Traffic Impact Assessment

Proposed Internal Road Network at
60-80 Southern Cross Avenue & 45-65 Hall Circuit
Middleton Grange

traffix
traffic & transport planners

po box 1061
potts point nsw 1335
t: +61 2 8324 8700
f: +61 2 9380 4481
w: www.traffix.com.au
abn: 66065132961

Reference: 16.068r03v02 TRAFFIX TIA Report
Date: 6 February 2017

Document Verification

Job Number:	16.068
Project:	60-80 Southern Cross Avenue & 45-65 Hall Circuit, Middleton Grange
Client:	Manta Group Pty Ltd

Revision	Date	Prepared By	Approved By	Signature
v01	19/10/2016	Asad Rajbhoy	Vince Doan	
v02	6/02/2017	Vince Doan	Vince Doan	

traffix
traffic & transport planners

t: +61 2 8324 8700
f: +61 2 9380 4481
w: www.traffix.com.au
abn: 66065132961

Contents

Appendices

1. Introduction

TRAFFIX has been commissioned by Manta Group Pty Ltd to undertake a Traffic Impact Assessment in support of a proposed internal road network at 60-80 Southern Cross Avenue & 45-65 Hall Circuit, Middleton Grange. The development is located within the Liverpool Council Local Government Area (LGA) and has been assessed under the Council's control. The site is zoned part B2 Local Centre, R1 General Residential, RE1 Public Recreation and SP2 Drainage and comprises an area of approximately 7.9 hectares.

This application relates to the subdivision of the site for a Town Centre comprising of 825 residential units, 20,240m^2 GLA of retail and 2,533m^2 GFA of commercial.

This report documents the findings of our investigations and should be read in the context of APP Corporation *'Planning Proposal – Amendments to Liverpool Local Environmental Plan 2008'* (November 2015) and Colston Budd Hunt & Kafes *'Transport Aspects of Planning Proposal for Middleton Grange Town Centre'* (June 2015) studies which established recommendations in relation to LEP and DCP consideration particularly in regard to road network and transport outcomes. The development is considered a major development as it consists of more than 300 residential dwellings and 4,000m^2 shops and commercial premises. It will therefore require formal referral to the Roads & Maritime Services (RMS) under the provisions of SEPP (Infrastructure) 2007.

The Planning Proposal has been submitted to Liverpool Council and with the Department of Planning and Environment for Gateway Determination. It is noted that the Planning Proposal has now been approved by the Department of Planning and Environment.

It is noted that this report assesses the traffic generation of the concept development assumed for the site for the purposes of assesses the potential traffic impacts on the local roads providing access to the site and designing a satisfactory internal road network. A more holistic traffic impact assessment report will be prepared to assess the overall impacts of the proposed Town Centre development to the more extended road network in the area.

2. Background

2.1 Location and Site

The site is situated approximately 500 metres west of the M7 Motorway Interchange with Cowpasture Road, seven (7) kilometres west of the Liverpool CBD and 40 kilometres south-west of Sydney CBD. The site comprises eight (8) lots including:

- Lots 1, 2, 3, 4, 5, and 6 in DP 1207518;
- Lot 1 in DP 1078564; and
- Lot 12 in DP 1108343

The site is also referred to as 60-80 Southern Cross Avenue and 45-65 Hall Circuit, Middleton Grange. It is irregular in shape and has an approximate area of 79,000m^2 with a 200 metre frontage to Southern Cross Avenue, a 150 metre frontage to Bravo Avenue and a 320 metre frontage to Flynn Avenue.

The majority of the site is vacant, with the exception being five residential dwellings. Three of the five dwellings are located along Southern Cross Avenue on the northern portion of the site and the other two residential dwellings are located along Flynn Avenue within the southern boundary of the site.

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 A**, which provides an appreciation of the general character of roads and other key attributes in proximity to the site.

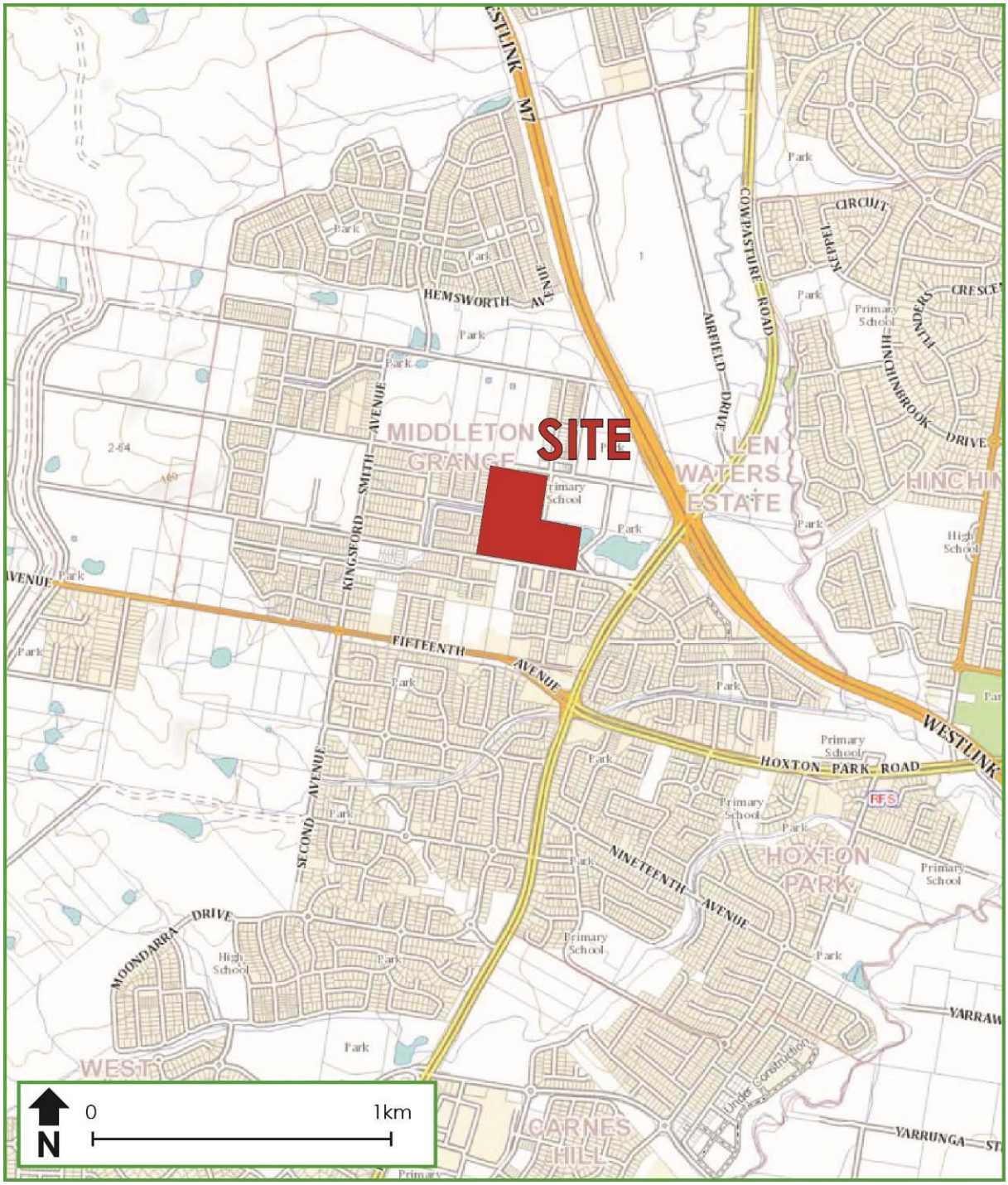


Figure 1: Location Plan

Figure 2: Site Plan

2.2 Overview Findings of the Planning Proposal

The APP Planning Proposal was completed in November 2015 along with a report regarding the transport aspects of planning proposal for Middleton Grange town centre. The findings of reports are discussed below with details of the road network.

Middleton Grange is to be rezoned to accommodate an urban development. The planning proposal relates to retail / commercial premises plus residential apartments and includes the realignment of the local road network and lot layout within the subject site.

Furthermore, two new roads traversing north-south are proposed (Road 3 and Road 4) between Southern Cross Avenue in the north and Flynn Avenue in south. An additional road (Road 9) will connect to Road 3 traversing adjacent to the southern boundary of Middleton Grange Public School. Road 9 will utilise the existing alignment of Hall Circuit and connect with Flynn Avenue. A detailed description of the proposed road network is provided in Section 4.2.

This subdivision is consistent with the Planning Proposal and is intended to deliver the concept plan as adopted in the planning proposal.

3. Existing Traffic Conditions

3.1 Road Network

The existing and future road hierarchy in the vicinity of the site is shown in **Figure 3** and **4,** respectively with the following roads of particular interest:

- M7 Motorway (Westlink): a motorway that generally traverse north-south and provides 40 kilometres of uninterrupted stretch between Baulkham Hills in the north to Dean Park in the West and Prestons in the south. It carries 150,000 vehicles per day (vpd) on average. The road is subject to a 100 km/h speed zoning and connects to Motorway M2 and Motorway M5. M7 Motorway generally carries two lanes of traffic in either direction along a divided carriageway.

- Cowpasture Road: an RMS Main Road (MR 648) that runs in a north-south direction between The Horsley Drive in the north and Camden Valley Way in the south. Cowpasture Road carries approximately 27,000 vehicles per day within the vicinity of the site with 'No Stopping' restrictions applying along its length at all times. It is subject to a 70km/h speed zoning in the vicinity of the site and generally carries two lanes of traffic in either direction within a separated carriageway of width 30 metres.

- Fifteenth Avenue: a collector road that runs in an east-west direction between Cowpasture Road in the east and Ramsay Road in the west. It is subject to a 60km/h speed zoning. Fifteenth Avenue carries a single lane of traffic in each direction.

- Kingsford Smith Avenue: a local road that traverses north-south between Mclver Ave in north and Fifteenth Avenue in the south. It is subject to a 50km/h speed zoning however, is also subject to a 40km/h speed zoning during the hours of 7:30am to 9:30am and 2:30pm to 4:00pm during school days. Kingsford Smith Avenue carries a single lane of traffic and kerb side parking in each direction with a carriageway of width 13 metres.

- Southern Cross Avenue: a local road that runs in an east-west direction between Hall Circuit in the east and De Garis Avenue in the west. It is subject to a 50km/h speed zoning however, is also subject to a 40km/h speed zoning during the hours of 8:00am to 9:30am and 2:30pm to 4:00pm during school days. Southern Cross Avenue carries a single lane of traffic in each direction.

- Flynn Avenue: a local road that runs parallel to Southern Cross Avenue between Cowpasture Road in the east and De Garis Avenue in the west. It is subject to a 50km/h speed zoning however, is also subject to a 40km/h speed zoning during the hours of 7:30am to 9:30am and 2:30pm to 4:00pm during school days (located near Kingsford Smith Avenue). This road is identified in the DCP as a neighbourhood centre street with a 26.7 metre reserve and 12.7 metre carriageway. Flynn Avenue carries a single lane of traffic and kerbside parking in either direction.

