4 – Development in Liverpool City Centre
- Liverpool Local Environmental Plan (LEP) 2008

8.2 Car Parking Provision

Considering that the site is within the Liverpool City Centre and lies within a B4 mixed use zone, the development is subject to the minimum parking provision requirements stipulated in the Liverpool LEP 2008:

- For the ground floor:
 - 1 space per 200m² GFA
- Any other part of the building:
 - 1 space per 100m² GFA for retail spaces
 - 1 space per 150m² GFA for any other purpose

Table 11 - Car Parking Provision (the final floor areas will be confirmed during the Stage 2 DA stage)

Component	Level	GFA	LEP Parking Rate	LEP Parking Requirement (max)	Proposed Provision
Library	Ground	1,586m ²	1 space per 200m ²	8 (7.9)	-
	Other Levels	3,440m ²	1 space per 150m ²	23 (22.9)	-
Council Office	Ground	117m ²	1 space per 200m ²	1 (0.6)	-
	Other Levels	16,884m ²	1 space per 150m ²	113 (112.6)	-
Commercial	Ground	270m ²	1 space per 200m ²	2 (1.4)	-
	Other Levels	27,207m ²	1 space per 150m ²	182 (181.4)	-
TOTAL				330	413

It is noted that the allocation of parking spaces to the various land uses will be assessed during the Stage 2 DA stage.

8.3 Accessible Car Parking

Based on the DCP Part 4, the development is required to provide accessible parking spaces based on the following minimum requirements:

- 2% of the total parking demand generated by the development

It is noted that the accessible parking provision is included within the total parking capacity.

Table 12 - Accessible Parking Provision

Component	Total Parking Provision	DCP Parking Rate	DCP requirement (min)	Proposed Provision
Accessible Parking	428 spaces	2% of total capacity	9 (8.6)	11

8.4 Bicycle Parking

The development must also provide bicycle parking spaces in accordance with the minimum requirements stipulated in the DCP Part 4:

- 1 bicycle space per 200m² of GFA (15% of this requirement is to be accessible to visitors)

Table 13 - Bicycle Parking Provision

Component	Total GFA	DCP requirements	DCP requirements (min)
Bicycle Parking	50,702m ²	1 space per 200m ²	251 (251.03)

The development will need to provide 251 bicycle spaces (where 38 spaces are accessible to visitors). This will be considered in further assessment in subsequent detailed 'Stage 2' DAs.

8.5 Motorcycle Parking

The development must also provide motorcycle parking spaces in accordance with the minimum requirements stipulated in the DCP Part 4:

- 1 motorcycle space per 20 car spaces

Table 14 - Motorcycle Parking Provision

Component	Total Parking Provision	DCP requirements	DCP requirements (min)
Motorcycle Parking	428 spaces	1 space per 20 car spaces	22 (21.4)

The development will need to provide 22 motorcycle spaces. This will be considered in further assessment in subsequent detailed 'Stage 2' DAs.

8.6 Servicing

Servicing within the Concept Proposal is indicated in two separate areas comprising

- Terminus Street Access – Loading dock for Council Admin and Library
- Scott Street Access – Loading area for the mixed-use commercial building.

9. Access and Car Park Assessment

A preliminary review of the concept parking layout has been undertaken at high-level to assess the capability of the design to comply with relevant Australian Standards. The high-level assessment indicates that the Masterplan will be capable to meet compliance. However, it is noted that the masterplan is a concept design and may be subject to changes during the detailed design stage.

It is highlighted that compliance with the relevant standards will need to be assessed during the preparation of the future development application. This would involve swept path assessments of B85/B99 vehicles entering and exiting the car parks as well as internal circulation. Swept path assessments of the largest vehicle accessing and exiting the loading docks will also need to be undertaken during the detailed design stage to ensure the feasibility of the design. Access control for the parking facilities should also be explored during the detailed design stage.

10. Further Considerations

RMS has plans for a future 6-lane widening along Terminus Street as shown in Figure 23. While it is noted that this proposal is currently at high level stages, the proposed road widening has been included within the traffic impact assessment and SIDRA modelling.

The Terminus Street access has also been designed to anticipate the proposed widening to ensure that the scheme operates under the current and planned arrangements.

Notwithstanding, once more information is provided, the proposed road widening of Terminus Street will be included in the detailed design stage.



Figure 23 - Proposed Terminus Street Widening (with Aerial and RMS proposal overlay)

11. Conclusion

This Traffic Impact Assessment report is submitted to Liverpool City Council in support of a Concept Development Application for a Concept Proposal for a new mixed-use precinct known as Liverpool Civic Place at 52 Scott Street, Liverpool (the site). This application sets out a Concept Proposal for the development of the site under Section 4.23 of the Environmental Planning and Assessment Act 1979.

