Traffic Impact Assessment

Planning Proposal

274 & 274A Longueville Road, Lane Cove
4-18 Northwood Road, Lane Cove

Reference: 16.326r01v6
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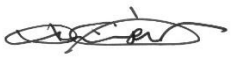
v1	09/09/2016	Kedar Ballurkar	Graham Pindar	
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Contents

1. Executive Summary

- *TRAFFIX has been commissioned by Pathways Property Group Pty Ltd to undertake a Traffic Impact Assessment in relation to a Planning Proposal (PP) submission for the site comprising 274 & 274A Longueville Road and 4-18 Northwood Road in Lane Cove. It is proposed to trigger the provisions of the State Environmental Planning Policy (Seniors Housing) to allow for a residential aged care facility to be permissible on the site. Further, the PP seeks to establish a maximum height and Floor Space Ratio (FSR).*

- *This site has been subject to a previous PP submission which envisaged a mixed use development containing high density residential apartments and a supermarket. This development was assessed to generate in the order of 52 vehicle trips per hour during the AM peak period and 188 vehicle trips per hour during the PM peak period. This PP was not supported by Lane Cove Council due to several reasons including concerns for traffic, parking and access.*

- *An important scenario to assess and which provides a context for the current Planning Proposal is the development potential under current zonings and controls. In this regard, a development envisaged with permissible uses has been assessed to generate in the order of 34 vehicle trips per hour during the AM peak period and 103 vehicle trips per hour during the PM peak period. This is significantly more than would occur under the current Planning Proposal, which comprises a predominant low traffic generating use (residential aged care facility) and this is especially of benefit having regard to the location of the site.*

- *Specifically, the Planning Proposal has been structured to achieve 'traffic neutral' outcome when compared with existing conditions assuming full occupancy. This has arisen as the desired outcome following community consultation (held on Tuesday 20 September 2016).*

- *The adopted development concept comprises a residential care facility for aged persons containing approximately 130 beds, a 760m^2 gross floor area veterinary hospital and 685m^2 gross floor area of retail/café space. These uses generate 29 vehicle trips per hour during the AM peak period and 62 vehicle trips per hour during the PM peak period. This is a very positive outcome for the local community as it provides significantly improved facilities and amenity, without creating additional traffic demands.*

- *The site access arrangements are optimal for the site with all access consolidated at a single entry driveway and a single exit driveway. These access arrangements have already been given 'in principle' support by the Roads and Maritime Services and rely on all entry via a new access at the*

existing signalised intersection of Longueville Road, Northwood Road and Kenneth Street, with a downstream left-out only access. This arrangement is also supported for the current PP and is expected to be adopted for any future development of the site.

- *The proposed site access will significantly improve safety along the site frontage through the removal of all existing (unsafe) driveways and consolidation of access arrangements. This will reduce delays to through traffic movements along the site frontage and will also enhance pedestrian safety.*

- *The parking demand as required under the DCP will be fully met on-site with 46 spaces provided within a single basement level. This compares with 175 spaces under the previous PP and 88 spaces under the development based on the current zoning and controls. It also compares favourably with the requirement for 45 spaces based on the existing development on the site. This outcome underscores the low traffic generating and associated parking generation that occurs with the uses now proposed. It is emphasised that the DCP parking rates take full account of the good accessibility to public transport services along this arterial road corridor.*

- *Concerns relating to the performance of the intersection of Northwood Road and River Road, as well as the residential amenity on Arabella Street and Woodford Street, which would form part of a route for entering and exiting northbound traffic to the site, have been considered and addressed. While it is acknowledged these streets and local intersections are particularly sensitive to future development of the subject site, these concerns are allayed by the adoption of a low traffic generation (a traffic neutral) outcome.*

- *In light of the above, it is considered that the Planning Proposal to include residential aged care facilities as a permissible use will not intensity future development on-site and is considered supportable on traffic planning grounds. Indeed, it is considered to be in the public interest by virtue of the neutral traffic outcome, the provision of all parking and servicing on-site; and the provision of substantially improved and safer site access arrangements.*

2. Introduction

TRAFFIX has been commissioned by Pathways Property Group Pty Ltd to undertake a Traffic Impact Assessment in relation to a Planning Proposal (PP) submission for the site comprising 274 & 274A Longueville Road and 4-18 Northwood Road in Lane Cove. It is proposed to trigger the provisions of State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 to allow for a residential aged care facility to be permissible on the site. Further, the PP seeks to establish a maximum height and Floor Space Ratio for the subject site.

The report should be read in the context of the Planning Proposal submission, prepared separately. Future development on the site under this PP is not expected to be of a scale that would warrant referral to the Roads and Maritime Services (RMS) under the provisions of State Environmental Planning Policy (Infrastructure) 2007, access arrangements from Northwood Road will require concurrence from the RMS being a classified road.

3. Planning Context

3.1 Prior Planning Proposal

The site has been the subject to a prior PP for a residential flat building located above a supermarket, with two levels of basement parking accommodating in the order of 175 spaces. That development was estimated to generate a net increase in the order of 52 vehicle trips per hour during the AM peak period and 188 vehicle trips per hour during the PM peak period. The PP was not supported by Council due to several reasons including concerns for traffic, parking and access.

It is noteworthy that in correspondence with the RMS for this (far more intense) PP, *'in principle'* support was granted for a fourth leg for entry only into the site at the signalised intersection of Longueville Road, Northwood Road and Kenneth Street. This matter has also been discussed with RMS officers in relation to this current planning proposal and is considered appropriate for adoption, subject to RMS review of modelling results. Correspondence with the RMS in relation to these access principles is included in **Appendix A**.

3.2 Existing Planning Controls

Under the *Lane Cove Local Environmental Plan 2009* the site is split into two zones with the permissible uses of the site being:

- B1 Neighbourhood Centre: Boarding houses; Business premises; Car parks; Child care centres; Community facilities; **Medical centres; Neighbourhood shops; Office premises**; Respite day care centres; **Restaurants or cafes;** Roads; **Shop top housing**; Signage; Take away food and drink premises; **Veterinary hospitals**
- R4 High Density Residential: Bed and breakfast accommodation; Boarding houses; Child care centres; Community facilities; Exhibition homes; Group homes; Home businesses; Home industries; Hotel or motel accommodation; Multi dwelling housing; **Neighbourhood shops**; Places of public worship; **Residential flat buildings**; Respite day care centres; Roads; **Shop top housing**; Signage

For the purpose of assessing the parking demand and traffic impacts of permissible development under existing site controls, the uses highlighted in bold have been adopted.

3.3 Community Consultation

As part of the PP process, a community consultation was hosted by the applicant on Tuesday 20 September 2016. TRAFFIX made a presentation outlining the traffic impacts of an assumed development concept that included residential aged care and retail uses, which indicated a future traffic generation that exceeded that now proposed. In relation to potential traffic issues, the following concerns were also raised by local residents during the facilitated question and answer time:

- Northbound traffic performing a local diversion to enter and exit the site via Woodford Street and Arabella Street. It was queried whether sufficient traffic data is available to understand conditions on this street, which it was emphasised had limited capacity to handle additional volumes.
- Clarity regarding the trip generation rates adopted for the analysis, and the impact of retail development on this site. This includes the assumptions made for establishing the traffic generation for the existing developments on site, particularly the service station development.
- Delays and road safety for the intersection of Northwood Road and River Road. In particular, it was asked whether a roundabout explored in the previous PP would be considered and whether the access of the development upstream on Northwood Road could be modified to avoid local impacts.

These are all important considerations and have been assessed and responded by the development concept envisaged under this PP, which has been amended since the consultation session. Fundamentally, this has been achieved by pursuing a ‘traffic neutral’ outcome, whereby there will be negligible change in site traffic generation, but with other compensating safety benefits. These matters are discussed further below.

4. Location and Site

The subject site comprises of 274 & 274A Longueville Road and 4-18 Northwood Road in Lane Cove. It is situated on the eastern side of Northwood Road, approximately 20 metres south of the intersection of Longueville Road with River Road West.

The site has an irregular configuration with a site area of 5,050m^2. It has a western frontage to Longueville Road and Northwood Road that extends for approximately 87 metres, whilst the remainder of the site is bound by low density residential developments to the north and south, as well as by public domain (open space) to the east.

Presently there are five vehicular crossovers from Longueville Road / Northwood Road connecting to the site, all of which are near the existing traffic signals at Kenneth Street. Two of these driveways are located on a Right-of-Way and connect to at-grade parking areas at the rear of the site. These driveways provide single movement width (both for entry and exit) only.

A Location Plan is presented in **Figure 1**, with a Site Plan presented in **Figure 2**. Reference should also be made to the Photographic Record presented in **Appendix B**, which provides an appreciation of the general character of roads and other key attributes in proximity to the site.

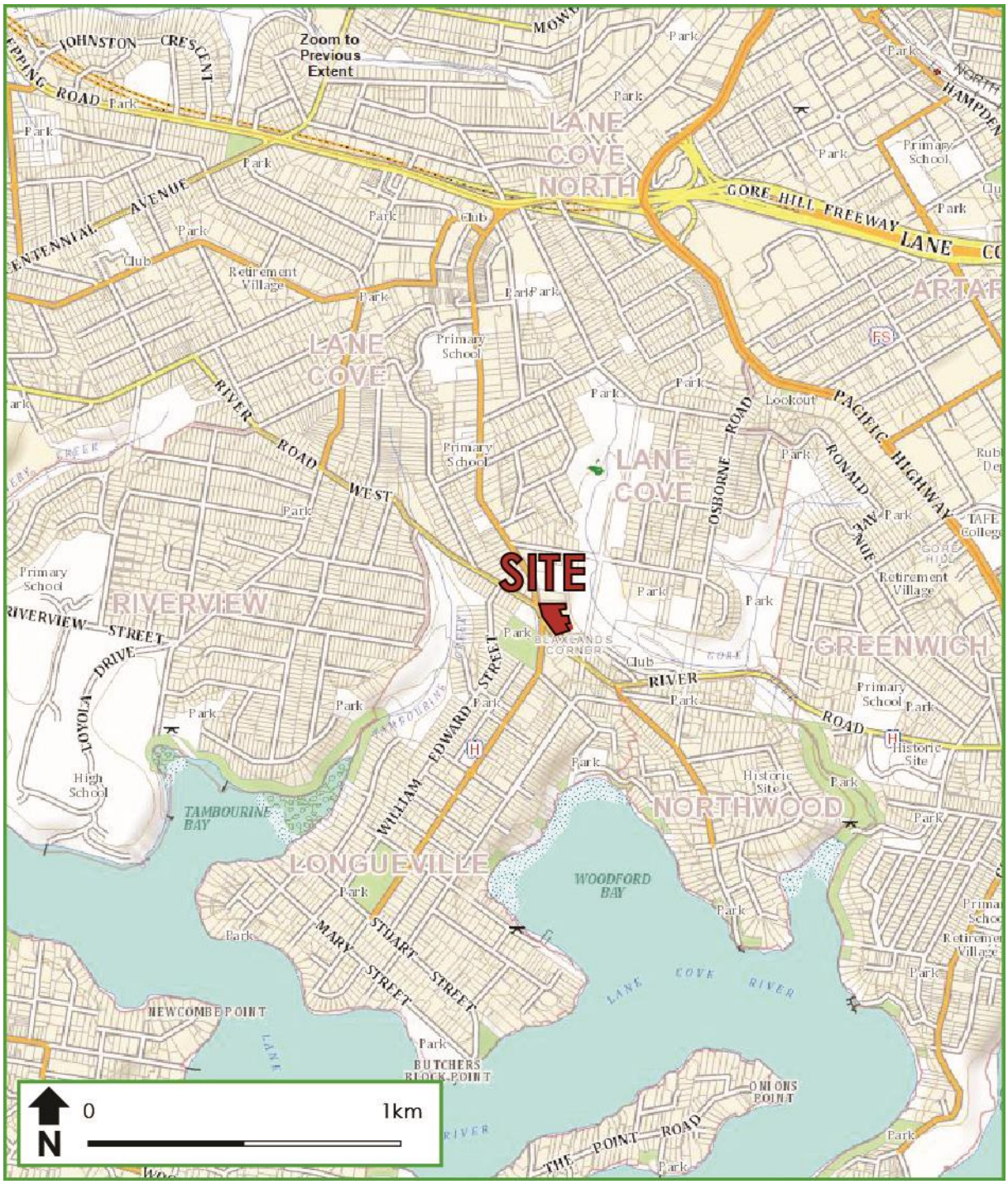


Figure 1: Location Plan

Figure 2: Site Plan

5. Existing Road Conditions

5.1 Road Network

The road hierarchy near the site is illustrated in **Figure 3** and is described below for roads that are of interest in the context of this application:

- River Road: a Roads and Maritime controlled secondary road (SR2070) that runs in an east-west direction between Shirley Road at Wollstonecraft to the east and Northwood Road at Northwood to the west. It carries approximately 16,400 vehicles per day (2016 AADT) and has a posted speed limit of 50 km/h. River Road generally accommodates one lane of traffic in each direction within an undivided carriageway, however this increases to two lanes in each direction within the vicinity of the site.

- River Road West: a Roads and Maritime controlled secondary road (SR2070) that runs in an east-west direction between Northwood Road at Longueville to the east and Bridge Street at Lane Cove to the west. It has a posted speed limit of 50 km/h and accommodates two lanes of traffic in each direction within an undivided carriageway.

- Longueville Road: a local road for the most part that runs in a north-south direction between the Pacific Highway to the north and Kenneth Street to the south. Between River Road West and Kenneth Street, it is upgraded to secondary road status (SR2070) and has a posted speed limit of 50 km/h. Within the vicinity of the site, and including along the frontage, both kerbsides of Longueville Road are subject to 'No Stopping' restrictions.