It can be seen from Figure 4 that the site is conveniently located with respect to the arterial and local road systems serving the region. It is therefore able to effectively access the arterial road network, minimising traffic impacts on local roads and residents / businesses in the vicinity of the site.

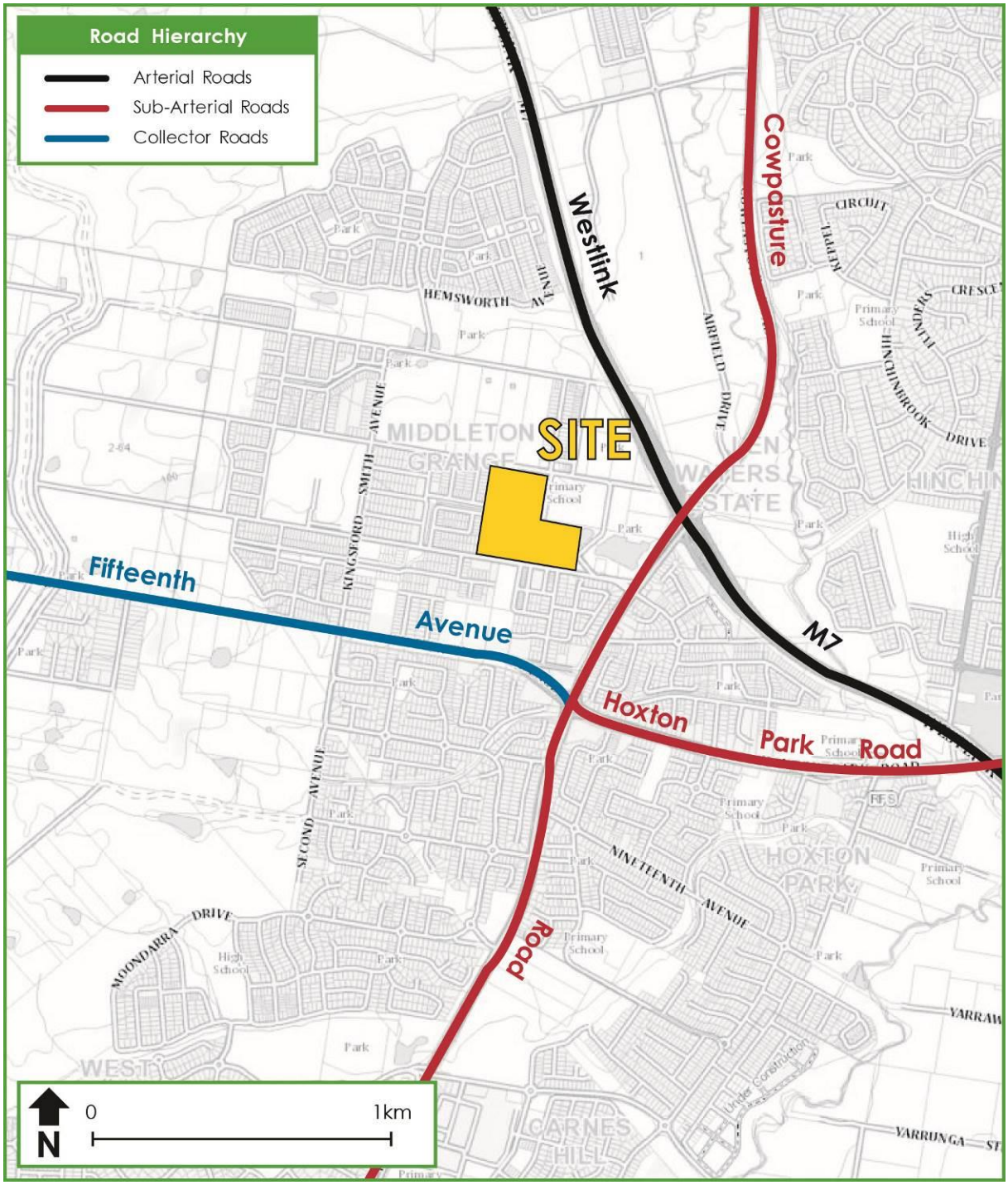


Figure 3: Existing Road Hierarchy

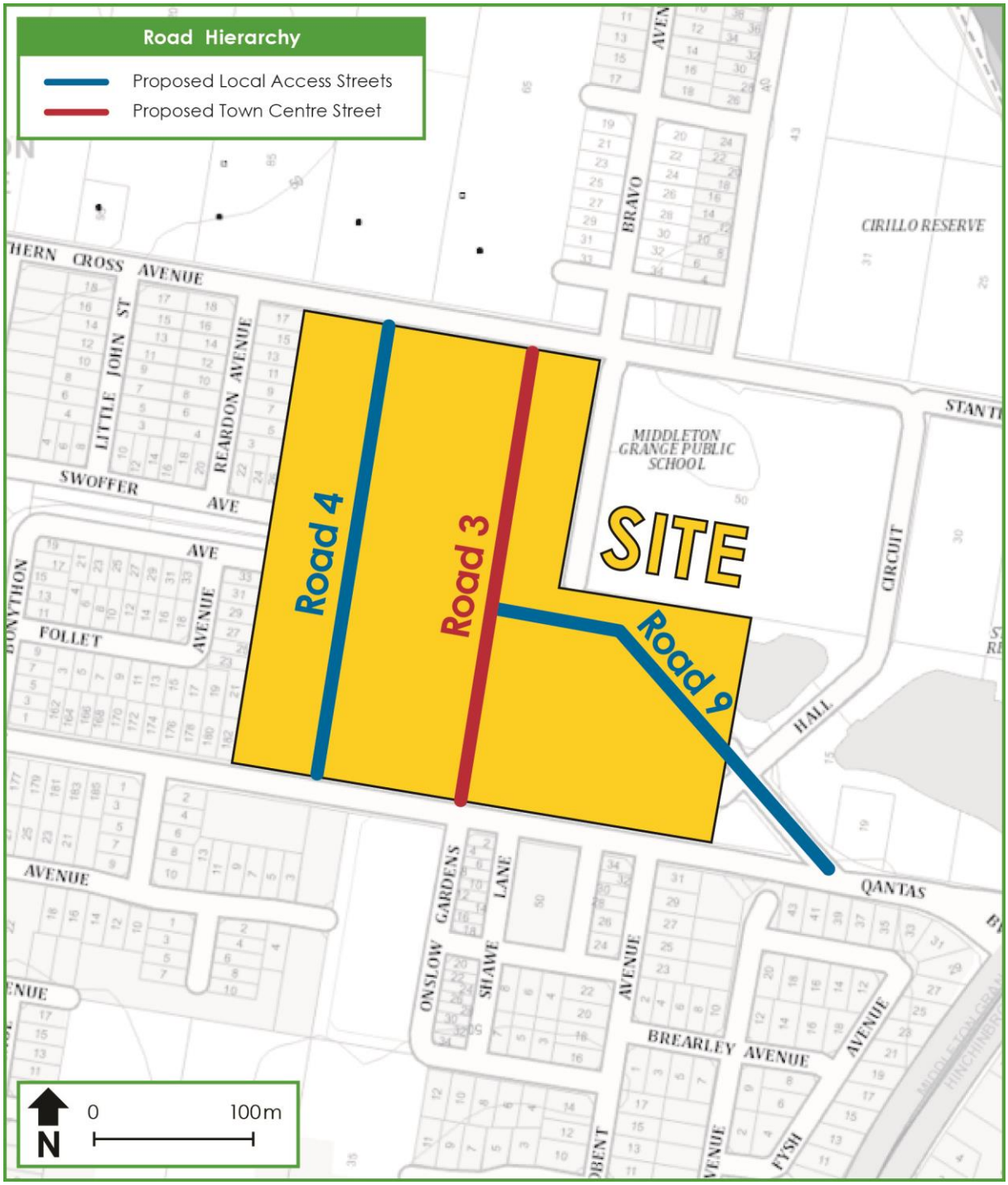


Figure 4: Proposed Road Hierarchy

3.2 Public Transport

The existing bus service that operate in the locality is shown in **Figure 5**. It is evident that the development has limited public transport access with one bus service located within 400 metres of the site. Route 853 provides services between Carnes Hill Shopping Centre, Liverpool Westfield and Railway Station. Liverpool Train Station lies on the T2 Inner West & South Line, T3 Bankstown Line and T5 Cumberland Line. A description of the proposed Public Transport Network is provided in Section 4.2.

3.3 Existing Site Generation

The subject site accommodates five (5) dwelling houses. The RMS *Technical Direction TDT2013/04a* provides traffic generation rates for low density residential dwellings, and recommends an average Sydney based hourly trip generation rate of 0.99 vehicle trips per dwelling during the AM peak period and 0.95 vehicle trips per dwelling during the PM peak period. Application of these rates results in 5 vehicle trips during both the morning and evening peak periods.