This Concept Proposal seeks approval for a mixed-use concept comprising approximately 50,702m² of Gross Floor Area (GFA). Specifically, the following key components and development parameters:

- North western building envelope - A building envelope accommodating 4 storeys and 5,010m² GFA for the purpose of an information and education facility (public library) use.
- South western building envelope - A building envelope accommodating 14 storeys and 17,748m² of GFA for the purpose of a public administration building use, and either (or a combination of) commercial premises or child care centre uses.
- Eastern building envelope - A building envelope accommodating 24 storeys and 27,944m² of GFA which will accommodate either (or a combination of) commercial premises, retail premises, educational establishments, tourist and visitor accommodation or boarding house (student accommodation) uses.
- A landscaping and public domain concept including the provision of a public through-site link connecting Scott Street to the north through to Terminus Street to the south; and
- Concept building envelope for a three-level shared basement car park across the entire site to accommodate approximately 413 parking spaces for all future uses, and a public car park.

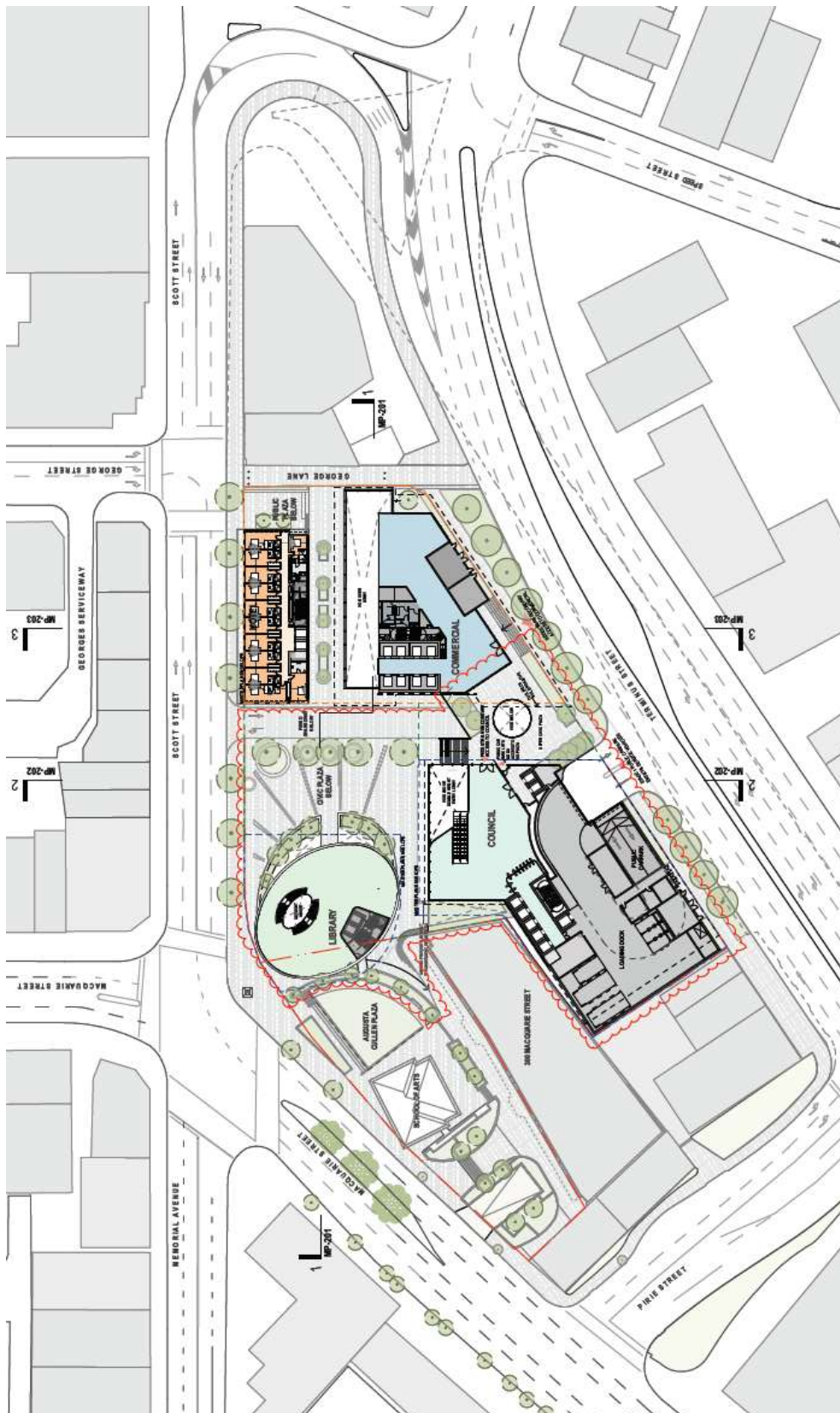
The following findings have been identified during the course of study:

- The peak hour traffic activity associated with the Concept Proposal will be accommodated within the road network having regard for the separation of movements between Scott Street and Terminus Street and the future widening of Terminus Street.
- The proposed car parking allocations will be provided with separate vehicles accesses and through the management system, this will ensure that the Terminus Street access will only provide access to the public car park, which replicates the current arrangement associated with the existing two-storey car park.
- The provision of two separate carpark access locations, reduces the traffic volumes on the Scott Street access, which is proposed as a shared zone.
- The access from Terminus Street will also provide access to the loading dock serving the Council Admin building and the Library, removing this activity from the shared zone.