- Northwood Road: a local road for the most part that runs in a north-south direction between Kenneth Street to the north and past Point Road to the south where it terminates just north of Northwood Ferry Wharf. Between Kenneth Street and River Road, it is

upgraded to secondary road status (SR2070) where the local alignment of Northwood Road is made to give way to traffic at the intersection with Northwood Road. It has a posted speed limit of 50 km/h, and north of River Road, accommodates two lanes of traffic in each direction within an undivided carriageway. Within the vicinity of the site, kerbside parking is generally permitted on Northwood Road, with peak hour No Stopping restrictions applying on the eastern kerbside lane.

- Kenneth Street: a collector road that runs in a northeast-southwest direction between Longueville Road to the east and Belcote Road to the west. It generally accommodates one through lane of traffic in each direction within an undivided carriageway and has a posted speed limit of 50 km/h and forming a signal controlled intersection with Northwood directly opposite the site.

- Arabella Street: a local street that generally runs in a northeast-southwest direction, starting from Northwood Road in the east and terminating west of Mary Street. Between Northwood Road and Woodford Street, it has a speed limit of 50 km/h and accommodates traffic flow in both directions within an undivided carriageway, with parking permitted on the northern kerbside only.

- Woodford Street: a local road that has an irregular alignment, extending between Kellys Esplanade in the east and Kenneth Street to the west. Between Arabella Street and Kenneth Street, it has a speed limit of 50 km/h and accommodates traffic flow in both directions within an undivided carriageway. Whilst parking is permitted on both kerbsides, a narrow road width prohibits motorists to park opposite to another parked car in accordance with the Road Rules 2014.

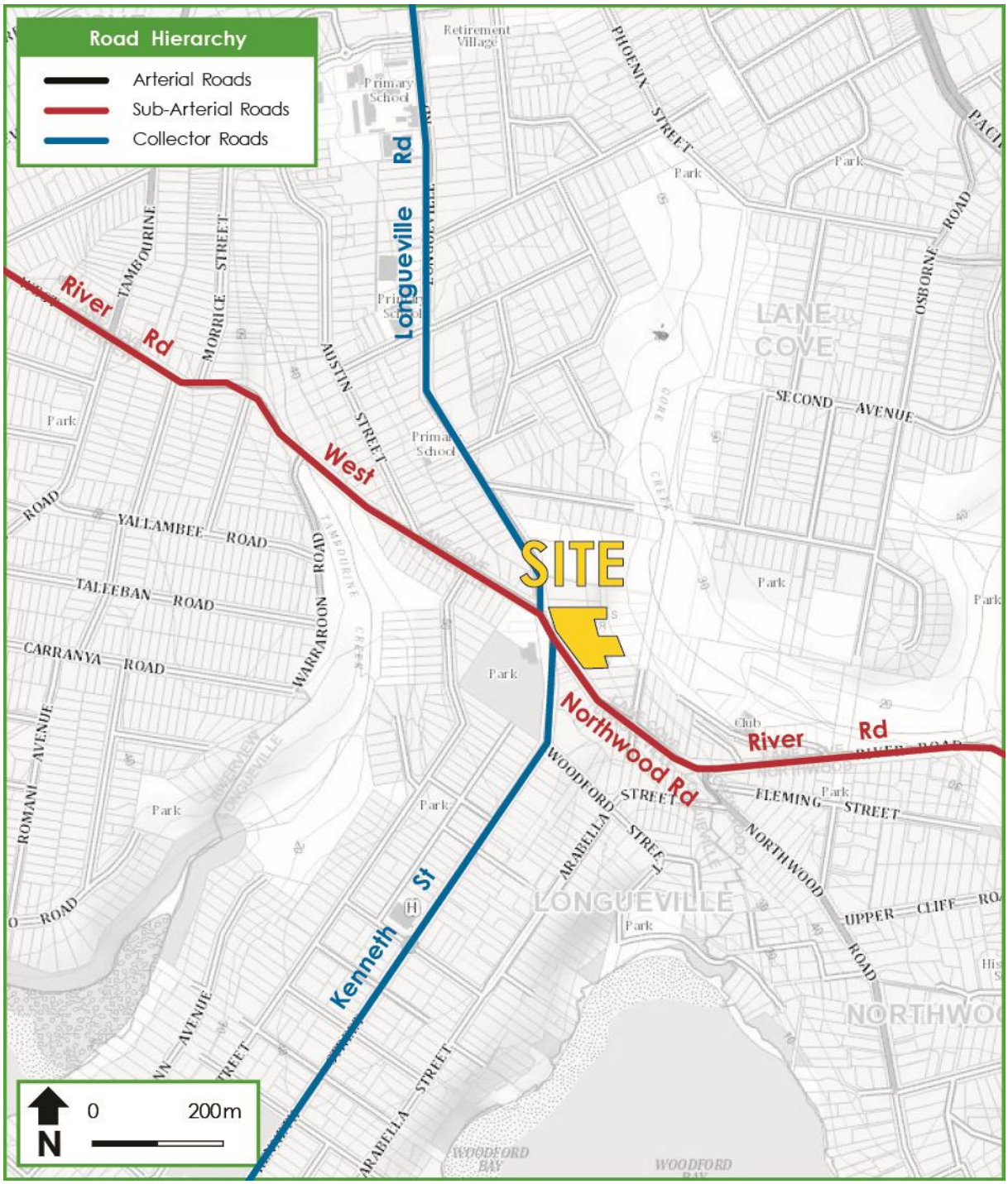


Figure 3: Road Hierarchy

5.2 Key Intersections

The key intersections near the site are shown below and provide an understanding of the existing road geometry and alignment:

Source: Near Map

Figure 4: Intersection of Longueville Road and River Road West

It can be seen from **Figure 4** that the intersection of Longueville Road and River Road West forms a signalised 'T-Junction'. On the north leg of Longueville Road, two approach lanes are provided with a 'No Right Turn' restriction imposed, whilst a single exit lane is provided. Conversely on the south leg of Longueville Road, two approach lanes are provided whereby both lanes are permitted to turn left, with the right lane also permitted to continue straight. Two exit lanes are also provided on this leg. The west leg of River Road West provides two approach lanes, both permitted to turn right, with a slip lane along

traffic on the left lane to bypass signals when turning onto the north leg of Longueville Road. Two exit lanes are also provided for River Road West.

Source: Near Map

Figure 5: Intersection of Longueville Road, Northwood Road and Kenneth Street

It can be seen from **Figure 5** that the intersection of Longueville Road, Northwood Road and Kenneth Street forms a signalised 'T-Junction'. On the north leg of Longueville Road, three approach lanes are provided, including two through lanes and a dedicated right turn bay. Two exit lanes are provided on this leg. Conversely, on the south leg of Longueville Road, two approach lanes and two exit lanes are provided. Two approach and two exit lanes are also provided on the west approach of Kenneth Street, with both approach lanes permitted to turn left.

Source: Near Map

Figure 6: Intersection of Northwood Road and River Road

It can be seen from **Figure 6** that the intersection of Northwood Road and River Road forms a T-Junction intersection. The western leg of Northwood Road and eastern leg of River Road are afforded priority over the southern leg of Northwood Road, which is a local road that forms the stem of the 'T' junction with Northwood Road. Northwood Road provides two lanes of traffic in each direction. The south leg of Northwood Road (the local road) includes two approach lanes that are split by a median island, with the left lane permitted to turn left only and the right lane permitted to turn right only.

5.3 Road Network Volumes

TRAFFIX has previously commissioned surveys for the above intersections in 2012 to establish typical weekday traffic volumes during peak periods. To determine whether these counts remain representative of present conditions, peak period surveys were undertaken on Tuesday, 2 August 2016 for the 'test' intersection of Longueville Road with River Road West.

Comparison of the 2016 survey with the survey undertaken for the same intersection on Thursday & Friday, 3-4 May 2012 (for the PM peak period and AM peak period respectively) reveals that traffic volumes on all approaches reduced, aside from the minor movements between River Road West and Longueville Road. The largest increase in volumes recorded for a single movement is eight (8) vehicle trips per hour and equates to an extra vehicle trip every 7.5 minutes during peak periods. On this basis, the traffic volumes established in the 2012 surveys are considered to remain valid, noting that daily fluctuations can occur. A summary of the 2012 and 2016 counts is presented in **Appendix C**.

These counts have been adopted as baseline volumes for intersection modelling undertaken and described below for existing conditions and with the addition of development concept volumes envisaged for the Planning Proposal, with the intent of comparatively assessing the performance of the future site access at the intersection of Longueville Road, Northwood Road and Kenneth Street against the existing configuration.

5.4 Existing Intersection Performance

To assess the performance of these nominated key intersections, hourly peak volumes were extracted from the surveyed time periods of the above counts between 7:00am-9:00am during the regular network weekday AM peak period and 4:00pm-6:00pm during the regular weekday PM peak period. These volumes adopted as baseline volumes and analysing using the SIDRA computer program to determine their performance characteristics under existing traffic conditions. In particular, a SIDRA network model has been prepared to account for the coordination of the two closely spaces signalised intersections.

The SIDRA model produces a range of outputs, the most useful of which are the Degree of Saturation (DOS) and Average Vehicle Delay per vehicle (AVD). The AVD is in turn related to a level of service (LOS) criteria. These performance measures can be interpreted using the following explanations:

DOS - the DOS is a measure of the operational performance of individual intersections. As both queue length and delay increase rapidly as DOS approaches 1, it is usual to attempt to keep DOS to less than

0.9. When DOS exceeds 0.9 residual queues can be anticipated, as occurs at many major intersections throughout the metropolitan area during peak periods. In this regard, a practical limit at 1.1 can be assumed. For intersections controlled by roundabout or give way/stop control, satisfactory intersection operation is generally indicated by a DOS of 0.8 or less.

AVD - the AVD for individual intersections provides a measure of the operational performance of an intersection. In general, levels of acceptability of AVD for individual intersections depend on the time of day (motorists generally accept higher delays during peak commuter periods) and the road system being modelled (motorists are more likely to accept longer delays on side streets than on the main road system).

LOS - this is a comparative measure which provides an indication of the operating performance of an intersection as shown below in **Table 1**:

Table 1: Intersection Performance Characteristics

Level of Service	Average Delay per Vehicle (sec/veh)	Traffic Signals, Roundabout	Give Way and Stop Signs
A	less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory but accident study required
D	43 to 56	Operating near capacity	Near capacity and accident study required
E	57 to 70	At capacity; at signals incidents will cause excessive delays. Roundabouts require other control mode	At capacity and requires other control mode
F	More than 70	Unsatisfactory and requires additional capacity.	Unsatisfactory and requires other control mode or major treatment.

A summary of the modelled results are provided in **Table 2** for the morning (AM) and afternoon (PM) peak hours. Reference should also be made to the SIDRA outputs provided in **Appendix D**, which provide detailed results for individual lanes and approaches.

Table 2: Existing Intersection Performance –SIDRA Network

Intersection	Control Type	Period	Intersection Degree of Saturation (DOS)	Average Delay (AVD)	Level of Service (LOS)
Longueville Road / River Road West	Signals	AM	0.747	17.9	B
		PM	0.658	18.2	B
Longueville Road / Kenneth Street / Northwood Road	Signals	AM	0.604	8.4	A
		PM	0.991	38.0	C
Northwood Road / River Road	Priority*	AM	1.018	135.5	F
		PM	0.833	185.0	F

* Note: For 'T' junctions, the results shown are for the movement with the highest delay in accordance with RMS Guidelines, while for signals the average delay across all approached is adopted.

The results in Table 2 reveal that the intersections of Longueville Road / River Road West and Longueville Road / Kenneth Street / Northwood Road operate at Level of Service of C, with acceptable delays under RMS guidelines.

The intersection of Northwood Road / River Road operates very well overall, but with a Level of Service of F for the worst performing approach, which is for motorists seeking to turn right from Northwood Road into River Road. This is common for local side roads on approach to busy arterial roads and reflects RMS priority to maintain efficient travel along the main road network. While the delays during both AM and PM peak periods therefore exceed desirable delays, this does not indicate a need for an intersection upgrade for exiting traffic.

5.5 Public Transport

The existing public transport network operating in the locality is shown in **Figure 7**. It is evident that the site is situated directly adjacent to bus stops that are serviced by Route 261 operating between Chatswood in the north and the Sydney central business district to the southeast. Bus stops on Longueville Road, within 200 metres walking distance of the site, are also serviced by Routes 253 and 254, which operate between Riverview and the Sydney central business district and McMahons Point Wharf, respectively.

It is noteworthy that during weekdays, services for these routes begin around 6:30am and end around 10:00pm. Whilst weekend services do not extend to these times, any increases in patronage associated with future development of the site should warrant consideration to increase the duration and frequency of services. In any case, early morning and late night services operate on all days of the week from the Lane Cove Interchange on Epping Road, approximately 1.3 kilometres. An arrangement to shuttle users of the site to this interchange would be feasible for large and organised development operating with fixed roster time, such as a residential aged care facility.

Nonetheless, the site is considered to have good access to public transport and is ideally located to take advantage of future public transport improvements.