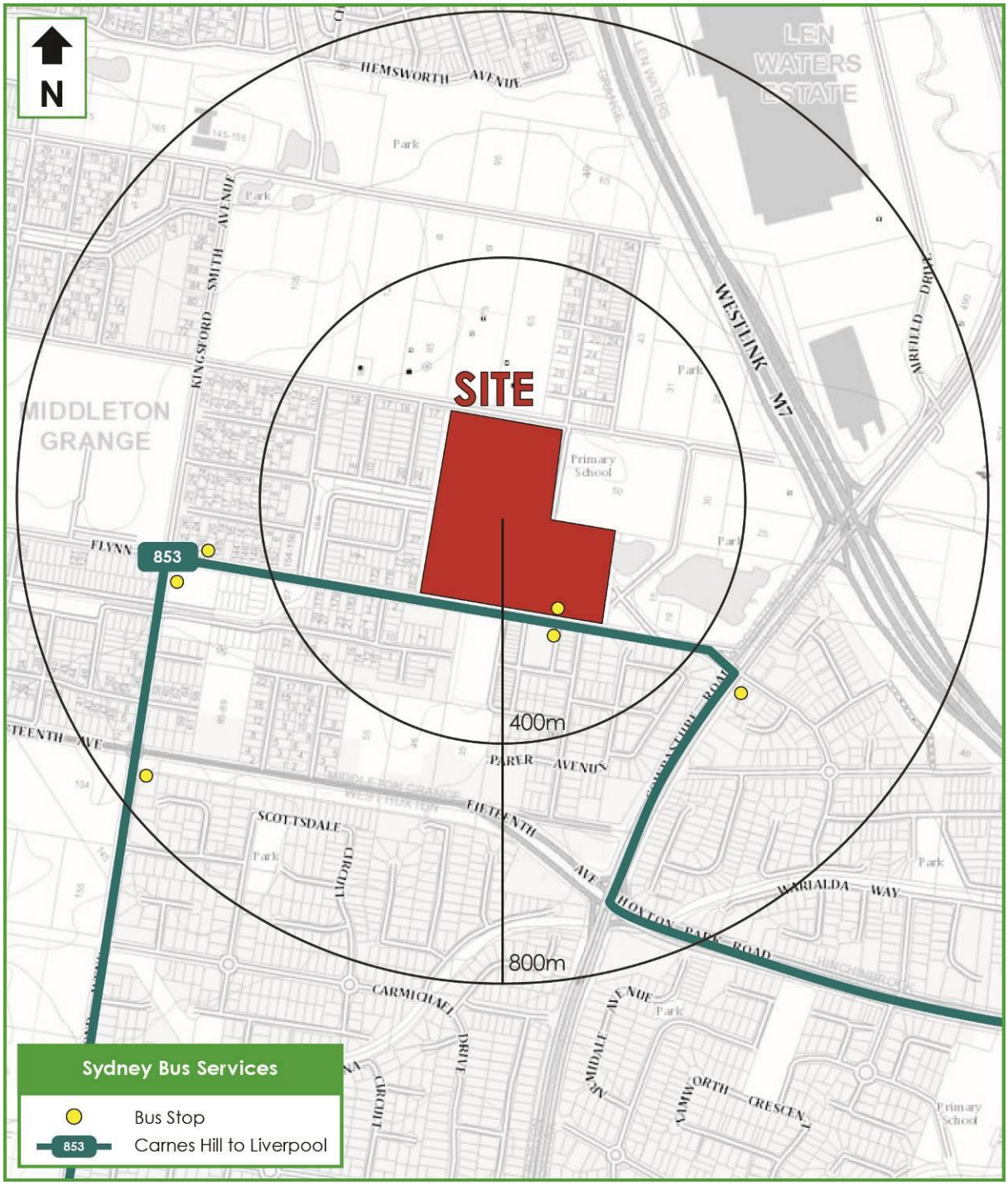


Figure 5: Existing Public Transport Services

4. Description of Proposed Development

4.1 Development Yield

A detailed description of the proposed development is provided in the Statement of Environmental Effects prepared separately. The overall development seeks to provide a wide range of land uses.

For the purposes of this assessment, the following indicative yield has been adopted:

- Construction of a town centre which includes:
  - 20,240m^2 GLA of retail; and
  - 2,533m2 GFA of commercial.
- A total of 825 high density residential units.

There is potentially scope for a range other land uses within the Precinct, including a community facility, childcare, public park area, passive open space and recreation facilities. However, for the purposes of this study, it is generally assumed that these uses will be ancillary to the overall development. For example, any public park area within the site would be expected to primarily cater for individuals in the immediate locality including the demands generated by the future residential and employee populations of the subject site.

The parking requirements and traffic impacts of the proposed development are discussed in Section 5 and Section 6 respectively. Reference should be made to the architectural plans submitted separately to Council, which are presented at reduced scale in **Appendix B**.

4.2 Access and Internal Road Arrangements

The proposed locations and alignments of proposed Roads 3, 4 and 9 can be seen in **Figure 4** and an indicative road network diagram is included in **Figure 6** below. The following traffic facilities have been proposed with regards to these three roads in the planning proposal:

Road 3:

- Road 3 leg added to the existing intersection of Flynn Avenue and Onslow Gardens. Vehicles exiting Road 3 will be subject to Give Way control.
- A new intersection of Road 3 and Southern Cross Avenue with vehicles exiting Road 3 subject to Give Way control.
- Road 3 is proposed to be a 21.4 metre wide reserve which includes a single lane of traffic, a lane for kerbside parking and 4.0 to 4.5 metre verges on each side. The proposed road is considered appropriate as a future bus route.

Road 4:

- A new intersection of Road 4 and Flynn Avenue with vehicles exiting Road 4 subject to Give Way control.
- A new intersection of Road 4 and Southern Cross Avenue with vehicles exiting Road 4 subject to Give Way control.
- Road 4 is considered as a local access type 2 street with a 17.4 metre reserve which includes 9.4 metre carriageway with four metre verges.

Road 9:

- Road 9 is proposed as a local access street type 1 with a 15.2 metre reserve which includes 7.2 metre carriageway and four metre verges. It is also proposed that the intersection of Road 9 and Flynn Avenue be controlled by a roundabout.
- Bravo Avenue is located on the western side of the primary school (eastern side of the site) and would connect with Southern Cross Avenue / Hall Circuit and Road 9. It provides a 13 metre reserve carrying a six metre carriageway and 3.5 metre verges.

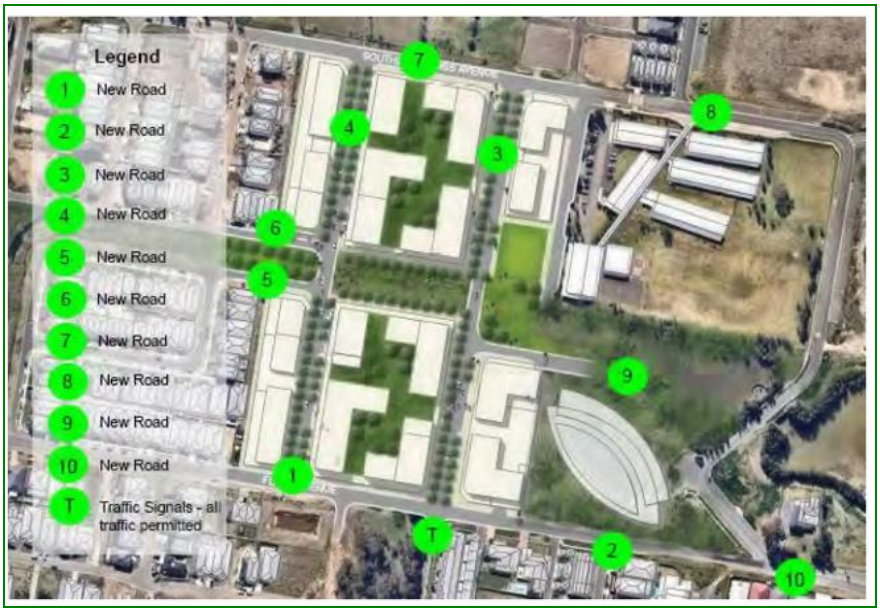


Figure 6: Indicative Road Layout (Planning Proposal 2015)

4.3 Proposed Public Transport Routes

The Liverpool City Council DCP (2008) supplies proposed future bus routes for the land subdivision and development in Middleton Grange. It is noted that the routes were proposed prior to the Indicative Road Layout Plan provided in the Planning Proposal for 60-80 Southern Cross Avenue & 45-65 Hall Circuit, Middleton Grange. The indicative Road Layout Plan has been provided in Figure 6 and TRAFFIX has interpreted these routes with the proposed road network provided in Figure 4 to provide a proposed public transport route in **Figure 7.** It is noted that these routes are subject to change.

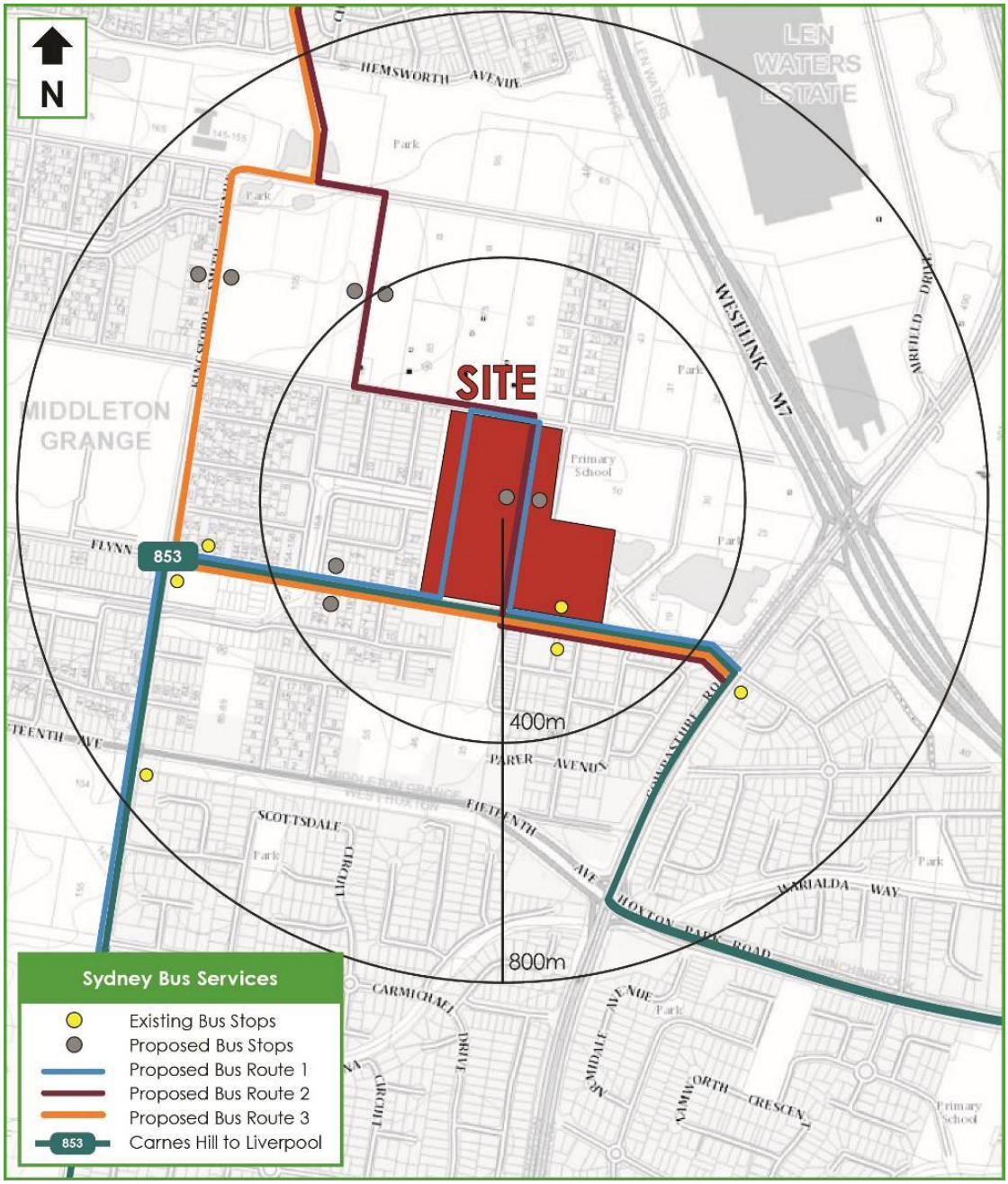


Figure 7: Proposed Public Transport Routes

5. Traffic Impacts

5.1 Survey of Existing Road Network

Surveys were conducted to collect the traffic volumes and turning counts at the following intersections in the vicinity of the site:

- Flynn Avenue / Onslow Gardens; and
- Southern Cross Avenue / Bravo Avenue.

These surveys were undertaken on a typical weekday in 2016 from 7:00-9:00am during the morning period and 4:00-6:00pm during the afternoon/evening period. This survey data was analysed to determine the peak hour for both morning and afternoon/evening period. The results indicated that the peak hour occurred at 7:30 to 8:30am in the morning and 4:45 to 5:45pm in the afternoon/evening.

