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South Appin Planning Proposal Study Update Transport Impact Assessment

Client // Walker Corporation (NSW) Pty Ltd
Office // NSW
Reference // N148780
Date // 02/05/18

South Appin Planning Proposal

Study Update

Transport Impact Assessment

Issue: B 02/05/18

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Quality Record

Issue	Date	Description	Prepared By	Checked By	Approved By	Signed
A	26/04/18	Final	Ghizlane Chergaoui	Ashish Modessa	Brett Maynard	Brett Maynard
B	01/05/18	Final incorporating client comments	Ghizlane Chergaoui	Ashish Modessa	Brett Maynard	

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Executive Summary

A Planning Proposal was previously prepared in 2013 to rezone lands generally located to the west of the existing Appin township from rural uses to residential use. The subject sites are generally separated into three distinct precincts as follows:

- Northern precinct: located north of the Appin Sportsground
- Central precinct: located between the Appin Sportsground and Macquariedale Road
- Southern precinct: located south of Macquariedale Road.

The previous proposal consisted of 300 residential lots, which has been reduced to 246 residential lots including 26 lots that are currently being completed as part of the approved DA for Stage 1 and 220 lots for Stages 2 to 7 that form this updated proposal for the South Appin project.

Site access for the central and southern precincts have been amended, whereby only 21 residential lots would be accessed via Macquariedale Road, with the majority of Central precinct and Southern precinct to be accessed via Rixon Road and directly via Appin Road respectively. This contrasts with the 2013 proposal where Macquariedale Road was to provide primary access to the Central precinct and part of the Southern precinct.

The site is expected to generate up to 156 vehicle movements during the morning peak hour and 171 vehicle movements during the evening peak hour on a typical weekday, distributed across 5 intersections with Appin Road. Compared to the 2013 proposal, these estimates have reduced by 57 and 63 vehicle movements during the morning and evening peak hours respectively.

Updated turning movement counts indicate that there have been only minor changes to peak period traffic volumes along Appin Road between the 2013 and 2018 (less than one percent per annum). However, an assessment of count station data between 2007 and 2016 provided by Roads and Maritime Services suggests some 3.5 per cent per annum growth, noting that this and other development activity (including Appin Valley) form part of any longer-term traffic growth.

The additional traffic generated by the proposed development would account for some 10% to 15% of the future traffic volumes along Appin Road in 2028 depending on the level of background traffic growth.

The proposed intersection arrangements would operate satisfactorily in 2028 based on a one per cent per annum background traffic growth rate, with or without development. Sensitivity testing of a 3.5 per cent growth rate alone indicates turning movements from Macquariedale Road and/ or King Street would be impacted along Appin Road in 2028 (and likely other intersections), with development traffic having only a minor impact on future traffic conditions.

It is not expected that the additional development-generated traffic will impact the capacity along or turning movements from either Rixon Road or Armstrong Road in the future, with both roundabouts having appropriate capacity.

A mid-block capacity assessment indicates Appin Road is anticipated to operate close to theoretical capacity limits in 10 years, based on a one per cent growth rate; and operate at the theoretical capacity if a 3.5 per cent growth rate is realised.

Should this higher background traffic growth be realised, further detailed investigation of the Appin Road corridor would be required (with or without the proposed development), including the need for widening/ duplication, bypass opportunities and/or intersection upgrades. Hence, the additional traffic generated by the proposal is not expected to trigger the need for any intersection upgrades other than those already proposed as part of the Planning Proposal.

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1. Introduction

1.1 Background

A Planning Proposal was previously prepared to rezone lands generally located to the west of the existing Appin township from rural uses to residential uses. The proposal previously consisted of 300 residential lots.

GTA Consultants (GTA) was commissioned by Walker Corporation in 2013 to undertake a traffic impact assessment for the proposed development. At the request of Roads and Maritime Services, the traffic study has been updated in 2018 to reflect current baseline traffic conditions.

The updated proposal for South Appin Stages 2 to 7 includes 220 residential lots, with Stage 1 consisting of an additional 26 lots recently being completed (separate approved DA). The residential lots are predominantly for traditional low density detached housing.

Vehicle access to the southern precinct (partly constructed) is proposed to be predominantly via Appin Road and extensions of King Street and Church Street. Access to 21 residential lots as part of Stages 4 and 6 of the central and southern precincts is proposed via Macquariedale Road (direct access), while the remainder of the central precinct (Stages 5 and 6) would be accessed from Rixon Road to the north. Access to the northern precinct (Stage 7) is proposed via the recently constructed Appin Valley subdivision further north.

1.2 Purpose of this Report

This report outlines the updated traffic conditions and sets out an assessment of the anticipated transport implications of the proposed development, including consideration of the following:

i existing traffic conditions surrounding the site
ii the traffic generating characteristics of the proposed development
iii suitability of the proposed access arrangements for the site
iv the transport impact of the development proposal on the surrounding road network.

1.3 References

In preparing this report, reference has been made to the following:

- traffic surveys completed on behalf of GTA as referenced in the context of this report
- traffic data provided by Roads and Maritime Services (Roads and Maritime) as referenced in the context of this report
- advice and correspondence with Roads and Maritime regarding Appin Road conditions and future road proposals
- plans for the proposed development prepared for Walker Corporation, Drawing Number WEA-CP-700, Issue 41, dated 15 June 2016
- other documents and data as referenced in this report.

2. Existing Conditions

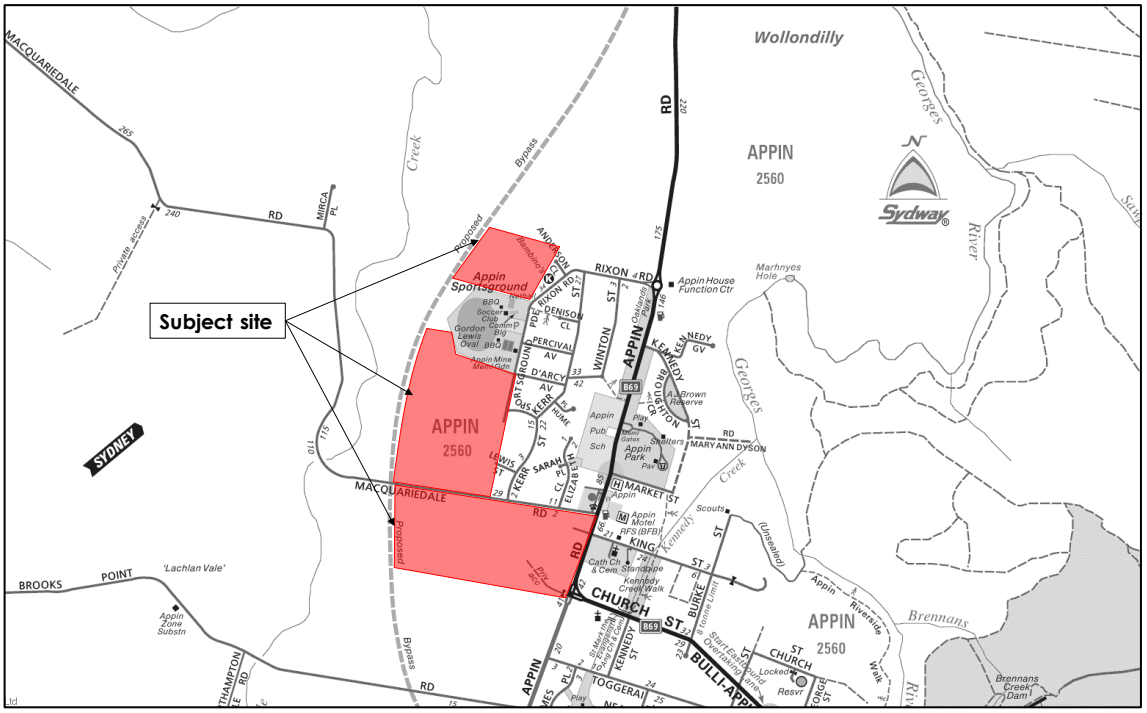
The South Appin project is located immediately adjacent to the existing Appin township, southwest of Sydney. The subject sites are generally located along the western and southern boundary of the Appin township. The site is separated into three distinct precincts as follows:

- Northern precinct: located north of the Appin Sportsground
- Central precinct: located between the Appin Sportsground and Macquariedale Road
- Southern precinct: located south of Macquariedale Road.

The site currently has a land use classification as Rural Landscape (RU2) and is largely undeveloped land. The surrounding properties predominantly include rural and residential land uses with some commercial land use located around the Appin Road/ Macquariedale Road intersection.

The location of the subject site and its surrounding environs is shown in Figure 2.1.

Figure 2.1: Subject site and its environs



Basemap source: Sydway Publishing Pty Ltd

2.1 Road Network

2.1.1 Adjoining Roads

Appin Road

Appin Road is classified as a State Road (MR177) and in the vicinity of the site is aligned in a north-south direction. It is a two-way road configured with a single traffic lane in each direction, generally with a carriageway width of approximately 12 metres.

Kerbside parking is not permitted in the section of the road between Church Street and Market Street.

Macquariedale Road

Macquariedale Road functions as a collector road and in the vicinity of the site is aligned in an east-west direction. It is a two-way road with two lanes, generally configured within an approximately eight-metre-wide carriageway near the intersection of Appin Road. It is noted the width of Macquariedale Road reduces somewhat to the west past edge of the township residential area. Macquariedale Road ends approximately 4 kilometres west of the township and as such, there is no significant through traffic to the west of Kerr Road.

Unrestricted parking is generally permitted on both sides of the carriageway. Within approximately 75 metres of Appin Road, the southern side of Maquariedale Road is subject to 'No Stopping' restrictions, while 90-degree angle parking spaces are provided off the carriageway on the northern side of the road.

King Street

King Street functions as a local road aligned in an east-west direction in the vicinity of the site. It is a two-way road configured with two-lanes and approximately a 10-metre-wide carriageway. King Street has a posted speed limit of 50 kilometres per hour. Unrestricted kerbside parking is available on both sides of the carriageway.

Church Street

Church Street functions as a collector road aligned in an east-west direction in the vicinity of the site. It is a two-way road configured with a traffic lane and a parking lane in each direction and an approximately 12-metre-wide carriageway. Church Street has a posted speed limit of 50 kilometres per hour. Unrestricted kerbside parking is available on both sides of the carriageway.

Rixon Road

Rixon Road functions as a collector road aligned in an east-west direction in the vicinity of the site. It is a two-way road configured with two-lanes within an approximately 13-metre-wide carriageway. Unrestricted kerbside parking is available on both sides of the carriageway.

2.1.2 Surrounding Intersections

The following intersections currently exist in the vicinity of the site:

- Appin Road/ Macquariedale Road (unsignalised)
- Appin Road/ King Street (unsignalised)
- Appin Road/ Church Street (unsignalised)
- Appin Road/ Rixon Road (unsignalised).

2.2 Traffic Volumes

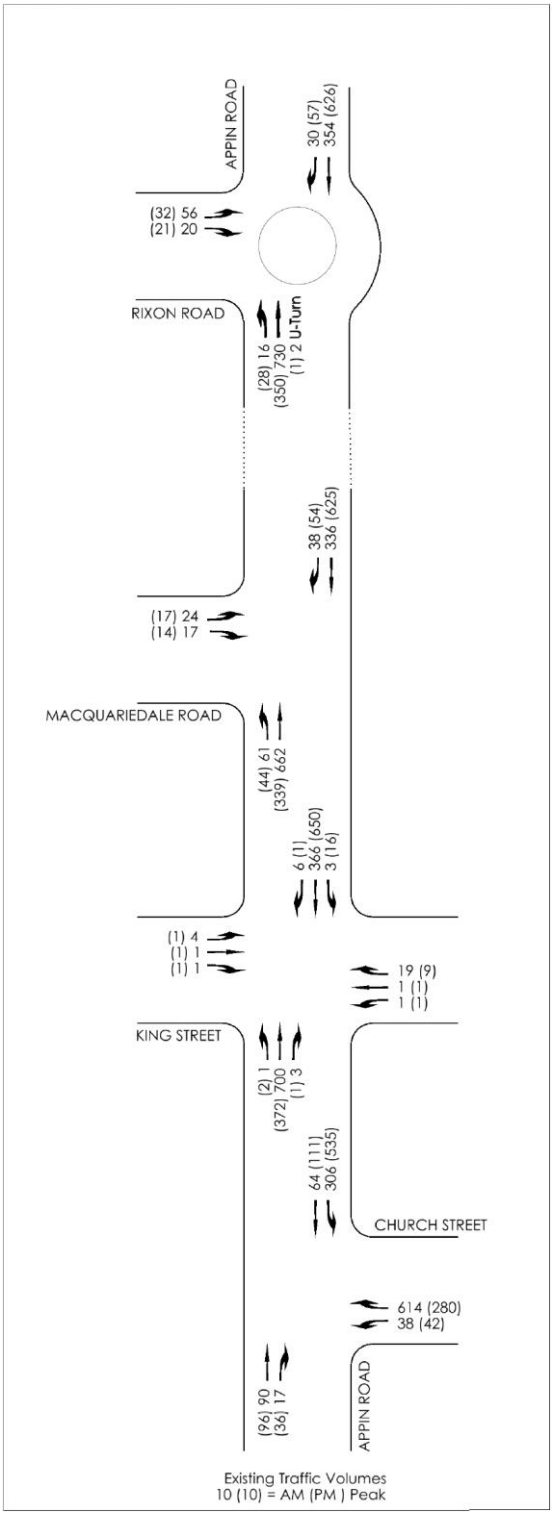
GTA commissioned intersection turning movement counts and mid-block automatic tube traffic movement counts on key roads in the vicinity of the site in 2013 and 2018. The updated intersection turning movement counts were conducted on Thursday 22 March 2018 between 7:00am and 9:00am and 4:00pm and 6:00pm at the following intersections:

- Appin Road/ Macquariedale Road
- Appin Road/ King Street
- Appin Road/ Church Street
- Appin Road/ Rixon Road.

An updated mid-block tube count was conducted over a seven-day period commencing Thursday 22 March 2018 on Appin Road, south of Church Street.

The AM and PM peak hour traffic volumes are summarised in Figure 2.2, with full results contained in Appendix A.

Figure 2.2: Existing AM/ PM Peak Hour Traffic Volumes



2.3 Intersection Operation

The operation of the key intersections within the study area have been assessed using SIDRA INTERSECTION[1], a computer-based modelling package which calculates intersection performance.

The commonly used measure of intersection performance, as defined by Roads and Maritime Services, is vehicle delay. SIDRA INTERSECTION determines the average delay that vehicles encounter and provides a measure of the level of service.

Table 2.1 shows the criteria that SIDRA INTERSECTION adopts in assessing the level of service.

Table 2.1: SIDRA INTERSECTION Level of Service Criteria

Level of Service (LOS)	Average Delay per vehicle (secs/ veh)	Traffic Signals, Roundabout	Give Way & Stop Sign
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	Near capacity	Near capacity, accident study required
E	57 to 70	At capacity, at signals incidents will cause excessive delays	At capacity, requires other control mode
F	Greater than 70	Extra capacity required	Extreme delay, major treatment required

Table 2.2 presents a summary of the existing operation of the intersections, with full results presented in Appendix B of this report. The intersections of Appin Road/ Macquariedale Road and Appin Road/ King Street have been assessed as having a short right turn bays on Appin Road based on the wide carriageway where through traffic is generally be able to pass a vehicle waiting to turn right. This is consistent with current observed intersection operation.

Table 2.2: Existing Operating Conditions

Intersection	Peak	Leg	Degree of Saturation (DOS)	Average Delay (sec)	95th Percentile Queue (m)	Level of Service (LOS)
Appin Road/ Rixon Road	AM	South	0.51	9	31	A
		North	0.27	7	14	A
		West	0.11	12	5	A
	PM	South	0.29	9	13	A
		North	0.46	7	28	A
		West	0.06	9	2	A
Appin Road/ Macquariedale Road	AM	South	0.40	4	0	A
		North	0.19	9	2	A
		West	0.14	26	3	B
	PM	South	0.22	4	0	A
		North	0.05	6	1	A
		West	0.08	21	2	B
Appin Road/ King Street	AM	South	0.00	6	0	A
		East	0.13	36	3	C
		North	0.01	8	0	A
		West	0.03	35	1	C

[1] Program used under license from Akcelik & Associates Pty Ltd.

Intersection	Peak	Leg	Degree of Saturation (DOS)	Average Delay (sec)	95th Percentile Queue (m)	Level of Service (LOS)
	PM	South	0.00	9	0	A
		East	0.06	31	1	C
		North	0.00	7	0	A
		West	0.02	31	1	C
Appin Road/ Church Street	AM	South	0.05	15	1	B
		East	0.38	6	0	A
		North	0.15	15	4	B
	PM	South	0.06	10	1	A
		East	0.19	6	0	A
		North	0.36	10	4	A

Table 2.2 indicates that all intersections analysed currently operate satisfactorily with spare capacity.

2.4 Public Transport

Appin is primarily serviced by the 887-bus route that operates between Campbelltown Railway Station and Wollongong. Bus stops are located on Appin Road, immediately south of Macquariedale Road are summarised in Table 2.3.

Table 2.3: Bus Service

Route #	Route Description	Location of Stop	Frequency
887	Campbelltown Railway Station and Wollongong	Appin Road	Generally running hourly between 5:38am and 8:13 pm

2.5 Pedestrian and Cycle Infrastructure

Pedestrian paths are generally available on streets surroundings of the site. These paths are located along both sides of Appin Road near Macquariedale Road, on the northern side of the road on Macquariedale Road before Elizabeth Close and on the northern side of Church Street.

Wollondilly Shire Council has a Shared Cycleway Plan for the area with a designated cycleway/ shared pathway network within Appin. The adopted plan complements the existing shared cycleway network. Proposed cycling routes within this plan aim to improve safety, provide connectivity with other transport modes and affect an increase in the use of bicycles in the community. The Shared Cycleway Plan was developed based on the following principles:

- Connecting residential areas to schools, retail hubs and community uses etc.
- Maximising the use off-road facilities.
- Providing on-road facilities along major connecting roads in rural areas.
- Incorporating off-road routes within known future land release areas.

3. Development Proposal

3.1 Land Uses

South Appin Stages 2 to 7 includes a residential yield for 220 residential lots. The lots will be separated over three precincts as summarised in Table 3.1. The layout plan for the proposed subdivision is provided in Figure 3.1.

Table 3.1: Development Schedule

Precinct	Stage	No. of Lots
South	2	40
	3	35
	4	38
Central	5	27
	6	40
North	7	40
Total		**220**

3.2 Vehicle Access

Vehicle access to the various precincts is shown in Figure 3.1 and is proposed as follows:

- Northern Precinct: via the internal road network of the North Appin subdivision.
- Central Precinct: via Rixon Road, through Sportsground Parade.
- Southern Precinct: via Appin Road.