Attachment 1 - Envelope Plan



Attachment 2 - Reference Design



Attachment 3 - SIDRA Outputs

MOVEMENT SUMMARY

 Site: 101 [George & Scott AM Scenario 1]

 Network: N102A [Scenario 1 - AM Peak]

New Site

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		veh	m				km/h
East: Scott St (E)														
5	T1	30	0.0	30	0.0	0.031	38.3	LOS C	0.7	5.2	0.89	0.63	0.89	6.0
Approach		30	0.0	30	0.0	0.031	38.3	LOS C	0.7	5.2	0.89	0.63	0.89	6.0
North: George St (N)														
7	L2	31	45.4	31	45.4	0.044	19.8	LOS B	0.9	8.8	0.53	0.61	0.53	28.1
9	R2	492	2.0	492	2.0	0.269	21.9	LOS B	8.2	58.4	0.62	0.71	0.62	27.1
Approach		523	4.6	523	4.6	0.269	21.8	LOS B	8.2	58.4	0.61	0.71	0.61	27.2
West: Scott St (W)														
11	T1	171	4.2	171	4.2	0.275	39.9	LOS C	6.7	48.8	0.91	0.73	0.91	4.4
Approach		171	4.2	171	4.2	0.275	39.9	LOS C	6.7	48.8	0.91	0.73	0.91	4.4
All Vehicles		724	4.3	724	4.3	0.275	26.7	LOS B	8.2	58.4	0.69	0.71	0.69	22.7

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	Average Delay	Level of Service	Average Back of Queue Pedestrian	Back of Queue Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	25.4	LOS C	0.1	0.1	0.65	0.65
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		158	44.6	LOS E			0.85	0.85

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.

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Organisation: PARKING AND TRAFFIC CONSULTANTS | Processed: Tuesday, 21 April 2020 6:25:30 PM

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MOVEMENT SUMMARY



Site: 101 [Macquarie & Memorial & Scott AM Scenario 1]



Network: N102A [Scenario 1 - AM Peak]

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m				km/h
East: Scott St (E)														
4a	L1	257	2.0	257	2.0	0.374	14.1	LOS A	5.7	40.7	0.38	0.59	0.38	10.6
5	T1	127	3.3	127	3.3	0.374	23.7	LOS B	5.7	40.7	0.57	0.53	0.57	31.0
6	R2	19	0.0	19	0.0	0.374	29.3	LOS C	4.3	30.9	0.60	0.52	0.60	26.6
Approach		403	2.3	403	2.3	0.374	17.9	LOS B	5.7	40.7	0.45	0.56	0.45	24.0
North: Macquarie St (N)														
7	L2	14	0.0	14	0.0	0.074	57.2	LOS E	0.7	5.2	0.94	0.68	0.94	17.9
9a	R1	34	3.1	34	3.1	0.320	57.6	LOS E	3.3	24.0	0.97	0.75	0.97	17.8
9	R2	25	4.2	25	4.2	0.320	59.4	LOS E	3.3	24.0	0.97	0.75	0.97	25.8
Approach		73	2.9	73	2.9	0.320	58.2	LOS E	3.3	24.0	0.96	0.73	0.96	21.2
West: Memorial Ave (W)														
10	L2	60	1.8	60	1.8	0.238	48.0	LOS D	4.3	31.2	0.88	0.74	0.88	28.5
11	T1	64	9.8	64	9.8	0.238	45.5	LOS D	4.3	31.2	0.89	0.73	0.89	21.8
12b	R3	22	9.5	22	9.5	0.238	52.4	LOS D	3.0	23.1	0.90	0.72	0.90	21.6
Approach		146	6.5	146	6.5	0.238	47.6	LOS D	4.3	31.2	0.89	0.73	0.89	25.2
SouthWest: Macquarie St (SW)														
30b	L3	266	0.8	266	0.8	0.379	27.0	LOS B	11.5	81.3	0.80	0.80	0.80	30.6
30a	L1	219	0.5	219	0.5	0.273	23.7	LOS B	9.1	64.2	0.77	0.76	0.77	28.3
32a	R1	113	1.9	113	1.9	0.109	12.3	LOS A	1.7	12.4	0.29	0.58	0.29	16.0
Approach		598	0.9	598	0.9	0.379	23.0	LOS B	11.5	81.3	0.69	0.74	0.69	28.8
All Vehicles		1220	2.2	1220	2.2	0.379	26.4	LOS B	11.5	81.3	0.65	0.68	0.65	26.3

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	Prop. Queued	Effective Stop Rate	
					Distance m			
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	44.3	LOS E	0.2	0.2	0.86	0.86
P4	West Full Crossing	53	17.1	LOS B	0.1	0.1	0.53	0.53
P8	SouthWest Full Crossing	53	49.6	LOS E	0.2	0.2	0.91	0.91
All Pedestrians		211	41.3	LOS E			0.81	0.81

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.