5.2 Modelling Assumptions

5.2.1 Traffic Distribution

The relative distribution of 2011 Journey-to-Work trips by car for areas in the vicinity of the site (for Travel Zones 3721 & 3722) has been used to determine the future distribution of traffic from the development onto the surrounding road network. In this regard, the localised distribution of this traffic onto the surrounding road network is summarised in **Table 1** below.

Table 1: Traffic Distribution

Direction	Vehicles Percentage		Location (To/From)
	Employed residents travelling to	Employed people coming from	
Cowpasture Road (North)	36%	15%	Sydney Inner City, Fairfield, Mount Druitt, Merrylands, Guildford, Parramatta, Carlingford, Ryde, Hunters Hill
Cowpasture Road (South)	12%	30%	Campbelltown, Camden
Fifteenth Avenue	15%	21%	Bringelly, Penrith, St Marys
Hoxton Park Road	37%	34%	Liverpool, Green Valley, Sydney Inner City, Hurstville, Marrickville, Sydenham, Petersham, Bankstown, Heathcote, Canterbury

It can be seen from Table 1 that much of the traffic generated by the development will be directed to the east of the development.

5.2.2 Traffic Generation Rates

The traffic generation rates outlined in the RMS *Guide to Traffic Generating Developments* and updated *Technical Direction 04a* have generally been adopted for the purposes of this study.

Retail and commercial traffic generation rates have been adopted from Colston Budd Hunt & Kafes traffic report. In addition, the RMS *Technical Direction 04a* provides a traffic generation rate for high density residential developments of 0.19 veh/hr and 0.15 veh/hr during the AM and PM peak, respectively. The RMS rates were from surveys conducted at eight separate locations within Sydney. It is noted that these locations surveyed were within close distance of ideal public transportation being near railway stations and a range of bus services. As previously mentioned, the site has limited access to public transport and is therefore recommended that the RMS *Guide to Traffic Generating Developments* for high density residential flat building in a metropolitan sub-regional centre to be adopted to ensure that all traffic will be accommodate across road network. A summary of the adopted traffic generations for the various land uses is provided in **Table 2** below.

Table 2: Adopted Traffic Generation Rates

Land Use	AM Peak			PM Peak		
	Traffic Generation Rate	IN	OUT	Traffic Generation Rate	IN	OUT
High Density Residential	0.29 / unit	20%	80%	0.29 / unit	80%	20%
Commercial	1.6 / 100m^2	90%	10%	1.2 / 100m^2	20%	80%
Retail	0.5 / 100m^2	90%	10%	4.6 / 100m^2	50%	50%

5.3 Traffic Generation

The future traffic generation associated with the site has also been assessed on the basis of the traffic generation rates outlined in the above, with the results summarised in **Table 3** below.

Table 3: Traffic Generation - Proposed Development

Land Use	No. / Area	Generation Rates		AM Peak			PM Peak		
		AM	PM	COMBINED	IN	OUT	COMBINED	IN	OUT
Residential	825	0.29 / unit	0.29 / unit	240	48	192	240	192	48
Commercial (GFA)	2,533	1.6 / 100m^2	1.2 / 100m^2	40	36	4	31	6	25
Retail (GLA)	20,240	0.5 / 100m^2	4.6 / 100m^2	101	91	10	930	465	465
TOTAL				381	175	206	1,201	663	538

Having regard for the above, the proposed development is expected to generate in the order of approximately 381 and 1,201 vehicles per hour during the weekend morning (AM) and evening (PM) peak periods, respectively.

5.4 Intersection Performance Testing

Intersection performance testing of the proposed intersections providing direct access to the Town Centre have been undertaken with regards to the existing traffic volumes along the local roads, as obtained from surveys, as well as the additional traffic volumes expected from the site, as discussed in Section 5.3. These intersections are as follows:

- Flynn Avenue / Onslow Gardens / Road 3;
- Flynn Avenue / Road 4;
- Southern Cross Avenue / Road 3; and
- Southern Cross Avenue / Road 4.

The intersections were analysed using the SIDRA computer program to determine their performance characteristics under existing + development traffic conditions during the peak hours of the local road network. 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. 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:

Level of Service	Average Delay per Vehicle (secs/veh)	Traffic Signals	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 4** below. Reference should also be made to the detailed SIDRA outputs included in **Appendix C**.

Table 4: Intersection Performance – Existing + Development

Intersection	Control	Period	Degree of Saturation (DOS)	Average Delay (AVD)	Level of Service (LOS)
Flynn Avenue / Onslow Gardens / Road 3	Give Way	AM	0.014	16.6	B
		PM	0.403	14.6	B
Flynn Avenue / Road 4	Give Way	AM	0.153	13.3	A
		PM	0.291	13.1	A
Southern Cross Avenue / Road 3	Give Way	AM	0.001	4.8	A
		PM	0.041	5.1	A
Southern Cross Avenue / Road 4	Give Way	AM	0.001	4.8	A
		PM	0.042	5.2	A

It can be seen from Table 4 that with the increased traffic volumes associated with the development, all intersections operate with a LOS B or better during both peak periods with minimal delays. Accordingly, the traffic impacts associated with the development can readily be accommodated on the local road network.

6. Access & Internal Design Aspects

6.1 Access

Access to the site is proposed via four new intersections as shown in **Figure 8** and are discussed further below.