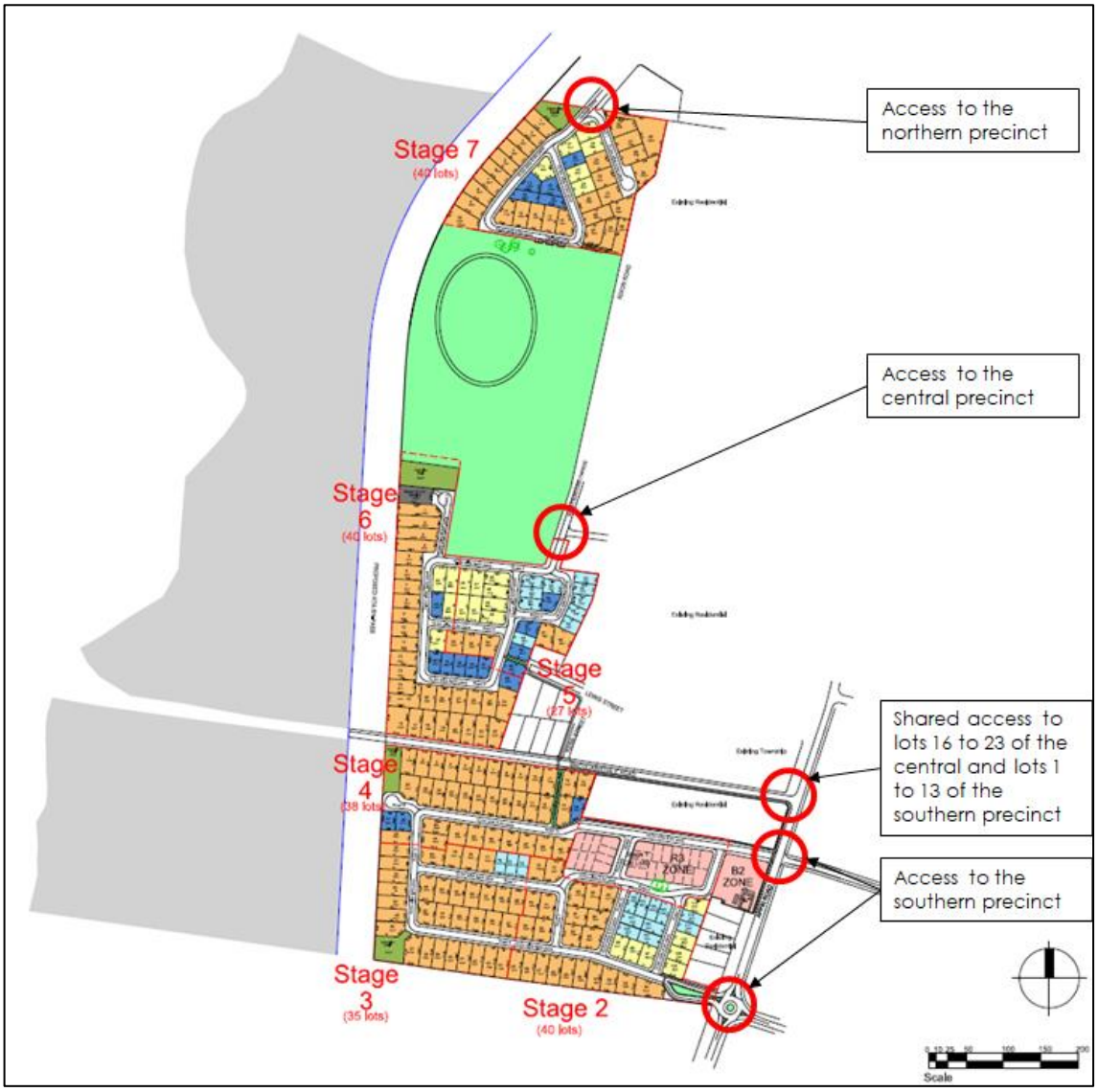
It is proposed that lots 1 to 13 of the southern precinct, as well as lots 13 to 23 of the central precinct be accessed through Macquariedale Road.

A west leg has recently been constructed at the Appin Road/ King Street intersection to facilitate access to the southern precinct. The intersection is a priority controlled four-way intersection with single approach and departure lanes provided on the western intersection leg.

It is further proposed that a new western leg is added to the existing Appin Road/ Church Street intersection to facilitate access to Stage 2 and Stage 3 lots in the southern precinct, with the intersection upgraded to a roundabout.

The above vehicle access strategy represents a change from the 2013 assessment for the central precinct in particular, where Macquariedale Road provided a primary subdivision access point.

Figure 3.1: Subdivision layout



Source: Walker Corporation, Drawing Number WEA-CP-700, Issue 41, dated 15 June 2016

4. Sustainable Transport Infrastructure

4.1 Public Transport

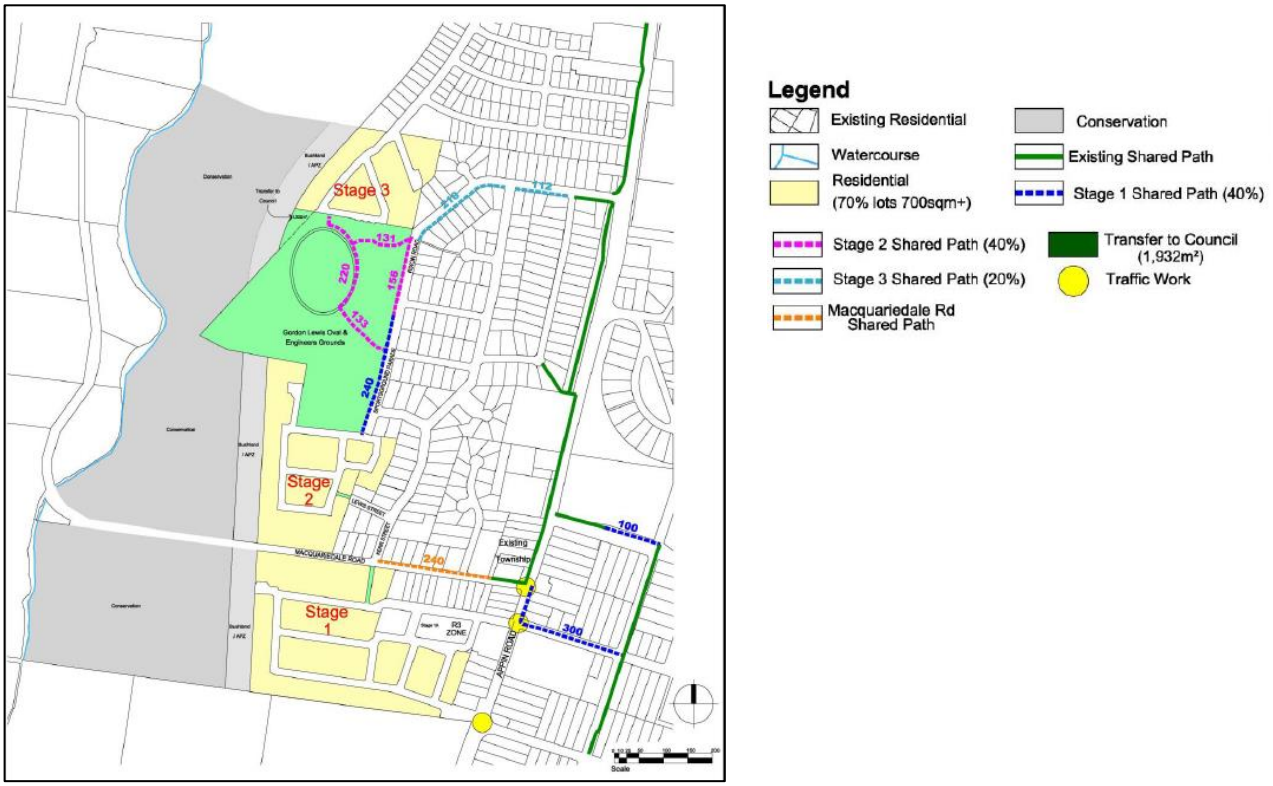
It is not proposed to provide public transport routes through the subdivision. It is understood that there are concerns from residents over increased traffic volumes given Rixon Road is linked to the central precinct. Notwithstanding, a future bus route could be provided along Appin Road and Macquariedale Road servicing the needs of the majority of residents.

4.2 Walking and Cycling

Pedestrian paths would be provided on one side of each of the roads within the future residential subdivision, which is generally consistent with the Wollondilly Shire Council Design Specifications 'Subdivisions and Engineering Standards'.

The general layout of the subdivision would be a grid formation which minimises walking and cycling distances. While it is not proposed to provide direct vehicle links to the northern precinct from the central precinct (i.e. connecting Rixon Road to Heritage Drive), it is proposed to construct shared paths along Sportsground Parade and through Gordon Lewis Oval to facilitate a walking and cycling between the central and northern precincts. This is illustrated in Figure 4.1, along the other shared path facilities to be constructed as part of this development proposal near each precinct to connect the sites with existing facilities along Appin Road.

Figure 4.1: Proposed shared path facilities



Source: South Appin Indicative Staging Plan (Development and Cycleways), Walker Corporation dated 18/01/17

5. Traffic Impact Assessment

5.1 Assessment Scenarios

The traffic impact of the proposed development has been assessed for existing and future traffic conditions, with an allowance background growth in through traffic along Appin Road (+10 years).

As stated in the development proposal, access to the subdivision would be provided separately for the three precincts:

- Access to the northern precinct via Armstrong Road.
- Access to the central precinct via Rixon Road.
- Access to lots 1 to 13 of the southern precinct and lots 13 to 23 of the central precinct via Macquariedale Road.
- Access to Stage 4 of the southern precinct and stage 1 via the new west leg on the Appin Road/ King Street intersection.
- Access to Stages 2 and 3 of the southern precinct via the new west leg on the Appin Road/ Church Street intersection, although interconnected with the above King Street access.

Also of relevance is the potential future Appin bypass road. It is understood there is no financial commitment by Roads and Maritime to build the bypass, however it could be constructed at a later stage to the west of the proposed subdivision precincts. This would provide a link from the north of Appin to the south-east, diverting through traffic around the Appin Township. There is no estimated timeframe for construction of this link, however it is unlikely that it will be constructed in the next 10 years.

5.2 Traffic Generation

Traffic generation estimates for the proposed development have been sourced from the Roads and Maritime *Guide to Traffic Generating Developments* (2002) and Roads and Maritime Technical Direction (TDT 2013/04). The Guide has until recently, been referenced when assessing the future traffic generation for a given development. The Technical Direction provides updated guidance based on more recent surveys.

The guide indicates the following in regard to vehicle trips per low density residential dwellings in regional areas:

- Weekday morning peak hour trips: 0.71 per dwelling
- Weekday evening peak hour trips: 0.78 per dwelling
- Daily: 7.4 per dwelling.

Further to this, the following traffic distribution is assumed:

- 20% inbound, 80% outbound, morning period
- 80% inbound, 20% outbound, evening period.

Estimates of peak hour traffic volumes for both the AM and PM peaks resulting from the proposal are set out in Table 5.1.

Table 5.1: Traffic Generation Estimates

Precinct	Lots	Traffic Generation Rate (Movements/ Dwelling)			Vehicle Movements		
		AM	PM	Daily	AM (In/ Out)	PM (In/ Out)	Daily
North	40	0.71	0.78	7.4	28 (6/ 22)	31 (25/ 6)	296
Central	67				48 (10/ 38)	52 (42/ 10)	496
South	113				80 (16/ 64)	88 (70/ 18)	836
Total	**220**	**-**	**-**	**-**	**156**	**171**	**1,628**

Table 5.1 indicates that the overall subdivision could be expected to generate around of 156 vehicle movements during the morning peak hour and 171 vehicle movements during the evening peak hour on a typical weekday.

In contrast with the previous study completed in 2013, traffic generation estimates have reduced by 39 vehicle movements during the morning peak hour and 43 vehicle movements during the evening peak hour[2].

5.3 Traffic Distribution

5.3.1 Distribution and Assignment

The directional distribution and assignment of traffic generated by the proposed development will be influenced by a number of factors, including the:

i configuration of the arterial road network in the immediate vicinity of the site
ii existing operation of intersections providing access between the local and arterial road network
iii distribution of households in the vicinity of the site
iv surrounding employment centres, retail centres and schools in relation to the site
v configuration of access points to the site.

Having consideration for the above, as well as the existing turning movements at the surrounding intersections, the following directional distributions have been assumed:

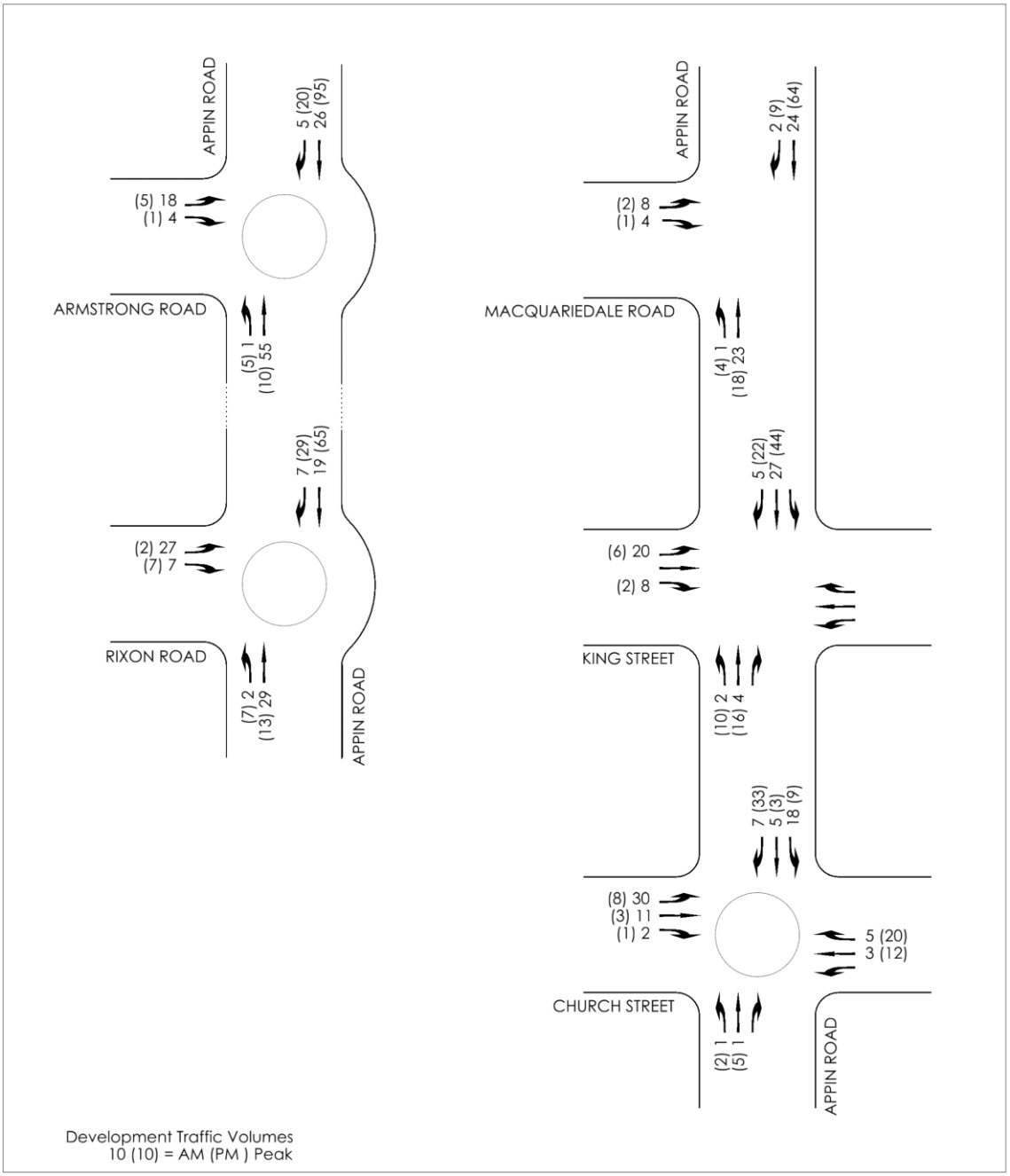
- Development accessing via Armstrong Road and Rixon Road accesses:
  - Appin Road, northbound 80%
  - Appin Road southbound 20% (Church Street 15% and Appin Road/ Wilton Road, south of Church Street 5%).
- Development accessing via Macquariedale Road, King Street or new Church Street leg accesses:
  - Appin Road, northbound 70%
  - Appin Road southbound 30% (Church Street 25% and Appin Road/ Wilton Road, south of Church Street 5%).

[2] This comparison excludes the 26 lots in Stage 1 i.e. 220 lots (2018 proposal) compared with 274 lots (2013 proposal).

5.3.2 Site Generated Traffic

Based on the above, Figure 5.1 has been prepared to show the estimated increase in turning movements at the study intersections following full development[3].

Figure 5.1: Development Generated Traffic Volumes



[3] For the purposes of this study, the 26 lots within Stage 1 have been included in Figure 5.1 and subsequent intersection analysis as they had not been building and occupied at the time of the traffic surveys.

5.4 Background Traffic Growth

GTA has reviewed the growth in peak period traffic volumes based on vehicle turning movement data collected at the study intersections in 2013 and 2018. The findings are summarised in Table 5.2.

Table 5.2: Historic background traffic growth

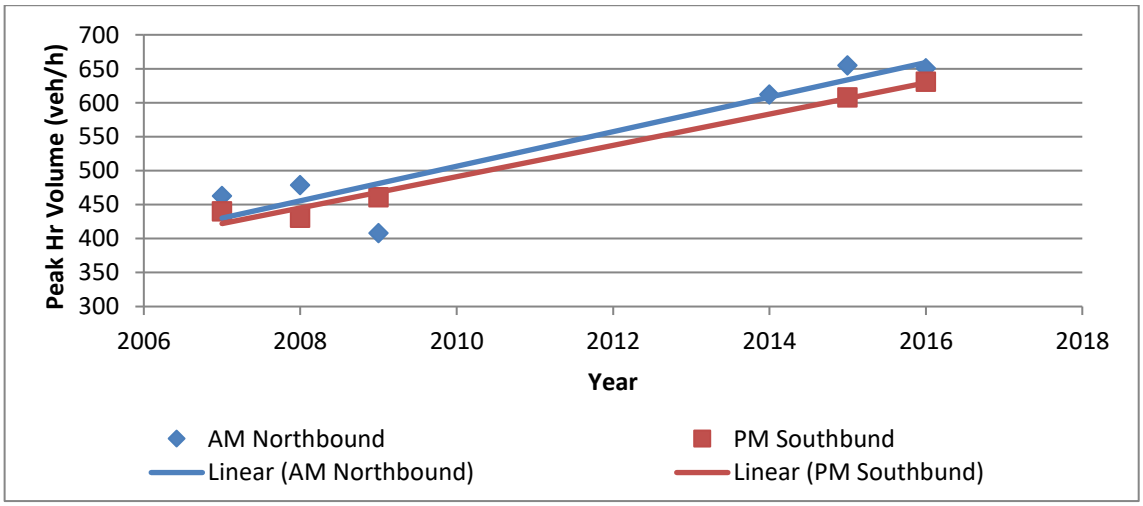
Location	AM Combined Traffic Movements*		Difference	PM Combined Traffic Movements*		Difference
	2013	2018		2013	2018	
Appin Road, North of Macquariedale Road	1856	1858	+2	1956	1983	+27
Appin Road, South of Macquariedale Road	1901	1896	-5	1978	1975	-3
Appin Road, South of King Street	1898	1852	-46	1930	1981	51
Appin Road, South of Church Street	486	398	-88	570	539	-31

* All figures provided relate to northbound and southbound volumes obtained during the same two-hour period.

Table 5.2 indicates that there have been minor changes to traffic flows along Appin Road in the five-year period between the surveys, equating to an annual traffic growth of less than one per cent. During this period, Appin Valley residential subdivision located north of Rixon Road has been completed.

However, Roads and Maritime provided tube count data from a count station located on Appin Road, just north of Church Street (see Figure 5.2), which indicates an average annual growth rate of around 3.5 per cent has occurred between 2007 and 2016 traffic counts[4], noting some likely variability in the data. This has not been interrogated in detail as part of this study.