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MOVEMENT SUMMARY

 Site: 3068 [Macquarie & Pirie AM Scenario 1]

 Network: N102A [Scenario 1 - AM Peak]

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		veh	m				km/h
SouthEast: Pirie St (SE)														
21	L2	434	4.9	434	4.9	0.156	6.2	LOS A	2.6	19.3	0.17	0.57	0.17	42.6
23	R2	216	0.5	216	0.5	0.420	33.9	LOS C	8.0	56.3	0.68	0.73	0.68	6.3
Approach		649	3.4	649	3.4	0.420	15.4	LOS B	8.0	56.3	0.34	0.63	0.34	32.2
NorthEast: Macquarie St (NE)														
24	L2	153	0.7	153	0.7	0.177	35.8	LOS C	8.0	56.0	0.96	0.82	0.96	7.3
25	T1	162	4.5	162	4.5	0.342	53.0	LOS D	4.5	33.0	0.97	0.76	0.97	22.2
Approach		315	2.7	315	2.7	0.342	44.7	LOS D	8.0	56.0	0.97	0.79	0.97	17.9
SouthWest: Macquarie St (SW)														
31	T1	398	1.3	398	1.3	0.414	17.6	LOS B	12.1	85.8	0.62	0.55	0.62	33.8
32	R2	260	2.8	260	2.8	0.414	30.9	LOS C	12.1	85.8	0.75	0.75	0.75	27.6
Approach		658	1.9	658	1.9	0.414	22.9	LOS B	12.1	85.8	0.67	0.63	0.67	31.1
All Vehicles		1622	2.7	1622	2.7	0.420	24.1	LOS B	12.1	85.8	0.59	0.66	0.59	28.2

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	Average Delay	Level of Service	Average Back of Queue	Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		
P5	SouthEast Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P6	NorthEast Full Crossing	53	40.1	LOS E	0.1	0.1	0.82	0.82
All Pedestrians		105	47.2	LOS E			0.89	0.89

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.

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MOVEMENT SUMMARY

Site: [Scott Access AM Peak Scenario 1]

Network: N102A [Scenario 1 - AM Peak]

Site Category: (None)
 Giveway / Yield (Two-Way)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		veh	m				km/h
South: SCOTT ST ACCESS														
1	L2	5	0.0	5	0.0	0.005	0.4	LOS A	0.0	0.1	0.20	0.07	0.20	9.7
Approach		5	0.0	5	0.0	0.005	0.4	LOS A	0.0	0.1	0.20	0.07	0.20	9.7
East: SCOTT ST														
4	L2	148	0.0	148	0.0	0.144	6.9	LOS A	0.0	0.0	0.00	0.62	0.00	23.0
5	T1	393	2.4	393	2.4	0.144	0.0	LOS A	0.0	0.0	0.00	0.18	0.00	38.1
Approach		541	1.8	541	1.8	0.144	1.9	NA	0.0	0.0	0.00	0.30	0.00	31.0
West: SCOTT ST														
11	T1	191	4.4	191	4.4	0.057	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		191	4.4	191	4.4	0.057	0.0	NA	0.0	0.0	0.00	0.00	0.00	50.0
All Vehicles		737	2.4	737	2.4	0.144	1.4	NA	0.0	0.1	0.00	0.22	0.00	33.6

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.
 Minor Road Approach LOS values are based on average delay for all vehicle movements.
 NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road 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 SUMMARY

 Site: 1484 [Terminus & Pirie AM Scenario 1]

 Network: N102A [Scenario 1 - AM Peak]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		veh	m				km/h
SouthEast: Pirie St (S)														
1	L2	112	4.7	112	4.7	0.363	48.8	LOS D	6.9	49.8	0.90	0.77	0.90	31.3
2	T1	109	1.0	109	1.0	0.363	49.9	LOS D	6.9	49.8	0.94	0.75	0.94	21.4
Approach		221	2.9	221	2.9	0.363	49.4	LOS D	6.9	49.8	0.92	0.76	0.92	27.1
NorthEast: Terminus St (E)														
4	L2	88	2.3	88	2.3	0.080	4.0	LOS A	0.1	0.8	0.02	0.55	0.02	45.3
5	T1	383	7.3	383	7.3	0.171	0.6	LOS A	0.3	2.0	0.03	0.02	0.03	59.0
6	R2	512	4.1	512	4.1	0.510	15.7	LOS B	6.2	45.0	0.61	0.72	0.61	11.7
Approach		983	5.2	983	5.2	0.510	8.8	LOS A	6.2	45.0	0.33	0.43	0.33	39.5
NorthWest: Pirie St (N)														
7	L2	323	2.8	323	2.8	0.164	23.3	LOS B	8.8	63.1	0.65	0.72	0.65	8.4
8	T1	33	3.2	33	3.2	0.121	55.9	LOS D	1.9	13.7	1.00	0.74	1.00	21.4
9	R2	7	0.0	7	0.0	0.059	64.3	LOS E	0.4	3.1	1.00	0.67	1.00	20.5
Approach		363	2.8	363	2.8	0.164	27.1	LOS B	8.8	63.1	0.69	0.72	0.69	12.3
SouthWest: Terminus St (W)														
10	L2	11	0.0	11	0.0	0.507	37.9	LOS C	15.7	114.2	0.84	0.73	0.84	29.5
11	T1	1022	4.5	1022	4.5	0.507	32.3	LOS C	15.7	114.4	0.84	0.73	0.84	29.5
12	R2	184	0.0	184	0.0	0.916	78.5	LOS F	12.7	89.0	1.00	1.00	1.46	25.0
Approach		1217	3.8	1217	3.8	0.916	39.4	LOS C	15.7	114.4	0.86	0.77	0.93	28.2
All Vehicles		2784	4.1	2784	4.1	0.916	27.8	LOS B	15.7	114.4	0.66	0.64	0.69	28.7

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	Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P1	SouthEast Full Crossing	53	12.6	LOS B	0.1	0.1	0.46	0.46
P3	NorthWest Full Crossing	53	36.1	LOS D	0.1	0.1	0.78	0.78
P4	SouthWest Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		158	34.3	LOS D			0.73	0.73

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.