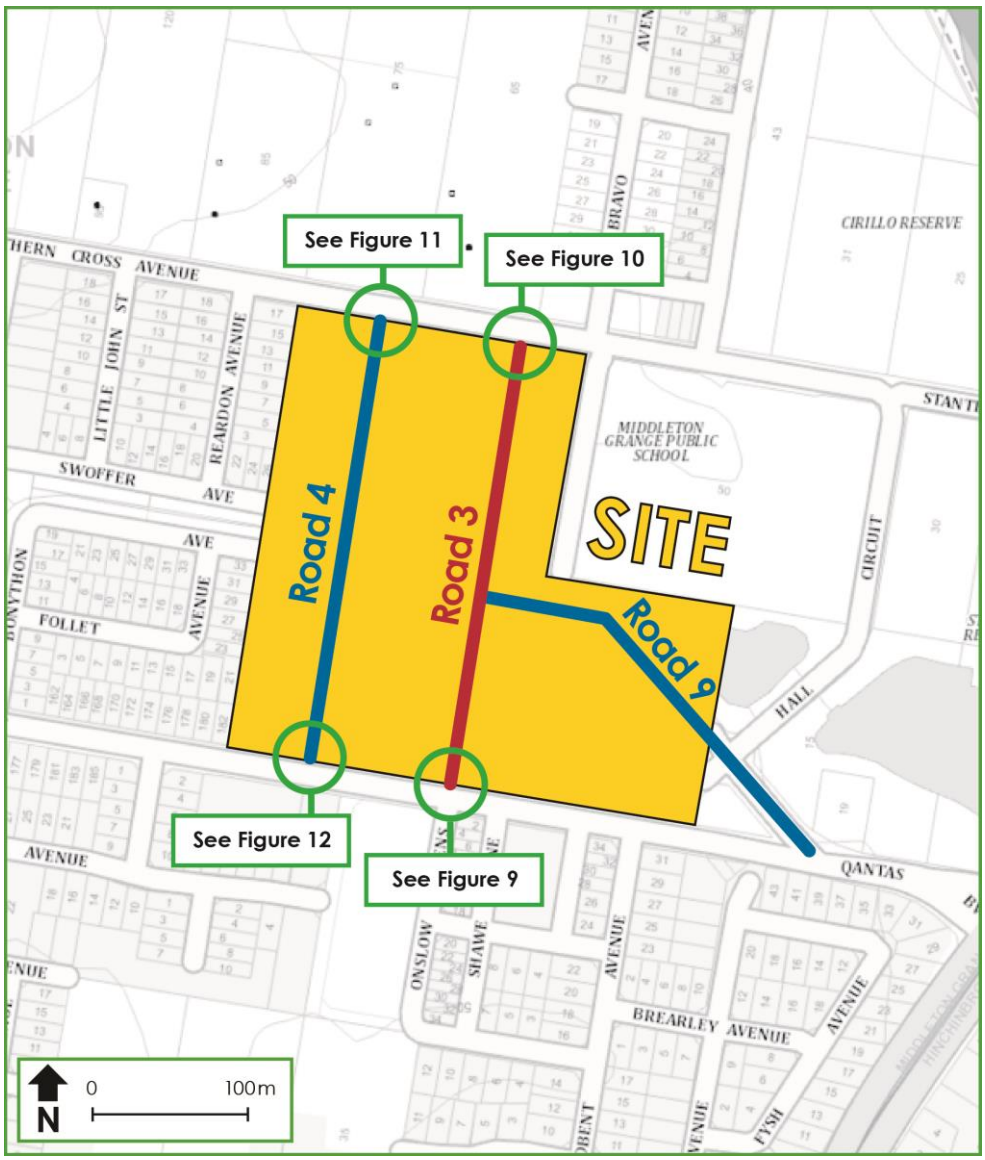


Figure 8: Proposed Intersections providing access to the Site

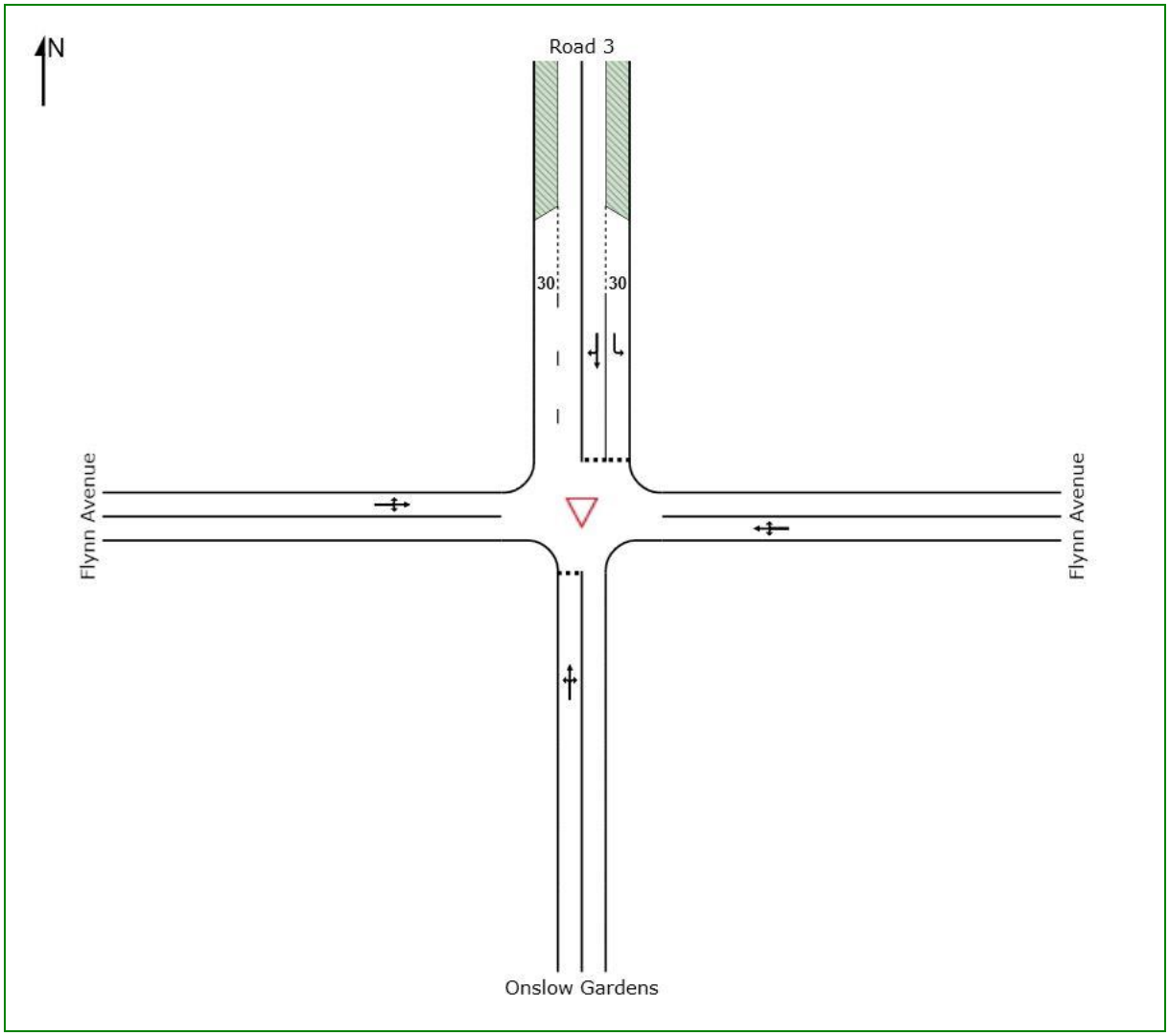


Figure 9: Indicative Intersection Arrangement – Flynn Avenue x Road 3 x Onslow Gardens

It can be seen from **Figure 9** that the intersection of Flynn Avenue, Road 3 and Onslow Gardens will form a four-way intersection with 'Give Way' priority controls at Road 3 and Onslow Gardens. The south, east and west approach provides a single lane of traffic with all turns permitted. The north approach of Road 3 provides a single left-turn lane with parking permitted 30 metres from the intersection and one traffic lane for through and right-turn movements. It is noted that Road 3 provides a single lane of traffic and kerbside parking on each side.

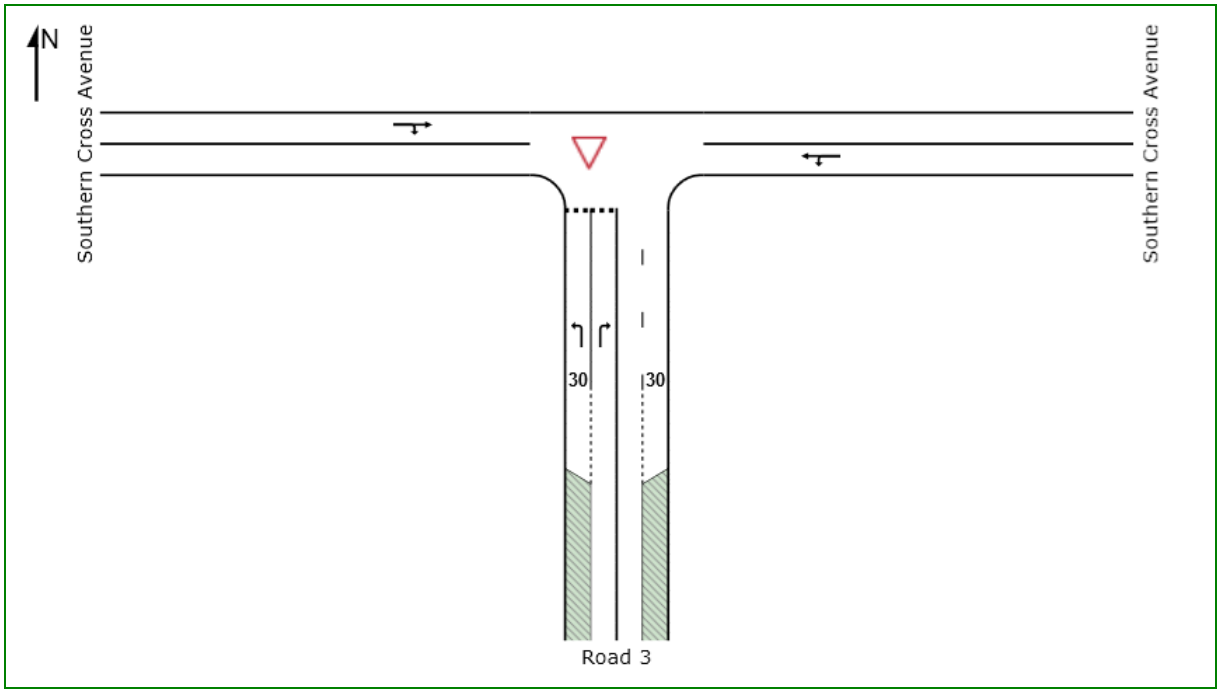


Figure 10: Indicative Intersection Arrangement – Southern Cross Avenue x Road 3

It can be seen from **Figure 10** that the intersection of Southern Cross Avenue with Road 3 will form a T-junction that has a 'Give Way' priority control. Both east and west legs on Southern Cross Avenue accommodate a single lane of traffic in each direction. The south leg of Road 3 generally provides a single lane of traffic and an additional lane for kerb side parking however, it forms two lanes at the intersection with Southern Cross Avenue.

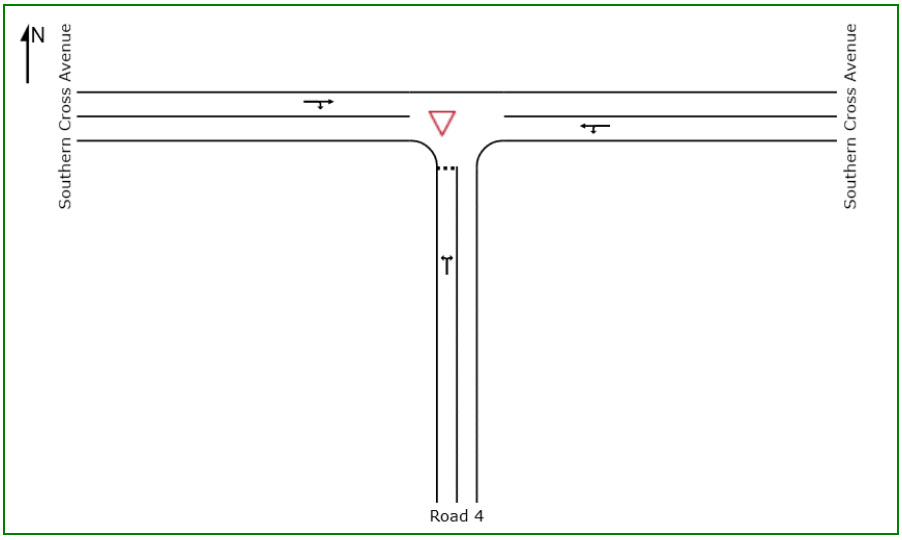


Figure 11: Indicative Intersection Arrangement – Southern Cross Avenue x Road 4

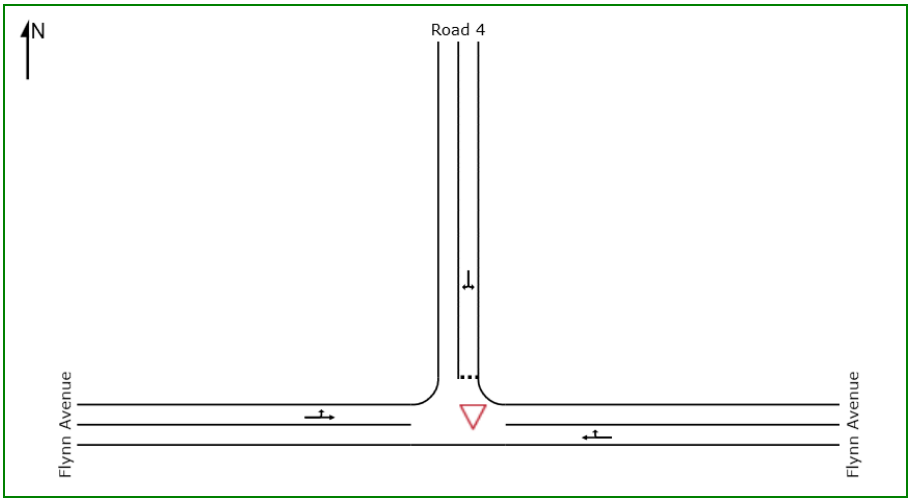


Figure 12: Indicative Intersection Arrangement – Flynn Avenue x Road 4

It can be seen from **Figure 11** and **Figure 12** that the intersections of Southern Cross Avenue with Road 4 and Flynn Ave with Road 4 will both form a T-junction that has a 'Giveway' priority control intersection. Furthermore, all legs on Southern Cross Avenue, Flynn Avenue and Road 4 accommodate a single lane of traffic in each direction.

6.2 Internal Design

The internal road network is shown on the plans provided in Appendix B. The internal road network has varying carriageway widths which are dependent on their function in the road hierarchy. As outlined in **Table 5** below:

Table 5: Proposed Road Geometry

Classification (Road)	Road Reserve Width	Approximate Carriageway Width
Northern Connector Street (Road 3)	21.4	13.6
Local Access Street Type 2 (Road 4)	17.4	9.4
Local Access Street Type 1 (Road 9)	15.2	7.2

The above widths are consistent with those nominally required within the Middleton Grange DCP. These carriageway widths are generous and will operate effectively. In addition, the proposed road geometry satisfies the recommended width outlined within the Australian Model Code for Residential Development (AMCORD) which recommends a minimum width of 5.5 metres (or 7.0 metres) for a local access street within a 13.5 metre road reserve.

In summary, the internal design is considered appropriate and will provide an appropriate amenity for future residents and other road users.

7. Conclusions

The following conclusions are noteworthy:

- TRAFFIX has been commissioned by Manta Group Pty Ltd to undertake a Traffic Impact Assessment in support of an internal road network for the proposed Town Centre at 60-80 Southern Cross Avenue & 45-65 Hall Circuit, Middleton Grange.
- This application relates to the subdivision of the site for a Town Centre comprising of 825 residential units, 20,240m^2 GLA of retail and 2,533m^2 GFA of commercial.
- Three new roads are proposed within the site. Two roads traverse north-south (Road 3 and Road 4) between Southern Cross Avenue in the north and Flynn Avenue in south. An additional road (Road 9) will connect to Road 3 traversing adjacent to the southern boundary of Middleton Grange Public School. Road 9 will utilise the existing alignment of Hall Circuit and connect with Flynn Avenue
- The impacts of the development which the subdivision supports have been assessed based on the RMS trip rates. The proposed development is expected to generate in the order of 380 and 1,200 vehicles per hour during the weekday morning and evening peak periods, respectively.
- The four priority controlled intersections proposed to provide access to the site operate with a LOS B or better during both peak periods with minimal delays with the increased traffic volumes associated with the development. Accordingly, the traffic impacts associated with the development can readily be accommodated on the local road network.
- The internal road cross sections are compliant with the Middleton Grange DCP and provide three different road typologies based on their role in the hierarchy. These will provide a legible hierarchy that is functional and efficient for vehicular traffic, while also providing footpaths on both sides and opportunities for on-street parking.
- Direct access to properties will be available from all internal roads.
- The development provides for future bus routes, all of which traverse Road 3 which is a connector road.
- A more holistic traffic impact assessment report will be prepared to assess the overall impacts of the proposed Town Centre development to the more extended road network in the area.