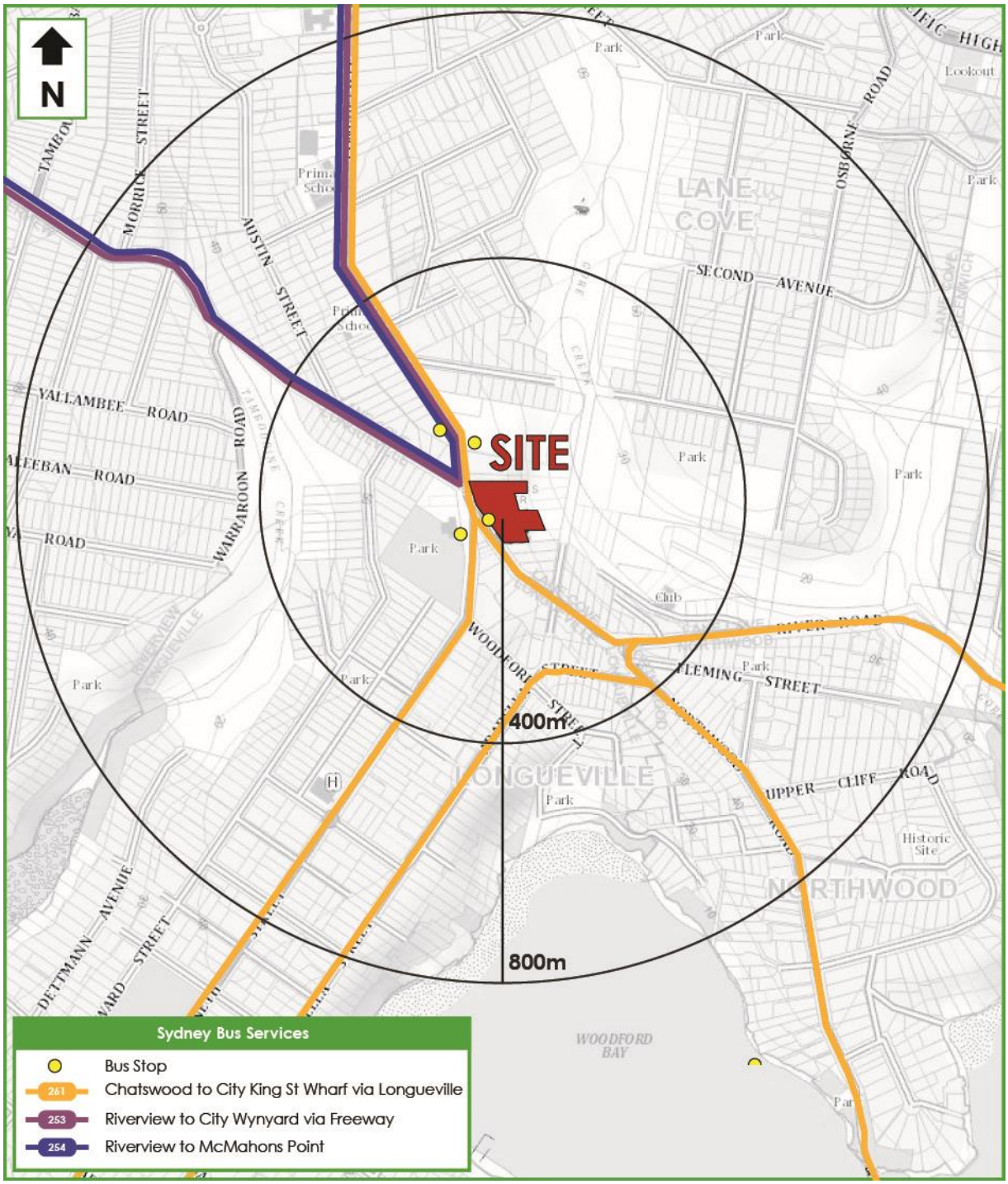


Figure 7: Public Transport

5.6 Existing Development on the Site

The existing development on the site provides a base case against which any future development proposal can be assessed. This includes development potential under existing controls as well as development potential under this Planning Proposal. Both of these scenarios are assessed in subsequent sections.

With regard to the existing base case scenario, the site comprises several properties which include the following:

- Two (2) dwelling houses;
- A service station (approximately 1,558m^2 in site area) that accommodates;
    - Several fuel bowsers;
    - A convenience store (approximately 160m^2 gross floor area); and
    - A mechanical repairs workshop.
- A two storey semi-detached building containing:
    - A ground floor retail tenancy (approximately 98.6m^2 gross floor area);
    - A first floor Pilates Studio (approximately 98.6m^2 gross floor area)
- A two storey semi-detached building containing:
    - A ground floor retail tenancy (approximately 107.4m^2 gross floor area);
    - A first floor residential apartment;
- A single ground level (with a lower ground level) building containing 316.3m^2 gross floor area of retail space; and
- A two storey (with a lower ground level) building containing:
    - A ground floor veterinary clinic (approximately 154m^2 gross floor area);
    - A 'in-house' lower ground floor pet grooming parlour (approximately 76m^2 gross floor area); and
    - Two (2) first floor residential apartments.

5.6.1 Current Parking Demand

The *Lane Cove Development Control Plan 2009* requires parking for the approved uses of the site to be provided in accordance with the rates shown listed in **Table 3**. Whilst the rates are applicable for new development only, they have been applied to the existing developments on-site for a comparison of parking demands under the Planning Proposal.

Table 3: Car Parking Rates

Type	Number / GFA	Parking Rate	Spaces Required
Residential Dwelling House			
Houses	2	1 space per dwelling	2
Shop Top Housing			
Dwellings	3	1 space per dwelling	3
Shop	522.6m^2	1 space per 40m^2	13
Service Stations			
Holding Bays	-	Minimum 4 holding bays	4
Employees	2*	1 space per 2 employees	1
Retail	160m^2	1 space per 25m^2	6
Vehicle Repair Station			
Holding Bays	-	Minimum 4 holding bays	4
Employees	4*	1 space per 2 employees	2
Gymnasium			
Customers	98.6m^2	3 spaces per 100m^2	3
Employees	5*	1 space per 5 employees	1
Veterinary Hospital			
Customers	2*	1 space per veterinarian	2
Veterinarian	2*	1 space per veterinarian	2
Employees	4*	1 space per 2 employees	2
		Total	**45**

*Estimates

It can be seen from Table 3 that the approved developments on-site are estimated to generate a parking demand for 45 spaces under Council's current planning controls. Site inspections reveal that parking on-site is not formalised, however this provision is generally accommodated on-site.

Site inspections also reveal there is no provision for accessible car parking on-site for the currently approved developments. In addition, most buildings are accessed at street level from parking located at the rear of the buildings, where the site has steep gradients.

5.6.2 Servicing and Waste Facilities

Whilst the service station development can accommodate large refuelling trucks, the remaining developments are unable to safely accommodate large trucks due to a combination of the site gradeints and limited geometry. Furthermore, the single flow widths of two of these accesses compounds difficulty for service vehicles to enter and exit the site without affecting amenity for users of these developments. A degree of reliance for on-street parking for waste and service vehicles presently occurs.

5.6.3 Existing Site Access

As mentioned above, the existing site is characterised by multiple driveway crossings directly onto Longueville Road / Northwood Road, all of which are in close proximity to the existing traffic signals at Kenneth Street. These driveways provide single movement width (both for entry and exit) only. They are relatively unsafe and involve significant conflicts with arterial through movements, while also presenting difficulties for pedestrian movement along the site frontage. These deficiencies are overcome under the Planning Proposal as discussed in the following sections.

5.6.4 Existing Site Traffic Generation

Residential Dwelling House

The RMS *Technical Direction TDT 2013/04a*, which supplements the *Guide to Traffic Generating Developments* provides updated traffic generation rates for low density residential dwellings based on surveys conducted in Sydney during 2010. It recommends an hourly trip generation rate of 0.95 vehicle trips per dwelling during the AM peak period and 0.99 vehicle trips per dwelling during the PM peak period. Application of these rates to the existing two dwelling houses on-site results in the following traffic generation:

- 2 vehicle trips per hour during the AM peak period (0 in, 2 out)*; and
- 2 vehicle trips per hour during the PM peak period (2 in, 0 out)*.

* Assumes an 80:20 traffic split.

Service Station (Refuelling and Workshop)

The RMS *Guide to Traffic Generating Developments* provides traffic generation rates for service station developments, which it defines to be inclusive of refuelling, retail and workshop uses. It recommends an hourly trip generation rate equivalent to 4 vehicle trips per 100m^2 of site area (with a separate rate for convenience stores applied further below). It is noted however, that these trips are drawn fundamentally from 'through' traffic already on the road network (i.e. 'linked' trips), and thus the actual trips destined to the existing service station on-site would be considerably lower. Nonetheless, noting the high southbound (city bound) traffic volumes established in surveys for Northwood Road, the AM peak period trip generation rate is assumed to be equivalent to 75% of the PM peak period rate.

In the context of estimating the local trip generation, such as for nearby residents refuelling and customers of the mechanical repairs workshop, a reduction factor of 80% has been adopted. Accordingly, application of the above rates and reduction factor to the existing service vehicle station on-site, with a site area of 1,558m^2, results in the following traffic generation:

- 9 vehicle trips per hour during the AM peak period (5 in, 4 out)*; and
- 12 vehicle trips per hour during the PM peak period (5 in, 7 out)*.

* Assumes a 60:40 traffic split.

Service Station (Convenience Store)

The RMS rates for service stations also includes a component for convenience stores, whereby the guide recommends an hourly trip generation rate of 30 vehicle trips per 100m^2 gross floor area during the PM peak period. Similar to the above, an 80% reduction factor has also been adopted to account for local traffic only. When also assuming the AM peak period trip generation to be 75% of the PM peak

period rate, the existing convenience store containing 160m^2 gross floor area is estimated to generate the following traffic:

- 7 vehicle trips per hour during the AM peak period (4 in, 3 out)*; and
- 10 vehicle trips per hour during the PM peak period (5 in, 5 out)*.

* Assumes a 50:50 traffic split.

Gymnasium

The RMS *Guide to Traffic Generating Developments* also provides traffic generation rates for gymnasiums which is defined to include fitness studios. It recommends an hourly trip generation rate of 9 vehicle trips per 100m^2 gross floor area during the PM peak period for gymnasiums situated in metropolitan sub-regional areas. The AM peak period generation has been assumed to be a third of the PM peak period rate. Application of these rates to the 98.6m^2 gross floor area Pilates Studio results in the following traffic generated:

- 3 vehicle trips per hour during the AM peak period (2 in, 1 out)*; and
- 9 vehicle trips per hour during the PM peak period (4 in, 5 out)*.

* Assumes a 50:50 traffic split.

Neighbourhood Retail

The RMS guide also provides traffic generation rates for secondary retail stores, defined to be those stores that tend not to be the primary attractors to a centre. It recommends an hourly trip generation rate of 4.6 vehicle trips per 100m^2 gross leasable floor area, occurring during the PM peak period on Thursdays. The AM peak period rate has been assumed to be third of the PM peak period rate to account mainly for staff arrivals, whilst it is also assumed that gross leasable floor area is equivalent to gross floor area. Application of the above rates to the combined 522.3m^2 gross floor area of approved retail space results in the following traffic generation:

- 8 vehicle trips per hour during the AM peak period (7 in, 1 out)*; and
- 24 vehicle trips per hour during the PM peak period (12 in, 12 out)#.

* Assumes an 80:20 traffic split.
# Assumes a 50:50 traffic split.

Veterinary Hospital

The RMS *Guide to Traffic Generating Developments* provides traffic generation rates for medical centres situated within shopping centres, which is considered the most applicable use for the existing veterinary on-site, estimated to have a gross floor area of approximately 230m^2. For this use, it recommends an hourly peak period trip generation rate of 2.2 vehicle trips per 100m^2 gross leasable floor area, occurring only during the PM peak period on Thursdays. In assuming a third of the PM peak period rate to represent staff arrivals during the AM peak period, the existing veterinary hospital has been assessed to generate the following traffic:

- 2 vehicle trips per hour during the AM peak period (2 in, 0 out)*; and
- 5 vehicle trips per hour during the PM peak period (2 in, 3 out)#.

* Assumes an 80:20 traffic split.
# Assumes a 50:50 traffic split.

Combined Traffic Generation

Having regard for the above trip generation for each development, the approved traffic generation of the site is estimated to be:

- 33 vehicle trips per hour during the AM peak period (20 in, 13 out); and
- 64 vehicle trips per hour during the PM peak period (32 in, 32 out).

It is emphasised that this level of traffic generation has historically occurred on the local road network, notwithstanding that the site is not presently fully occupied. Again, this represents a base case level of traffic generation against which future development scenarios may be assessed.

6. Permissible Development under Current Planning Controls

6.1 Description of Potential Development under Current Controls

A development permissible under current planning controls, incorporating the highlighted uses in Section 3.2, has been envisaged with the following composition:

- A four storey mixed use development containing:
  - 185m^2 gross floor area of retail space;
  - 8 residential apartments that are 70m^2, each assumed to contain two bedrooms; and
- A three storey mixed use development containing:
  - 1,200m^2 gross floor area of retail space;
  - A medical centre containing 1,200m^2 gross floor area; and
  - 17 residential apartments that are 70m^2, each assumed to contain two bedrooms.

6.2 Car Parking Demand

The Lane Cove Development Control Plan 2009 requires parking for the selected permissible uses of the site to be provided in accordance with the rates shown listed in **Table 4**.

Table 4: Car Parking Rates

Type	Number / GFA	Parking Rate	Spaces Required
Shop Top Housing			
Dwellings	25	1 space per dwelling	25
Shop			
Tenancy	1,385m^2	1 space per 40m^2	35
Medical Centre			
Visitors	15	1 space per 3 rooms	5
Professionals	15*	1 space per professional	15
Employees	15*	1 space per 2 employees	8
		Total	**88**

*Estimates

It can be seen from Table 4 that this development is estimated to generate a parking demand for 88 spaces, which is substantially greater than the demand of 45 spaces generated by the existing developments on-site.

6.3 Servicing and Waste Facilities

It is noted that as the subject site is split into two zones, the potential for separated developments under existing controls is more likely. The consolidated 'in principle' agreement for a single entry and single exit access is thus not a guaranteed outcome, to which each development may have to accommodate separate on-site service and waste provisions to Council's satisfaction.