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MOVEMENT SUMMARY

Site: 101 [Terminus & Scott AM Scenario 1]

Network: N102A [Scenario 1 - AM Peak]

Site Category: (None)
 Giveway / Yield (Two-Way)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		veh	m				km/h
South: RoadName														
1	L2	34	0.0	34	0.0	0.018	4.7	LOS A	0.0	0.0	0.00	0.57	0.00	31.2
3	R2	143	2.2	143	2.2	0.116	5.6	LOS A	0.5	3.4	0.27	0.60	0.27	48.3
Approach		177	1.8	177	1.8	0.116	5.4	LOS A	0.5	3.4	0.22	0.59	0.22	47.4
West: Scott St(W)														
11	T1	178	4.1	178	4.1	0.108	0.1	LOS A	0.0	0.0	0.00	0.10	0.00	51.4
12	R2	16	100.0	16	100.0	0.108	4.3	LOS A	0.0	0.0	0.00	0.10	0.00	46.8
Approach		194	12.0	194	12.0	0.108	0.7	NA	0.0	0.0	0.00	0.10	0.00	51.4
All Vehicles		371	7.1	371	7.1	0.116	2.8	NA	0.5	3.4	0.10	0.33	0.10	49.5

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.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road 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.

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MOVEMENT SUMMARY



Site: 101 [Terminus & Speed & Newbridge AM Scenario 1]



Network: N102A [Scenario 1 - AM Peak]

New Site

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue	Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		veh	m				km/h
South: Speed St (S)														
1	L2	17	0.0	17	0.0	0.042	44.3	LOS D	0.8	5.4	0.82	0.68	0.82	7.9
3	R2	328	1.9	328	1.9	0.827	59.0	LOS E	20.1	142.7	1.00	0.93	1.15	22.4
Approach		345	1.8	345	1.8	0.827	58.3	LOS E	20.1	142.7	0.99	0.91	1.14	22.0
East: Newbridge Rd (E)														
4	L2	1006	3.3	1006	3.3	0.816	20.0	LOS B	41.5	298.8	0.78	0.86	0.78	37.6
5	T1	977	4.0	977	4.0	0.378	8.5	LOS A	11.9	86.5	0.46	0.41	0.46	47.0
Approach		1983	3.7	1983	3.7	0.816	14.3	LOS A	41.5	298.8	0.62	0.64	0.62	41.3
North: Terminus St (N)														
7	L2	22	71.4	22	71.4	0.359	68.6	LOS E	1.4	15.8	1.00	0.72	1.00	18.9
Approach		22	71.4	22	71.4	0.359	68.6	LOS E	1.4	15.8	1.00	0.72	1.00	18.9
West: Terminus St (W)														
10	L2	170	1.8	170	1.8	0.093	5.6	LOS A	0.0	0.0	0.00	0.53	0.00	41.6
11	T1	1149	4.9	1149	4.9	0.349	6.4	LOS A	6.7	48.9	0.26	0.22	0.26	52.0
Approach		1319	4.5	1319	4.5	0.349	6.3	LOS A	6.7	48.9	0.22	0.26	0.22	51.5
All Vehicles		3670	4.2	3670	4.2	0.827	15.9	LOS B	41.5	298.8	0.52	0.53	0.53	40.7

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	Back of Queue Distance m	Prop. Queued	Effective Stop Rate	
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95	
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95	
All Pedestrians		105	54.3	LOS E			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.

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MOVEMENT SUMMARY

Site: 101 [Terminus Access AM Scenario 1 (Left-In Left-Out)]

Network: N102A [Scenario 1 - AM Peak]

Terminus & Access AM
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m				km/h
NorthEast: Terminus St E														
5	T1	994	3.9	994	3.9	0.325	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		994	3.9	994	3.9	0.325	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.9
NorthWest: Access														
7	L2	17	0.0	17	0.0	0.017	1.4	LOS A	0.1	0.5	0.38	0.22	0.38	9.9
Approach		17	0.0	17	0.0	0.017	1.4	LOS A	0.1	0.5	0.38	0.22	0.38	9.9
SouthWest: Terminus St W														
10	L2	107	0.0	107	0.0	0.238	6.6	LOS A	0.0	0.0	0.00	0.32	0.00	52.9
11	T1	1238	4.5	1238	4.5	0.238	0.0	LOS A	0.0	0.0	0.00	0.09	0.00	52.2
Approach		1345	4.1	1345	4.1	0.238	0.5	NA	0.0	0.0	0.00	0.11	0.00	52.5
All Vehicles		2356	4.0	2356	4.0	0.325	0.3	NA	0.1	0.5	0.00	0.06	0.00	50.3

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.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road 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.