It is therefore concluded that the proposed internal road network is supportable on traffic planning grounds and will operate satisfactorily.

Appendix A

Photographic Record

View looking west on Flynn Avenue with subject site on right hand side of photograph.

View looking west on Flynn Avenue with subject site on left hand side of photograph.

Appendix B

Reduced Plans

SOUTHERN CROSS AVENUE

REARDON AVENUE

SWOFFER AVENUE

DRAINAGE RESERVE

DRAINAGE RESERVE

BONYTHON AVE

FOLLET AVE

FLYNN AVENUE

HALL CIRCUIT

MIDDLETON GRANGE PUBLIC SCHOOL

LOT 102 DP1128111 PUBLIC RESERVE

Lot 1 DP1207518

1 D.P.1078564 1029m²

Lot 2 4582m²

Lot 3 3556m²

Lot 4 1.244ha

Lot 5 1.244ha

Lot 6 5316m²

Lot 7 3314m²

Lot 8 2000m²

Note: Dimensions and areas are subject to final survey

No.	AMENDMENT	DATE

vince morgan SURVEYORS

Vince Morgan (Surveyors) Pty Ltd
77 UNION ROAD PENRITH
PO BOX 4156 PENRITH PLAZA 2750
Ph 47215293 Fax 47312821
email mail@vmsurvey.com.au
www.vincemorgansurveyors.com.au

DATUM:	DATE: 12.07.16
ORIGIN:	SCALE 1:1000 @A2
DRAWN: IVM	CHECKED:

MANTA GROUP

MIDDLETON GRANGE TOWN CENTRE

LOT CALCULATION PLAN
MIDDLETON GRANGE TOWN CENTRE

PLAN No. 19133-P19

SHEET 1 OF 1 SHEETS

FILE:

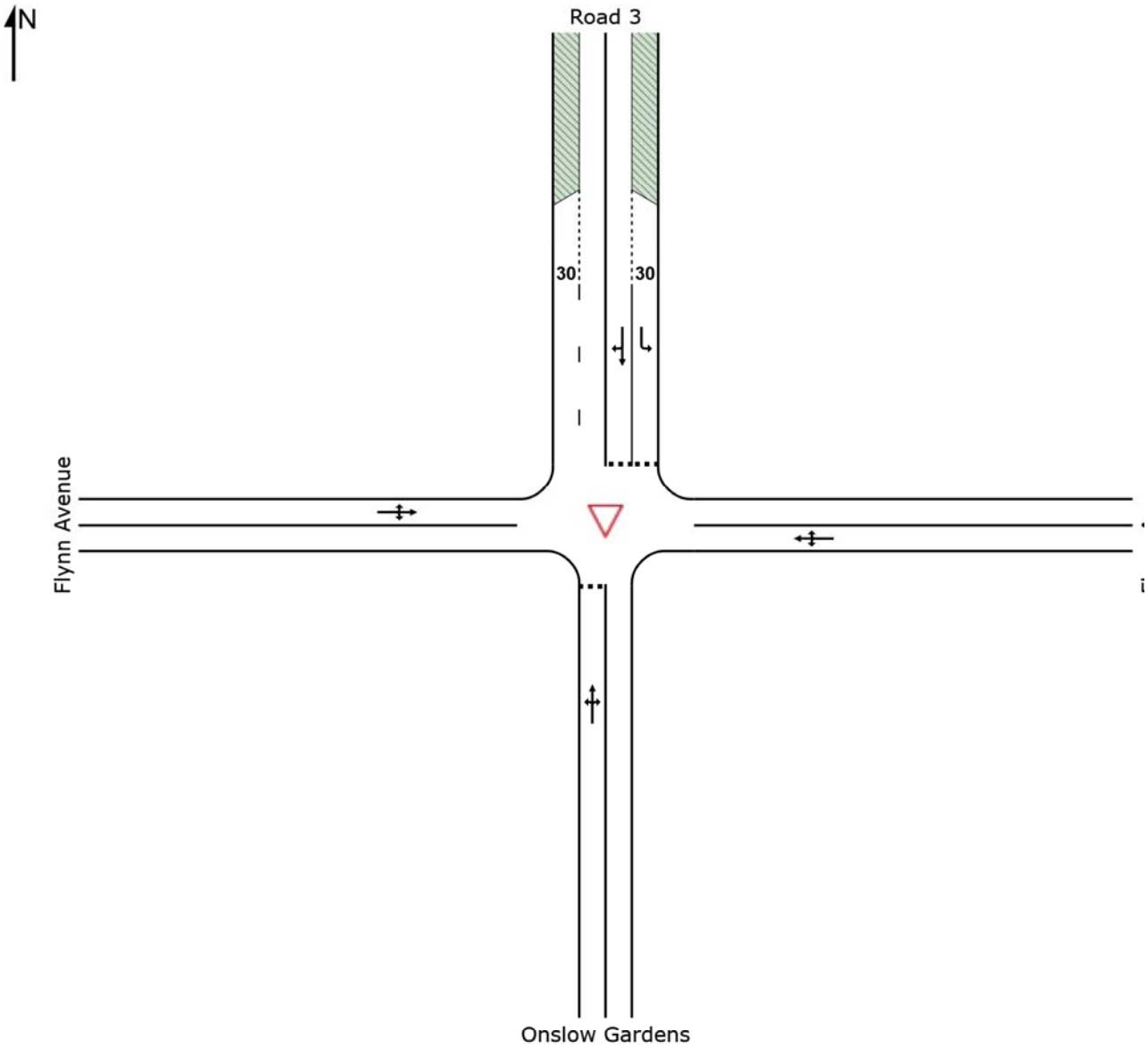
Appendix C

SIDRA Modelling Outputs

SITE LAYOUT

Site: 05v [J05 - Flynn Ave x Onslow Gardens x Road 3 - EX + DEV_AM Peak (Improvements) - Conversion]

Intersection: Flynn Avenue x Onslow Gardens x Road 3
Scenario: Existing + Development (825 High Density Residential Units | 22,140m2 of Retail & Commercial)
Period: AM Peak
Giveway / Yield (Two-Way)



MOVEMENT SUMMARY

Site: 05v [J05 - Flynn Ave x Onslow Gardens x Road 3 - EX + DEV_AM Peak (Improvements) - Conversion]

Network: 1 [Network - EX + DEV_AM Peak (Improvements)]

Intersection: Flynn Avenue x Onslow Gardens x Road 3
Scenario: Existing + Development (825 High Density Residential Units | 22,140m2 of Retail & Commercial)
Period: AM Peak
Giveway / Yield (Two-Way)

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: Onslow Gardens													
1	L2	5	0.0	5	0.0	0.013	6.1	LOS A	0.0	0.3	0.52	0.61	28.8
2	T1	1	0.0	1	0.0	0.013	13.0	LOS A	0.0	0.3	0.52	0.61	28.8
3	R2	1	0.0	1	0.0	0.013	17.3	LOS B	0.0	0.3	0.52	0.61	28.8
Approach		7	0.0	7	0.0	0.013	8.7	LOS A	0.0	0.3	0.52	0.61	28.8
East: Flynn Avenue													
4	L2	3	0.0	3	0.0	0.294	9.3	LOS A	0.8	5.9	0.22	0.07	46.8
5	T1	443	1.7	443	1.7	0.294	1.0	LOS A	0.8	5.9	0.22	0.07	46.8
6	R2	49	0.0	49	0.0	0.294	9.4	LOS A	0.8	5.9	0.22	0.07	46.8
Approach		496	1.5	496	1.5	0.294	1.9	NA	0.8	5.9	0.22	0.07	46.8
North: Road 3													
7	L2	87	0.0	87	0.0	0.149	7.8	LOS A	0.4	2.8	0.56	0.78	35.6
8	T1	1	0.0	1	0.0	0.097	13.0	LOS A	0.3	2.1	0.79	0.90	31.5
9	R2	24	0.0	24	0.0	0.097	17.0	LOS B	0.3	2.1	0.79	0.90	26.5
Approach		113	0.0	113	0.0	0.149	9.8	LOS A	0.4	2.8	0.61	0.81	33.1
West: Flynn Avenue													
10	L2	43	0.0	43	0.0	0.501	5.3	LOS A	0.3	2.4	0.04	0.04	46.5
11	T1	664	1.7	664	1.7	0.501	0.1	LOS A	0.3	2.4	0.04	0.04	46.5
12	R2	11	0.0	11	0.0	0.501	7.4	LOS A	0.3	2.4	0.04	0.04	45.0
Approach		718	1.6	718	1.6	0.501	0.5	NA	0.3	2.4	0.04	0.04	46.4
All Vehicles		1334	1.4	1334	1.4	0.501	1.9	NA	0.8	5.9	0.15	0.12	44.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 05v [J05 - Flynn Ave x Onslow Gardens x Road 3 - EX + DEV_PM Peak (Improvements) - Conversion]

Network: 1 [Network - EX + DEV_PM Peak (Improvements)]

Intersection: Flynn Avenue x Onslow Gardens x Road 3
Scenario: Existing + Development (825 High Density Residential Units | 22,140m2 of Retail & Commercial)
Period: PM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