6.4 Trip Generation

The traffic generation that would arise under the adopted concept development associated with the current zonings and controls would include the following components:

6.4.1 Medium Density Residential

The RMS *Guide to Traffic Generating Developments* provides traffic generation rates for medium density residential developments which it defines as containing between 2 and 20 dwellings. It recommends for

apartments containing up to two bedrooms, an hourly trip rate of between 0.4-0.5 vehicle trips per dwelling during the AM and PM peak periods. Application of the upper limit of this range (each apartment is assumed to contain two bedrooms) to the 25 apartments results in the following traffic generation:

- 13 vehicle trips per hour during the AM peak period (3 in, 10 out)*; and
- 13 vehicle trips per hour during the PM peak period (10 in, 3 out)*.

* Assumes an 80:20 traffic split.

6.4.2 Neighbourhood Retail

The RMS guide also provides traffic generation rates for secondary retail stores, defined to be those stores that tend not to be the primary attractors to a centre. It recommends an hourly trip generation rate of 4.6 vehicle trips per 100m^2 gross leasable floor area, occurring during the PM peak period on Thursdays. The AM peak period rate has been assumed to be third of the PM peak period rate to account mainly for staff arrivals, whilst it is also assumed that gross leasable floor area is equivalent to gross floor area. Application of the above rates to the combined 1,385m^2 gross floor area of retail space results in the following traffic generation:

- 21 vehicle trips per hour during the AM peak period (17 in, 4 out)*; and
- 64 vehicle trips per hour during the PM peak period (32 in, 32 out)#.

* Assumes an 80:20 traffic split.
# Assumes a 50:50 traffic split.

6.4.3 Medical Centre

The RMS *Guide to Traffic Generating Developments* provides traffic generation rates for medical centres situated within shopping centres. For this use, it recommends an hourly peak period trip generation rate of 2.2 vehicle trips per 100m^2 gross leasable floor area, occurring only during the PM peak period on Thursdays. In assuming a third of the PM peak period rate to represent staff arrivals during the AM peak period, the 1,200m^2 gross floor area medical centre is estimated to generate the following traffic:

- 9 vehicle trips per hour during the AM peak period (7 in, 2 out)*; and

- 26 vehicle trips per hour during the PM peak period (13 in, 13 out)#.

* Assumes an 80:20 traffic split.

Assumes a 50:50 traffic split.

6.4.4 Combined Traffic Generation

Having regard for the above trip generation for each development, the traffic generation arising from this permissible development is estimated to be:

- 43 vehicle trips per hour during the AM peak period (27 in, 16 out); and
- 103 vehicle trips per hour during the PM peak period (55 in, 48 out).

7. Development under Planning Proposal

7.1 Description of Development Concept

To assess the impacts directly attributable to the PP, the applicant has envisaged a development concept that would comprise of a mixed use development containing a residential aged care facility and be of scale that would comply with the proposed maximum controls set under the LEP. Such a development would accommodate the following uses and approximate areas or provisions:

- A residential care facility for aged persons containing 130 beds (with a limit of 20 employees);
- A veterinary hospital containing 760m^2 gross floor area (with a limit of five staff); and
- 685m^2 gross floor area of combined retail and café space.

7.2 Parking Demand

7.2.1 Council Controls

The parking requirements for the adopted development concept has been assessed with respect to the Lane Cove Development Control Plan 2009 (DCP) and State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 (Seniors Housing SEPP), as summarised in **Table 5**. The DCP does not contain guidance on parking for residential aged care centres and instead rates have been adopted for this use from the Seniors Housing SEPP, to which it is stated that a consent authority must not refuse consent to a development application on parking related grounds if the minimum provision is satisfied under this policy.

Table 5: Car Parking Rates

Type	Number / GFA	Parking Rate	Spaces Required
Residential Care Facility (Aged)[1,3]			
Beds	130	1 space for every 10 beds	13
Employees	20	1 space per 2 employees	10
Veterinary Hospital[2,4]			
Veterinarians	2	1 space per veterinarian	2
Employees	3	1 space per 2 employees	2
Customers	-	1 space per veterinarian	2
Retail (Shops and Café)[2,4]			
Tenancy	685m^2	1 space per 40m^2	17
		Totals	**46**

[1] Parking rates adopted from Seniors Housing SEPP and are minimum rates.
[2] Parking rates adopted from DCP.
[3] Car parking analysis excludes ambulance parking requirements.
[4] Parking spaces rounded up to the nearest whole number in accordance with DCP.

It can be seen from Table 5 that to comply with the DCP and the Seniors Housing SEPP, such a development must provide a minimum of 46 parking spaces, noting that the calculated parking provisions for the veterinary hospital, retail and café components are exact requirements in accordance with the DCP. However, these requirements are treated cumulatively for each use and does not consider:

- Any shared use of parking, such as visitors to the aged care facility using retail parking at peak visiting times.
- Any reduction in parking for the neighbourhood retail use due to the significant local catchment (with many people walking) as well as patronage from the aged care facility itself.
- Staff rosters, which are expected to reduce the number of staff on site at any one time.
- The site constraints, which are characterised by difficult vehicular access and challenging topography; and

- The consideration of sustainable planning outcomes based on reduced car travel and support for non-travel modes, which may be dealt with under a Green Travel Plan.

In supplementing the last point made above, a parking survey has also been undertaken of an aged care facility, operated by the applicant, in Northbridge. The count took place on a typical weekday morning (Tuesday 11 October 2016) between 6:30am and 8:15am, which oversees a roster change with morning shifts experiencing the most staff rostered. During this timeframe, a maximum of 21 parking spaces out of a total of 41 spaces were recorded as occupied. This indicates that the reliance on private car usage is low having regard for the operational characteristics of the aged care homes run by the applicant.

It is therefore recommended that consideration be given to permitting a lower parking provision than nominally required under the DCP during a subsequent development application stage if approval for a development containing residential aged care uses is sought. Nonetheless, this assessment serves to demonstrate that the site is considered to be of a sufficient size to accommodate all parking demands generated by future development envisaged under this Planning Proposal.

7.2.2 Comparison

It is evident that future development which draws directly on the controls sought under this PP is likely to generate a similar parking demand compared to the existing developments on-site, and will be substantially less than what could be generated by a permissible development under current planning proposals.

It is also emphasised that the consolidation of site accesses into a single signalised entry access and downstream exit access will improve safety and accessibility to the site, especially as the existing accesses on-site are deficient, with single width roadways relied upon for both entry and exit movements.

7.2.3 Accessible Parking

Whist the DCP does not stipulate accessible parking requirements for residential care facilities, it is encouraged that compliance with the Building Code of Australia (BCA) is achieved where relevant. Under the BCA, a residential care facility which caters to aged persons is classified as a Class 9c building. However no accessible parking rates are prescribed for this type of building. It is thus

envisaged that the applicant propose a suitable provision of accessible parking during a subsequent development application phase, having regard for the operation of a future development.

Veterinary hospitals, retail and café uses have identical requirements under the DCP for accessible parking. For each component, a single accessible parking space must be provided for every 20 car parking spaces for each component, with a minimum for one accessible space. Having regard for the individual car parking provisions for the veterinary hospital, retail tenancy and café tenancy, three (3) parking spaces will need to be designed as accessible spaces to comply with the DCP. A final accessible parking provision may be confirmed during a subsequent development application phase and it is recommended that these spaces be designed in accordance with AS2890.6 (2009).

7.2.4 Motorcycle Parking

The DCP requires a single motorcycle parking space to be provided per 15 car spaces for all types of development. This equates to a requirement for four (4) motorcycle parking spaces in the case of the development concept. A final motorcycle parking provision may be confirmed during a subsequent development application phase and it is recommended that the spaces be designed in accordance with AS2890.1 (2004).

7.2.5 Bicycle Facilities

The DCP stipulates bicycle parking rates for various uses, and where no rates are published for a specific use, Council will consider a provision based on merit taking into consideration similar uses as well as those contained in the NSW Guidelines for Walking and Cycling. Accordingly, the bicycle parking requirements for the development concept has been assessed for each individual use, as summarised in **Table 6**.

Table 6: Bicycle Parking Rates

Type	Number / GFA	Parking Rate	Spaces Required
Residential Care Facility (Aged or Disabled Self-Contained Housing)[1]			
Residents	130	3-5% of the number of units	4 - 7
Visitors			4 - 7
Veterinary Hospital[2]			

Employees	5	1 space per 5 professionals	1
Customers	756.57m^2	1 rack plus 1 rack per 200m^2 GFA	5
Retail (Shop and Cafe)[2]			
Employees	685m^2	1 space per 50m^2	14
Customers		2 racks plus 1 rack per 200m^2 over 200m^2 GFA	5
		Totals	**33 – 39**

[1] Parking rates adopted from NSW Guidelines for Walking and Cycling

[2] Parking rates adopted from DCP.

It can be seen from Table 2 that the development concept will generate a requirement for 33 and 39 bicycle parking spaces to be provided under the DCP. It is noteworthy however, that the bicycle parking provision for residents should take into account their age and mobility, and in this regard there is the possibility that bicycle parking would only be necessary for staff – in which case a provision of between 29 and 32 bicycle parking spaces would be considered more appropriate. Nonetheless a final bicycle parking provision may be confirmed during a subsequent development application phase, and it is recommended that the facilities be designed in accordance with AS2890.3 (2015) for each user class as appropriate.

7.3 Servicing

The DCP stipulates that parking areas shall be provided and designed to allow for access and loading by Council's waste collection contractor. It is considered that a subsequent development application phase would be an appropriate time to determine a suitable service vehicle provision, having regard for the loading requirements of the future development that approval is sought for.

Nonetheless, it is relevant to highlight that the maximum height controls sought in the PP will allow for a ground floor height of 4.5 metres. This would permit a vehicle of all heights covered under AS2890.2 (2002) and ensure that all anticipated service vehicles and Council's waste collection vehicle will be able to access the site and enter internal loading bays and waste collection points. This would be a significant improvement over what has been assessed for the current conditions of the site and provide a benefit to the public in terms of safety and amenity.

7.4 Trip Generation

7.4.1 Residential Care Facility

RMS Guidelines

The RMS *Guide to Traffic Generating Developments* provides traffic generation rates for housing for aged and disabled persons. It recommends an hourly trip rate of between 0.1 and 0.2 vehicle trips per hour during the PM peak period. It is understood that the residential care facility envisaged in the indicative development is to cater for aged persons requiring a high level of care. Thus in assuming that residents will have limited mobility, adopting the lower range of the above rate for both the AM and PM peak periods results in the following traffic generation for this 130 bed component:

- 13 vehicle trips per hour during the AM peak period (8 in, 5 out)*; and
- 13 vehicle trips per hour during the PM peak period (5 in, 8 out)*.

* Assumes a 60:40 traffic split.

Survey Based Assessment

During the Community Consultation, the subject of trip generation were raised by residents, to which clarification was sought regarding the source of these rates. To reaffirm that the RMS trip rate selected for residential aged care facilities is appropriate, TRAFFIX agreed to commission surveys at Pathways Sailors Bay, a residential aged care facility in Northbridge which is operated by the applicant.

The facility accommodates 120 beds, which is of a similar scale, and has the operational characteristics that are anticipated to be adopted for a future residential aged care facility on the subject site. This includes a similar timetable for rostering for a morning shift, afternoon shift and night shift. It is understood from the applicant that the morning shift has the highest number of staff, where it is expected that the changeover during the morning period would constitute the busiest period in terms of traffic movements.

With the above in mind, TRAFFIX undertook on-site surveys on Tuesday 11 October 2016 between 6:45am and 8:15am to determine the parking level occupancy and traffic generation during the morning rostered changeover. It was observed that at any one time, only 21 of 41 total parking spaces were occupied, which represents an approximate 50% vacancy rate. Of particular relevance between 7:15am and 8:15am, which coincides with the regular network peak in Lane Cove, only 9 vehicle trips were recorded for the Northbridge development.

These results are consistent with our previous experience relating to aged care homes and that the selection of the lower end of the rates under the RMS *Guide to Traffic Generating Developments* is considered suitable. A comparable traffic generation for a future aged care development at the subject site is therefore anticipated in light of the likelihood of similar operating characteristics and proximity to public transport services.

7.4.2 Veterinary Hospital

In adopting the same rates used to estimate the traffic generation for the existing veterinary hospital on-site, the 760m^2 gross floor area veterinary hospital is expected to generate the following traffic:

- 6 vehicle trips per hour during the AM peak period (5 in, 1 out)*; and
- 17 vehicle trips per hour during the PM peak period (9 in, 8 out)#.

* Assumes an 80:20 traffic split.
# Assumes a 50:50 traffic split.

7.4.3 Retail

In adopting the same rates used to estimate the traffic generation for the existing retail space on-site, the 685m^2 gross floor area of retail and café space is expected to generate the following traffic:

- 10 vehicle trips per hour during the AM peak period (8 in, 2 out)*; and
- 32 vehicle trips per hour during the PM peak period (16 in, 16 out)#.

* Assumes an 80:20 traffic split.
# Assumes a 50:50 traffic split.

7.4.4 Combined Traffic Generation

When accounting for the volumes estimated for each use, the areas and provisions envisaged for the development concept will generate the following traffic:

- 29 vehicle trips per hour during the AM peak period (21 in, 8 out); and
- 62 vehicle trips per hour during the PM peak period (30 in, 32 out).

7.4.5 Net Traffic Generation

The above volumes are not considered to be a net increase over approved conditions. When accounting for the assessment for the approved developments on-site, the following change in net traffic would arise from the site:

- -4 vehicle trips per hour during the AM peak period (1 in, -5 out); and
- -2 vehicle trips per hour during the PM peak period (-2 in, 0 out).

These net traffic volumes are relevant when assessing the performance of the proposed site access at the intersection of Longueville Road, Northwood Road and Kenneth Street.