Figure 5.2: Roads and Maritime – Appin Road Historic Traffic Data



[4] There is a gap in the tube count data provided by Roads and Maritime between 2009 and 2014. This gap indicates there might be inconsistencies in the linearity of traffic growth at this location.

The projected background peak hour traffic along Appin Road in 2028 (+ 10 years) is summarised in Table 5.3 based on the growth rate previously adopted by GTA (one per cent per annum) and validated through updated 2018 traffic counts, as well as that provided by Roads and Maritime (3.5 per cent per annum).

Table 5.3: Projected traffic conditions along Appin Road, south of King Street

Location	AM Combined Peak Traffic Movements			PM Combined Peak Traffic Movements		
	2018	2028 (with one per cent traffic growth)	2028 (with 3.5 per cent traffic growth)	2018	2028 (with one per cent traffic growth)	2028 (with 3.5 per cent traffic growth)
Appin Road, South of King Street	1072	1184	1510	1027	1134	1447

Against the anticipated 2028 background traffic volumes illustrated in Table 5.3, the additional traffic generated by the proposed development is expected to contribute approximately 10% to 15% of the future traffic volumes when included.

To appreciate the baseline traffic conditions in 2028 without the proposed development, SIDRA INTERSECTION modelling has been completed for the study intersections using the two different background traffic growth rates for the through movements along Appin Road, for sensitivity testing purposes. The results are summarised in the following sections.

5.4.1 2028 Baseline with one per cent traffic growth

Table 5.4 presents a summary of the 2028 operation of the study intersections (without the proposed development) applying a one per cent per annum background traffic growth, with full results presented in Appendix C of this report.

Table 5.4: 2028 Baseline SIDRA Results (with one per cent growth)

Intersection	Peak	Leg	Degree of Saturation (DOS)	Average Delay (sec)	95th Percentile Queue (m)	Level of Service (LOS)
Appin Road/ Rixon Road	AM	South	0.56	9	37	A
		North	0.29	7	16	A
		West	0.12	13	5	A
	PM	South	0.32	9	15	A
		North	0.50	7	33	A
		West	0.06	9	2	A
Appin Road/ Macquariedale Road	AM	South	0.44	4	0	A
		North	0.07	10	2	A
		West	0.17	33	4	C
	PM	South	0.24	4	0	A
		North	0.05	6	2	A
		West	0.10	25	2	B
Appin Road/ King Street	AM	South	0.01	6	0	A
		East	0.16	49	3	D
		North	0.23	3	0	A
		West	0.03	46	1	D
	PM	South	0.00	8	0	A
		East	0.07	40	2	C
		North	0.00	8	0	A
		West	0.03	40	1	C

Intersection	Peak	Leg	Degree of Saturation (DOS)	Average Delay (sec)	95th Percentile Queue (m)	Level of Service (LOS)
Appin Road/ Church Street	AM	South	0.06	17	1	B
		East	0.42	6	0	A
		North	0.18	16	5	B
	PM	South	0.06	11	1	A
		East	0.21	6	0	A
		North	0.15	10	4	A

Table 5.4 indicates that in 2028, the study intersections would operate with spare capacity based on one per cent traffic growth without the development.

5.4.2 2028 Baseline with 3.5 per cent traffic growth

Sensitivity testing of a 3.5 per cent per annum background traffic growth on the 2028 operation of the study intersections (without the proposed development) is summarised in Table 5.5, with full results presented in Appendix C of this report.

Table 5.5: 2028 Baseline SIDRA Results (with 3.5 per cent growth)

Intersection	Peak	Leg	Degree of Saturation (DOS)	Average Delay (sec)	95th Percentile Queue (m)	Level of Service (LOS)
Appin Road/ Rixon Road	AM	South	0.70	9	62	A
		North	0.36	7	22	A
		West	0.17	17	8	B
	PM	South	0.39	9	20	A
		North	0.62	7	51	A
		West	0.06	10	2	A
Appin Road/ Macquariedale Road	AM	South	0.55	4	0	A
		North	0.10	14	3	A
		West	0.38	79	9	F
	PM	South	0.29	4	0	A
		North	0.06	7	2	A
		West	0.19	49	4	D
Appin Road/ King Street	AM	South	0.01	7	0	A
		East	0.41	149	8	F
		North	0.29	14	1	A
		West	0.08	127	2	F
	PM	South	0.00	11	0	A
		East	0.17	101	3	F
		North	0.00	10	0	A
		West	0.05	101	1	F
Appin Road/ Church Street	AM	South	0.09	24	2	B
		East	0.52	6	0	A
		North	0.34	23	10	B
	PM	South	0.07	12	2	A
		East	0.26	6	0	A
		North	0.22	11	6	A

Table 5.5 indicates that while there is still some remaining intersection capacity with the increased background traffic growth of 3.5 per cent, however right turn and/ or through movements from Macquariedale Road and King Street could experience significant delays as a result of the anticipated through traffic volumes, presenting operational and/ or safety issues.

5.5 Traffic Impact

The impacts of the additional traffic generated by the proposed development on the study intersections has been assessed using SIDRA INTERSECTION for the 2028 design year.

The assessment assumes that all intersection arrangements would be retained as existing except for the provision of a west leg at Church Street and upgrade to roundabout.

Modelling was not completed for the Appin Road/ Armstrong Road intersection that provides access to the northern precinct, as the existing roundabout and internal road network was considered adequate to cater for the additional 30 vehicle movements per hour (approximately) generated by the precinct.

5.5.1 2028 with development (with one per cent growth)

Table 5.6 presents a summary of the anticipated future operation of the intersections including the proposed development and one per cent background growth, with full results included in Appendix D of this report.

Table 5.6: Base 2028 + Development SIDRA Results (with one per cent growth)

Intersection	Peak	Leg	Degree of Saturation (DOS)	Average Delay (sec)	95th Percentile Queue (m)	Level of Service (LOS)
Appin Road/ Rixon Road	AM	South	0.59	9	41	A
		North	0.32	7	18	A
		West	0.19	14	8	A
	PM	South	0.35	10	17	A
		North	0.57	8	42	A
		West	0.07	9	3	A
Appin Road/ Macquariedale Road	AM	South	0.45	4	0	A
		North	0.07	10	2	A
		West	0.23	36	6	C
	PM	South	0.25	4	0	A
		North	0.41	6	2	A
		West	0.13	30	3	C
Appin Road/ King Street	AM	South	0.01	6	0	A
		East	0.18	54	4	D
		North	0.24	9	1	A
		West	0.16	54	3	D
	PM	South	0.00	9	0	A
		East	0.09	50	2	D
		North	0.02	6	1	A
		West	0.05	51	1	D
Appin Road/ Church Street	AM	South	0.19	15	10	B
		East	0.54	10	37	A
		North	0.30	9	18	A
		West	0.07	14	3	A

	PM	South	0.16	11	7	A
		East	0.33	10	18	A
		North	0.52	9	39	A
		West	0.01	11	1	A

Table 5.6 indicates that the additional development traffic does not significantly impact the operation of the study intersections in 2028 compared to base conditions.

5.5.2 2028 with development (with 3.5 per cent growth)

Sensitivity testing of a 3.5 per cent per annum background traffic growth on the 2028 operation of the study intersections including the proposed development is summarised in Table 5.7, with full results presented in Appendix D of this report.

Table 5.7: Base 2028 + Development SIDRA Results (with 3.5 per cent growth)

Intersection	Peak	Leg	Degree of Saturation (DOS)	Average Delay (sec)	95th Percentile Queue (m)	Level of Service (LOS)
Appin Road/ Rixon Road	AM	South	0.73	9	71	A
		North	0.39	7	25	A
		West	0.26	19	13	B
	PM	South	0.42	23	23	A
		North	0.69	66	66	A
		West	0.08	3	3	A
Appin Road/ Macquariedale Road	AM	South	0.56	4	0	A
		North	0.17	14	3	A
		West	0.51	92	13	F
	PM	South	0.30	4	0	A
		North	0.07	7	2	A
		West	0.26	64	6	E
Appin Road/ King Street	AM	South	0.00	7	0	A
		East	0.46	171	9	F
		North	0.30	13	0	A
		West	0.36	156	8	F
	PM	South	0.00	11	0	A
		East	0.17	101	3	F
		North	0.00	10	0	A
		West	0.05	101	1	F
Appin Road/ Church Street	AM	South	0.31	18	17	B
		East	0.70	10	61	A
		North	0.38	9	24	A
		West	0.09	18	5	B
	PM	South	0.22	12	10	A
		East	0.42	11	24	A
		North	0.64	9	62	A
		West	0.02	12	1	A

Table 5.7 indicates that the additional development traffic does not significantly impact the operation of the study intersections in 2028 (compared to 2028 base case), noting that the right turn and/ or through movements from Macquariedale Road and King Street continuing to experience delays as a result of the anticipated through traffic volumes.

5.6 Midblock Capacity Assessment

The '*Austroads Guide to Traffic Management – Part 3: Traffic Studies and Analysis'* provides typical mid-block capacities for urban roads. These are summarised in Table 5.8.

Table 5.8: Typical mid-block capacity – urban roads

Type of Lane	One-way Mid-block Capacity (passenger car per hour)
Median or Inner Lane	
Divided Road	1,000
Undivided Road	900
Middle Lane (of a 3 Lane Carriageway)	
Divided Road	900
Undivided Road	1,000
Kerb Lane	
Adjacent to Parking Lane	900
Occasional Parked Vehicles	600
Clearway Condition	900

Source: Table 5.1 of Austroads Guide to Traffic management – Part 3: Traffic Studies and Analysis

As shown in Table 5.8, the mid-block capacity of a road is in the order of 900-1,000 vehicles per hour per traffic lane for urban roads (interrupted flows), assuming clearway conditions. These volumes are theoretical capacities for mid-block, with the level of service experienced by drivers subject to the exact quantum of traffic.

Analysis of mid-block level of service (LOS) was conducted based on criteria set out by the Roads and Maritime and experience with comparable developments, with a summary provided in Table 5.9.

Table 5.9: Mid-block Level of Service criteria

LOS	Description	Volume to Capacity Ratio (VCR) Range
A	A condition of free flow in which individual drivers are virtually unaffected by the presence of others in the traffic stream. Freedom to select desired speeds and to manoeuvre within the traffic stream is extremely high, and the general level of comfort and convenience provided is excellent.	0.00 – 0.34
B	In the zone of stable flow and drivers still have the reasonable freedom to select their desired speed and to manoeuvre within the traffic stream, although the general level of comfort and convenience is a little less than LOS A.	0.35 – 0.50
C	Also in the zone of stable flow, but most drivers are restricted to some extent in their freedom to select their desired speed and to manoeuvre within the traffic stream. The general level of comfort and convenience declines noticeably at this level.	0.51 – 0.74
D	Close to the limit of stable flow and approaching unstable flow. All drivers are severely restricted in their freedom to select their desired speed and to manoeuvre within the traffic stream. The general level of comfort and convenience is poor, and small increases in traffic flow will generally cause operational problems.	0.75 – 0.89
E	Occurs when traffic volumes are at or close to capacity, and there is virtually no freedom to select desired speeds or to manoeuvre within the traffic stream. Flow is unstable and minor disturbances within the traffic stream will cause break-down.	0.90 – 0.99

Source: Based on values as supplied in Guide to Traffic Generating Developments (Roads and Maritime, 2002)

Based in Table 5.9, an assessment of the post development weekday AM and PM peak hour traffic volumes has been completed to determine the general suitability of the current Appin Road configuration through the Appin township. The findings of this assessment are outlined in Table 5.10 based on a one per cent background growth and Table 5.11 for sensitivity testing of a higher 3.5 per cent background growth.

Table 5.10: Summary of mid-block capacity (with one per cent growth)

Location	Number of Lanes Provided	Theoretical Capacity	Weekday Peak Direction Traffic Volume – Post Development AM (PM)	LOS
Appin Road (North of Macquariedale Road)	1	1,000 veh/ hr	804 veh/ hr (817veh/ hr)	D (D)
Appin Road (South of Macquariedale Road)	1	1,000 veh/ hr	816 veh/ hr (796 veh/ hr)	D (D)
Appin Road (South of King Street)	1	1,000 veh/ hr	783 veh/ hr (766 veh/ hr)	D (D)
Appin Road (South of Church Street)	1	1,000 veh/ hr	118 veh/ hr (168 veh/ hr)	A (A)

Table 5.11: Summary of mid-block capacity (with 3.5 per cent growth)

Location	Number of Lanes Provided	Theoretical Capacity	Weekday Peak Direction Traffic Volume – Post Development AM (PM)	LOS
Appin Road (North of Macquariedale Road)	1	1,000 veh/ hr	1,007 veh/ hr (1,008 veh/ hr)	F (F)
Appin Road (South of Macquariedale Road)	1	1,000 veh/ hr	1,018 veh/ hr (987 veh/ hr)	F (E)
Appin Road (South of King Street)	1	1,000 veh/ hr	997 veh/ hr (965 veh/ hr)	E (E)
Appin Road (South of Church Street)	1	1,000 veh/ hr	146 veh/ hr (202 veh/ hr)	A (A)

Table 5.10 indicates that the current configuration of Appin Road (mid-block) is anticipated to operate close to its theoretical capacity but within acceptable limits, based on a one per cent growth rate up to 2028.

The sensitivity testing in Table 5.11 indicates that Appin Road (mid-block) would operate at its theoretical capacity. Should this higher background traffic growth be realised, further detailed investigation of the Appin Road corridor would be required (with or without the proposed development), including the need for widening/ duplication, bypass opportunities and/ or intersection upgrades.

5.7 Mitigation Measures

Church Street

A potential new roundabout has been proposed for the intersection of Appin Road and Church Street, which is currently a reverse-priority T-intersection. The roundabout is expected to operate satisfactorily under both traffic growth scenarios and would provide improved safety and operational outcomes for the intersection, compared with the existing layout. While not specifically modelled, background traffic growth would result in increased delays for movements that do not have priority, if this intersection is not upgraded.

King Street

Traffic signals have been considered at the Appin Road/ King Street intersection as an alternative to providing a new access at Church Street. However, the current traffic volumes along King Street do not meet the Roads and Maritime warrants for traffic signals. The warrants that are required to be met for four one-hour periods of an average day are reproduced below:

- *Traffic demand*
  - *The major road flow exceeds 600 vehicles per hour in each direction; and*
  - *The minor road flow exceeds 200 vehicles per hour in one direction.*

The forecast approach volumes on King Street (assuming no Church Street connection) would not exceed 60 vehicles per hour and therefore less than 50 per cent of the standard requirement for traffic signals. As such, a better alternative would be for King Street to be left-in, left-out if Appin Road through traffic increases substantially, with right turn movements facilitated through the proposed roundabout at Church Street. The following design constraints also exist with respect to signalising the Appin Road/ King Street intersection:

- The alignment of King Street east and west is offset at Appin Road, requiring land acquisition from the adjacent church to provide generally compliant intersection geometry and facilitate all turning movements.
- The Macquariedale Road and King Street intersections are in close proximity, limiting the length of any southbound right turn bay on Appin Road and impacting any potential upgrade of the Macquariedale Road intersection.

It is recommended that the existing intersection treatment is maintained in the short term, with left-in, left-out arrangements considered should significant background traffic growth be realised. Implementing such a treatment in the short term would unnecessarily constrain local traffic activity.

Macquariedale Road

There is a minor reliance on Macquariedale Road to provide access to the proposed development. Given this is less than 10 vehicles per hour on any individual turning movement, the general traffic impact of this is negligible.

However, further investigation would be required to improve delays experienced on Macquariedale Road should there be any additional development west of Appin Road including residential and commercial development beyond what is currently proposed.

In consultation with Roads and Maritime and Council, opportunities to improve the capacity and operation of the Appin Road/ Macquariedale Road intersection were previously considered following the 2013 study, however these were not considered acceptable at the time and therefore significant intervention may be required should this intersection require upgrading in the future.

Rixon Road and Armstrong Road

The additional 30 and 50 (approximately) development-generated traffic movements along Armstrong Road and Rixon Road respectively would be readily absorbed along these roads and at their roundabout-controlled intersections with Appin Road. Therefore, improvements are not required to these roads/ intersections to accommodate the development.

6. Conclusion

Based on the analysis and discussions presented within this report, the following conclusions are made:

i The updated proposal for South Appin Stages 2 to 7 includes 220 residential lots (compared with the previous 300 lots assessed in 2013), noting that Stage 1 (26 lots) is currently being completed.

ii It is proposed that only 21 residential lots be accessed via Macquariedale Road. Access to the central precinct is proposed via Rixon Road (reducing the development traffic through the Appin township), while the southern precinct can be accessed via either King Street or a new access at the Appin Road/ Church Street intersection. Proposed access to the northern precinct is being retained via Armstrong Road.

iii It is further proposed that the intersection of Appin Road with Church Street and the site access could be upgraded to a roundabout to accommodate a fourth (western) leg and the associated development traffic. This would improve the safety and operation of the existing intersection.

iv The site is expected to generate up to 156 vehicle movements during the morning peak hour and 171 vehicle movements during the evening peak hour on a typical weekday.

v Against background traffic volumes in the vicinity of the site, the additional traffic generated by the proposed development accounts for some 10% to 15% of the future traffic along Appin Road.

vi There have been minor changes to peak period traffic volumes along Appin in the five-year period between the 2013 and 2018 traffic surveys (less than one percent per annum). However, an assessment of traffic growth between 2007 and 2016 provided by Roads and Maritime suggests some 3.5 per cent per annum growth.

vii The current roundabout arrangements at Armstrong Road and Rixon Road would adequately accommodate the additional traffic generated by the proposed development in the future.

viii The anticipated background traffic along Appin Road is expected to impact turning movements from Macquariedale Road and/ or King Street in 2028 with/ without the proposed development in their current priority-controlled arrangements.

ix The proposed intersection arrangements would operate satisfactorily in 2028 based on a one per cent background traffic growth rate, with sensitivity testing of a 3.5 per cent growth rate suggesting development traffic would only have a minor impact on future traffic conditions.

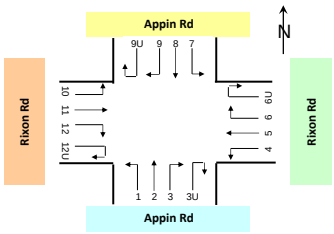
x The mid-block capacity assessment indicates Appin Road is anticipated to operate within the theoretical capacity limits in 10 years, based on a one per cent growth rate; and operate close to theoretical capacity if a 3.5 per cent growth rate is realised.

xi Should this higher background traffic growth be realised, further detailed investigation of the Appin Road corridor would be required (with or without the proposed development), including the need for widening/ duplication, bypass opportunities and/or intersection upgrades.