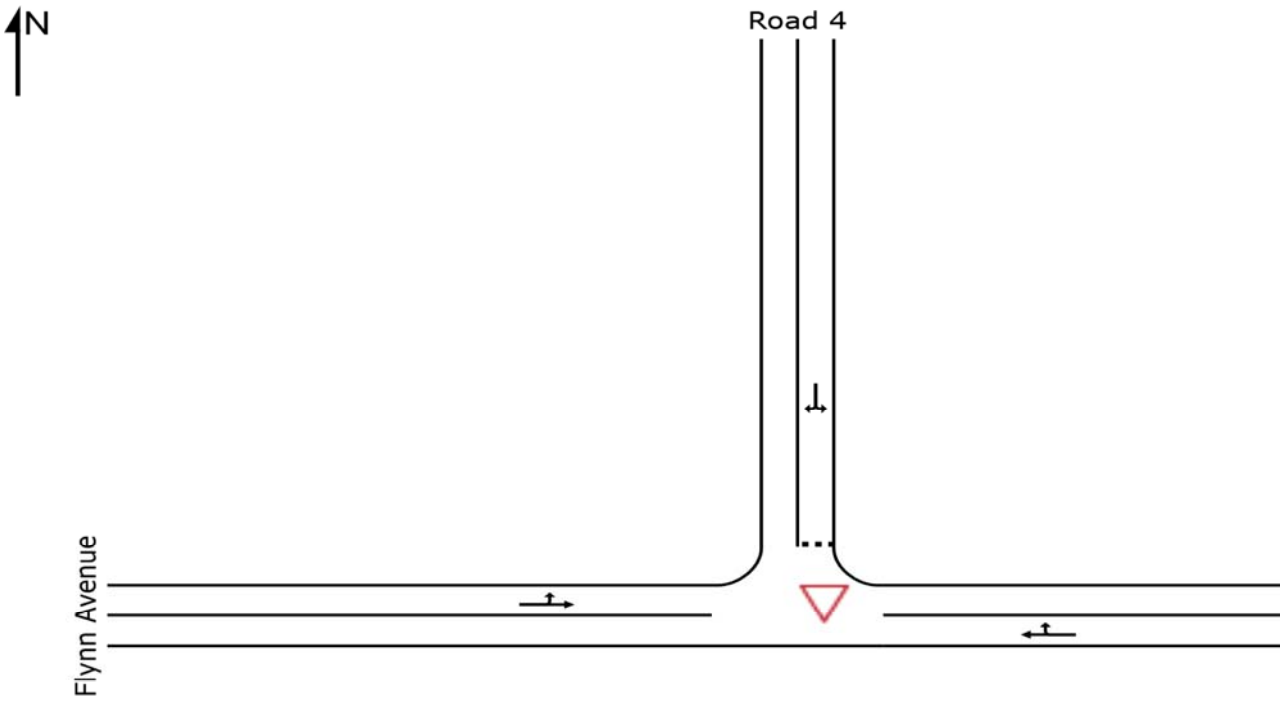
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Onslow Gardens													
1	L2	1	0.0	1	0.0	0.006	6.1	LOS A	0.0	0.1	0.55	0.63	28.3
2	T1	1	0.0	1	0.0	0.006	9.4	LOS A	0.0	0.1	0.55	0.63	28.3
3	R2	1	0.0	1	0.0	0.006	11.2	LOS A	0.0	0.1	0.55	0.63	28.3
Approach		3	0.0	3	0.0	0.006	8.9	LOS A	0.0	0.1	0.55	0.63	28.3
East: Flynn Avenue													
4	L2	4	0.0	4	0.0	0.364	6.9	LOS A	1.6	11.4	0.28	0.16	46.1
5	T1	454	1.4	454	1.4	0.364	1.0	LOS A	1.6	11.4	0.28	0.16	45.9
6	R2	149	0.0	149	0.0	0.364	6.9	LOS A	1.6	11.4	0.28	0.16	45.9
Approach		607	1.0	607	1.0	0.364	2.5	NA	1.6	11.4	0.28	0.16	45.9
North: Road 3													
7	L2	95	0.0	95	0.0	0.072	5.3	LOS A	0.3	2.0	0.32	0.55	38.2
8	T1	1	0.0	1	0.0	0.409	11.8	LOS A	1.8	12.6	0.76	0.98	32.9
9	R2	162	0.0	162	0.0	0.409	14.8	LOS B	1.8	12.6	0.76	0.98	28.1
Approach		258	0.0	258	0.0	0.409	11.3	LOS A	1.8	12.6	0.60	0.82	31.1
West: Flynn Avenue													
10	L2	175	0.0	175	0.0	0.219	4.6	LOS A	0.0	0.1	0.01	0.23	39.3
11	T1	239	1.3	239	1.3	0.219	0.0	LOS A	0.0	0.1	0.01	0.23	39.3
12	R2	1	0.0	1	0.0	0.219	6.8	LOS A	0.0	0.1	0.01	0.23	42.0
Approach		415	0.8	415	0.8	0.219	2.0	NA	0.0	0.1	0.01	0.23	39.4
All Vehicles		1283	0.7	1283	0.7	0.409	4.1	NA	1.8	12.6	0.25	0.32	41.2

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.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 06 [J06 - Flynn Ave x Road 4 - EX + DEV_AM Peak (Improvements)]

Intersection: Flynn Avenue x Road 4
Scenario: Existing + Development (825 High Density Residential Units | 22,140m2 of Retail & Commercial)
Period: AM Peak
Giveway / Yield (Two-Way)



Organisation: TRAFFIX | Created: Monday, 26 September 2016 3:20:08 PM
Project: \\192.168.3.1\tdata\Synergy\Projects\16\16.068\Modelling\16.068m07 TRAFFIX 45-65 Hall Circult, Middleton Grange_with DEV and Improvements (J05 GW).sip7

MOVEMENT SUMMARY

Site: 06 [J06 - Flynn Ave x Road 4 - EX + DEV_AM Peak (Improvements)]

Network: 1 [Network - EX + DEV_AM Peak (Improvements)]

Intersection: Flynn Avenue x Road 4
Scenario: Existing + Development (825 High Density Residential Units | 22,140m2 of Retail & Commercial)
Period: AM Peak
Giveway / Yield (Two-Way)

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
East: Flynn Avenue													
5	T1	436	1.7	436	1.7	0.269	0.7	LOS A	0.6	4.4	0.15	0.05	42.0
6	R2	37	0.0	37	0.0	0.269	8.8	LOS A	0.6	4.4	0.15	0.05	42.0
Approach		473	1.6	473	1.6	0.269	1.3	NA	0.6	4.4	0.15	0.05	42.0
North: Road 4													
7	L2	81	0.0	81	0.0	0.155	7.6	LOS A	0.5	3.8	0.59	0.79	34.2
9	R2	20	0.0	20	0.0	0.155	13.7	LOS A	0.5	3.8	0.59	0.79	34.2
Approach		101	0.0	101	0.0	0.155	8.8	LOS A	0.5	3.8	0.59	0.79	34.2
West: Flynn Avenue													
10	L2	24	0.0	24	0.0	0.343	4.6	LOS A	0.0	0.0	0.00	0.02	49.7
11	T1	637	1.8	637	1.8	0.343	0.0	LOS A	0.0	0.0	0.00	0.02	49.7
Approach		661	1.8	661	1.8	0.343	0.2	NA	0.0	0.0	0.00	0.02	49.7
All Vehicles		1235	1.5	1235	1.5	0.343	1.3	NA	0.6	4.4	0.11	0.09	47.2

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.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 06 [J06 - Flynn Ave x Road 4 - EX + DEV_PM Peak (Improvements)]

Network: 1 [Network - EX + DEV_PM Peak (Improvements)]

Intersection: Flynn Avenue x Road 4
Scenario: Existing + Development (825 High Density Residential Units | 22,140m2 of Retail & Commercial)
Period: PM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

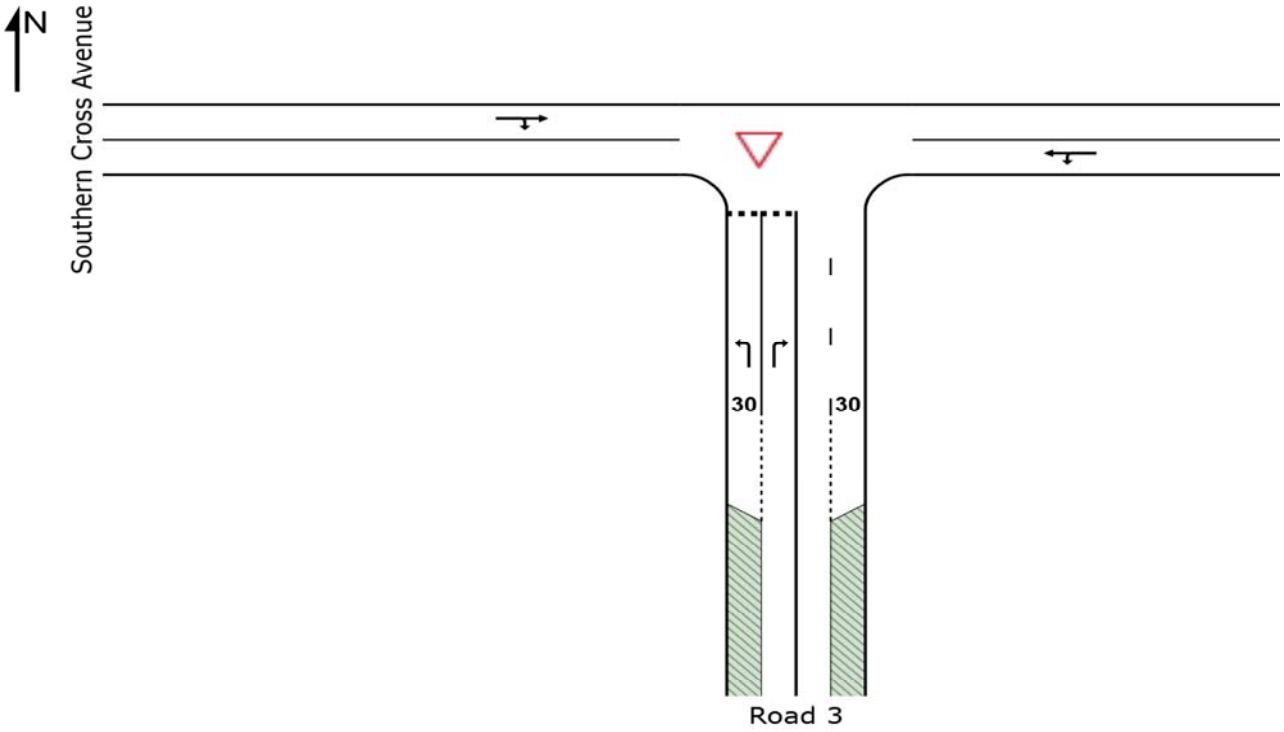
Mov ID	OD Mov	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
East: Flynn Avenue													
5	T1	501	1.3	501	1.3	0.363	1.0	LOS A	1.6	11.3	0.29	0.13	37.9
6	R2	116	0.0	116	0.0	0.363	7.4	LOS A	1.6	11.3	0.29	0.13	37.9
Approach		617	1.0	617	1.0	0.363	2.2	NA	1.6	11.3	0.29	0.13	37.9
North: Road 4													
7	L2	62	0.0	62	0.0	0.291	6.4	LOS A	1.1	7.8	0.59	0.80	32.1
9	R2	97	0.0	97	0.0	0.291	13.1	LOS A	1.1	7.8	0.59	0.80	32.1
Approach		159	0.0	159	0.0	0.291	10.5	LOS A	1.1	7.8	0.59	0.80	32.1
West: Flynn Avenue													
10	L2	109	0.0	109	0.0	0.240	4.6	LOS A	0.0	0.0	0.00	0.13	48.4
11	T1	352	0.9	352	0.9	0.240	0.0	LOS A	0.0	0.0	0.00	0.13	48.4
Approach		461	0.7	461	0.7	0.240	1.1	NA	0.0	0.0	0.00	0.13	48.4
All Vehicles		1237	0.8	1237	0.8	0.363	2.9	NA	1.6	11.3	0.22	0.22	43.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 07 [J07 - Southern Cross Ave x Road 3 - EX + DEV_AM Peak (Improvements)]

Intersection: Southern Cross Avenue x Road 3
Scenario: Existing + Development (825 High Density Residential Units | 22,140m2 of Retail & Commercial)
Period: AM Peak
Giveway / Yield (Two-Way)