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MOVEMENT SUMMARY

 Site: 101 [George & Scott PM Scenario 1]

 Network: N102B [Scenario 1 - PM Peak]

New Site

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		veh	m				km/h
East: Scott St (E)														
5	T1	52	3.8	52	3.8	0.078	44.6	LOS D	1.3	9.1	0.87	0.63	0.87	5.3
Approach		52	3.8	52	3.8	0.078	44.6	LOS D	1.3	9.3	0.87	0.63	0.87	5.3
North: George St (N)														
7	L2	35	45.8	35	45.8	0.043	15.3	LOS B	0.9	8.5	0.46	0.59	0.46	30.2
9	R2	693	1.3	693	1.3	0.327	17.6	LOS B	10.4	73.8	0.56	0.70	0.56	28.9
Approach		728	3.4	728	3.4	0.327	17.5	LOS B	10.4	73.8	0.56	0.70	0.56	29.0
West: Scott St (W)														
11	T1	141	2.2	141	2.2	0.319	53.3	LOS D	6.3	44.8	0.97	0.76	0.97	3.4
Approach		141	2.2	141	2.2	0.319	53.3	LOS D	6.3	44.8	0.97	0.76	0.97	3.4
All Vehicles		921	3.3	921	3.3	0.327	24.5	LOS B	10.4	73.8	0.64	0.70	0.64	24.3

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	Average Delay	Level of Service	Average Back of Queue Pedestrian	Back of Queue Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	31.6	LOS D	0.1	0.1	0.73	0.73
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		158	46.7	LOS E			0.88	0.88

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.

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MOVEMENT SUMMARY



Site: 101 [Macquarie & Memorial & Scott PM Scenario 1]



Network: N102B [Scenario 1 - PM Peak]

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles														
Mov ID	Turn	Demand	Flows	Arrival	Flows	Deg. Satn	Average Delay	Level of Service	95% Back of Queue	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed	
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m			km/h	
East: Scott St (E)														
4a	L1	646	1.3	646	1.3	0.799	9.0	LOS A	9.2	65.3	0.39	0.65	0.41	14.7
5	T1	184	0.6	184	0.6	0.371	28.1	LOS B	8.4	59.8	0.67	0.60	0.67	29.1
6	R2	46	6.8	46	6.8	0.371	31.5	LOS C	8.4	59.8	0.67	0.60	0.67	25.8
Approach		877	1.4	877	1.4	0.799	14.2	LOS A	9.2	65.3	0.46	0.64	0.48	23.8
North: Macquarie St (N)														
7	L2	21	5.0	21	5.0	0.117	57.8	LOS E	1.2	8.4	0.94	0.70	0.94	17.8
9a	R1	76	1.4	76	1.4	0.761	63.3	LOS E	7.6	53.8	1.00	0.92	1.19	16.9
9	R2	48	0.0	48	0.0	0.761	65.1	LOS E	7.6	53.8	1.00	0.92	1.19	24.8
Approach		145	1.4	145	1.4	0.761	63.1	LOS E	7.6	53.8	0.99	0.88	1.15	20.2
West: Memorial Ave (W)														
10	L2	38	0.0	38	0.0	0.086	21.0	LOS B	2.4	17.2	0.55	0.55	0.55	36.4
11	T1	53	2.0	53	2.0	0.086	19.4	LOS B	2.4	17.2	0.58	0.57	0.58	31.5
12b	R3	13	0.0	13	0.0	0.086	39.2	LOS C	0.9	6.6	0.76	0.66	0.76	25.1
Approach		103	1.0	103	1.0	0.086	22.4	LOS B	2.4	17.2	0.59	0.57	0.59	33.1
SouthWest: Macquarie St (SW)														
30b	L3	152	2.1	152	2.1	0.378	45.4	LOS D	7.4	52.5	0.87	0.79	0.87	24.2
30a	L1	125	0.8	125	0.8	0.264	41.9	LOS C	5.8	41.2	0.84	0.75	0.84	22.8
32a	R1	112	2.8	112	2.8	0.238	35.2	LOS C	4.4	31.6	0.71	0.71	0.71	7.1
Approach		388	1.9	388	1.9	0.378	41.4	LOS C	7.4	52.5	0.81	0.75	0.81	21.0
All Vehicles		1514	1.5	1514	1.5	0.799	26.4	LOS B	9.2	65.3	0.61	0.69	0.64	22.9

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	Prop. Queued	Effective Stop Rate	
					Distance m			
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	18.7	LOS B	0.1	0.1	0.56	0.56
P4	West Full Crossing	53	41.8	LOS E	0.1	0.1	0.84	0.84
P8	SouthWest Full Crossing	53	22.3	LOS C	0.1	0.1	0.61	0.61
All Pedestrians		211	34.3	LOS D			0.74	0.74

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.