7.5 Traffic Impacts

7.5.1 Trip Distributions

For modelling the traffic impacts of the existing, permissible and proposed access arrangements at the intersection of Longueville Road, Northwood Road and Kenneth Street, trip distributions will need to be assumed for the above volumes and applied across the road network. Whilst it is emphasised that the overall net traffic generated under the development concept C is less than the currently approved and permissible developments on-site assessed, the majority of distributed volumes will be attributed to the consolidation of the existing five accesses into a single entry and exit access.

It is noteworthy that none of the abovementioned uses have trip generating characteristics that are substantially linked between place of residence and place of employment, the only instances being a relatively low proportion of staff travelling to and from work. Analysis of the road hierarchy is therefore considered the most reliable approach to assigning a split of development traffic volumes.

Longueville Road, River Road and River Road West connect the site with key regional destinations, leading to Chatswood, St Leonards and the City of Ryde local government area respectively. When acknowledging that River Road also provides the shortest route to the Sydney central business district, the development volumes have been distributed as follows:

- 40% of vehicle trips originating from and destined to River Road;
- 25% of vehicle trips originating from and destined to River Road West;
- 25% of vehicle trips originating from and destined to Longueville Road;
- 5% of vehicle trips originating from and destined to Kenneth Street; and
- 5% of vehicle trips originating from and destined to Northwood Road, south of River Road.

An equivalent assumption for the splits of traffic generated by the approved developments on-site is also made, in order to properly distribute the net traffic volumes that would be brought on by the development concept.

Having regard for these percentage distributions, the net traffic volumes generated over approved and permissible conditions, and after accounting for consolidated accesses, has been split according to the diagrammatic representation shown in **Figure 8**, for both AM and PM peak periods.

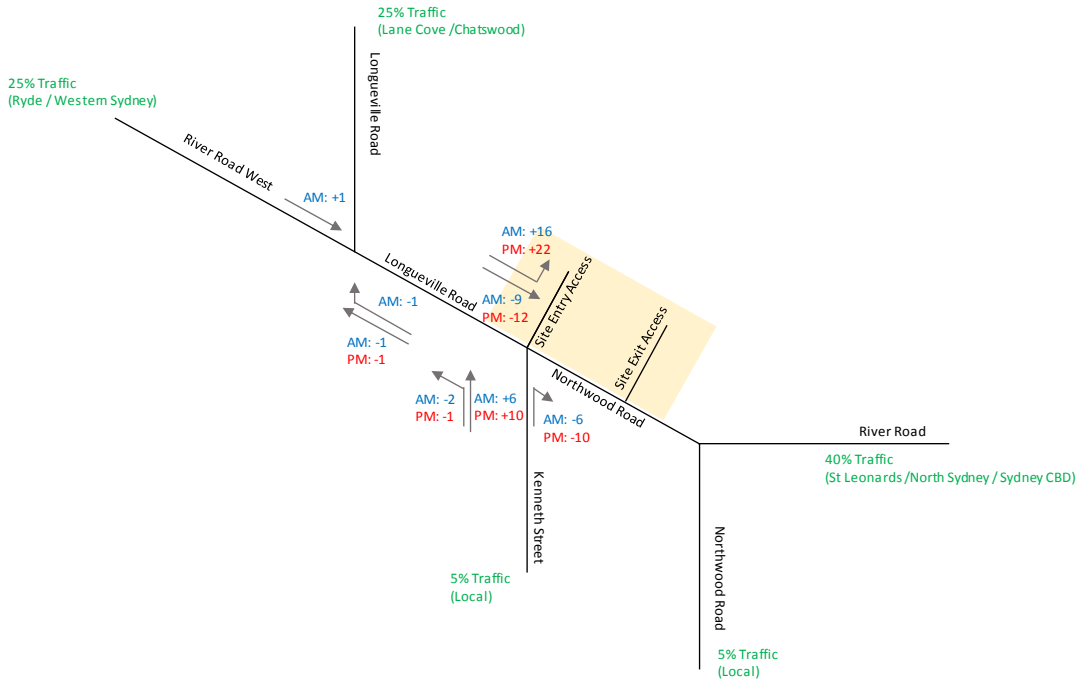


Figure 8: Public Transport

7.5.2 Peak Period Intersection Performances

The performance of the nominated critical intersections under existing conditions and with the distributed volumes of the development concept has been modelled using SIDRA Intersection 7.0. A summary of the results, which adopt baseline traffic volumes from the traffic surveys described in Section 3, is presented in **Table 7**. Reference should also be made to the detailed SIDRA outputs presented in **Appendix D**.

Table 7: Intersection Performance

Intersection	Control Type	Scenario	Period	Intersection Degree of Saturation	Average Delay (s)	Level of Service (LoS)
Longueville Road / River Road West	Signals	Existing	AM	0.747	17.9	B
			PM	0.657	18.3	B
		Future	AM	0.779	20.0	B
			PM	0.667	18.3	B
Longueville Road / Kenneth Street / Northwood Road / Site Access (Future Only)	Signals	Existing	AM	0.604	8.4	A
			PM	0.991	38.0	C
		Future	AM	0.766	10.1	A
			PM	0.991	38.0	C
Northwood Road / River Road	Priority*	Existing	AM	1.018	135.5	F
			PM	0.833	185.0	F
		Future	AM	1.018	135.5	F
			PM	0.833	185.0	F

* Note: For 'T' junctions, the results shown are for the movement with the highest delay in accordance with RMS Guidelines, while for signals the average delay across all approached is adopted.

The results of the software modelling reveal that minimal delays of no more than two seconds will be experienced at the two signalised intersections. The Level of Service will continue to operate at C or better without any downgrading, and therefore the performance of these intersections is deemed satisfactory under RMS guidelines. This result is attributed in part to the capability of the existing phases of the intersection of Kenneth Street, Longueville Road and Northwood Road to accommodate traffic movements for the proposed site access leg. That is, introduction of a new phase to facilitate traffic

movements into the site is not needed, which may otherwise result in additional delays for other motorists at this intersection.

Furthermore, the intersection of Northwood Road and River Road will not experience any delays arising from the development concept over approved conditions.

7.5.3 Traffic Impacts

It is emphasised that traffic volumes for the development concept, which draws on the controls sought in the PP, are nearly half that when compared to the proposal that would be permissible under the current controls and even less than generated under the existing development on the site. The very minor increase in morning peak delays is attributable to the consolidation of site accesses, which is likely to be an inevitability for any future development on-site. This is easily outweighed by eliminating safety concerns associated with the existing accesses, as currently two crossovers are single lane for both directions and cannot accommodate queuing on-site. Most importantly, the performance of the intersection of Northwood Road and River Road, which has exceeded capacity, will not change should the development concept be operational.

Finally, when considering the impact on residential amenity, by the location of the site (on a RMS managed road with high traffic volumes), left turn exit movements on Northwood Road are a commonality for both existing and future developments. Given that no signalised intersection is situated south of the site for at least a kilometre, northbound traffic heading to River Road West and Longueville Road are assumed to divert through the local section of Northwood Road, through Arabella Street and Woodford Street before re-entering Longueville Road / Northwood Road via Kenneth Street. As the proposed future entry access will be signposted as No Right Turn, an identical route would be used by motorists originating from River Road, with the only exception being a through movement at the Kenneth Street intersection.

It is therefore emphasised that the net traffic volumes arising from the development concept over approved and permissible conditions will not generate any additional movements on the above described route, based on the assigned distributions. Therefore, there will be no additional traffic on Northwood Road (local alignment), Arabella Street and Woodford Road.

8. Conclusions

In summary:

- An accompanying Planning Proposal seeks approval to include residential aged care facilities as a permissible use for the subject site. This would be in addition to, but not limited to, retail, café and veterinary hospital uses which are already permissible under the *Lane Cove Local Environmental Plan 2009*. In addition, the PP seeks to establish a maximum height and floor space ratio.

- A development concept that would be compliant with the proposed controls has been envisaged by the applicant for the purpose of assessing the impacts of the Planning Proposal. Indicatively, this development would contain a residential care facility for aged persons containing approximately 130 beds, a 760m^2 gross floor area veterinary hospital and 685m^2 gross floor area of retail/café space.

- *'In principle*' support has also been given by the Roads and Maritime Services for a signalised entry only site access at the intersection of Longueville Road, Northwood Street and Kenneth Street. This is expected to significantly improve safety along the site frontage through the removal of all existing (unsafe) driveways and reduce delays to through traffic.

- The parking requirements for this Scenario has been assessed with respect to the *Lane Cove Development Control Plan 2009* and *State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004* and compared to the existing development on the site and to a permissible development having regard to the current planning controls

- A provision of 46 parking spaces would satisfy the requirements of both these policies and the site is of a suitable size to accommodate this demand. Nonetheless a final provision may be confirmed during a subsequent development application stage, and should take note of efficiencies gained with proximity to public transport and operating characteristics of a potential aged care development, if proposed. It is noteworthy that this parking demand is almost equivalent to what has been assessed for the existing developments on-site under Council's current planning controls.

- Concerns relating the performance of the intersection of Northwood Road and River Road, as well as the residential amenity on Arabella Street and Woodford Street have been considered and addressed. Noting the sensitivity of the local road network to additional traffic volumes, a low traffic generating (traffic neutral) outcome has been adopted.

- The traffic generation arising from the development Scenario has been assessed as a net decrease over and above existing traffic conditions to be -4 vehicle trips per hour during the AM peak period and -2 vehicle trips during the PM peak period. Intersection modelling reveals that there will be very minimal delays within the surrounding road network, attributed only to the consolidation of site accesses, which is considered to be an inevitability of any future full scale development.

- An assessment has also been made to compare the traffic generating potential of the development Scenario with a high potential development that would be permissible under current planning controls. Application of RMS guideline rates indicate that this development would, during the PM peak period, generate an additional 41 vehicle trips per hour over what has been estimated for the development Scenario applicable to the Planning Proposal (and an additional 14 vehicle trips per hour during the AM peak period). This demonstrates that on a floor space basis, residential aged care uses are one of the lowest traffic generating uses, which is especially of benefit having regard to the location of the site.

In light of the above, it is considered that the Planning Proposal to include residential aged care facilities as a permissible use will not intensity future development on-site and is considered supportable on traffic planning grounds.

Appendix A

RMS Correspondence

Your Reference:	12.014
Our Reference:	SYD12/00422
Contact:	Owen Hodgson
Telephone	8849 2012

NSW GOVERNMENT | Transport Roads & Maritime Services

Traffix
Traffic and Transport Planners
PO Box 1061
POTTS POINT NSW 1335

Attention: Andrew Johnson

PLANNING PROPOSAL FOR 4-16 NORTHWOOD ROAD AND 274 LONGUEVILLE ROAD, NORTHWOOD. – RESPONSE TO FURTHER INFORMATION

Dear Sir/Madam

I refer to your letter dated 5 September 2012 in response to pre-DA advice from Roads and Maritime Services (RMS) with regard to a planning proposal to rezone 4-16 Northwood Road and 274 Longueville Road, Northwood, to allow for the construction of a mixed use retail and residential development comprised of 105 residential units and 1460m^2 of retail uses.

RMS advises that it grants in principle agreement to the construction and signalisation of a fourth leg of the Northwood Road and Kenneth Street (TCS 936) intersection, (opposite Kenneth Street) into the proposed development, subject to the following information being supplied, to RMS satisfaction with the development application:-

- the review of intersection modelling (for both signalised intersections),
- the design and geometry of this intersection,
- the impacts of the modifications on the operation of the signals,
- the warrants for signalisation and
- a road safety audit addressing road safety concerns.

RMS in principle agreement is limited to:-

1. Modifications to TCS 936 which will restrict traffic movements at the fourth leg (opposite Kenneth Street) to:
   a) a through traffic movement into the site from Kenneth Street; and
   b) left turn only into the site from Northwood Road (from the north) preferably with a deceleration lane into the site.

2. Egress from the development being located to the south of the ingress, as far as possible from TCS 936 and provided via a left out only configuration

3. A full upgrade of the combined intersections to current standards, including associated pedestrian facilities.

This letter is a clarification of RMS's previous letter dated 4 September 2012 and the comments provided above are informal and of a Pre-DA nature, they are not to be interpreted as binding upon the RMS and may change following formal assessment of a submitted development application from the appropriate consent authority

Please refer all the further inquiries regarding this proposal to RMS's Senior Land Use & Transport Planner, Owen Hodgson on 8849 2012.

Yours sincerely

Chris Goudanas
Land Use Planning and Assessment Manager
Transport Planning, Sydney Region

7 September 2012

Cc Lane Cove Council

Appendix B

Photographic Record

View looking south on Longueville Road with subject site on left-hand side of photograph.

View looking north on Northwood Road with subject site on right-hand side of photograph.

View looking north on Longueville Road at the intersection of River Road West.

View looking north on Kenneth Street towards the intersection of Longueville Road and Northwood Road.

View looking south at the intersection of Kenneth Street, Longueville Road and Northwood Road, with subject site straight ahead.

View looking north on Northwood Road towards intersection with River Road.