Appendix A

Intersection Survey Results

Job No.	: N4037
Client	: GTA Consultants
Suburb	: Endeavour Appin Study
Location	: 4. Appin Rd / Rixon Rd
Day/Date	: Thu, 22nd Mar 2018
Weather	: Fine
Description	: Classified Intersection Count
	: 15 mins Data



MATRIX Traffic and Transport Data

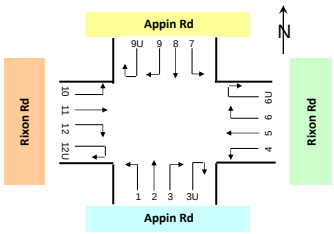
Classifications	**Class 1**	**Class 2**
	Lights	Heavies

Approach	**Appin Rd**												**Rixon Rd**											
Direction	**Direction 1 (Left Turn)**			**Direction 2 (Through)**			**Direction 3 (Right Turn)**			**Direction 3U (U Turn)**			**Direction 4 (Left Turn)**			**Direction 5 (Through)**			**Direction 6 (Right Turn)**			**Direction 6U (U Turn)**		
Time Period	**Lights**	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**
7:00 to 7:15	3	0	**3**	111	2	**113**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
7:15 to 7:30	4	0	**4**	140	5	**145**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
7:30 to 7:45	6	0	**6**	203	4	**207**	0	0	**0**	1	0	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
7:45 to 8:00	7	0	**7**	167	9	**176**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
8:00 to 8:15	1	0	**1**	178	12	**190**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
8:15 to 8:30	2	0	**2**	148	9	**157**	0	0	**0**	1	0	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
8:30 to 8:45	5	0	**5**	122	11	**133**	0	0	**0**	1	0	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
8:45 to 9:00	5	0	**5**	101	3	**104**	1	0	**1**	1	0	**1**	1	0	**1**	0	0	**0**	0	0	**0**	0	0	**0**
AM Totals	**33**	**0**	**33**	**1,170**	**55**	**1,225**	**1**	**0**	**1**	**4**	**0**	**4**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
16:00 to 16:15	9	0	**9**	88	7	**95**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
16:15 to 16:30	6	0	**6**	87	8	**95**	2	0	**2**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
16:30 to 16:45	8	0	**8**	80	3	**83**	0	0	**0**	1	0	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
16:45 to 17:00	5	0	**5**	70	7	**77**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
17:00 to 17:15	7	0	**7**	97	5	**102**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
17:15 to 17:30	6	0	**6**	85	3	**88**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
17:30 to 17:45	8	0	**8**	75	5	**80**	0	0	**0**	0	0	**0**	1	0	**1**	0	0	**0**	0	0	**0**	0	0	**0**
17:45 to 18:00	11	0	**11**	96	0	**96**	1	0	**1**	1	0	**1**	1	0	**1**	0	0	**0**	1	0	**1**	0	0	**0**
PM Totals	**60**	**0**	**60**	**678**	**38**	**716**	**3**	**0**	**3**	**2**	**0**	**2**	**2**	**0**	**2**	**0**	**0**	**0**	**1**	**0**	**1**	**0**	**0**	**0**

Approach	**Appin Rd**												**Rixon Rd**											
Direction	**Direction 7 (Left Turn)**			**Direction 8 (Through)**			**Direction 9 (Right Turn)**			**Direction 9U (U Turn)**			**Direction 10 (Left Turn)**			**Direction 11 (Through)**			**Direction 12 (Right Turn)**			**Direction 12U (U Turn)**		
Time Period	**Lights**	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**
7:00 to 7:15	0	0	**0**	65	5	**70**	2	1	**3**	0	0	**0**	11	1	**12**	0	0	**0**	1	0	**1**	0	0	**0**
7:15 to 7:30	0	0	**0**	76	2	**78**	8	1	**9**	0	0	**0**	11	0	**11**	0	0	**0**	5	0	**5**	0	0	**0**
7:30 to 7:45	0	0	**0**	110	9	**119**	10	1	**11**	0	0	**0**	17	1	**18**	0	0	**0**	7	0	**7**	0	0	**0**
7:45 to 8:00	0	0	**0**	68	7	**75**	4	0	**4**	0	0	**0**	14	1	**15**	0	0	**0**	4	0	**4**	0	0	**0**
8:00 to 8:15	0	0	**0**	67	3	**70**	5	0	**5**	0	0	**0**	15	0	**15**	0	0	**0**	4	0	**4**	0	0	**0**
8:15 to 8:30	0	0	**0**	81	9	**90**	10	0	**10**	0	0	**0**	8	0	**8**	0	0	**0**	5	0	**5**	0	0	**0**
8:30 to 8:45	0	0	**0**	82	6	**88**	6	0	**6**	0	0	**0**	13	1	**14**	0	0	**0**	3	0	**3**	0	0	**0**
8:45 to 9:00	0	0	**0**	80	4	**84**	4	0	**4**	0	0	**0**	8	0	**8**	0	0	**0**	1	0	**1**	0	0	**0**
AM Totals	**0**	**0**	**0**	**629**	**45**	**674**	**49**	**3**	**52**	**0**	**0**	**0**	**97**	**4**	**101**	**0**	**0**	**0**	**30**	**0**	**30**	**0**	**0**	**0**
16:00 to 16:15	0	0	**0**	135	5	**140**	13	1	**14**	0	0	**0**	11	0	**11**	0	0	**0**	9	0	**9**	0	0	**0**
16:15 to 16:30	0	0	**0**	148	2	**150**	14	1	**15**	0	0	**0**	7	0	**7**	1	0	**1**	2	0	**2**	0	0	**0**
16:30 to 16:45	0	0	**0**	144	5	**149**	19	0	**19**	0	0	**0**	6	1	**7**	0	0	**0**	2	0	**2**	0	0	**0**
16:45 to 17:00	0	0	**0**	186	1	**187**	9	0	**9**	0	0	**0**	7	0	**7**	0	0	**0**	8	0	**8**	0	0	**0**
17:00 to 17:15	0	0	**0**	125	6	**131**	8	0	**8**	0	0	**0**	8	0	**8**	0	0	**0**	1	0	**1**	0	0	**0**
17:15 to 17:30	0	0	**0**	156	1	**157**	9	0	**9**	0	1	**1**	11	0	**11**	0	0	**0**	3	0	**3**	0	0	**0**
17:30 to 17:45	0	0	**0**	138	0	**138**	14	0	**14**	0	0	**0**	14	0	**14**	0	0	**0**	14	0	**14**	0	0	**0**
17:45 to 18:00	0	0	**0**	127	3	**130**	10	0	**10**	0	0	**0**	9	0	**9**	0	0	**0**	5	0	**5**	0	0	**0**
PM Totals	**0**	**0**	**0**	**1,159**	**23**	**1,182**	**96**	**2**	**98**	**0**	**1**	**1**	**73**	**1**	**74**	**1**	**0**	**1**	**44**	**0**	**44**	**0**	**0**	**0**

Job No. : N4037
Client : GTA Consultants
Suburb : Endeavour Appin Study
Location : 4. Appin Rd / Rixon Rd

Day/Date : Thu, 22nd Mar 2018
Weather : Fine
Description : Classified Intersection Count
: Hourly Summary

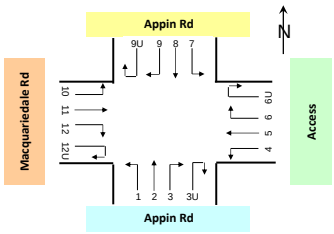


MATRIX Traffic and Transport Data

Approach	Appin Rd												Rixon Rd											
Direction	Direction 1 (Left Turn)			Direction 2 (Through)			Direction 3 (Right Turn)			Direction 3U (U Turn)			Direction 4 (Left Turn)			Direction 5 (Through)			Direction 6 (Right Turn)			Direction 6U (U Turn)		
Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total
7:00 to 8:00	20	0	**20**	621	20	**641**	0	0	**0**	1	0	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
7:15 to 8:15	18	0	**18**	688	30	**718**	0	0	**0**	1	0	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
7:30 to 8:30	16	0	**16**	696	34	**730**	0	0	**0**	2	0	**2**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
7:45 to 8:45	15	0	**15**	615	41	**656**	0	0	**0**	2	0	**2**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
8:00 to 9:00	13	0	**13**	549	35	**584**	1	0	**1**	3	0	**3**	1	0	**1**	0	0	**0**	0	0	**0**	0	0	**0**
AM Totals	**33**	**0**	**33**	**1,170**	**55**	**1,225**	**1**	**0**	**1**	**4**	**0**	**4**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
16:00 to 17:00	28	0	**28**	325	25	**350**	2	0	**2**	1	0	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
16:15 to 17:15	26	0	**26**	334	23	**357**	2	0	**2**	1	0	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
16:30 to 17:30	26	0	**26**	332	18	**350**	0	0	**0**	1	0	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
16:45 to 17:45	26	0	**26**	327	20	**347**	0	0	**0**	0	0	**0**	1	0	**1**	0	0	**0**	0	0	**0**	0	0	**0**
17:00 to 18:00	32	0	**32**	353	13	**366**	1	0	**1**	1	0	**1**	2	0	**2**	0	0	**0**	1	0	**1**	0	0	**0**
PM Totals	**60**	**0**	**60**	**678**	**38**	**716**	**3**	**0**	**3**	**2**	**0**	**2**	**2**	**0**	**2**	**0**	**0**	**0**	**1**	**0**	**1**	**0**	**0**	**0**

Approach	Appin Rd												Rixon Rd											
Direction	Direction 7 (Left Turn)			Direction 8 (Through)			Direction 9 (Right Turn)			Direction 9U (U Turn)			Direction 10 (Left Turn)			Direction 11 (Through)			Direction 12 (Right Turn)			Direction 12U (U Turn)		
Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total
7:00 to 8:00	0	0	**0**	319	23	**342**	24	3	**27**	0	0	**0**	53	3	**56**	0	0	**0**	17	0	**17**	0	0	**0**
7:15 to 8:15	0	0	**0**	321	21	**342**	27	2	**29**	0	0	**0**	57	2	**59**	0	0	**0**	20	0	**20**	0	0	**0**
7:30 to 8:30	0	0	**0**	326	28	**354**	29	1	**30**	0	0	**0**	54	2	**56**	0	0	**0**	20	0	**20**	0	0	**0**
7:45 to 8:45	0	0	**0**	298	25	**323**	25	0	**25**	0	0	**0**	50	2	**52**	0	0	**0**	16	0	**16**	0	0	**0**
8:00 to 9:00	0	0	**0**	310	22	**332**	25	0	**25**	0	0	**0**	44	1	**45**	0	0	**0**	13	0	**13**	0	0	**0**
AM Totals	**0**	**0**	**0**	**629**	**45**	**674**	**49**	**3**	**52**	**0**	**0**	**0**	**97**	**4**	**101**	**0**	**0**	**0**	**30**	**0**	**30**	**0**	**0**	**0**
16:00 to 17:00	0	0	**0**	613	13	**626**	55	2	**57**	0	0	**0**	31	1	**32**	1	0	**1**	21	0	**21**	0	0	**0**
16:15 to 17:15	0	0	**0**	603	14	**617**	50	1	**51**	0	0	**0**	28	1	**29**	1	0	**1**	13	0	**13**	0	0	**0**
16:30 to 17:30	0	0	**0**	611	13	**624**	45	0	**45**	0	1	**1**	32	1	**33**	0	0	**0**	14	0	**14**	0	0	**0**
16:45 to 17:45	0	0	**0**	605	8	**613**	40	0	**40**	0	1	**1**	40	0	**40**	0	0	**0**	26	0	**26**	0	0	**0**
17:00 to 18:00	0	0	**0**	546	10	**556**	41	0	**41**	0	1	**1**	42	0	**42**	0	0	**0**	23	0	**23**	0	0	**0**
PM Totals	**0**	**0**	**0**	**1,159**	**23**	**1,182**	**96**	**2**	**98**	**0**	**1**	**1**	**73**	**1**	**74**	**1**	**0**	**1**	**44**	**0**	**44**	**0**	**0**	**0**

Job No.	: N4037
Client	: GTA Consultants
Suburb	: Endeavour Appin Study
Location	: 1. Appin Rd / Macquariedale Rd
Day/Date	: Thu, 22nd Mar 2018
Weather	: Fine
Description	: Classified Intersection Count
	: 15 mins Data



MATRIX Traffic and Transport Data

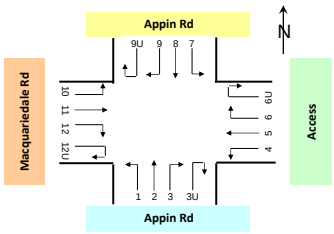
Classifications	**Class 1**	**Class 2**
	Lights	Heavies

Approach	**Appin Rd**												**Access**											
Direction	**Direction 1 (Left Turn)**			**Direction 2 (Through)**			**Direction 3 (Right Turn)**			**Direction 3U (U Turn)**			**Direction 4 (Left Turn)**			**Direction 5 (Through)**			**Direction 6 (Right Turn)**			**Direction 6U (U Turn)**		
Time Period	**Lights**	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**
7:00 to 7:15	21	1	**22**	106	6	**112**	2	0	**2**	0	0	**0**	1	0	**1**	1	0	**1**	0	0	**0**	0	0	**0**
7:15 to 7:30	14	0	**14**	121	3	**124**	1	0	**1**	0	0	**0**	9	0	**9**	0	0	**0**	6	0	**6**	0	0	**0**
7:30 to 7:45	12	0	**12**	169	3	**172**	0	0	**0**	0	0	**0**	7	0	**7**	2	0	**2**	3	0	**3**	0	0	**0**
7:45 to 8:00	9	1	**10**	158	11	**169**	0	0	**0**	0	0	**0**	7	0	**7**	1	0	**1**	6	0	**6**	0	0	**0**
8:00 to 8:15	20	0	**20**	165	9	**174**	0	0	**0**	0	0	**0**	0	1	**1**	2	0	**2**	4	0	**4**	0	0	**0**
8:15 to 8:30	19	0	**19**	139	8	**147**	2	0	**2**	0	0	**0**	5	0	**5**	1	0	**1**	5	0	**5**	0	0	**0**
8:30 to 8:45	14	0	**14**	97	11	**108**	0	0	**0**	0	0	**0**	3	0	**3**	0	0	**0**	3	0	**3**	0	0	**0**
8:45 to 9:00	22	0	**22**	81	2	**83**	1	0	**1**	0	0	**0**	7	0	**7**	1	0	**1**	6	0	**6**	0	0	**0**
AM Totals	**131**	**2**	**133**	**1,036**	**53**	**1,089**	**6**	**0**	**6**	**0**	**0**	**0**	**39**	**1**	**40**	**8**	**0**	**8**	**33**	**0**	**33**	**0**	**0**	**0**
16:00 to 16:15	10	0	**10**	75	6	**81**	0	0	**0**	0	0	**0**	2	0	**2**	3	0	**3**	2	0	**2**	0	0	**0**
16:15 to 16:30	11	0	**11**	77	7	**84**	0	0	**0**	0	0	**0**	8	0	**8**	1	0	**1**	2	0	**2**	0	0	**0**
16:30 to 16:45	13	0	**13**	83	4	**87**	0	0	**0**	0	0	**0**	7	0	**7**	1	0	**1**	6	0	**6**	0	0	**0**
16:45 to 17:00	10	0	**10**	80	7	**87**	0	0	**0**	0	0	**0**	10	0	**10**	0	0	**0**	1	0	**1**	0	0	**0**
17:00 to 17:15	14	0	**14**	85	5	**90**	0	0	**0**	0	0	**0**	7	1	**8**	2	0	**2**	2	0	**2**	0	0	**0**
17:15 to 17:30	10	0	**10**	77	4	**81**	1	0	**1**	0	0	**0**	4	0	**4**	1	0	**1**	5	0	**5**	0	0	**0**
17:30 to 17:45	10	0	**10**	68	3	**71**	0	0	**0**	0	0	**0**	8	0	**8**	4	0	**4**	1	0	**1**	0	0	**0**
17:45 to 18:00	11	0	**11**	95	0	**95**	0	0	**0**	0	0	**0**	13	0	**13**	2	0	**2**	2	0	**2**	0	0	**0**
PM Totals	**89**	**0**	**89**	**640**	**36**	**676**	**1**	**0**	**1**	**0**	**0**	**0**	**59**	**1**	**60**	**14**	**0**	**14**	**21**	**0**	**21**	**0**	**0**	**0**

Approach	**Appin Rd**												**Macquariedale Rd**											
Direction	**Direction 7 (Left Turn)**			**Direction 8 (Through)**			**Direction 9 (Right Turn)**			**Direction 9U (U Turn)**			**Direction 10 (Left Turn)**			**Direction 11 (Through)**			**Direction 12 (Right Turn)**			**Direction 12U (U Turn)**		
Time Period	**Lights**	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**
7:00 to 7:15	0	0	**0**	62	4	**66**	9	1	**10**	0	0	**0**	8	1	**9**	0	0	**0**	3	0	**3**	0	0	**0**
7:15 to 7:30	0	0	**0**	70	3	**73**	7	0	**7**	0	0	**0**	8	1	**9**	0	0	**0**	2	0	**2**	0	0	**0**
7:30 to 7:45	0	0	**0**	106	11	**117**	8	0	**8**	0	0	**0**	8	0	**8**	0	0	**0**	0	0	**0**	0	0	**0**
7:45 to 8:00	0	0	**0**	65	5	**70**	9	1	**10**	0	0	**0**	5	0	**5**	0	0	**0**	3	1	**4**	0	0	**0**
8:00 to 8:15	1	0	**1**	70	2	**72**	7	1	**8**	0	0	**0**	4	0	**4**	0	0	**0**	4	1	**5**	0	0	**0**
8:15 to 8:30	0	0	**0**	71	6	**77**	12	0	**12**	0	0	**0**	7	0	**7**	1	0	**1**	7	1	**8**	0	0	**0**
8:30 to 8:45	0	0	**0**	68	7	**75**	7	1	**8**	0	0	**0**	5	0	**5**	0	0	**0**	5	0	**5**	0	0	**0**
8:45 to 9:00	1	0	**1**	45	4	**49**	18	0	**18**	0	0	**0**	7	0	**7**	0	0	**0**	2	0	**2**	0	0	**0**
AM Totals	**2**	**0**	**2**	**557**	**42**	**599**	**77**	**4**	**81**	**0**	**0**	**0**	**52**	**2**	**54**	**1**	**0**	**1**	**26**	**3**	**29**	**0**	**0**	**0**
16:00 to 16:15	0	0	**0**	160	7	**167**	15	0	**15**	0	0	**0**	6	0	**6**	0	0	**0**	4	0	**4**	0	0	**0**
16:15 to 16:30	0	0	**0**	133	3	**136**	13	0	**13**	0	0	**0**	4	0	**4**	0	0	**0**	3	1	**4**	0	0	**0**
16:30 to 16:45	0	0	**0**	149	6	**155**	10	0	**10**	0	0	**0**	3	0	**3**	0	0	**0**	3	0	**3**	0	0	**0**
16:45 to 17:00	0	0	**0**	166	1	**167**	16	0	**16**	0	0	**0**	4	0	**4**	0	0	**0**	3	0	**3**	0	0	**0**
17:00 to 17:15	0	0	**0**	128	5	**133**	14	0	**14**	0	0	**0**	5	0	**5**	0	0	**0**	1	0	**1**	0	0	**0**
17:15 to 17:30	0	0	**0**	123	2	**125**	15	0	**15**	0	0	**0**	10	0	**10**	0	0	**0**	5	0	**5**	0	0	**0**
17:30 to 17:45	0	0	**0**	129	1	**130**	24	0	**24**	0	0	**0**	9	0	**9**	0	0	**0**	6	0	**6**	0	0	**0**
17:45 to 18:00	0	0	**0**	102	3	**105**	15	0	**15**	0	0	**0**	5	0	**5**	0	0	**0**	5	0	**5**	0	0	**0**
PM Totals	**0**	**0**	**0**	**1,090**	**28**	**1,118**	**122**	**0**	**122**	**0**	**0**	**0**	**46**	**0**	**46**	**0**	**0**	**0**	**30**	**1**	**31**	**0**	**0**	**0**

Job No. : N4037
Client : GTA Consultants
Suburb : Endeavour Appin Study
Location : 1. Appin Rd / Macquariedale Rd

Day/Date : Thu, 22nd Mar 2018
Weather : Fine
Description : Classified Intersection Count
: Hourly Summary