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MOVEMENT SUMMARY

 Site: 3068 [Macquarie & Pirie PM Scenario 1]

 Network: N102B [Scenario 1 - PM Peak]

Site Category: (None)

Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		veh	m				km/h
SouthEast: Pirie St (SE)														
21	L2	518	1.8	518	1.8	0.255	16.4	LOS B	8.1	57.6	0.58	0.71	0.58	35.2
23	R2	160	2.0	160	2.0	0.611	46.5	LOS D	8.0	56.9	0.88	0.78	0.88	4.8
Approach		678	1.9	678	1.9	0.611	23.5	LOS B	8.1	57.6	0.65	0.73	0.65	28.6
NorthEast: Macquarie St (NE)														
24	L2	358	0.9	358	0.9	0.552	30.3	LOS C	16.2	114.2	0.84	0.83	0.84	8.5
25	T1	408	1.3	408	1.3	0.533	39.7	LOS C	10.6	74.7	0.94	0.77	0.94	25.8
Approach		766	1.1	766	1.1	0.552	35.3	LOS C	16.2	114.2	0.89	0.80	0.89	21.0
SouthWest: Macquarie St (SW)														
31	T1	206	1.5	206	1.5	0.532	11.1	LOS A	13.2	92.7	0.44	0.39	0.44	37.8
32	R2	441	0.2	441	0.2	0.532	34.0	LOS C	13.2	92.7	0.81	0.79	0.81	26.4
Approach		647	0.7	647	0.7	0.532	26.7	LOS B	13.2	92.7	0.69	0.66	0.69	29.2
All Vehicles		2092	1.2	2092	1.2	0.611	28.8	LOS C	16.2	114.2	0.75	0.73	0.75	26.0

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	Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P5	SouthEast Full Crossing	53	40.9	LOS E	0.1	0.1	0.83	0.83
P6	NorthEast Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		105	47.6	LOS E			0.89	0.89

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.

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MOVEMENT SUMMARY

Site: [Scott Access PM Peak Scenario 1]

Network: N102B [Scenario 1 - PM Peak]

Site Category: (None)
 Giveway / Yield (Two-Way)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %				Vehicles veh	Distance m				
South: SCOTT ST ACCESS														
1	L2	132	0.0	132	0.0	0.269	1.6	LOS A	0.6	4.0	0.41	0.32	0.41	8.9
Approach		132	0.0	132	0.0	0.269	1.6	LOS A	0.6	4.0	0.41	0.32	0.41	8.9
East: SCOTT ST														
4	L2	1	0.0	1	0.0	0.176	6.9	LOS A	0.3	2.1	0.00	0.00	0.00	34.4
5	T1	685	0.0	685	0.0	0.176	0.0	LOS A	0.3	2.1	0.00	0.00	0.00	49.8
Approach		686	0.0	686	0.0	0.176	0.0	NA	0.3	2.1	0.00	0.00	0.00	49.8
West: SCOTT ST														
11	T1	142	0.0	142	0.0	0.039	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		142	0.0	142	0.0	0.039	0.0	NA	0.0	0.0	0.00	0.00	0.00	50.0
All Vehicles		960	0.0	960	0.0	0.269	0.2	NA	0.6	4.0	0.06	0.04	0.06	33.9

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.
 Minor Road Approach LOS values are based on average delay for all vehicle movements.
 NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road 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 SUMMARY

 Site: 1484 [Terminus & Pirie PM Scenario 1]

 Network: N102B [Scenario 1 - PM Peak]

New Site
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network User-Given Cycle Time)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		veh	m				km/h
SouthEast: Pirie St (S)														
1	L2	173	0.6	173	0.6	0.473	46.5	LOS D	9.5	66.6	0.90	0.79	0.90	31.8
2	T1	111	0.0	111	0.0	0.473	52.7	LOS D	9.5	66.6	0.96	0.77	0.96	20.7
Approach		283	0.4	283	0.4	0.473	48.9	LOS D	9.5	66.6	0.92	0.79	0.92	28.1
NorthEast: Terminus St (E)														
4	L2	54	0.0	54	0.0	0.049	4.0	LOS A	0.1	0.5	0.02	0.55	0.02	45.4
5	T1	495	6.1	495	6.1	0.223	0.6	LOS A	0.4	2.7	0.03	0.02	0.03	59.0
6	R2	550	2.0	550	2.0	0.510	11.1	LOS A	4.6	32.6	0.45	0.67	0.45	14.9
Approach		1099	3.7	1099	3.7	0.510	6.0	LOS A	4.6	32.6	0.24	0.37	0.24	44.8
NorthWest: Pirie St (N)														
7	L2	657	1.0	657	1.0	0.327	19.1	LOS B	11.6	81.6	0.61	0.73	0.61	9.9
8	T1	123	0.0	123	0.0	0.505	54.3	LOS D	7.0	49.0	0.99	0.79	0.99	21.7
9	R2	17	0.0	17	0.0	0.222	69.7	LOS E	1.0	7.3	1.00	0.69	1.00	19.3
Approach		797	0.8	797	0.8	0.505	25.6	LOS B	11.6	81.6	0.67	0.74	0.67	15.2
SouthWest: Terminus St (W)														
10	L2	17	6.3	17	6.3	0.500	42.1	LOS C	13.6	100.1	0.87	0.75	0.87	27.6
11	T1	557	5.8	557	5.8	0.500	36.5	LOS C	13.9	101.9	0.87	0.75	0.87	27.7
12	R2	92	0.0	92	0.0	0.370	57.8	LOS E	5.0	35.1	0.95	0.77	0.95	29.1
Approach		666	5.0	666	5.0	0.500	39.6	LOS C	13.9	101.9	0.88	0.75	0.88	28.0
All Vehicles		2845	2.9	2845	2.9	0.510	23.6	LOS B	13.9	101.9	0.58	0.61	0.58	28.7

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	Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P1	SouthEast Full Crossing	53	13.1	LOS B	0.1	0.1	0.47	0.47
P3	NorthWest Full Crossing	53	40.9	LOS E	0.1	0.1	0.83	0.83
P4	SouthWest Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		158	36.1	LOS D			0.75	0.75

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.