Appendix C

Surveys (2012 & 2016)

R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Mob.0418-239019

Client : Traffix

Job No/Name : 6165 LANE COVE Northwood Rd

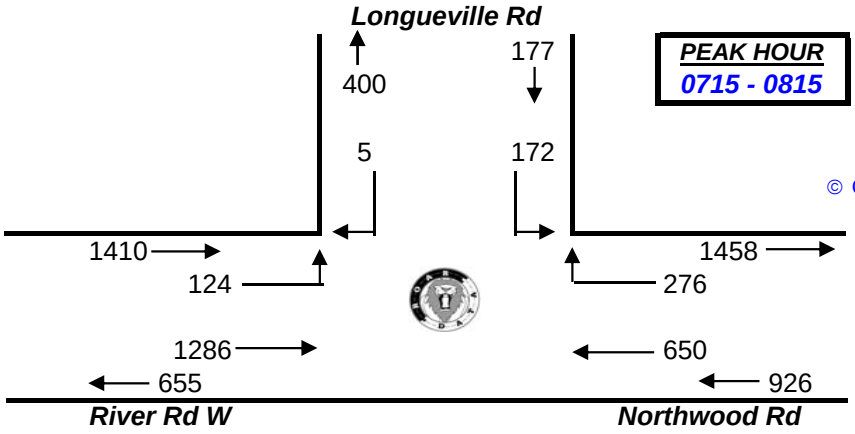
Day/Date : Tuesday 2nd August 2016 2016

All Vehicles

	WEST		NORTH		EAST		
	River Rd W		*Longueville*		*Northwood*		
Time Per	**L**	**T**	**R**	**L**	**T**	**R**	**TOTAL**
0700 - 0715	26	244	3	57	114	39	**483**
0715 - 0730	32	310	3	36	110	56	**547**
0730 - 0745	23	329	2	47	148	62	**611**
0745 - 0800	30	338	0	44	192	70	**674**
0800 - 0815	39	309	0	45	200	88	**681**
0815 - 0830	47	321	1	54	172	65	**660**
0830 - 0845	45	316	2	61	137	71	**632**
0845 - 0900	35	319	1	69	139	68	**631**
Period End	**277**	**2486**	**12**	**413**	**1212**	**519**	**4919**

	WEST		NORTH		EAST		
	River Rd W		*Longueville*		*Northwood*		
Peak Per	**L**	**T**	**R**	**L**	**T**	**R**	**TOTAL**
0700 - 0800	111	1221	8	184	564	227	**2315**
0715 - 0815	124	1286	5	172	650	276	**2513**
0730 - 0830	139	1297	3	190	712	285	**2626**
0745 - 0845	161	1284	3	204	701	294	**2647**
0800 - 0900	166	1265	4	229	648	292	**2604**

PEAK HR	**124**	**1286**	**5**	**172**	**650**	**276**	**2513**

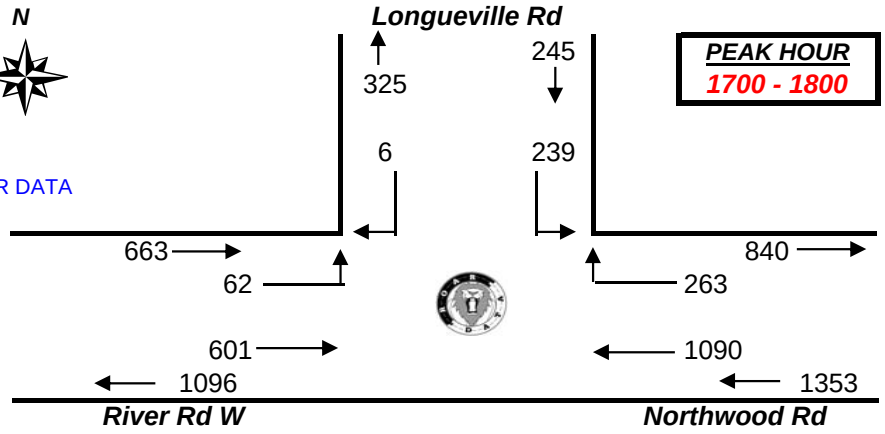


All Vehicles

	WEST		NORTH		EAST		
	River Rd W		*Longueville*		*Northwood*		
Time Per	**L**	**T**	**R**	**L**	**T**	**R**	**TOTAL**
1600 - 1615	9	99	2	37	209	53	**409**
1615 - 1630	18	114	0	62	267	63	**524**
1630 - 1645	16	121	1	62	236	55	**491**
1645 - 1700	17	134	3	57	250	64	**525**
1700 - 1715	19	167	1	65	274	67	**593**
1715 - 1730	13	150	2	55	297	71	**588**
1730 - 1745	15	149	2	61	258	65	**550**
1745 - 1800	15	135	1	58	261	60	**530**
Period End	**122**	**1069**	**12**	**457**	**2052**	**498**	**4210**

	WEST		NORTH		EAST		
	River Rd W		*Longueville*		*Northwood*		
Peak Per	**L**	**T**	**R**	**L**	**T**	**R**	**TOTAL**
1600 - 1700	60	468	6	218	962	235	**1949**
1615 - 1715	70	536	5	246	1027	249	**2133**
1630 - 1730	65	572	7	239	1057	257	**2197**
1645 - 1745	64	600	8	238	1079	267	**2256**
1700 - 1800	62	601	6	239	1090	263	**2261**

PEAK HOUR	**62**	**601**	**6**	**239**	**1090**	**263**	**2261**

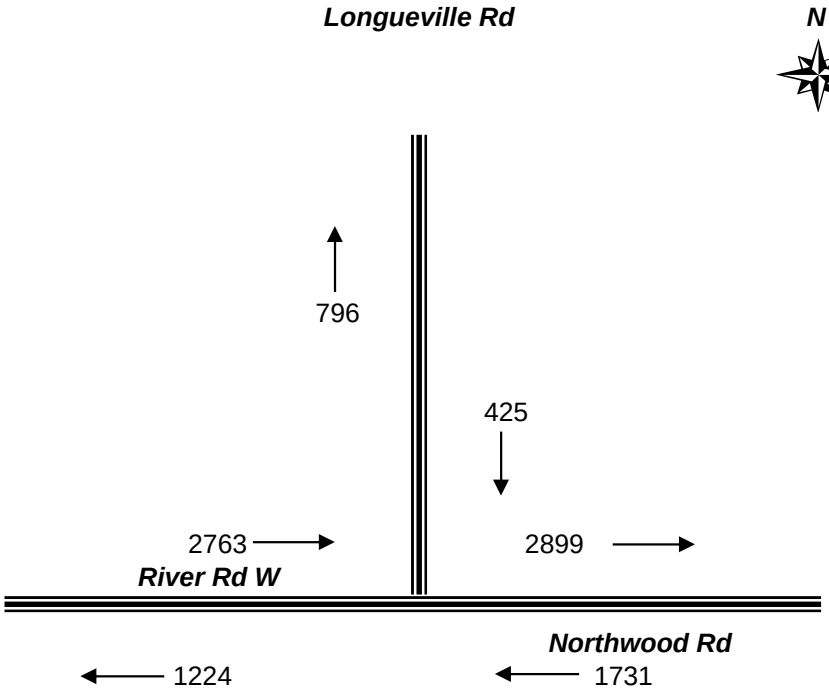


R.O.A.R DATA
Reliable, Original & Authentic Results
Ph.88196847, Mob.0418-239019

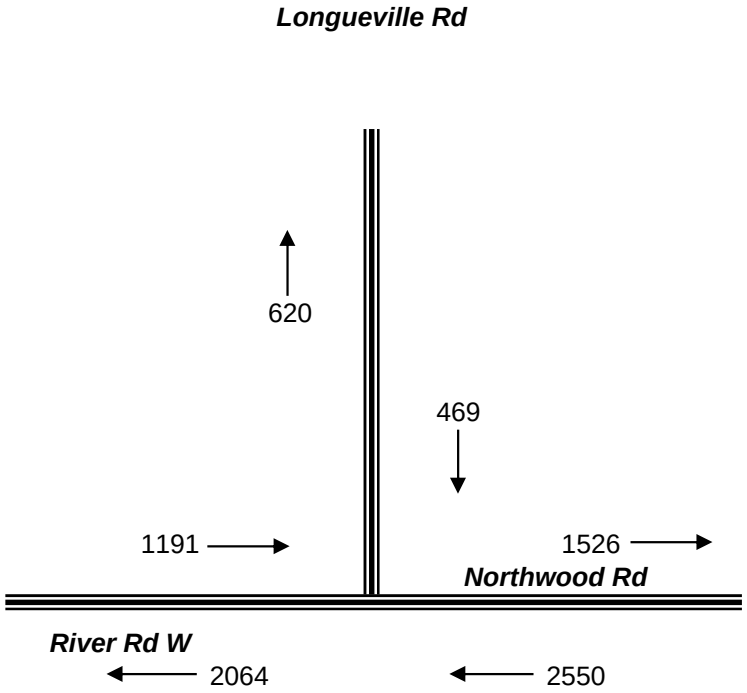
Client : Traffix
Job No/Name : 6165 LANE COVE Northwood Rd
Day/Date : Tuesday 2nd August 2016 2016

TOTAL VOLUMES FOR COUNT PERIODS

AM



PM

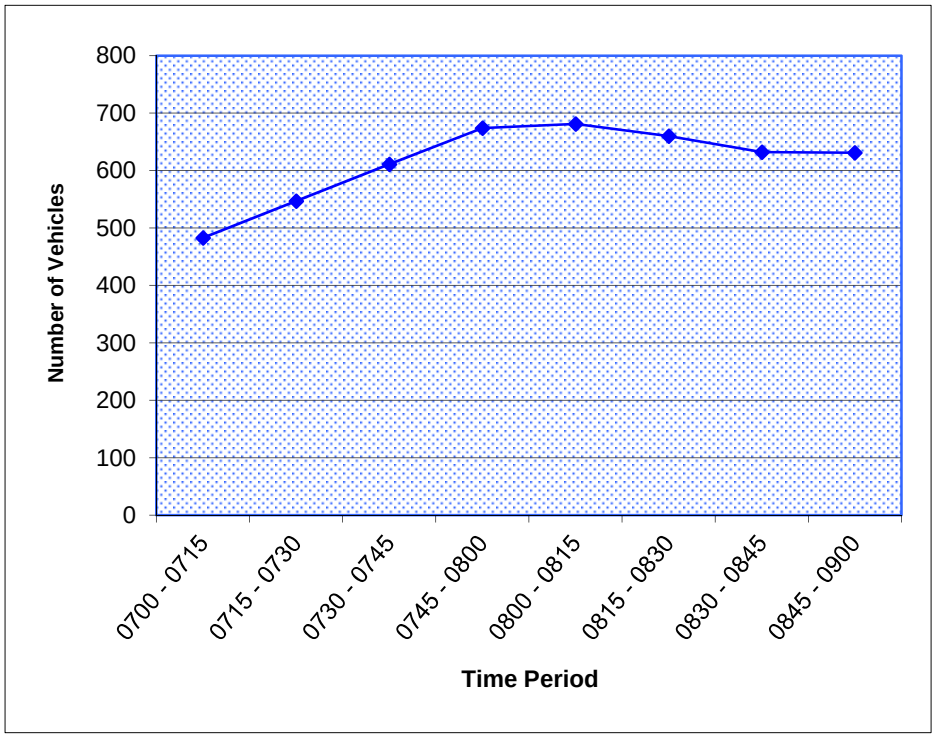


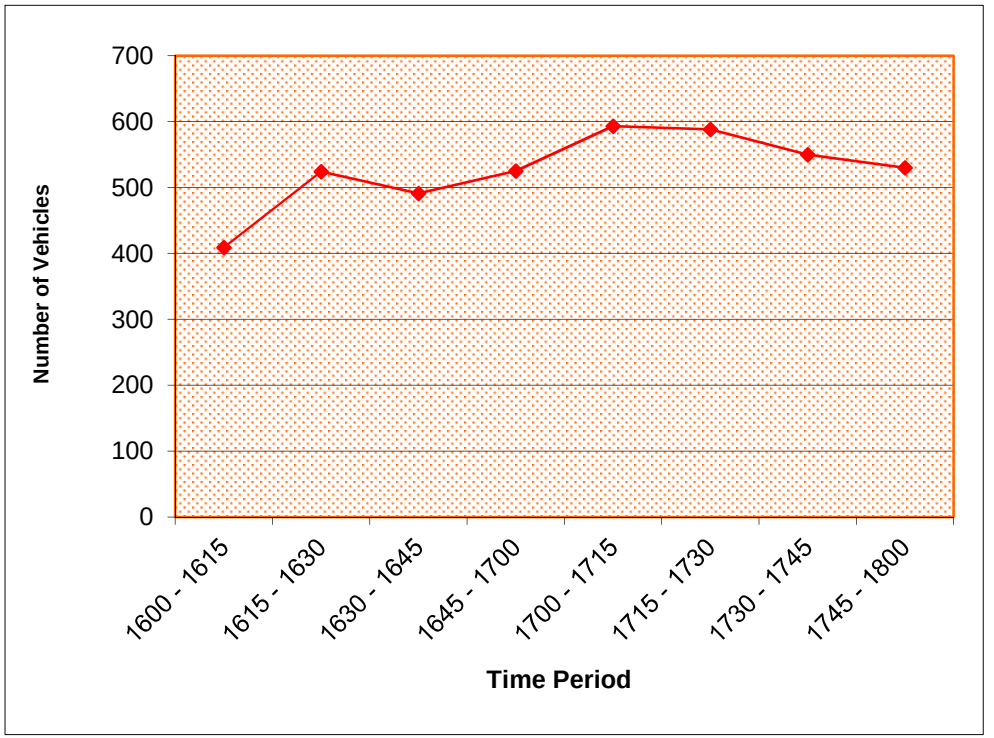
R.O.A.R DATA
Reliable, Original & Authentic Results
Ph.88196847, Mob.0418-239019

Client : Traffix
Job No/Name : 6165 LANE COVE Northwood Rd
Day/Date : Tuesday 2nd August 2016 2016