Organisation: TRAFFIX | Created: Monday, 26 September 2016 3:20:17 PM
Project: \\192.168.3.1\tdata\Synergy\Projects\16\16.068\Modelling\16.068m07 TRAFFIX 45-65 Hall Circult, Middleton Grange_with DEV and Improvements (J05 GW).sip7

MOVEMENT SUMMARY

Site: 07 [J07 - Southern Cross Ave x Road 3 - EX + DEV_AM Peak (Improvements)]

Network: 1 [Network - EX + DEV_AM Peak (Improvements)]

Intersection: Southern Cross Avenue x Road 3
Scenario: Existing + Development (825 High Density Residential Units | 22,140m2 of Retail & Commercial)
Period: AM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Road 3													
1	L2	1	0.0	1	0.0	0.001	4.6	LOS A	0.0	0.0	0.09	0.49	39.7
3	R2	1	0.0	1	0.0	0.001	4.8	LOS A	0.0	0.0	0.15	0.50	42.7
Approach		2	0.0	2	0.0	0.001	4.7	LOS A	0.0	0.0	0.12	0.50	41.6
East: Southern Cross Avenue													
4	L2	9	0.0	9	0.0	0.021	4.6	LOS A	0.0	0.0	0.00	0.13	47.2
5	T1	32	0.0	32	0.0	0.021	0.0	LOS A	0.0	0.0	0.00	0.13	47.2
Approach		41	0.0	41	0.0	0.021	1.1	NA	0.0	0.0	0.00	0.13	47.2
West: Southern Cross Avenue													
11	T1	37	0.0	37	0.0	0.024	0.0	LOS A	0.1	0.4	0.05	0.11	47.7
12	R2	9	0.0	9	0.0	0.024	4.7	LOS A	0.1	0.4	0.05	0.11	43.1
Approach		46	0.0	46	0.0	0.024	1.0	NA	0.1	0.4	0.05	0.11	47.3
All Vehicles		89	0.0	89	0.0	0.024	1.1	NA	0.1	0.4	0.03	0.13	47.0

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.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 07 [J07 - Southern Cross Ave x Road 3 - EX + DEV_PM Peak (Improvements)]

Network: 1 [Network - EX + DEV_PM Peak (Improvements)]

Intersection: Southern Cross Avenue x Road 3
Scenario: Existing + Development (825 High Density Residential Units | 22,140m2 of Retail & Commercial)
Period: AM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

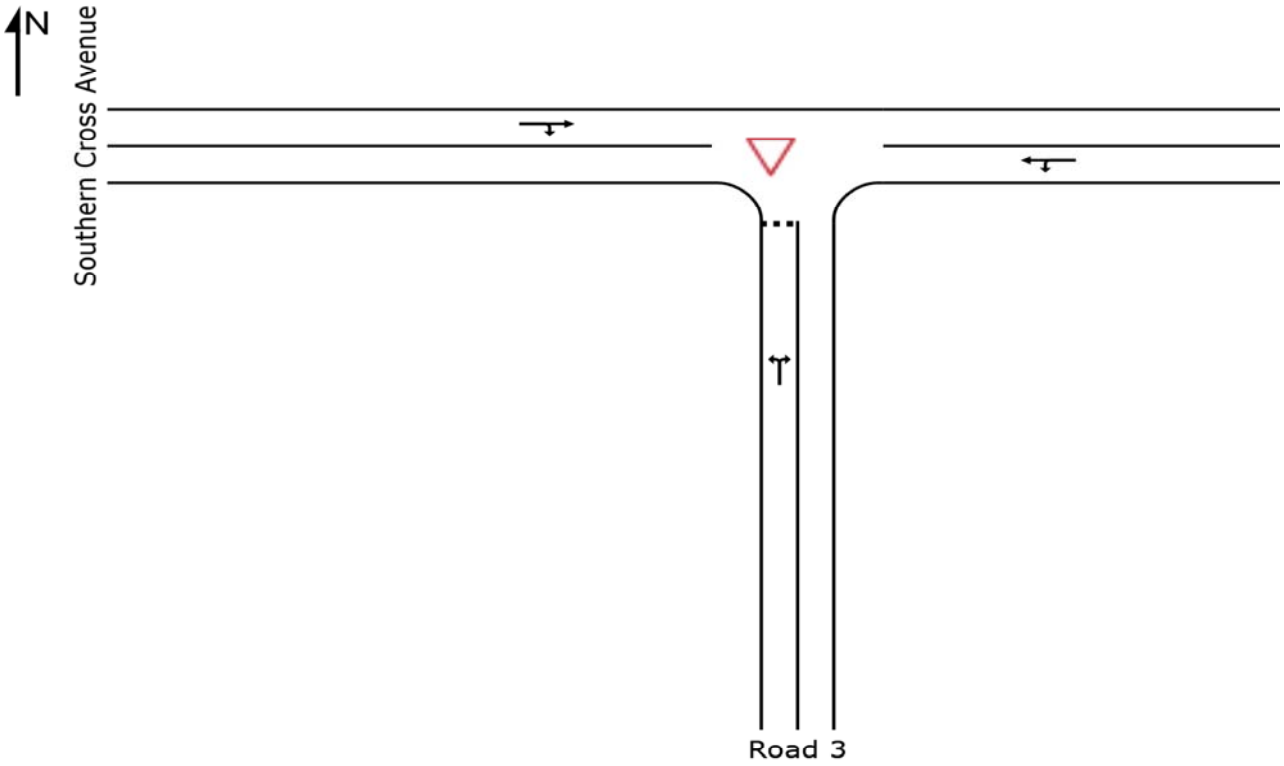
Mov ID	OD Mov	Demand Flows Total veh/h	Demand Flows HV %	Arrival Flows Total veh/h	Arrival Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Road 3													
1	L2	46	0.0	46	0.0	0.029	4.7	LOS A	0.1	0.8	0.12	0.50	39.6
3	R2	46	0.0	46	0.0	0.041	5.1	LOS A	0.1	0.9	0.22	0.53	42.4
Approach		93	0.0	93	0.0	0.041	4.9	LOS A	0.1	0.9	0.17	0.51	41.4
East: Southern Cross Avenue													
4	L2	46	0.0	46	0.0	0.047	4.6	LOS A	0.0	0.0	0.00	0.27	44.3
5	T1	46	0.0	46	0.0	0.047	0.0	LOS A	0.0	0.0	0.00	0.27	44.3
Approach		93	0.0	93	0.0	0.047	2.3	NA	0.0	0.0	0.00	0.27	44.3
West: Southern Cross Avenue													
11	T1	36	0.0	36	0.0	0.046	0.2	LOS A	0.2	1.5	0.18	0.29	43.9
12	R2	46	0.0	46	0.0	0.046	4.8	LOS A	0.2	1.5	0.18	0.29	34.2
Approach		82	0.0	82	0.0	0.046	2.8	NA	0.2	1.5	0.18	0.29	40.7
All Vehicles		267	0.0	267	0.0	0.047	3.3	NA	0.2	1.5	0.11	0.36	42.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 08 [J08 - Southern Cross Ave x Road 4 - EX + DEV_AM Peak (Improvements)]

Intersection: Southern Cross Avenue x Road 4
Scenario: Existing + Development (825 High Density Residential Units | 22,140m2 of Retail & Commercial)
Period: AM Peak
Giveway / Yield (Two-Way)



Organisation: TRAFFIX | Created: Monday, 26 September 2016 3:20:26 PM
Project: \\192.168.3.1\tdata\Synergy\Projects\16\16.068\Modelling\16.068m07 TRAFFIX 45-65 Hall Circuit, Middleton Grange_with DEV and Improvements (J05 GW).sip7

MOVEMENT SUMMARY

Site: 08 [J08 - Southern Cross Ave x Road 4 - EX + DEV_AM Peak (Improvements)] Network: 1 [Network - EX + DEV_AM Peak (Improvements)]

Intersection: Southern Cross Avenue x Road 4
Scenario: Existing + Development (825 High Density Residential Units | 22,140m2 of Retail & Commercial)
Period: AM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Road 3													
1	L2	1	0.0	1	0.0	0.002	4.6	LOS A	0.0	0.0	0.09	0.51	45.1
3	R2	1	0.0	1	0.0	0.002	4.8	LOS A	0.0	0.0	0.09	0.51	39.7
Approach		2	0.0	2	0.0	0.002	4.7	LOS A	0.0	0.0	0.09	0.51	43.5
East: Southern Cross Avenue													
4	L2	5	0.0	5	0.0	0.016	4.6	LOS A	0.0	0.0	0.00	0.09	45.2
5	T1	27	0.0	27	0.0	0.016	0.0	LOS A	0.0	0.0	0.00	0.09	49.1
Approach		33	0.0	33	0.0	0.016	0.7	NA	0.0	0.0	0.00	0.09	48.9
West: Southern Cross Avenue													
11	T1	45	0.0	45	0.0	0.026	0.0	LOS A	0.0	0.2	0.02	0.06	49.1
12	R2	5	0.0	5	0.0	0.026	4.7	LOS A	0.0	0.2	0.02	0.06	49.1
Approach		51	0.0	51	0.0	0.026	0.5	NA	0.0	0.2	0.02	0.06	49.1
All Vehicles		85	0.0	85	0.0	0.026	0.7	NA	0.0	0.2	0.02	0.08	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.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 08 [J08 - Southern Cross Ave x Road 4 - EX + DEV_PM Peak (Improvements)]

Network: 1 [Network - EX + DEV_PM Peak (Improvements)]

Intersection: Southern Cross Avenue x Road 4
Scenario: Existing + Development (825 High Density Residential Units | 22,140m2 of Retail & Commercial)
Period: AM Peak
Giveway / Yield (Two-Way)

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: Road 3													
1	L2	27	0.0	27	0.0	0.042	4.7	LOS A	0.2	1.1	0.16	0.52	44.8
3	R2	27	0.0	27	0.0	0.042	5.2	LOS A	0.2	1.1	0.16	0.52	39.3
Approach		55	0.0	55	0.0	0.042	4.9	LOS A	0.2	1.1	0.16	0.52	43.2
East: Southern Cross Avenue													
4	L2	27	0.0	27	0.0	0.047	4.6	LOS A	0.0	0.0	0.00	0.16	41.9
5	T1	65	0.0	65	0.0	0.047	0.0	LOS A	0.0	0.0	0.00	0.16	48.3
Approach		93	0.0	93	0.0	0.047	1.3	NA	0.0	0.0	0.00	0.16	47.8
West: Southern Cross Avenue													
11	T1	65	0.0	65	0.0	0.049	0.1	LOS A	0.2	1.1	0.12	0.16	47.4
12	R2	27	0.0	27	0.0	0.049	4.8	LOS A	0.2	1.1	0.12	0.16	47.4
Approach		93	0.0	93	0.0	0.049	1.5	NA	0.2	1.1	0.12	0.16	47.4
All Vehicles		240	0.0	240	0.0	0.049	2.2	NA	0.2	1.1	0.08	0.24	46.4

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.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.