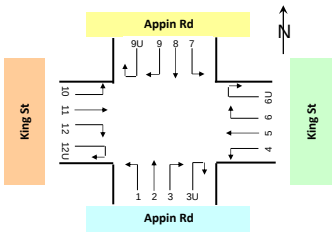


MATRIX Traffic and Transport Data

Approach	Appin Rd												Access											
Direction	Direction 1 (Left Turn)			Direction 2 (Through)			Direction 3 (Right Turn)			Direction 3U (U Turn)			Direction 4 (Left Turn)			Direction 5 (Through)			Direction 6 (Right Turn)			Direction 6U (U Turn)		
Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total
7:00 to 8:00	56	2	**58**	554	23	**577**	3	0	**3**	0	0	**0**	24	0	**24**	4	0	**4**	15	0	**15**	0	0	**0**
7:15 to 8:15	55	1	**56**	613	26	**639**	1	0	**1**	0	0	**0**	23	1	**24**	5	0	**5**	19	0	**19**	0	0	**0**
7:30 to 8:30	60	1	**61**	631	31	**662**	2	0	**2**	0	0	**0**	19	1	**20**	6	0	**6**	18	0	**18**	0	0	**0**
7:45 to 8:45	62	1	**63**	559	39	**598**	2	0	**2**	0	0	**0**	15	1	**16**	4	0	**4**	18	0	**18**	0	0	**0**
8:00 to 9:00	75	0	**75**	482	30	**512**	3	0	**3**	0	0	**0**	15	1	**16**	4	0	**4**	18	0	**18**	0	0	**0**
AM Totals	**131**	**2**	**133**	**1,036**	**53**	**1,089**	**6**	**0**	**6**	**0**	**0**	**0**	**39**	**1**	**40**	**8**	**0**	**8**	**33**	**0**	**33**	**0**	**0**	**0**
16:00 to 17:00	44	0	**44**	315	24	**339**	0	0	**0**	0	0	**0**	27	0	**27**	5	0	**5**	11	0	**11**	0	0	**0**
16:15 to 17:15	48	0	**48**	325	23	**348**	0	0	**0**	0	0	**0**	32	1	**33**	4	0	**4**	11	0	**11**	0	0	**0**
16:30 to 17:30	47	0	**47**	325	20	**345**	1	0	**1**	0	0	**0**	28	1	**29**	4	0	**4**	14	0	**14**	0	0	**0**
16:45 to 17:45	44	0	**44**	310	19	**329**	1	0	**1**	0	0	**0**	29	1	**30**	7	0	**7**	9	0	**9**	0	0	**0**
17:00 to 18:00	45	0	**45**	325	12	**337**	1	0	**1**	0	0	**0**	32	1	**33**	9	0	**9**	10	0	**10**	0	0	**0**
PM Totals	**89**	**0**	**89**	**640**	**36**	**676**	**1**	**0**	**1**	**0**	**0**	**0**	**59**	**1**	**60**	**14**	**0**	**14**	**21**	**0**	**21**	**0**	**0**	**0**

Approach	Appin Rd												Macquariedale Rd											
Direction	Direction 7 (Left Turn)			Direction 8 (Through)			Direction 9 (Right Turn)			Direction 9U (U Turn)			Direction 10 (Left Turn)			Direction 11 (Through)			Direction 12 (Right Turn)			Direction 12U (U Turn)		
Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total
7:00 to 8:00	0	0	**0**	303	23	**326**	33	2	**35**	0	0	**0**	29	2	**31**	0	0	**0**	8	1	**9**	0	0	**0**
7:15 to 8:15	1	0	**1**	311	21	**332**	31	2	**33**	0	0	**0**	25	1	**26**	0	0	**0**	9	2	**11**	0	0	**0**
7:30 to 8:30	1	0	**1**	312	24	**336**	36	2	**38**	0	0	**0**	24	0	**24**	1	0	**1**	14	3	**17**	0	0	**0**
7:45 to 8:45	1	0	**1**	274	20	**294**	35	3	**38**	0	0	**0**	21	0	**21**	1	0	**1**	19	3	**22**	0	0	**0**
8:00 to 9:00	2	0	**2**	254	19	**273**	44	2	**46**	0	0	**0**	23	0	**23**	1	0	**1**	18	2	**20**	0	0	**0**
AM Totals	**2**	**0**	**2**	**557**	**42**	**599**	**77**	**4**	**81**	**0**	**0**	**0**	**52**	**2**	**54**	**1**	**0**	**1**	**26**	**3**	**29**	**0**	**0**	**0**
16:00 to 17:00	0	0	**0**	608	17	**625**	54	0	**54**	0	0	**0**	17	0	**17**	0	0	**0**	13	1	**14**	0	0	**0**
16:15 to 17:15	0	0	**0**	576	15	**591**	53	0	**53**	0	0	**0**	16	0	**16**	0	0	**0**	10	1	**11**	0	0	**0**
16:30 to 17:30	0	0	**0**	566	14	**580**	55	0	**55**	0	0	**0**	22	0	**22**	0	0	**0**	12	0	**12**	0	0	**0**
16:45 to 17:45	0	0	**0**	546	9	**555**	69	0	**69**	0	0	**0**	28	0	**28**	0	0	**0**	15	0	**15**	0	0	**0**
17:00 to 18:00	0	0	**0**	482	11	**493**	68	0	**68**	0	0	**0**	29	0	**29**	0	0	**0**	17	0	**17**	0	0	**0**
PM Totals	**0**	**0**	**0**	**1,090**	**28**	**1,118**	**122**	**0**	**122**	**0**	**0**	**0**	**46**	**0**	**46**	**0**	**0**	**0**	**30**	**1**	**31**	**0**	**0**	**0**

Job No.	: N4037
Client	: GTA Consultants
Suburb	: Endeavour Appin Study
Location	: 2. Appin Rd / King St
Day/Date	: Thu, 22nd Mar 2018
Weather	: Fine
Description	: Classified Intersection Count
	: 15 mins Data



MATRIX Traffic and Transport Data

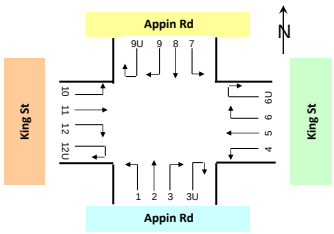
Classifications	**Class 1**	**Class 2**
	Lights	Heavies

Approach	**Appin Rd**												**King St**											
Direction	**Direction 1 (Left Turn)**			**Direction 2 (Through)**			**Direction 3 (Right Turn)**			**Direction 3U (U Turn)**			**Direction 4 (Left Turn)**			**Direction 5 (Through)**			**Direction 6 (Right Turn)**			**Direction 6U (U Turn)**		
Time Period	**Lights**	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**
7:00 to 7:15	1	0	**1**	127	7	**134**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	1	0	**1**	0	0	**0**
7:15 to 7:30	0	0	**0**	134	3	**137**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	1	0	**1**	0	0	**0**
7:30 to 7:45	1	0	**1**	175	3	**178**	1	0	**1**	0	0	**0**	0	0	**0**	0	0	**0**	7	0	**7**	0	0	**0**
7:45 to 8:00	0	0	**0**	163	12	**175**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	4	0	**4**	0	0	**0**
8:00 to 8:15	0	0	**0**	178	10	**188**	2	0	**2**	0	0	**0**	0	0	**0**	0	0	**0**	2	0	**2**	0	0	**0**
8:15 to 8:30	0	0	**0**	152	7	**159**	0	0	**0**	0	0	**0**	1	0	**1**	0	0	**0**	6	0	**6**	0	0	**0**
8:30 to 8:45	0	0	**0**	105	11	**116**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	5	0	**5**	0	0	**0**
8:45 to 9:00	0	0	**0**	100	2	**102**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	3	0	**3**	0	0	**0**
AM Totals	**2**	**0**	**2**	**1,134**	**55**	**1,189**	**3**	**0**	**3**	**0**	**0**	**0**	**1**	**0**	**1**	**0**	**0**	**0**	**29**	**0**	**29**	**0**	**0**	**0**
16:00 to 16:15	0	0	**0**	88	6	**94**	1	0	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
16:15 to 16:30	2	0	**2**	81	7	**88**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	4	0	**4**	0	0	**0**
16:30 to 16:45	0	0	**0**	92	4	**96**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	3	0	**3**	0	0	**0**
16:45 to 17:00	0	0	**0**	88	6	**94**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	2	0	**2**	0	0	**0**
17:00 to 17:15	0	0	**0**	95	5	**100**	2	0	**2**	0	0	**0**	2	0	**2**	0	0	**0**	3	0	**3**	0	0	**0**
17:15 to 17:30	0	0	**0**	84	4	**88**	0	0	**0**	0	0	**0**	1	0	**1**	0	0	**0**	6	0	**6**	0	0	**0**
17:30 to 17:45	1	0	**1**	75	3	**78**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	1	0	**1**	0	0	**0**
17:45 to 18:00	0	0	**0**	106	0	**106**	1	0	**1**	0	0	**0**	0	0	**0**	0	0	**0**	1	0	**1**	0	0	**0**
PM Totals	**3**	**0**	**3**	**709**	**35**	**744**	**4**	**0**	**4**	**0**	**0**	**0**	**3**	**0**	**3**	**0**	**0**	**0**	**20**	**0**	**20**	**0**	**0**	**0**

Approach	**Appin Rd**												**King St**											
Direction	**Direction 7 (Left Turn)**			**Direction 8 (Through)**			**Direction 9 (Right Turn)**			**Direction 9U (U Turn)**			**Direction 10 (Left Turn)**			**Direction 11 (Through)**			**Direction 12 (Right Turn)**			**Direction 12U (U Turn)**		
Time Period	**Lights**	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**
7:00 to 7:15	0	0	**0**	63	5	**68**	2	1	**3**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
7:15 to 7:30	1	0	**1**	78	1	**79**	3	1	**4**	1	0	**1**	1	1	**2**	0	0	**0**	3	0	**3**	0	0	**0**
7:30 to 7:45	1	0	**1**	111	11	**122**	0	1	**1**	0	0	**0**	1	0	**1**	0	0	**0**	1	0	**1**	0	0	**0**
7:45 to 8:00	1	0	**1**	76	6	**82**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
8:00 to 8:15	1	0	**1**	71	4	**75**	1	0	**1**	0	0	**0**	1	0	**1**	0	0	**0**	0	0	**0**	0	0	**0**
8:15 to 8:30	0	0	**0**	81	6	**87**	4	0	**4**	0	0	**0**	2	0	**2**	0	0	**0**	0	0	**0**	0	0	**0**
8:30 to 8:45	0	0	**0**	76	8	**84**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
8:45 to 9:00	2	0	**2**	52	4	**56**	1	0	**1**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
AM Totals	**6**	**0**	**6**	**608**	**45**	**653**	**11**	**3**	**14**	**1**	**0**	**1**	**5**	**1**	**6**	**0**	**0**	**0**	**4**	**0**	**4**	**0**	**0**	**0**
16:00 to 16:15	6	0	**6**	162	6	**168**	0	1	**1**	0	0	**0**	1	0	**1**	0	0	**0**	0	1	**1**	0	0	**0**
16:15 to 16:30	4	0	**4**	140	4	**144**	0	0	**0**	0	0	**0**	1	0	**1**	0	0	**0**	0	0	**0**	0	0	**0**
16:30 to 16:45	1	0	**1**	156	6	**162**	0	0	**0**	0	0	**0**	1	0	**1**	0	0	**0**	0	0	**0**	0	0	**0**
16:45 to 17:00	5	0	**5**	175	1	**176**	0	0	**0**	0	0	**0**	0	1	**1**	0	0	**0**	0	0	**0**	0	0	**0**
17:00 to 17:15	4	0	**4**	131	6	**137**	1	0	**1**	0	0	**0**	1	0	**1**	0	0	**0**	0	0	**0**	0	0	**0**
17:15 to 17:30	4	0	**4**	130	2	**132**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
17:30 to 17:45	3	0	**3**	138	1	**139**	0	0	**0**	0	0	**0**	1	0	**1**	0	0	**0**	0	0	**0**	0	0	**0**
17:45 to 18:00	5	0	**5**	116	3	**119**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**
PM Totals	**32**	**0**	**32**	**1,148**	**29**	**1,177**	**1**	**1**	**2**	**0**	**0**	**0**	**5**	**1**	**6**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**

Job No. : N4037
Client : GTA Consultants
Suburb : Endeavour Appin Study
Location : 2. Appin Rd / King St

Day/Date : Thu, 22nd Mar 2018
Weather : Fine
Description : Classified Intersection Count
: Hourly Summary

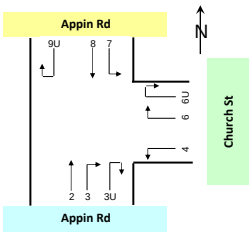


MATRIX Traffic and Transport Data

Approach	Appin Rd												King St											
Direction	Direction 1 (Left Turn)			Direction 2 (Through)			Direction 3 (Right Turn)			Direction 3U (U Turn)			Direction 4 (Left Turn)			Direction 5 (Through)			Direction 6 (Right Turn)			Direction 6U (U Turn)		
Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total
7:00 to 8:00	2	0	**2**	599	25	**624**	1	0	**1**	0	0	**0**	0	0	**0**	0	0	**0**	13	0	**13**	0	0	**0**
7:15 to 8:15	1	0	**1**	650	28	**678**	3	0	**3**	0	0	**0**	0	0	**0**	0	0	**0**	14	0	**14**	0	0	**0**
7:30 to 8:30	1	0	**1**	668	32	**700**	3	0	**3**	0	0	**0**	1	0	**1**	0	0	**0**	19	0	**19**	0	0	**0**
7:45 to 8:45	0	0	**0**	598	40	**638**	2	0	**2**	0	0	**0**	1	0	**1**	0	0	**0**	17	0	**17**	0	0	**0**
8:00 to 9:00	0	0	**0**	535	30	**565**	2	0	**2**	0	0	**0**	1	0	**1**	0	0	**0**	16	0	**16**	0	0	**0**
AM Totals	**2**	**0**	**2**	**1,134**	**55**	**1,189**	**3**	**0**	**3**	**0**	**0**	**0**	**1**	**0**	**1**	**0**	**0**	**0**	**29**	**0**	**29**	**0**	**0**	**0**
16:00 to 17:00	2	0	**2**	349	23	**372**	1	0	**1**	0	0	**0**	0	0	**0**	0	0	**0**	9	0	**9**	0	0	**0**
16:15 to 17:15	2	0	**2**	356	22	**378**	2	0	**2**	0	0	**0**	2	0	**2**	0	0	**0**	12	0	**12**	0	0	**0**
16:30 to 17:30	0	0	**0**	359	19	**378**	2	0	**2**	0	0	**0**	3	0	**3**	0	0	**0**	14	0	**14**	0	0	**0**
16:45 to 17:45	1	0	**1**	342	18	**360**	2	0	**2**	0	0	**0**	3	0	**3**	0	0	**0**	12	0	**12**	0	0	**0**
17:00 to 18:00	1	0	**1**	360	12	**372**	3	0	**3**	0	0	**0**	3	0	**3**	0	0	**0**	11	0	**11**	0	0	**0**
PM Totals	**3**	**0**	**3**	**709**	**35**	**744**	**4**	**0**	**4**	**0**	**0**	**0**	**3**	**0**	**3**	**0**	**0**	**0**	**20**	**0**	**20**	**0**	**0**	**0**

Approach	Appin Rd												King St											
Direction	Direction 7 (Left Turn)			Direction 8 (Through)			Direction 9 (Right Turn)			Direction 9U (U Turn)			Direction 10 (Left Turn)			Direction 11 (Through)			Direction 12 (Right Turn)			Direction 12U (U Turn)		
Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total
7:00 to 8:00	3	0	**3**	328	23	**351**	5	3	**8**	1	0	**1**	2	1	**3**	0	0	**0**	4	0	**4**	0	0	**0**
7:15 to 8:15	4	0	**4**	336	22	**358**	4	2	**6**	1	0	**1**	3	1	**4**	0	0	**0**	4	0	**4**	0	0	**0**
7:30 to 8:30	3	0	**3**	339	27	**366**	5	1	**6**	0	0	**0**	4	0	**4**	0	0	**0**	1	0	**1**	0	0	**0**
7:45 to 8:45	2	0	**2**	304	24	**328**	5	0	**5**	0	0	**0**	3	0	**3**	0	0	**0**	0	0	**0**	0	0	**0**
8:00 to 9:00	3	0	**3**	280	22	**302**	6	0	**6**	0	0	**0**	3	0	**3**	0	0	**0**	0	0	**0**	0	0	**0**
AM Totals	**6**	**0**	**6**	**608**	**45**	**653**	**11**	**3**	**14**	**1**	**0**	**1**	**5**	**1**	**6**	**0**	**0**	**0**	**4**	**0**	**4**	**0**	**0**	**0**
16:00 to 17:00	16	0	**16**	633	17	**650**	0	1	**1**	0	0	**0**	3	1	**4**	0	0	**0**	0	1	**1**	0	0	**0**
16:15 to 17:15	14	0	**14**	602	17	**619**	1	0	**1**	0	0	**0**	3	1	**4**	0	0	**0**	0	0	**0**	0	0	**0**
16:30 to 17:30	14	0	**14**	592	15	**607**	1	0	**1**	0	0	**0**	2	1	**3**	0	0	**0**	0	0	**0**	0	0	**0**
16:45 to 17:45	16	0	**16**	574	10	**584**	1	0	**1**	0	0	**0**	2	1	**3**	0	0	**0**	0	0	**0**	0	0	**0**
17:00 to 18:00	16	0	**16**	515	12	**527**	1	0	**1**	0	0	**0**	2	0	**2**	0	0	**0**	0	0	**0**	0	0	**0**
PM Totals	**32**	**0**	**32**	**1,148**	**29**	**1,177**	**1**	**1**	**2**	**0**	**0**	**0**	**5**	**1**	**6**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**

Job No.	: N4037
Client	: GTA Consultants
Suburb	: Endeavour Appin Study
Location	: 3. Appin Rd / Church St
Day/Date	: Thu, 22nd Mar 2018
Weather	: Fine
Description	: Classified Intersection Count
	: 15 mins Data



MATRIX Traffic and Transport Data

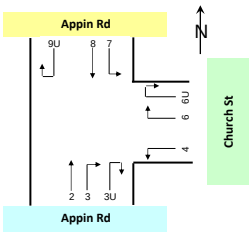
Classifications	**Class 1**	**Class 2**
	Lights	Heavies