AM ***PM***

River Rd Wst / Longueville Rd / Northwood Rd





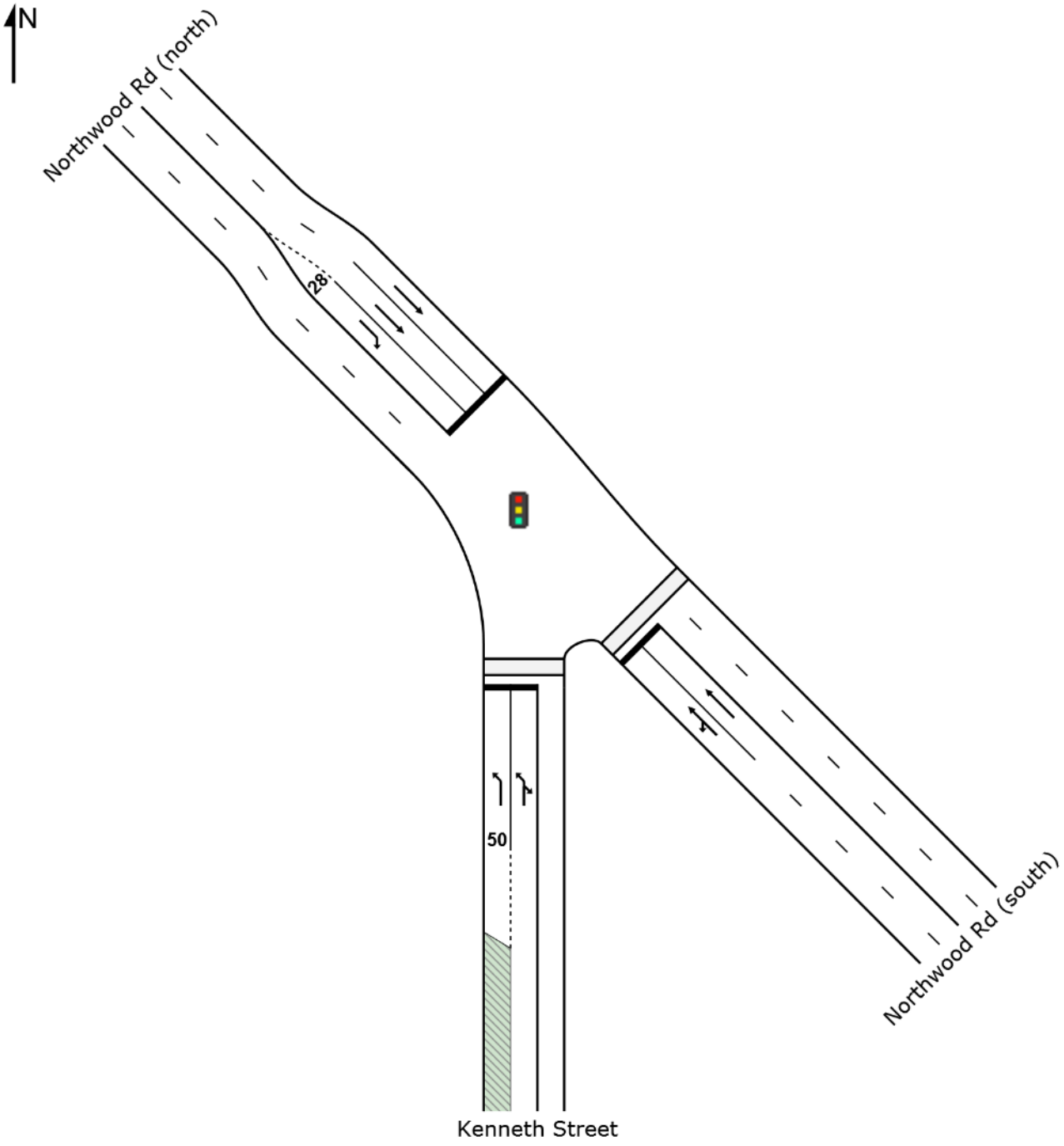
Appendix D

SIDRA Intersection Outputs

SITE LAYOUT

Site: 01 [01 Northwood Rd - Kenneth St EX - AM]

Northwood Road & Kenneth Street
Scenario: Existing
Period: AM
Signals - Fixed Time Coordinated



MOVEMENT SUMMARY

Site: 01 [01 Northwood Rd - Kenneth St EX - AM]

Network: N101 [01 AM EX]

Northwood Road & Kenneth Street
Scenario: Existing
Period: AM
Signals - Fixed Time Coordinated Cycle Time = 95 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles

Mov ID	OD Mov	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	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Kenneth Street													
1a	L1	193	5.0	193	5.0	0.300	27.9	LOS B	6.5	47.5	0.77	0.75	14.7
3b	R3	160	5.0	160	5.0	0.604	46.4	LOS D	7.2	52.3	0.98	0.81	18.7
Approach		353	5.0	353	5.0	0.604	36.3	LOS C	7.2	52.3	0.86	0.78	17.2
SouthEast: Northwood Rd (south)													
21b	L3	13	5.0	13	5.0	0.545	17.0	LOS B	12.0	87.6	0.52	0.47	34.8
22	T1	798	5.0	798	5.0	0.545	11.7	LOS A	12.0	87.6	0.52	0.47	29.8
Approach		811	5.0	811	5.0	0.545	11.8	LOS A	12.0	87.6	0.52	0.47	29.9
NorthWest: Northwood Rd (north)													
28	T1	1526	5.0	1526	5.0	0.573	0.5	LOS A	1.6	11.6	0.05	0.05	48.8
29a	R1	117	5.0	117	5.0	0.246	4.6	LOS A	0.6	4.6	0.21	0.49	37.4
Approach		1643	5.0	1643	5.0	0.573	0.8	LOS A	1.6	11.6	0.06	0.08	48.0
All Vehicles		2806	5.0	2806	5.0	0.604	8.4	LOS A	12.0	87.6	0.29	0.28	34.4

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 per ped
P1	South Full Crossing	53	14.3	LOS B	0.1	0.1	0.55	0.55
P5	SouthEast Full Crossing	53	41.8	LOS E	0.1	0.1	0.94	0.94
All Pedestrians		105	28.0	LOS C			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.

MOVEMENT SUMMARY

Site: 01 [01 Northwood Rd - Kenneth St EX - PM]

Network: N101 [03 PM EX]

Northwood Road & Kenneth Street
Scenario: Existing
Period: PM
Signals - Fixed Time Coordinated Cycle Time = 90 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Kenneth Street													
1a	L1	169	5.0	169	5.0	0.266	26.6	LOS B	5.4	39.3	0.76	0.74	15.3
3b	R3	92	5.0	92	5.0	0.327	41.3	LOS C	3.6	26.5	0.92	0.77	20.0
Approach		261	5.0	261	5.0	0.327	31.7	LOS C	5.4	39.3	0.82	0.75	17.7
SouthEast: Northwood Rd (south)													
21b	L3	23	5.0	23	5.0	0.991	61.1	LOS E	64.3	469.3	1.00	1.29	16.6
22	T1	1439	5.0	1439	5.0	0.991	60.1	LOS E	64.3	469.3	1.00	1.33	11.2
Approach		1462	5.0	1462	5.0	0.991	60.1	LOS E	64.3	469.3	1.00	1.33	11.3
NorthWest: Northwood Rd (north)													
28	T1	767	5.0	767	5.0	0.295	0.4	LOS A	0.5	3.4	0.03	0.03	49.1
29a	R1	192	5.0	192	5.0	0.706	28.5	LOS C	5.5	39.9	0.96	0.86	16.7
Approach		959	5.0	959	5.0	0.706	6.0	LOS A	5.5	39.9	0.22	0.19	37.8
All Vehicles		2682	5.0	2682	5.0	0.991	38.0	LOS C	64.3	469.3	0.70	0.87	16.0

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

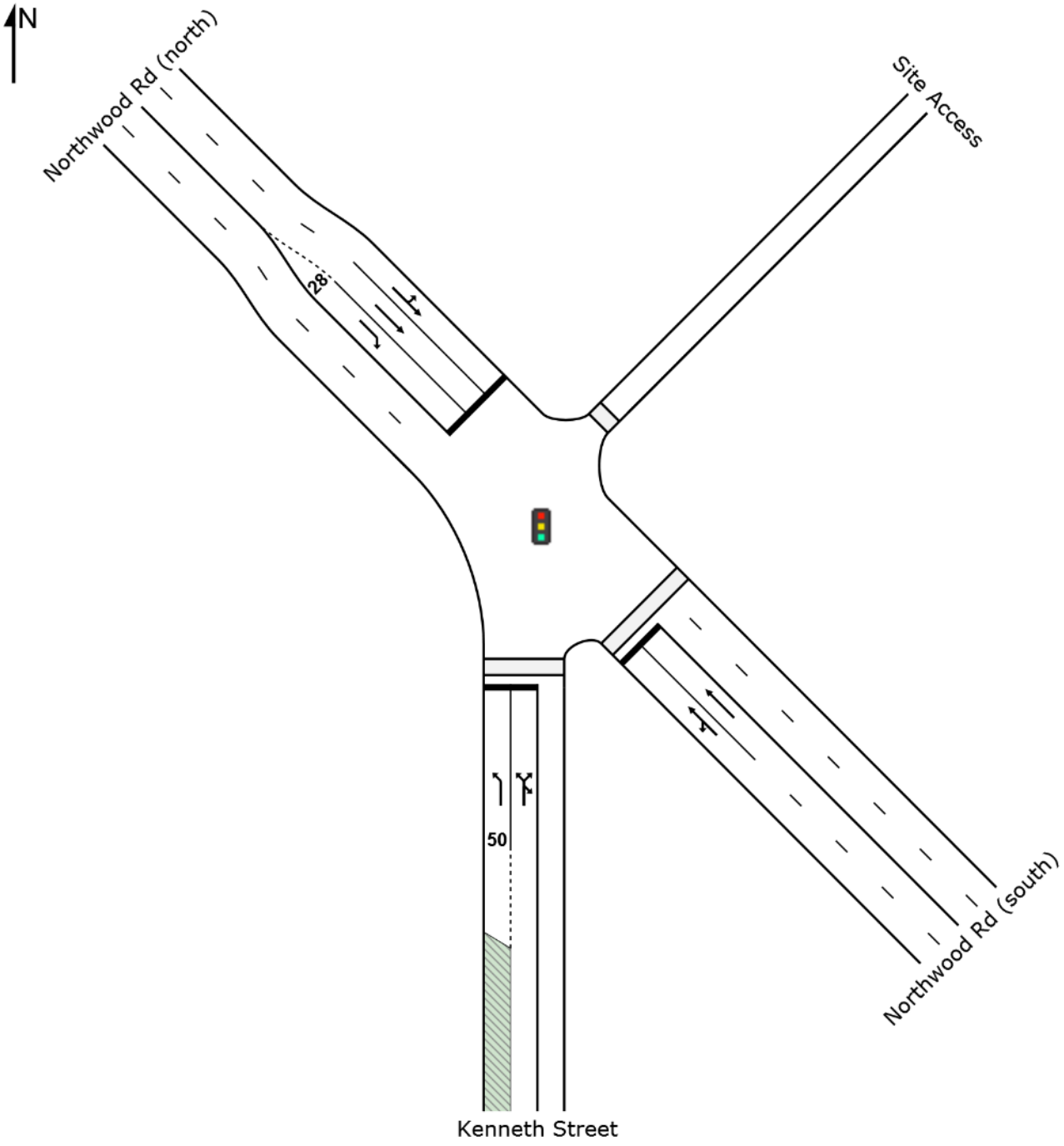
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	13.9	LOS B	0.1	0.1	0.56	0.56
P5	SouthEast Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94
All Pedestrians		105	26.6	LOS C			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.

SITE LAYOUT

Site: 01 [01 Northwood Rd - Kenneth St FU - AM]

Northwood Road & Kenneth Street
Scenario: Existing + Development (Future)
Period: AM
Signals - Fixed Time Coordinated



MOVEMENT SUMMARY

Site: 01 [01 Northwood Rd - Kenneth St FU - AM]

Network: N101 [02 AM FU]

Northwood Road & Kenneth Street
Scenario: Existing + Development (Future)
Period: AM
Signals - Fixed Time Coordinated Cycle Time = 95 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Kenneth Street													
1a	L1	191	5.1	191	5.1	0.635	35.7	LOS C	7.8	56.7	0.91	0.83	12.3
3a	R1	6	0.0	6	0.0	0.635	44.5	LOS D	7.5	54.6	0.98	0.83	26.8
3b	R3	154	5.2	154	5.2	0.635	46.4	LOS D	7.5	54.6	0.98	0.83	18.8
Approach		351	5.0	351	5.0	0.635	40.5	LOS C	7.8	56.7	0.94	0.83	16.2
SouthEast: Northwood Rd (south)													
21b	L3	13	5.0	13	5.0	0.766	20.5	LOS B	12.6	91.9	0.64	0.63	32.0
22	T1	798	5.0	798	5.0	0.766	15.1	LOS B	12.6	91.9	0.64	0.63	26.7
Approach		811	5.0	811	5.0	0.766	15.1	LOS B	12.6	91.9	0.64	0.63	26.8
NorthWest: Northwood Rd (north)													
27	L2	18	0.0	18	0.0	0.577	3.8	LOS A	1.9	13.8	0.06	0.07	55.0
28	T1	1518	5.0	1518	5.0	0.577	0.6	LOS A	1.9	13.8	0.05	0.06	48.5
29a	R1	117	5.0	117	5.0	0.307	8.8	LOS A	1.4	9.9	0.46	0.59	30.8
Approach		1653	5.0	1653	5.0	0.577	1.2	LOS A	1.9	13.8	0.08	0.10	47.2
All Vehicles		2814	5.0	2814	5.0	0.766	10.1	LOS A	12.6	91.9	0.35	0.34	32.6

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.