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MOVEMENT SUMMARY

Site: 101 [Terminus & Scott PM Scenario 1]

Network: N102B [Scenario 1 - PM Peak]

Site Category: (None)
 Giveway / Yield (Two-Way)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		veh	m				km/h
South: RoadName														
1	L2	49	4.3	49	4.3	0.027	4.7	LOS A	0.0	0.0	0.00	0.56	0.00	31.2
3	R2	116	0.0	116	0.0	0.094	5.6	LOS A	0.4	2.6	0.28	0.60	0.28	48.4
Approach		165	1.3	165	1.3	0.094	5.3	LOS A	0.4	2.6	0.19	0.59	0.19	46.9
West: Scott St(W)														
11	T1	182	2.9	182	2.9	0.118	0.1	LOS A	0.0	0.0	0.00	0.11	0.00	52.1
12	R2	31	58.6	31	58.6	0.118	4.3	LOS A	0.0	0.0	0.00	0.11	0.00	47.5
Approach		213	10.9	213	10.9	0.118	0.7	NA	0.0	0.0	0.00	0.11	0.00	52.0
All Vehicles		378	6.7	378	6.7	0.118	2.7	NA	0.4	2.6	0.08	0.32	0.08	49.8

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.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road 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.

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MOVEMENT SUMMARY



Site: 101 [Terminus & Speed & Newbridge PM Scenario 1]



Network: N102B [Scenario 1 - PM Peak]

New Site

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue	Back of Queue Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		veh	m				km/h
South: Speed St (S)														
1	L2	22	0.0	22	0.0	0.032	29.5	LOS C	0.8	5.6	0.66	0.66	0.66	11.0
3	R2	638	1.7	638	1.7	0.927	62.8	LOS E	44.6	316.8	1.00	1.01	1.25	21.4
Approach		660	1.6	660	1.6	0.927	61.7	LOS E	44.6	316.8	0.99	1.00	1.23	21.3
East: Newbridge Rd (E)														
4	L2	676	4.7	676	4.7	0.934	54.8	LOS D	61.5	447.0	1.00	1.03	1.21	23.9
5	T1	1140	4.1	1140	4.1	0.934	48.4	LOS D	63.5	460.0	1.00	1.07	1.20	23.1
Approach		1816	4.3	1816	4.3	0.934	50.8	LOS D	63.5	460.0	1.00	1.06	1.20	23.5
North: Terminus St (N)														
7	L2	28	55.6	28	55.6	0.427	68.6	LOS E	1.8	18.3	1.00	0.73	1.00	19.0
Approach		28	55.6	28	55.6	0.427	68.6	LOS E	1.8	18.3	1.00	0.73	1.00	19.0
West: Terminus St (W)														
10	L2	164	1.3	164	1.3	0.089	5.6	LOS A	0.0	0.0	0.00	0.53	0.00	41.6
11	T1	1071	3.7	1071	3.7	0.725	29.7	LOS C	28.2	203.7	0.87	0.77	0.87	35.0
Approach		1234	3.4	1234	3.4	0.725	26.5	LOS B	28.2	203.7	0.75	0.74	0.75	35.3
All Vehicles		3739	3.9	3739	3.9	0.934	44.8	LOS D	63.5	460.0	0.92	0.94	1.06	26.0

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	Average Delay	Level of Service	Average Back of Queue	Back of Queue Distance	Prop. Queued	Effective Stop Rate	
		ped/h	sec		Pedestrian ped	m			
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95	
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95	
All Pedestrians		105	54.3	LOS E			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.

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MOVEMENT SUMMARY

Site: 101 [Terminus Access PM Scenario 1 (Left-In Left-Out)]

Network: N102B [Scenario 1 - PM Peak]

Terminus & Access AM
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m				km/h
NorthEast: Terminus St E														
5	T1	1162	4.0	1162	4.0	0.122	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		1162	4.0	1162	4.0	0.122	0.0	NA	0.0	0.0	0.00	0.00	0.00	60.0
NorthWest: Access														
7	L2	65	0.0	65	0.0	0.095	3.8	LOS A	0.4	2.7	0.56	0.50	0.56	9.8
Approach		65	0.0	65	0.0	0.095	3.8	LOS A	0.4	2.7	0.56	0.50	0.56	9.8
SouthWest: Terminus St W														
10	L2	4	0.0	4	0.0	0.348	6.6	LOS A	0.0	0.0	0.00	0.01	0.00	55.3
11	T1	1211	3.2	1211	3.2	0.348	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.4
Approach		1216	3.2	1216	3.2	0.348	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.3
All Vehicles		2443	3.5	2443	3.5	0.348	0.1	NA	0.4	2.7	0.01	0.02	0.01	38.8

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.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road 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.

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