Approach	**Appin Rd**										**Church St**									
Direction		**Direction 2 (Through)**			**Direction 3 (Right Turn)**			**Direction 3U (U Turn)**			**Direction 4 (Left Turn)**				**Direction 6 (Right Turn)**			**Direction 6U (U Turn)**		
Time Period		**Lights**	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**		**Lights**	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**
7:00 to 7:15		20	1	**21**	3	0	**3**	0	0	**0**	12	0	**12**		102	6	**108**	0	0	**0**
7:15 to 7:30		14	1	**15**	6	0	**6**	0	0	**0**	9	1	**10**		124	2	**126**	0	0	**0**
7:30 to 7:45		19	0	**19**	2	1	**3**	0	0	**0**	9	1	**10**		162	3	**165**	0	0	**0**
7:45 to 8:00		18	3	**21**	2	0	**2**	0	0	**0**	4	0	**4**		142	9	**151**	0	0	**0**
8:00 to 8:15		20	2	**22**	7	1	**8**	0	0	**0**	12	1	**13**		159	8	**167**	0	0	**0**
8:15 to 8:30		25	3	**28**	4	0	**4**	0	0	**0**	9	2	**11**		126	5	**131**	0	0	**0**
8:30 to 8:45		15	1	**16**	6	0	**6**	0	0	**0**	6	0	**6**		91	9	**100**	0	0	**0**
8:45 to 9:00		19	0	**19**	7	1	**8**	0	0	**0**	5	0	**5**		76	2	**78**	0	0	**0**
AM Totals		**150**	**11**	**161**	**37**	**3**	**40**	**0**	**0**	**0**	**66**	**5**	**71**		**982**	**44**	**1,026**	**0**	**0**	**0**
16:00 to 16:15		21	0	**21**	9	0	**9**	0	0	**0**	12	1	**13**		73	6	**79**	0	0	**0**
16:15 to 16:30		27	1	**28**	7	0	**7**	0	0	**0**	12	0	**12**		51	6	**57**	0	0	**0**
16:30 to 16:45		16	0	**16**	8	0	**8**	0	0	**0**	10	1	**11**		78	4	**82**	0	0	**0**
16:45 to 17:00		31	0	**31**	11	1	**12**	0	0	**0**	6	0	**6**		56	6	**62**	0	0	**0**
17:00 to 17:15		32	0	**32**	8	0	**8**	0	0	**0**	2	0	**2**		67	5	**72**	0	0	**0**
17:15 to 17:30		19	0	**19**	8	0	**8**	0	0	**0**	4	0	**4**		64	4	**68**	0	0	**0**
17:30 to 17:45		17	0	**17**	9	0	**9**	0	0	**0**	8	0	**8**		58	3	**61**	0	0	**0**
17:45 to 18:00		31	0	**31**	8	0	**8**	0	0	**0**	7	0	**7**		75	0	**75**	0	0	**0**
PM Totals		**194**	**1**	**195**	**68**	**1**	**69**	**0**	**0**	**0**	**61**	**2**	**63**		**522**	**34**	**556**	**0**	**0**	**0**

Approach	**Appin Rd**									
Direction	**Direction 7 (Left Turn)**			**Direction 8 (Through)**				**Direction 9U (U Turn)**		
Time Period	**Lights**	**Heavies**	**Total**	**Lights**	**Heavies**	**Total**		**Lights**	**Heavies**	**Total**
7:00 to 7:15	48	4	**52**	17	2	**19**		0	0	**0**
7:15 to 7:30	63	1	**64**	17	0	**17**		0	0	**0**
7:30 to 7:45	95	8	**103**	16	3	**19**		0	0	**0**
7:45 to 8:00	66	1	**67**	14	3	**17**		0	0	**0**
8:00 to 8:15	64	3	**67**	8	0	**8**		0	0	**0**
8:15 to 8:30	66	3	**69**	15	5	**20**		0	0	**0**
8:30 to 8:45	58	8	**66**	17	0	**17**		0	0	**0**
8:45 to 9:00	39	3	**42**	9	0	**9**		0	0	**0**
AM Totals	**499**	**31**	**530**	**113**	**13**	**126**		**0**	**0**	**0**
16:00 to 16:15	135	7	**142**	24	0	**24**		0	0	**0**
16:15 to 16:30	115	3	**118**	27	1	**28**		0	0	**0**
16:30 to 16:45	137	5	**142**	20	1	**21**		0	0	**0**
16:45 to 17:00	132	1	**133**	38	0	**38**		0	0	**0**
17:00 to 17:15	118	4	**122**	17	2	**19**		0	0	**0**
17:15 to 17:30	106	1	**107**	21	0	**21**		0	0	**0**
17:30 to 17:45	102	2	**104**	35	0	**35**		0	0	**0**
17:45 to 18:00	93	0	**93**	23	3	**26**		0	0	**0**
PM Totals	**938**	**23**	**961**	**205**	**7**	**212**		**0**	**0**	**0**

Job No. : N4037
Client : GTA Consultants
Suburb : Endeavour Appin Study
Location : 3. Appin Rd / Church St

Day/Date : Thu, 22nd Mar 2018
Weather : Fine
Description : Classified Intersection Count
: Hourly Summary



MATRIX Traffic and Transport Data

Approach	Appin Rd									Church St								
Direction		Direction 2 (Through)			Direction 3 (Right Turn)			Direction 3U (U Turn)			Direction 4 (Left Turn)				Direction 6 (Right Turn)			Direction 6U (U Turn)		
Time Period		Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total		Lights	Heavies	Total	Lights	Heavies	Total
7:00 to 8:00		71	5	**76**	13	1	**14**	0	0	**0**	34	2	**36**		530	20	**550**	0	0	**0**
7:15 to 8:15		71	6	**77**	17	2	**19**	0	0	**0**	34	3	**37**		587	22	**609**	0	0	**0**
7:30 to 8:30		82	8	**90**	15	2	**17**	0	0	**0**	34	4	**38**		589	25	**614**	0	0	**0**
7:45 to 8:45		78	9	**87**	19	1	**20**	0	0	**0**	31	3	**34**		518	31	**549**	0	0	**0**
8:00 to 9:00		79	6	**85**	24	2	**26**	0	0	**0**	32	3	**35**		452	24	**476**	0	0	**0**
AM Totals		**150**	**11**	**161**	**37**	**3**	**40**	**0**	**0**	**0**	**66**	**5**	**71**		**982**	**44**	**1,026**	**0**	**0**	**0**
16:00 to 17:00		95	1	**96**	35	1	**36**	0	0	**0**	40	2	**42**		258	22	**280**	0	0	**0**
16:15 to 17:15		106	1	**107**	34	1	**35**	0	0	**0**	30	1	**31**		252	21	**273**	0	0	**0**
16:30 to 17:30		98	0	**98**	35	1	**36**	0	0	**0**	22	1	**23**		265	19	**284**	0	0	**0**
16:45 to 17:45		99	0	**99**	36	1	**37**	0	0	**0**	20	0	**20**		245	18	**263**	0	0	**0**
17:00 to 18:00		99	0	**99**	33	0	**33**	0	0	**0**	21	0	**21**		264	12	**276**	0	0	**0**
PM Totals		**194**	**1**	**195**	**68**	**1**	**69**	**0**	**0**	**0**	**61**	**2**	**63**		**522**	**34**	**556**	**0**	**0**	**0**

Approach	Appin Rd									
Direction	Direction 7 (Left Turn)			Direction 8 (Through)				Direction 9U (U Turn)		
Time Period	Lights	Heavies	Total	Lights	Heavies	Total		Lights	Heavies	Total
7:00 to 8:00	272	14	**286**	64	8	**72**		0	0	**0**
7:15 to 8:15	288	13	**301**	55	6	**61**		0	0	**0**
7:30 to 8:30	291	15	**306**	53	11	**64**		0	0	**0**
7:45 to 8:45	254	15	**269**	54	8	**62**		0	0	**0**
8:00 to 9:00	227	17	**244**	49	5	**54**		0	0	**0**
AM Totals	**499**	**31**	**530**	**113**	**13**	**126**		**0**	**0**	**0**
16:00 to 17:00	519	16	**535**	109	2	**111**		0	0	**0**
16:15 to 17:15	502	13	**515**	102	4	**106**		0	0	**0**
16:30 to 17:30	493	11	**504**	96	3	**99**		0	0	**0**
16:45 to 17:45	458	8	**466**	111	2	**113**		0	0	**0**
17:00 to 18:00	419	7	**426**	96	5	**101**		0	0	**0**
PM Totals	**938**	**23**	**961**	**205**	**7**	**212**		**0**	**0**	**0**

Appendix B

SIDRA Results – Existing Conditions

MOVEMENT SUMMARY

Site: 4 [Appin Road/ Rixon Road - AM]

Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand 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: Appin Road											
1	L2	17	0.0	0.512	3.2	LOS A	4.3	31.0	0.20	0.34	47.3
2	T1	768	4.7	0.512	3.2	LOS A	4.3	31.0	0.20	0.34	48.3
3u	U	2	0.0	0.512	9.2	LOS A	4.3	31.0	0.20	0.34	52.4
Approach		787	4.5	0.512	3.2	LOS A	4.3	31.0	0.20	0.34	48.3
North: Appin Road											
8	T1	373	7.9	0.270	3.1	LOS A	1.9	14.3	0.15	0.36	48.2
9	R2	32	3.3	0.270	7.3	LOS A	1.9	14.3	0.15	0.36	48.4
Approach		404	7.6	0.270	3.4	LOS A	1.9	14.3	0.15	0.36	48.3
West: Rixon Road											
10	L2	59	3.6	0.114	8.1	LOS A	0.7	4.7	0.72	0.75	44.3
12	R2	21	0.0	0.114	12.2	LOS A	0.7	4.7	0.72	0.75	45.3
Approach		80	2.6	0.114	9.2	LOS A	0.7	4.7	0.72	0.75	44.6
All Vehicles		1272	5.4	0.512	3.6	LOS A	4.3	31.0	0.22	0.37	48.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.
Roundabout Capacity Model: SIDRA Standard.
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: 4 [Appin Road/ Rixon Road - PM]

Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand 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: Appin Road											
1	L2	29	0.0	0.289	3.3	LOS A	1.8	13.1	0.23	0.36	47.2
2	T1	368	7.1	0.289	3.3	LOS A	1.8	13.1	0.23	0.36	48.2
3u	U	1	0.0	0.289	9.3	LOS A	1.8	13.1	0.23	0.36	52.3
Approach		399	6.6	0.289	3.3	LOS A	1.8	13.1	0.23	0.36	48.1
North: Appin Road											
8	T1	659	2.1	0.455	3.1	LOS A	3.9	27.8	0.17	0.36	48.2
9	R2	60	3.5	0.455	7.4	LOS A	3.9	27.8	0.17	0.36	48.3
Approach		719	2.2	0.455	3.4	LOS A	3.9	27.8	0.17	0.36	48.2
West: Rixon Road											
10	L2	34	3.1	0.057	4.9	LOS A	0.3	2.1	0.49	0.59	45.7
12	R2	22	0.0	0.057	9.0	LOS A	0.3	2.1	0.49	0.59	46.9
Approach		56	1.9	0.057	6.5	LOS A	0.3	2.1	0.49	0.59	46.2
All Vehicles		1174	3.7	0.455	3.5	LOS A	3.9	27.8	0.20	0.37	48.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.
Roundabout Capacity Model: SIDRA Standard.
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: 1 [Appin Road/ Macquariedale Road - AM]

Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand 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: Macquariedale Road											
1	L2	64	1.6	0.403	3.9	LOS A	0.0	0.0	0.00	0.05	48.6
2	T1	697	4.7	0.403	0.0	LOS A	0.0	0.0	0.00	0.05	49.5
Approach		761	4.4	0.403	0.3	NA	0.0	0.0	0.00	0.05	49.4
North: Macquariedale Road											
8	T1	354	7.1	0.190	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
9	R2	40	5.3	0.058	8.9	LOS A	0.2	1.6	0.62	0.79	43.7
Approach		394	7.0	0.190	0.9	NA	0.2	1.6	0.06	0.08	48.8
West: Appin Road											
10	L2	25	0.0	0.139	8.0	LOS A	0.5	3.4	0.76	0.89	41.0
12	R2	18	17.6	0.139	26.0	LOS B	0.5	3.4	0.76	0.89	34.8
Approach		43	7.3	0.139	15.5	LOS B	0.5	3.4	0.76	0.89	39.0
All Vehicles		1198	5.4	0.403	1.1	NA	0.5	3.4	0.05	0.09	48.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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: 1 [Appin Road/ Macquariedale Road - PM]

Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand 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: Macquariedale Road											
1	L2	46	0.0	0.216	3.9	LOS A	0.0	0.0	0.00	0.06	48.5
2	T1	357	7.1	0.216	0.0	LOS A	0.0	0.0	0.00	0.06	49.4
Approach		403	6.3	0.216	0.4	NA	0.0	0.0	0.00	0.06	49.3
North: Macquariedale Road											
8	T1	658	2.7	0.343	0.0	LOS A	0.0	0.0	0.00	0.00	49.9
9	R2	57	0.0	0.047	6.1	LOS A	0.2	1.4	0.45	0.62	45.2
Approach		715	2.5	0.343	0.5	NA	0.2	1.4	0.04	0.05	49.3
West: Appin Road											
10	L2	18	0.0	0.083	5.8	LOS A	0.3	2.0	0.61	0.72	42.4
12	R2	15	7.1	0.083	20.6	LOS B	0.3	2.0	0.61	0.72	36.7
Approach		33	3.2	0.083	12.5	LOS A	0.3	2.0	0.61	0.72	40.4
All Vehicles		1151	3.8	0.343	0.8	NA	0.3	2.0	0.04	0.07	48.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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: 2 [Appin Road/ King Street - AM]

Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand 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: Appin Road											
1	L2	1	0.0	0.390	4.6	LOS A	0.0	0.0	0.00	0.00	49.1
2	T1	737	4.6	0.390	0.0	LOS A	0.0	0.0	0.00	0.00	49.9
3	R2	3	0.0	0.003	5.9	LOS A	0.0	0.1	0.44	0.53	43.8
Approach		741	4.5	0.390	0.1	NA	0.0	0.1	0.00	0.00	49.8
East: King Street											
4	L2	1	0.0	0.125	6.4	LOS A	0.4	2.6	0.84	0.92	34.1
5	T1	1	0.0	0.125	35.9	LOS C	0.4	2.6	0.84	0.92	36.2
6	R2	20	0.0	0.125	23.5	LOS B	0.4	2.6	0.84	0.92	27.2
Approach		22	0.0	0.125	23.3	LOS B	0.4	2.6	0.84	0.92	28.1
North: Appin Road											
7	L2	3	0.0	0.209	3.9	LOS A	0.0	0.0	0.00	0.00	49.1
8	T1	385	7.4	0.209	0.0	LOS A	0.0	0.0	0.00	0.00	49.9
9	R2	6	16.7	0.010	8.2	LOS A	0.0	0.3	0.62	0.68	37.7
Approach		395	7.5	0.209	0.2	NA	0.0	0.3	0.01	0.02	49.5
West: King Street											
10	L2	4	0.0	0.025	11.1	LOS A	0.1	0.5	0.77	0.86	18.8
11	T1	1	0.0	0.025	34.5	LOS C	0.1	0.5	0.77	0.86	39.1
12	R2	1	0.0	0.025	22.5	LOS B	0.1	0.5	0.77	0.86	34.9
Approach		6	0.0	0.025	16.9	LOS B	0.1	0.5	0.77	0.86	24.4
All Vehicles		1164	5.4	0.390	0.6	NA	0.4	2.6	0.02	0.03	47.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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: 2 [Appin Road/ King Street - PM]

Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand 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: Appin Road											
1	L2	2	0.0	0.210	4.6	LOS A	0.0	0.0	0.00	0.00	49.1
2	T1	392	6.2	0.210	0.0	LOS A	0.0	0.0	0.00	0.00	49.9
3	R2	1	0.0	0.002	8.7	LOS A	0.0	0.0	0.59	0.62	42.0
Approach		395	6.1	0.210	0.1	NA	0.0	0.0	0.00	0.00	49.8
East: King Street											
4	L2	1	0.0	0.058	8.8	LOS A	0.2	1.2	0.81	0.91	35.5
5	T1	1	0.0	0.058	30.5	LOS C	0.2	1.2	0.81	0.91	37.5
6	R2	9	0.0	0.058	20.6	LOS B	0.2	1.2	0.81	0.91	28.3
Approach		12	0.0	0.058	20.4	LOS B	0.2	1.2	0.81	0.91	29.9
North: Appin Road											
7	L2	17	0.0	0.366	3.9	LOS A	0.0	0.0	0.00	0.01	49.0
8	T1	684	2.6	0.366	0.0	LOS A	0.0	0.0	0.00	0.01	49.7
9	R2	1	100.0	0.002	7.1	LOS A	0.0	0.1	0.53	0.54	37.9
Approach		702	2.7	0.366	0.1	NA	0.0	0.1	0.00	0.01	49.6
West: King Street											
10	L2	4	25.0	0.020	7.7	LOS A	0.1	0.5	0.62	0.72	19.6
11	T1	1	0.0	0.020	30.6	LOS C	0.1	0.5	0.62	0.72	40.9
12	R2	1	0.0	0.020	19.9	LOS B	0.1	0.5	0.62	0.72	37.1
Approach		6	16.7	0.020	13.6	LOS A	0.1	0.5	0.62	0.72	25.5
All Vehicles		1115	4.0	0.366	0.4	NA	0.2	1.2	0.01	0.02	48.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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: 3v [Appin Road/ Church Street - AM]

Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand 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: Appin Road											
2	T1	95	8.9	0.170	13.0	LOS A	0.6	4.4	0.61	1.05	45.0
3	R2	18	11.8	0.047	15.1	LOS B	0.1	1.1	0.66	1.01	47.2
Approach		113	9.3	0.170	13.3	LOS A	0.6	4.4	0.62	1.04	45.4
East: Church Street											
4	L2	40	10.5	0.381	5.7	LOS A	0.0	0.0	0.00	0.59	53.1
6	R2	646	3.9	0.381	5.6	LOS A	0.0	0.0	0.00	0.59	50.5
Approach		686	4.3	0.381	5.6	NA	0.0	0.0	0.00	0.59	50.7
North: Appin Road											
7	L2	322	4.9	0.205	5.7	LOS A	1.0	7.1	0.08	0.52	51.6
8	T1	67	17.2	0.145	14.8	LOS B	0.5	3.9	0.66	1.05	44.1
Approach		389	7.0	0.205	7.3	LOS A	1.0	7.1	0.18	0.61	50.1
All Vehicles		1188	5.7	0.381	6.9	NA	1.0	7.1	0.12	0.64	50.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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: 3v [Appin Road/ Church Street - PM]

Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand 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: Appin Road											
2	T1	101	1.0	0.106	9.2	LOS A	0.4	2.7	0.39	0.96	48.2
3	R2	38	2.8	0.056	10.3	LOS A	0.2	1.3	0.45	0.93	50.2
Approach		139	1.5	0.106	9.5	LOS A	0.4	2.7	0.41	0.95	48.9
East: Church Street											
4	L2	44	4.8	0.192	5.6	LOS A	0.0	0.0	0.00	0.58	53.4
6	R2	295	7.9	0.192	5.6	LOS A	0.0	0.0	0.00	0.58	50.1
Approach		339	7.5	0.192	5.6	NA	0.0	0.0	0.00	0.58	50.6
North: Appin Road											
7	L2	563	3.0	0.361	5.8	LOS A	2.0	14.7	0.15	0.52	51.4
8	T1	117	1.8	0.133	9.8	LOS A	0.5	3.5	0.45	0.98	47.9
Approach		680	2.8	0.361	6.5	LOS A	2.0	14.7	0.20	0.60	50.8
All Vehicles		1158	4.0	0.361	6.6	NA	2.0	14.7	0.17	0.64	50.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.