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 per ped
P1	South Full Crossing	53	12.7	LOS B	0.1	0.1	0.52	0.52
P5	SouthEast Full Crossing	53	41.8	LOS E	0.1	0.1	0.94	0.94
P6	NorthEast Full Crossing	53	40.8	LOS E	0.1	0.1	0.93	0.93
All Pedestrians		158	31.8	LOS D			0.79	0.79

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: 01 [01 Northwood Rd - Kenneth St FU - PM]

Network: N101 [04 PM FU]

Northwood Road & Kenneth Street
Scenario: Existing + Future (Development)
Period: PM
Signals - Fixed Time Coordinated Cycle Time = 90 seconds (User-Given Phase Times)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Kenneth Street													
1a	L1	168	5.0	168	5.0	0.265	26.5	LOS B	5.3	39.0	0.76	0.74	15.3
3a	R1	11	0.0	11	0.0	0.303	38.4	LOS C	3.6	26.0	0.90	0.77	28.9
3b	R3	81	5.6	81	5.6	0.303	40.3	LOS C	3.6	26.0	0.90	0.77	20.5
Approach		260	5.0	260	5.0	0.303	31.3	LOS C	5.3	39.0	0.81	0.75	18.5
SouthEast: Northwood Rd (south)													
21b	L3	23	5.0	23	5.0	0.991	61.1	LOS E	64.3	469.3	1.00	1.29	16.6
22	T1	1439	5.0	1439	5.0	0.991	60.1	LOS E	64.3	469.3	1.00	1.33	11.2
Approach		1462	5.0	1462	5.0	0.991	60.1	LOS E	64.3	469.3	1.00	1.33	11.3
NorthWest: Northwood Rd (north)													
27	L2	24	0.0	24	0.0	0.305	3.8	LOS A	0.7	4.8	0.04	0.08	54.9
28	T1	755	5.1	755	5.1	0.305	0.5	LOS A	0.7	4.8	0.04	0.05	48.6
29a	R1	192	5.0	192	5.0	0.764	30.0	LOS C	5.6	40.8	0.98	0.88	16.2
Approach		971	4.9	971	4.9	0.764	6.4	LOS A	5.6	40.8	0.22	0.22	37.6
All Vehicles		2693	5.0	2693	5.0	0.991	38.0	LOS C	64.3	469.3	0.70	0.87	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

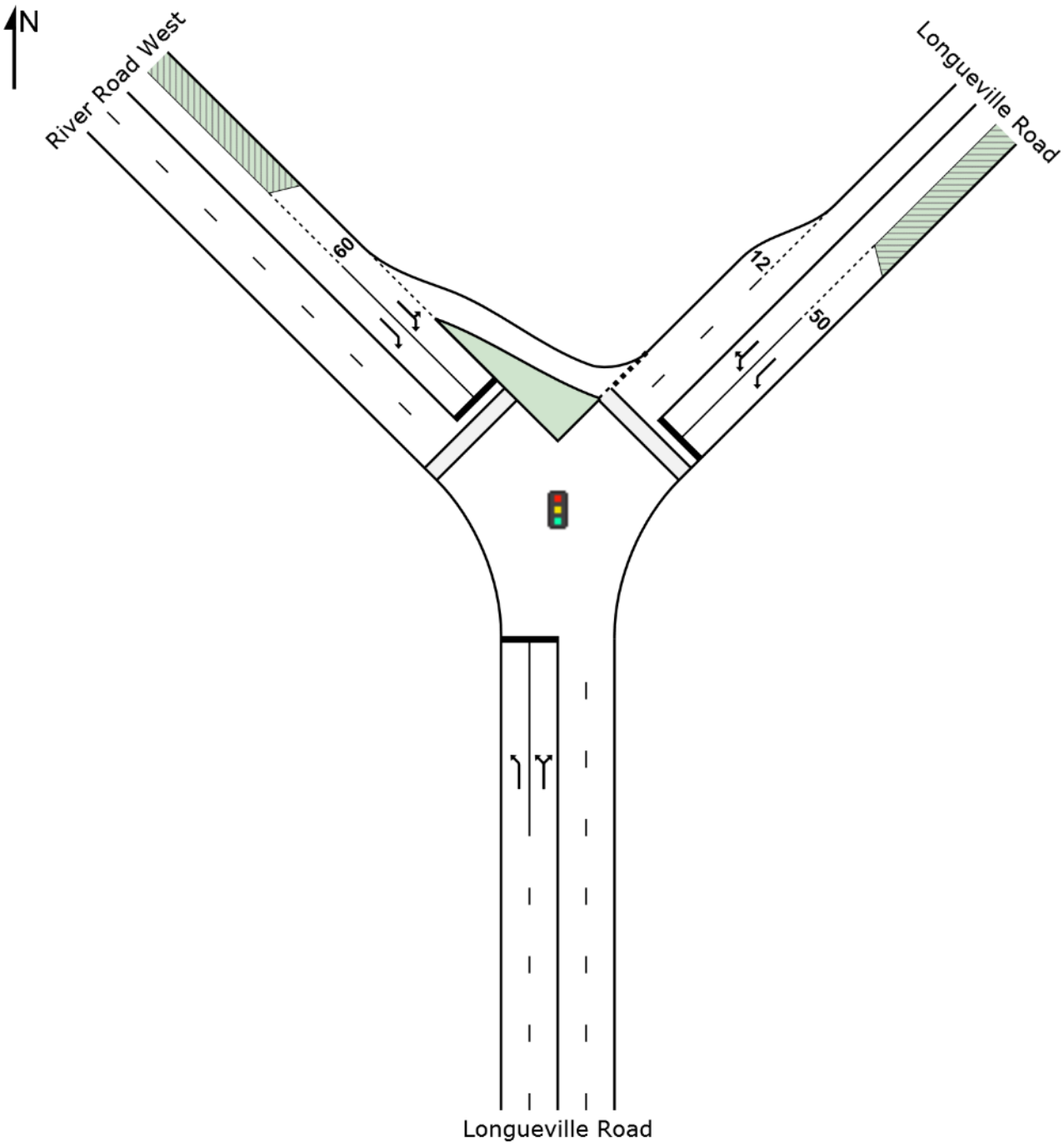
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	13.9	LOS B	0.1	0.1	0.56	0.56
P5	SouthEast Full Crossing	53	5.0	LOS A	0.0	0.0	0.33	0.33
P6	NorthEast Full Crossing	53	38.4	LOS D	0.1	0.1	0.92	0.92
All Pedestrians		158	19.1	LOS B			0.61	0.61

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.

SITE LAYOUT

Site: 101 [03 Longueville Rd - River Rd W EX - AM]

Longueville Rd & River Road West
Scenario: Existing
Period: AM
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

Site: 101 [03 Longueville Rd - River Rd W EX - AM]

Network: N101 [01 AM EX]

Longueville Rd & River Road West
Scenario: Existing
Period: AM
Signals - Fixed Time Coordinated Cycle Time = 95 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles

Mov ID	OD Mov	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	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Longueville Road													
1a	L1	684	5.0	684	5.0	0.489	3.8	LOS A	3.5	25.8	0.12	0.55	55.9
3a	R1	291	5.0	291	5.0	0.747	51.5	LOS D	7.8	57.1	1.00	0.86	35.5
Approach		975	5.0	975	5.0	0.747	18.0	LOS B	7.8	57.1	0.38	0.65	47.9
NorthEast: Longueville Road													
24a	L1	181	5.0	181	5.0	0.256	39.7	LOS C	3.9	28.5	0.88	0.76	39.4
26	R2	5	5.0	5	5.0	0.256	41.6	LOS C	3.5	25.5	0.89	0.76	47.0
Approach		186	5.0	186	5.0	0.256	39.7	LOS C	3.9	28.5	0.88	0.76	39.7
NorthWest: River Road West													
27	L2	131	5.0	131	5.0	0.606	16.9	LOS B	18.7	136.7	0.61	0.79	54.0
29a	R1	1354	5.0	1354	5.0	0.606	14.9	LOS B	19.1	139.7	0.61	0.78	50.4
Approach		1484	5.0	1484	5.0	0.606	15.1	LOS B	19.1	139.7	0.61	0.78	51.0
All Vehicles		2645	5.0	2645	5.0	0.747	17.9	LOS B	19.1	139.7	0.54	0.73	48.9

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	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P6	NorthEast Full Crossing	53	8.9	LOS A	0.1	0.1	0.43	0.43
P7	NorthWest Full Crossing	53	41.8	LOS E	0.1	0.1	0.94	0.94
All Pedestrians		105	25.3	LOS C			0.69	0.69

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 [03 Longueville Rd - River Rd W EX - PM]

Network: N101 [03 PM EX]

Longueville Rd & River Road West
Scenario: Existing
Period: PM
Signals - Fixed Time Coordinated Cycle Time = 90 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Longueville Road													
1a	L1	1147	5.0	1147	5.0	0.655	7.7	LOS A	7.8	57.1	0.26	0.61	53.5
3a	R1	277	5.0	277	5.0	0.655	24.7	LOS B	7.8	57.1	0.89	0.84	44.6
Approach		1424	5.0	1424	5.0	0.655	11.0	LOS A	7.8	57.1	0.39	0.65	51.6
NorthEast: Longueville Road													
24a	L1	252	5.0	252	5.0	0.146	16.0	LOS B	3.1	22.8	0.54	0.70	49.5
26	R2	6	5.0	6	5.0	0.146	18.6	LOS B	2.6	18.7	0.57	0.70	53.2
Approach		258	5.0	258	5.0	0.146	16.1	LOS B	3.1	22.8	0.54	0.70	49.7
NorthWest: River Road West													
27	L2	65	5.0	65	5.0	0.657	34.6	LOS C	14.3	104.1	0.92	0.86	48.9
29a	R1	633	5.0	633	5.0	0.657	33.8	LOS C	14.3	104.1	0.92	0.85	42.0
Approach		698	5.0	698	5.0	0.657	33.9	LOS C	14.3	104.1	0.92	0.85	43.0
All Vehicles		2380	5.0	2380	5.0	0.657	18.3	LOS B	14.3	104.1	0.56	0.71	48.4

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	Distance m	Prop. Queued	Effective Stop Rate per ped
P6	NorthEast Full Crossing	53	28.1	LOS C	0.1	0.1	0.79	0.79
P7	NorthWest Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94
All Pedestrians		105	33.7	LOS D			0.86	0.86

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 [03 Longueville Rd - River Rd W FU - AM]

Network: N101 [02 AM FU]

Longueville Rd & River Road West
Scenario: Existing + Development (Future)
Period: AM
Signals - Fixed Time Coordinated Cycle Time = 95 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Longueville Road													
1a	L1	683	5.0	683	5.0	0.524	5.8	LOS A	7.8	57.1	0.33	0.63	54.6
3a	R1	289	5.0	289	5.0	0.647	48.3	LOS D	7.8	57.1	1.00	0.85	36.4
Approach		973	5.0	973	5.0	0.647	18.4	LOS B	7.8	57.1	0.53	0.70	47.7
NorthEast: Longueville Road													
24a	L1	181	5.0	181	5.0	0.220	36.4	LOS C	3.7	26.9	0.84	0.75	40.5
26	R2	5	5.0	5	5.0	0.220	37.9	LOS C	3.3	24.4	0.85	0.75	47.9
Approach		186	5.0	186	5.0	0.220	36.4	LOS C	3.7	26.9	0.84	0.75	40.9
NorthWest: River Road West													
27	L2	131	5.0	131	5.0	0.779	20.7	LOS B	29.8	217.8	0.78	0.87	52.8
29a	R1	1355	5.0	1355	5.0	0.779	18.8	LOS B	29.8	217.8	0.70	0.82	48.4
Approach		1485	5.0	1485	5.0	0.779	18.9	LOS B	29.8	217.8	0.70	0.83	49.1
All Vehicles		2644	5.0	2644	5.0	0.779	20.0	LOS B	29.8	217.8	0.65	0.78	48.0

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	Distance m	Prop. Queued	Effective Stop Rate per ped
P6	NorthEast Full Crossing	53	10.2	LOS B	0.1	0.1	0.46	0.46
P7	NorthWest Full Crossing	53	41.8	LOS E	0.1	0.1	0.94	0.94
All Pedestrians		105	26.0	LOS C			0.70	0.70

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 [03 Longueville Rd - River Rd W FU - PM]

Network: N101 [04 PM FU]

Longueville Rd & River Road West
Scenario: Existing + Development (Future)
Period: PM
Signals - Fixed Time Coordinated Cycle Time = 90 seconds (Network Cycle Time - User-Given)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Longueville Road													
1a	L1	1152	5.0	1152	5.0	0.659	7.6	LOS A	7.8	57.1	0.26	0.61	53.5
3a	R1	281	4.9	281	4.9	0.659	24.5	LOS B	7.8	57.1	0.89	0.84	44.7
Approach		1433	5.0	1433	5.0	0.659	11.0	LOS A	7.8	57.1	0.39	0.65	51.6
NorthEast: Longueville Road													
24a	L1	252	5.0	252	5.0	0.148	16.0	LOS B	3.2	23.2	0.54	0.70	49.5
26	R2	6	5.0	6	5.0	0.148	18.6	LOS B	2.5	18.3	0.57	0.70	53.2
Approach		258	5.0	258	5.0	0.148	16.1	LOS B	3.2	23.2	0.54	0.70	49.7
NorthWest: River Road West													
27	L2	65	5.0	65	5.0	0.667	34.8	LOS C	14.6	106.4	0.92	0.86	48.9
29a	R1	633	5.0	633	5.0	0.667	34.1	LOS C	14.6	106.4	0.93	0.85	41.8
Approach		698	5.0	698	5.0	0.667	34.2	LOS C	14.6	106.4	0.93	0.85	42.9
All Vehicles		2388	5.0	2388	5.0	0.667	18.3	LOS B	14.6	106.4	0.56	0.72	48.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
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Movement Performance - Pedestrians

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P6	NorthEast Full Crossing	53	28.1	LOS C	0.1	0.1	0.79	0.79
P7	NorthWest Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94
All Pedestrians		105	33.7	LOS D			0.86	0.86

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.