Appendix C

SIDRA Results – 2028 Baseline Conditions

2028 with 1% background growth

MOVEMENT SUMMARY

Site: 4 [Appin Road/ Rixon Road - AM]

Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand 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: Appin Road											
1	L2	17	0.0	0.561	3.2	LOS A	5.1	36.8	0.22	0.34	47.2
2	T1	848	4.2	0.561	3.2	LOS A	5.1	36.8	0.22	0.34	48.2
3u	U	2	0.0	0.561	9.2	LOS A	5.1	36.8	0.22	0.34	52.3
Approach		867	4.1	0.561	3.2	LOS A	5.1	36.8	0.22	0.34	48.2
North: Appin Road											
8	T1	412	7.2	0.294	3.1	LOS A	2.2	16.1	0.15	0.35	48.3
9	R2	32	3.3	0.294	7.3	LOS A	2.2	16.1	0.15	0.35	48.4
Approach		443	6.9	0.294	3.4	LOS A	2.2	16.1	0.15	0.35	48.3
West: Rixon Road											
10	L2	59	3.6	0.123	9.1	LOS A	0.7	5.3	0.76	0.78	43.8
12	R2	21	0.0	0.123	13.2	LOS A	0.7	5.3	0.76	0.78	44.8
Approach		80	2.6	0.123	10.2	LOS A	0.7	5.3	0.76	0.78	44.0
All Vehicles		1391	4.9	0.561	3.7	LOS A	5.1	36.8	0.23	0.37	48.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.
Roundabout Capacity Model: SIDRA Standard.
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: 4 [Appin Road/ Rixon Road - PM]

Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand 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: Appin Road											
1	L2	29	0.0	0.315	3.3	LOS A	2.0	14.7	0.23	0.36	47.2
2	T1	407	6.5	0.315	3.3	LOS A	2.0	14.7	0.23	0.36	48.2
3u	U	1	0.0	0.315	9.3	LOS A	2.0	14.7	0.23	0.36	52.2
Approach		438	6.0	0.315	3.3	LOS A	2.0	14.7	0.23	0.36	48.1
North: Appin Road											
8	T1	727	1.9	0.496	3.1	LOS A	4.6	32.5	0.18	0.35	48.2
9	R2	60	3.5	0.496	7.4	LOS A	4.6	32.5	0.18	0.35	48.3
Approach		787	2.0	0.496	3.4	LOS A	4.6	32.5	0.18	0.35	48.2
West: Rixon Road											
10	L2	34	3.1	0.059	5.1	LOS A	0.3	2.1	0.52	0.61	45.7
12	R2	22	0.0	0.059	9.3	LOS A	0.3	2.1	0.52	0.61	46.8
Approach		56	1.9	0.059	6.7	LOS A	0.3	2.1	0.52	0.61	46.1
All Vehicles		1281	3.4	0.496	3.5	LOS A	4.6	32.5	0.21	0.37	48.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.
Roundabout Capacity Model: SIDRA Standard.
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: 1 [Appin Road/ Macquariedale Road - AM]

Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand 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: Macquariedale Road											
1	L2	64	1.6	0.440	3.9	LOS A	0.0	0.0	0.00	0.04	48.6
2	T1	769	4.2	0.440	0.0	LOS A	0.0	0.0	0.00	0.04	49.5
Approach		834	4.0	0.440	0.3	NA	0.0	0.0	0.00	0.04	49.5
North: Macquariedale Road											
8	T1	391	6.5	0.209	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
9	R2	40	5.3	0.066	9.8	LOS A	0.2	1.8	0.67	0.84	43.3
Approach		431	6.4	0.209	0.9	NA	0.2	1.8	0.06	0.08	48.8
West: Appin Road											
10	L2	25	0.0	0.173	8.7	LOS A	0.6	4.1	0.81	0.91	39.6
12	R2	18	17.6	0.173	32.6	LOS C	0.6	4.1	0.81	0.91	33.0
Approach		43	7.3	0.173	18.6	LOS B	0.6	4.1	0.81	0.91	37.5
All Vehicles		1307	4.9	0.440	1.1	NA	0.6	4.1	0.05	0.08	48.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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: 1 [Appin Road/ Macquariedale Road - PM]

Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand 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: Macquariedale Road											
1	L2	46	0.0	0.235	3.9	LOS A	0.0	0.0	0.00	0.06	48.6
2	T1	394	6.4	0.235	0.0	LOS A	0.0	0.0	0.00	0.06	49.4
Approach		440	5.7	0.235	0.4	NA	0.0	0.0	0.00	0.06	49.3
North: Macquariedale Road											
8	T1	726	2.5	0.378	0.1	LOS A	0.0	0.0	0.00	0.00	49.9
9	R2	57	0.0	0.050	6.2	LOS A	0.2	1.5	0.48	0.64	45.2
Approach		783	2.3	0.378	0.5	NA	0.2	1.5	0.03	0.05	49.3
West: Appin Road											
10	L2	18	0.0	0.100	6.0	LOS A	0.3	2.3	0.66	0.76	41.4
12	R2	15	7.1	0.100	24.9	LOS B	0.3	2.3	0.66	0.76	35.4
Approach		33	3.2	0.100	14.5	LOS B	0.3	2.3	0.66	0.76	39.3
All Vehicles		1256	3.5	0.378	0.8	NA	0.3	2.3	0.04	0.07	48.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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: 2 [Appin Road/ King Street - AM]

Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand 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: Appin Road											
1	L2	1	0.0	0.429	4.6	LOS A	0.0	0.0	0.00	0.00	49.0
2	T1	814	4.1	0.429	0.0	LOS A	0.0	0.0	0.00	0.00	49.9
3	R2	3	0.0	0.003	6.1	LOS A	0.0	0.1	0.46	0.54	43.7
Approach		818	4.1	0.429	0.1	NA	0.0	0.1	0.00	0.00	49.8
East: King Street											
4	L2	1	0.0	0.163	7.0	LOS A	0.5	3.3	0.88	0.94	31.4
5	T1	1	0.0	0.163	48.5	LOS D	0.5	3.3	0.88	0.94	33.7
6	R2	20	0.0	0.163	30.0	LOS C	0.5	3.3	0.88	0.94	25.1
Approach		22	0.0	0.163	29.8	LOS C	0.5	3.3	0.88	0.94	25.8
North: Appin Road											
7	L2	3	0.0	0.229	3.9	LOS A	0.0	0.0	0.00	0.00	49.1
8	T1	425	6.7	0.229	0.0	LOS A	0.0	0.0	0.00	0.00	49.9
9	R2	6	16.7	0.011	9.2	LOS A	0.0	0.3	0.67	0.73	36.8
Approach		435	6.8	0.229	0.2	NA	0.0	0.3	0.01	0.01	49.5
West: King Street											
10	L2	4	0.0	0.032	12.7	LOS A	0.1	0.7	0.82	0.91	17.9
11	T1	1	0.0	0.032	46.3	LOS D	0.1	0.7	0.82	0.91	37.3
12	R2	1	0.0	0.032	28.3	LOS B	0.1	0.7	0.82	0.91	32.7
Approach		6	0.0	0.032	20.9	LOS B	0.1	0.7	0.82	0.91	23.2
All Vehicles		1281	4.9	0.429	0.7	NA	0.5	3.3	0.02	0.03	47.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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: 2 [Appin Road/ King Street - PM]

Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand 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: Appin Road											
1	L2	2	0.0	0.231	4.6	LOS A	0.0	0.0	0.00	0.00	49.1
2	T1	433	5.6	0.231	0.0	LOS A	0.0	0.0	0.00	0.00	49.9
3	R2	1	0.0	0.001	8.3	LOS A	0.0	0.0	0.60	0.60	42.3
Approach		436	5.6	0.231	0.1	NA	0.0	0.0	0.00	0.00	49.8
East: King Street											
4	L2	1	0.0	0.073	9.7	LOS A	0.2	1.5	0.86	0.93	33.2
5	T1	1	0.0	0.073	40.0	LOS C	0.2	1.5	0.86	0.93	35.4
6	R2	9	0.0	0.073	25.4	LOS B	0.2	1.5	0.86	0.93	26.5
Approach		12	0.0	0.073	25.3	LOS B	0.2	1.5	0.86	0.93	28.0
North: Appin Road											
7	L2	17	0.0	0.403	3.9	LOS A	0.0	0.0	0.00	0.01	49.0
8	T1	756	2.4	0.403	0.0	LOS A	0.0	0.0	0.00	0.01	49.7
9	R2	1	100.0	0.002	7.7	LOS A	0.0	0.1	0.55	0.56	37.4
Approach		774	2.4	0.403	0.1	NA	0.0	0.1	0.00	0.01	49.6
West: King Street											
10	L2	4	25.0	0.025	8.2	LOS A	0.1	0.6	0.68	0.76	18.9
11	T1	1	0.0	0.025	40.2	LOS C	0.1	0.6	0.68	0.76	39.5
12	R2	1	0.0	0.025	24.6	LOS B	0.1	0.6	0.68	0.76	35.4
Approach		6	16.7	0.025	16.3	LOS B	0.1	0.6	0.68	0.76	24.6
All Vehicles		1227	3.6	0.403	0.4	NA	0.2	1.5	0.01	0.02	48.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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: 3 [Appin Road/ Church Street - AM]

Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand 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: Appin Road											
1	L2	1	0.0	0.183	9.0	LOS A	1.2	9.0	0.79	0.78	49.7
2	T1	104	8.1	0.183	9.7	LOS A	1.2	9.0	0.79	0.78	48.8
3	R2	18	11.8	0.183	14.5	LOS B	1.2	9.0	0.79	0.78	51.8
Approach		123	8.5	0.183	10.4	LOS A	1.2	9.0	0.79	0.78	49.4
East: Church Street											
4	L2	40	10.5	0.528	4.7	LOS A	5.0	35.8	0.39	0.59	50.9
5	T1	1	0.0	0.528	4.9	LOS A	5.0	35.8	0.39	0.59	51.2
6	R2	714	3.5	0.528	9.6	LOS A	5.0	35.8	0.39	0.59	49.4
Approach		755	3.9	0.528	9.3	LOS A	5.0	35.8	0.39	0.59	49.5
North: Appin Road											
7	L2	356	4.4	0.277	4.0	LOS A	2.3	16.9	0.16	0.43	53.2
8	T1	75	15.5	0.277	4.4	LOS A	2.3	16.9	0.16	0.43	54.8
9	R2	1	0.0	0.277	8.9	LOS A	2.3	16.9	0.16	0.43	54.2
Approach		432	6.3	0.277	4.1	LOS A	2.3	16.9	0.16	0.43	53.5
West: Church Street											
10	L2	1	0.0	0.005	8.7	LOS A	0.0	0.2	0.75	0.59	45.6
11	T1	1	0.0	0.005	9.0	LOS A	0.0	0.2	0.75	0.59	51.0
12	R2	1	0.0	0.005	13.6	LOS A	0.0	0.2	0.75	0.59	50.9
Approach		3	0.0	0.005	10.4	LOS A	0.0	0.2	0.75	0.59	49.5
All Vehicles		1313	5.1	0.528	7.7	LOS A	5.0	35.8	0.35	0.55	50.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.
Roundabout Capacity Model: SIDRA Standard.
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: 3 [Appin Road/ Church Street - PM]

Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand 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: Appin Road											
1	L2	1	0.0	0.148	5.8	LOS A	0.9	6.5	0.56	0.61	51.3
2	T1	112	0.9	0.148	6.2	LOS A	0.9	6.5	0.56	0.61	51.4
3	R2	38	2.8	0.148	10.9	LOS A	0.9	6.5	0.56	0.61	53.6
Approach		151	1.4	0.148	7.4	LOS A	0.9	6.5	0.56	0.61	52.1
East: Church Street											
4	L2	44	4.8	0.295	4.8	LOS A	2.1	15.3	0.40	0.61	51.3
5	T1	1	0.0	0.295	5.0	LOS A	2.1	15.3	0.40	0.61	51.5
6	R2	325	7.1	0.295	9.8	LOS A	2.1	15.3	0.40	0.61	49.3
Approach		371	6.8	0.295	9.2	LOS A	2.1	15.3	0.40	0.61	49.6
North: Appin Road											
7	L2	622	2.7	0.487	4.2	LOS A	4.9	35.3	0.28	0.43	52.7
8	T1	129	1.6	0.487	4.5	LOS A	4.9	35.3	0.28	0.43	54.7
9	R2	1	0.0	0.487	9.1	LOS A	4.9	35.3	0.28	0.43	53.4
Approach		753	2.5	0.487	4.2	LOS A	4.9	35.3	0.28	0.43	53.0
West: Church Street											
10	L2	1	0.0	0.003	5.9	LOS A	0.0	0.1	0.54	0.53	47.9
11	T1	1	0.0	0.003	6.2	LOS A	0.0	0.1	0.54	0.53	52.9
12	R2	1	0.0	0.003	10.9	LOS A	0.0	0.1	0.54	0.53	52.8
Approach		3	0.0	0.003	7.7	LOS A	0.0	0.1	0.54	0.53	51.5
All Vehicles		1277	3.6	0.487	6.1	LOS A	4.9	35.3	0.35	0.50	51.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.
Roundabout Capacity Model: SIDRA Standard.
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.

2028 with 3.5% background growth

MOVEMENT SUMMARY

Site: 4 [Appin Road/ Rixon Road - AM]

Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand 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: Appin Road											
1	L2	17	0.0	0.702	3.3	LOS A	8.6	62.1	0.29	0.34	47.0
2	T1	1084	3.3	0.702	3.3	LOS A	8.6	62.1	0.29	0.34	48.0
3u	U	2	0.0	0.702	9.3	LOS A	8.6	62.1	0.29	0.34	52.0
Approach		1103	3.2	0.702	3.3	LOS A	8.6	62.1	0.29	0.34	48.0
North: Appin Road											
8	T1	525	5.6	0.363	3.1	LOS A	3.0	22.2	0.17	0.35	48.2
9	R2	32	3.3	0.363	7.4	LOS A	3.0	22.2	0.17	0.35	48.3
Approach		557	5.5	0.363	3.3	LOS A	3.0	22.2	0.17	0.35	48.2
West: Rixon Road											
10	L2	59	3.6	0.166	13.3	LOS A	1.1	7.9	0.89	0.87	41.7
12	R2	21	0.0	0.166	17.3	LOS B	1.1	7.9	0.89	0.87	42.6
Approach		80	2.6	0.166	14.4	LOS A	1.1	7.9	0.89	0.87	41.9
All Vehicles		1740	3.9	0.702	3.8	LOS A	8.6	62.1	0.28	0.37	47.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.
Roundabout Capacity Model: SIDRA Standard.
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: 4 [Appin Road/ Rixon Road - PM]

Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand 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: Appin Road											
1	L2	29	0.0	0.389	3.3	LOS A	2.7	19.9	0.26	0.36	47.1
2	T1	520	5.1	0.389	3.3	LOS A	2.7	19.9	0.26	0.36	48.1
3u	U	1	0.0	0.389	9.3	LOS A	2.7	19.9	0.26	0.36	52.1
Approach		551	4.8	0.389	3.3	LOS A	2.7	19.9	0.26	0.36	48.0
North: Appin Road											
8	T1	929	1.5	0.616	3.1	LOS A	7.2	50.9	0.22	0.35	48.1
9	R2	60	3.5	0.616	7.4	LOS A	7.2	50.9	0.22	0.35	48.1
Approach		989	1.6	0.616	3.4	LOS A	7.2	50.9	0.22	0.35	48.1
West: Rixon Road											
10	L2	34	3.1	0.064	5.8	LOS A	0.3	2.4	0.59	0.65	45.3
12	R2	22	0.0	0.064	10.0	LOS A	0.3	2.4	0.59	0.65	46.3
Approach		56	1.9	0.064	7.5	LOS A	0.3	2.4	0.59	0.65	45.7
All Vehicles		1596	2.7	0.616	3.5	LOS A	7.2	50.9	0.25	0.36	48.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.
Roundabout Capacity Model: SIDRA Standard.
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: 1 [Appin Road/ Macquariedale Road - AM]

Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand 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: Macquariedale Road											
1	L2	64	1.6	0.550	3.9	LOS A	0.0	0.0	0.00	0.03	48.7
2	T1	983	3.3	0.550	0.0	LOS A	0.0	0.0	0.00	0.03	49.6
Approach		1047	3.2	0.550	0.2	NA	0.0	0.0	0.00	0.03	49.5
North: Macquariedale Road											
8	T1	499	5.1	0.264	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
9	R2	40	5.3	0.104	13.8	LOS A	0.4	2.6	0.80	0.91	41.3
Approach		539	5.1	0.264	1.0	NA	0.4	2.6	0.06	0.07	48.7
West: Appin Road											
10	L2	25	0.0	0.378	20.0	LOS B	1.2	9.0	0.93	1.02	30.9
12	R2	18	17.6	0.378	78.8	LOS F	1.2	9.0	0.93	1.02	23.2
Approach		43	7.3	0.378	44.4	LOS D	1.2	9.0	0.93	1.02	28.3
All Vehicles		1629	3.9	0.550	1.7	NA	1.2	9.0	0.04	0.07	47.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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: 1 [Appin Road/ Macquariedale Road - PM]

Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand 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: Macquariedale Road											
1	L2	46	0.0	0.291	3.9	LOS A	0.0	0.0	0.00	0.05	48.7
2	T1	503	5.0	0.291	0.0	LOS A	0.0	0.0	0.00	0.05	49.5
Approach		549	4.6	0.291	0.3	NA	0.0	0.0	0.00	0.05	49.5
North: Macquariedale Road											
8	T1	928	1.9	0.482	0.1	LOS A	0.0	0.0	0.00	0.00	49.9
9	R2	57	0.0	0.057	6.9	LOS A	0.2	1.6	0.53	0.69	44.9
Approach		985	1.8	0.482	0.5	NA	0.2	1.6	0.03	0.04	49.3
West: Appin Road											
10	L2	18	0.0	0.194	7.0	LOS A	0.6	4.2	0.82	0.88	36.7
12	R2	15	7.1	0.194	48.5	LOS D	0.6	4.2	0.82	0.88	29.6
Approach		33	3.2	0.194	25.7	LOS B	0.6	4.2	0.82	0.88	34.1
All Vehicles		1567	2.8	0.482	0.9	NA	0.6	4.2	0.04	0.06	48.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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: 2 [Appin Road/ King Street - AM]

Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand 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: Appin Road											
1	L2	1	0.0	0.545	4.6	LOS A	0.0	0.0	0.00	0.00	49.0
2	T1	1039	3.2	0.545	0.0	LOS A	0.0	0.0	0.00	0.00	49.9
3	R2	3	0.0	0.003	6.7	LOS A	0.0	0.1	0.52	0.57	43.5
Approach		1043	3.2	0.545	0.1	NA	0.0	0.1	0.00	0.00	49.8
East: King Street											
4	L2	1	0.0	0.405	24.7	LOS B	1.1	8.0	0.97	1.02	18.9
5	T1	1	0.0	0.405	149.2	LOS F	1.1	8.0	0.97	1.02	21.2
6	R2	20	0.0	0.405	83.7	LOS F	1.1	8.0	0.97	1.02	15.0
Approach		22	0.0	0.405	84.0	LOS F	1.1	8.0	0.97	1.02	15.5
North: Appin Road											
7	L2	3	0.0	0.290	3.9	LOS A	0.0	0.0	0.00	0.00	49.1
8	T1	543	5.2	0.290	0.0	LOS A	0.0	0.0	0.00	0.00	49.9
9	R2	6	16.7	0.019	13.9	LOS A	0.1	0.5	0.80	0.88	33.0
Approach		553	5.3	0.290	0.2	NA	0.1	0.5	0.01	0.01	49.4
West: King Street											
10	L2	4	0.0	0.078	20.7	LOS B	0.2	1.5	0.93	0.97	13.8
11	T1	1	0.0	0.078	126.7	LOS F	0.2	1.5	0.93	0.97	28.8
12	R2	1	0.0	0.078	63.2	LOS E	0.2	1.5	0.93	0.97	23.4
Approach		6	0.0	0.078	45.4	LOS D	0.2	1.5	0.93	0.97	17.7
All Vehicles		1624	3.9	0.545	1.4	NA	1.1	8.0	0.02	0.02	46.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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: 2 [Appin Road/ King Street - PM]

Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand 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: Appin Road											
1	L2	2	0.0	0.293	4.6	LOS A	0.0	0.0	0.00	0.00	49.1
2	T1	553	4.4	0.293	0.0	LOS A	0.0	0.0	0.00	0.00	49.9
3	R2	1	0.0	0.002	10.9	LOS A	0.0	0.1	0.73	0.69	40.6
Approach		556	4.4	0.293	0.1	NA	0.0	0.1	0.00	0.00	49.8
East: King Street											
4	L2	1	0.0	0.168	15.3	LOS B	0.5	3.2	0.94	0.98	24.1
5	T1	1	0.0	0.168	101.2	LOS F	0.5	3.2	0.94	0.98	26.5
6	R2	9	0.0	0.168	54.0	LOS D	0.5	3.2	0.94	0.98	19.2
Approach		12	0.0	0.168	54.7	LOS D	0.5	3.2	0.94	0.98	20.3
North: Appin Road											
7	L2	17	0.0	0.510	3.9	LOS A	0.0	0.0	0.00	0.01	48.9
8	T1	965	1.9	0.510	0.0	LOS A	0.0	0.0	0.00	0.01	49.7
9	R2	1	100.0	0.002	9.6	LOS A	0.0	0.1	0.61	0.60	35.7
Approach		983	1.9	0.510	0.1	NA	0.0	0.1	0.00	0.01	49.6
West: King Street											
10	L2	4	25.0	0.053	9.8	LOS A	0.1	1.2	0.84	0.89	15.8
11	T1	1	0.0	0.053	100.6	LOS F	0.1	1.2	0.84	0.89	33.1
12	R2	1	0.0	0.053	50.4	LOS D	0.1	1.2	0.84	0.89	27.9
Approach		6	16.7	0.053	31.7	LOS C	0.1	1.2	0.84	0.89	20.4
All Vehicles		1557	2.8	0.510	0.6	NA	0.5	3.2	0.01	0.02	48.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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: 3 [Appin Road/ Church Street - AM]

Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand 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: Appin Road											
1	L2	1	0.0	0.296	11.9	LOS A	2.2	16.1	0.93	0.91	47.7
2	T1	134	6.3	0.296	12.6	LOS A	2.2	16.1	0.93	0.91	46.6
3	R2	18	11.8	0.296	17.6	LOS B	2.2	16.1	0.93	0.91	49.8
Approach		153	6.9	0.296	13.2	LOS A	2.2	16.1	0.93	0.91	47.1
East: Church Street											
4	L2	40	10.5	0.676	5.2	LOS A	8.0	57.6	0.55	0.59	50.3
5	T1	1	0.0	0.676	5.3	LOS A	8.0	57.6	0.55	0.59	50.6
6	R2	912	2.8	0.676	10.0	LOS A	8.0	57.6	0.55	0.59	48.8
Approach		953	3.1	0.676	9.8	LOS A	8.0	57.6	0.55	0.59	48.9
North: Appin Road											
7	L2	455	3.5	0.348	4.0	LOS A	3.2	23.6	0.17	0.43	53.2
8	T1	95	12.2	0.348	4.4	LOS A	3.2	23.6	0.17	0.43	54.9
9	R2	1	0.0	0.348	8.9	LOS A	3.2	23.6	0.17	0.43	54.1
Approach		551	5.0	0.348	4.1	LOS A	3.2	23.6	0.17	0.43	53.5
West: Church Street											
10	L2	1	0.0	0.006	11.9	LOS A	0.0	0.3	0.88	0.64	42.6
11	T1	1	0.0	0.006	12.2	LOS A	0.0	0.3	0.88	0.64	48.5
12	R2	1	0.0	0.006	16.8	LOS B	0.0	0.3	0.88	0.64	48.4
Approach		3	0.0	0.006	13.7	LOS A	0.0	0.3	0.88	0.64	46.8
All Vehicles		1659	4.1	0.676	8.2	LOS A	8.0	57.6	0.46	0.56	50.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.
Roundabout Capacity Model: SIDRA Standard.
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: 3 [Appin Road/ Church Street - PM]

Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand 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: Appin Road											
1	L2	1	0.0	0.194	6.5	LOS A	1.3	9.0	0.64	0.66	51.0
2	T1	142	0.7	0.194	6.9	LOS A	1.3	9.0	0.64	0.66	51.0
3	R2	38	2.8	0.194	11.6	LOS A	1.3	9.0	0.64	0.66	53.2
Approach		181	1.2	0.194	7.9	LOS A	1.3	9.0	0.64	0.66	51.6
East: Church Street											
4	L2	44	4.8	0.378	5.1	LOS A	2.9	21.2	0.49	0.63	50.9
5	T1	1	0.0	0.378	5.4	LOS A	2.9	21.2	0.49	0.63	51.1
6	R2	416	5.6	0.378	10.1	LOS A	2.9	21.2	0.49	0.63	49.0
Approach		461	5.5	0.378	9.6	LOS A	2.9	21.2	0.49	0.63	49.3
North: Appin Road											
7	L2	795	2.1	0.614	4.3	LOS A	7.9	56.0	0.34	0.43	52.4
8	T1	165	1.3	0.614	4.6	LOS A	7.9	56.0	0.34	0.43	54.3
9	R2	1	0.0	0.614	9.2	LOS A	7.9	56.0	0.34	0.43	53.0
Approach		961	2.0	0.614	4.3	LOS A	7.9	56.0	0.34	0.43	52.7
West: Church Street											
10	L2	1	0.0	0.004	6.7	LOS A	0.0	0.1	0.62	0.55	47.3
11	T1	1	0.0	0.004	6.9	LOS A	0.0	0.1	0.62	0.55	52.4
12	R2	1	0.0	0.004	11.6	LOS A	0.0	0.1	0.62	0.55	52.4
Approach		3	0.0	0.004	8.4	LOS A	0.0	0.1	0.62	0.55	51.0
All Vehicles		1606	2.9	0.614	6.3	LOS A	7.9	56.0	0.42	0.51	51.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.
Roundabout Capacity Model: SIDRA Standard.
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.

Appendix D

SIDRA Results – 2028 Baseline Conditions + Development

2028 with 1% background growth

MOVEMENT SUMMARY

Site: 4 [Appin Road/ Rixon Road - AM]

Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand 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: Appin Road											
1	L2	19	0.0	0.591	3.3	LOS A	5.7	41.2	0.26	0.35	47.1
2	T1	880	4.1	0.591	3.3	LOS A	5.7	41.2	0.26	0.35	48.1
3u	U	2	0.0	0.591	9.3	LOS A	5.7	41.2	0.26	0.35	52.1
Approach		901	4.0	0.591	3.3	LOS A	5.7	41.2	0.26	0.35	48.0
North: Appin Road											
8	T1	432	6.8	0.318	3.1	LOS A	2.4	18.0	0.19	0.36	48.1
9	R2	39	2.7	0.318	7.4	LOS A	2.4	18.0	0.19	0.36	48.2
Approach		471	6.5	0.318	3.5	LOS A	2.4	18.0	0.19	0.36	48.1
West: Rixon Road											
10	L2	87	2.4	0.186	9.7	LOS A	1.2	8.3	0.80	0.82	43.5
12	R2	28	0.0	0.186	13.8	LOS A	1.2	8.3	0.80	0.82	44.5
Approach		116	1.8	0.186	10.7	LOS A	1.2	8.3	0.80	0.82	43.7
All Vehicles		1487	4.6	0.591	3.9	LOS A	5.7	41.2	0.28	0.39	47.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.
Roundabout Capacity Model: SIDRA Standard.
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: 4 [Appin Road/ Rixon Road - PM]

Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand 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: Appin Road											
1	L2	37	0.0	0.346	3.5	LOS A	2.3	16.7	0.31	0.39	46.9
2	T1	420	6.3	0.346	3.5	LOS A	2.3	16.7	0.31	0.39	47.9
3u	U	1	0.0	0.346	9.5	LOS A	2.3	16.7	0.31	0.39	51.9
Approach		458	5.7	0.346	3.5	LOS A	2.3	16.7	0.31	0.39	47.8
North: Appin Road											
8	T1	797	1.7	0.566	3.2	LOS A	5.9	41.6	0.24	0.37	47.9
9	R2	91	2.3	0.566	7.5	LOS A	5.9	41.6	0.24	0.37	48.0
Approach		887	1.8	0.566	3.6	LOS A	5.9	41.6	0.24	0.37	47.9
West: Rixon Road											
10	L2	36	2.9	0.070	5.2	LOS A	0.4	2.6	0.54	0.63	45.5
12	R2	29	0.0	0.070	9.4	LOS A	0.4	2.6	0.54	0.63	46.6
Approach		65	1.6	0.070	7.1	LOS A	0.4	2.6	0.54	0.63	46.0
All Vehicles		1411	3.1	0.566	3.7	LOS A	5.9	41.6	0.27	0.39	47.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.
Roundabout Capacity Model: SIDRA Standard.
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: 1 [Appin Road/ Macquariedale Road - AM]

Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand 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: Macquariedale Road											
1	L2	65	1.6	0.453	3.9	LOS A	0.0	0.0	0.00	0.04	48.6
2	T1	794	4.1	0.453	0.0	LOS A	0.0	0.0	0.00	0.04	49.5
Approach		859	3.9	0.453	0.3	NA	0.0	0.0	0.00	0.04	49.5
North: Macquariedale Road											
8	T1	416	6.1	0.222	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
9	R2	42	5.0	0.073	10.1	LOS A	0.3	2.0	0.69	0.86	43.1
Approach		458	6.0	0.222	1.0	NA	0.3	2.0	0.06	0.08	48.8
West: Appin Road											
10	L2	34	0.0	0.232	10.0	LOS A	0.8	5.7	0.83	0.94	38.8
12	R2	22	14.3	0.232	36.0	LOS C	0.8	5.7	0.83	0.94	32.1
Approach		56	5.7	0.232	20.3	LOS B	0.8	5.7	0.83	0.94	36.8
All Vehicles		1373	4.7	0.453	1.3	NA	0.8	5.7	0.05	0.09	48.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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: 1 [Appin Road/ Macquariedale Road - PM]

Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand 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: Macquariedale Road											
1	L2	51	0.0	0.247	3.9	LOS A	0.0	0.0	0.00	0.06	48.6
2	T1	413	6.1	0.247	0.0	LOS A	0.0	0.0	0.00	0.06	49.4
Approach		463	5.5	0.247	0.4	NA	0.0	0.0	0.00	0.06	49.3
North: Macquariedale Road											
8	T1	794	2.3	0.413	0.1	LOS A	0.0	0.0	0.00	0.00	49.9
9	R2	66	0.0	0.060	6.4	LOS A	0.2	1.7	0.49	0.65	45.1
Approach		860	2.1	0.413	0.5	NA	0.2	1.7	0.04	0.05	49.2
West: Appin Road											
10	L2	20	0.0	0.129	6.1	LOS A	0.4	2.9	0.71	0.78	40.4
12	R2	16	6.7	0.129	30.1	LOS C	0.4	2.9	0.71	0.78	34.1
Approach		36	2.9	0.129	16.7	LOS B	0.4	2.9	0.71	0.78	38.2
All Vehicles		1359	3.3	0.413	0.9	NA	0.4	2.9	0.04	0.07	48.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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: 2 [Appin Road/ King Street - AM]

Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand 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: Appin Road											
1	L2	3	0.0	0.432	4.6	LOS A	0.0	0.0	0.00	0.00	49.0
2	T1	818	4.1	0.432	0.0	LOS A	0.0	0.0	0.00	0.00	49.9
3	R2	3	0.0	0.003	6.2	LOS A	0.0	0.1	0.47	0.54	43.7
Approach		824	4.1	0.432	0.1	NA	0.0	0.1	0.00	0.00	49.8
East: King Street											
4	L2	1	0.0	0.181	7.7	LOS A	0.5	3.7	0.90	0.95	30.1
5	T1	1	0.0	0.181	53.5	LOS D	0.5	3.7	0.90	0.95	32.5
6	R2	20	0.0	0.181	33.5	LOS C	0.5	3.7	0.90	0.95	24.0
Approach		22	0.0	0.181	33.3	LOS C	0.5	3.7	0.90	0.95	24.8
North: Appin Road											
7	L2	3	0.0	0.244	3.9	LOS A	0.0	0.0	0.00	0.00	49.1
8	T1	454	6.3	0.244	0.0	LOS A	0.0	0.0	0.00	0.00	49.9
9	R2	12	9.1	0.020	8.9	LOS A	0.1	0.5	0.66	0.75	37.3
Approach		468	6.3	0.244	0.2	NA	0.1	0.5	0.02	0.02	49.2
West: King Street											
10	L2	25	0.0	0.162	13.3	LOS A	0.5	3.4	0.82	0.91	18.2
11	T1	1	0.0	0.162	53.5	LOS D	0.5	3.4	0.82	0.91	37.9
12	R2	9	0.0	0.162	32.0	LOS C	0.5	3.4	0.82	0.91	33.4
Approach		36	0.0	0.162	19.4	LOS B	0.5	3.4	0.82	0.91	22.0
All Vehicles		1351	4.7	0.432	1.2	NA	0.5	3.7	0.04	0.05	45.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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: 2 [Appin Road/ King Street - PM]

Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand 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: Appin Road											
1	L2	13	0.0	0.245	4.6	LOS A	0.0	0.0	0.00	0.01	48.9
2	T1	449	5.4	0.245	0.0	LOS A	0.0	0.0	0.00	0.01	49.6
3	R2	1	0.0	0.002	8.7	LOS A	0.0	0.0	0.63	0.62	42.0
Approach		463	5.2	0.245	0.2	NA	0.0	0.0	0.00	0.02	49.5
East: King Street											
4	L2	1	0.0	0.089	10.4	LOS A	0.3	1.8	0.88	0.94	31.2
5	T1	1	0.0	0.089	49.9	LOS D	0.3	1.8	0.88	0.94	33.5
6	R2	9	0.0	0.089	30.2	LOS C	0.3	1.8	0.88	0.94	24.9
Approach		12	0.0	0.089	30.2	LOS C	0.3	1.8	0.88	0.94	26.4
North: Appin Road											
7	L2	17	0.0	0.426	3.9	LOS A	0.0	0.0	0.00	0.01	49.0
8	T1	802	2.2	0.426	0.0	LOS A	0.0	0.0	0.00	0.01	49.7
9	R2	24	4.3	0.022	5.7	LOS A	0.1	0.7	0.48	0.60	40.7
Approach		843	2.2	0.426	0.2	NA	0.1	0.7	0.01	0.03	49.2
West: King Street											
10	L2	11	10.0	0.054	7.8	LOS A	0.2	1.2	0.67	0.77	19.1
11	T1	1	0.0	0.054	50.7	LOS D	0.2	1.2	0.67	0.77	39.9
12	R2	3	0.0	0.054	29.6	LOS C	0.2	1.2	0.67	0.77	35.8
Approach		15	7.1	0.054	15.5	LOS B	0.2	1.2	0.67	0.77	23.4
All Vehicles		1333	3.3	0.426	0.6	NA	0.3	1.8	0.02	0.04	47.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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: 3 [Appin Road/ Church Street - AM]

Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand 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: Appin Road											
1	L2	1	0.0	0.190	9.2	LOS A	1.3	9.5	0.80	0.79	49.6
2	T1	106	7.9	0.190	9.9	LOS A	1.3	9.5	0.80	0.79	48.7
3	R2	18	11.8	0.190	14.7	LOS B	1.3	9.5	0.80	0.79	51.6
Approach		125	8.4	0.190	10.6	LOS A	1.3	9.5	0.80	0.79	49.3
East: Church Street											
4	L2	40	10.5	0.543	4.9	LOS A	5.2	37.6	0.43	0.59	50.7
5	T1	3	0.0	0.543	5.0	LOS A	5.2	37.6	0.43	0.59	51.1
6	R2	719	3.5	0.543	9.7	LOS A	5.2	37.6	0.43	0.59	49.2
Approach		762	3.9	0.543	9.4	LOS A	5.2	37.6	0.43	0.59	49.4
North: Appin Road											
7	L2	375	4.2	0.304	4.1	LOS A	2.4	17.6	0.19	0.44	53.0
8	T1	79	14.7	0.304	4.5	LOS A	2.4	17.6	0.19	0.44	54.6
9	R2	7	0.0	0.304	9.0	LOS A	2.4	17.6	0.19	0.44	53.9
Approach		461	5.9	0.304	4.2	LOS A	2.4	17.6	0.19	0.44	53.3
West: Church Street											
10	L2	32	0.0	0.067	9.2	LOS A	0.4	2.9	0.77	0.72	46.3
11	T1	12	0.0	0.067	9.5	LOS A	0.4	2.9	0.77	0.72	51.7
12	R2	2	0.0	0.067	14.1	LOS A	0.4	2.9	0.77	0.72	51.6
Approach		45	0.0	0.067	9.5	LOS A	0.4	2.9	0.77	0.72	48.3
All Vehicles		1394	4.8	0.543	7.8	LOS A	5.2	37.6	0.40	0.56	50.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.
Roundabout Capacity Model: SIDRA Standard.
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: 3 [Appin Road/ Church Street - PM]

Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand 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: Appin Road											
1	L2	2	0.0	0.164	6.3	LOS A	1.0	7.3	0.61	0.64	51.1
2	T1	117	0.9	0.164	6.7	LOS A	1.0	7.3	0.61	0.64	51.1
3	R2	38	2.8	0.164	11.4	LOS A	1.0	7.3	0.61	0.64	53.3
Approach		157	1.3	0.164	7.8	LOS A	1.0	7.3	0.61	0.64	51.8
East: Church Street											
4	L2	44	4.8	0.334	5.1	LOS A	2.4	17.8	0.46	0.63	51.1
5	T1	13	0.0	0.334	5.3	LOS A	2.4	17.8	0.46	0.63	51.4
6	R2	347	6.7	0.334	10.1	LOS A	2.4	17.8	0.46	0.63	49.2
Approach		404	6.3	0.334	9.4	LOS A	2.4	17.8	0.46	0.63	49.5
North: Appin Road											
7	L2	632	2.7	0.517	4.2	LOS A	5.5	39.3	0.30	0.44	52.4
8	T1	132	1.6	0.517	4.5	LOS A	5.5	39.3	0.30	0.44	54.3
9	R2	35	0.0	0.517	9.1	LOS A	5.5	39.3	0.30	0.44	53.0
Approach		798	2.4	0.517	4.5	LOS A	5.5	39.3	0.30	0.44	52.7
West: Church Street											
10	L2	8	0.0	0.013	6.2	LOS A	0.1	0.5	0.56	0.55	49.0
11	T1	3	0.0	0.013	6.5	LOS A	0.1	0.5	0.56	0.55	53.8
12	R2	1	0.0	0.013	11.1	LOS A	0.1	0.5	0.56	0.55	53.8
Approach		13	0.0	0.013	6.6	LOS A	0.1	0.5	0.56	0.55	51.0
All Vehicles		1372	3.4	0.517	6.3	LOS A	5.5	39.3	0.39	0.52	51.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.
Roundabout Capacity Model: SIDRA Standard.
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.

2028 with 3.5% background growth

MOVEMENT SUMMARY

Site: 4 [Appin Road/ Rixon Road - AM]

Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand 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: Appin Road											
1	L2	17	0.0	0.702	3.3	LOS A	8.6	62.1	0.29	0.34	47.0
2	T1	1084	3.3	0.702	3.3	LOS A	8.6	62.1	0.29	0.34	48.0
3u	U	2	0.0	0.702	9.3	LOS A	8.6	62.1	0.29	0.34	52.0
Approach		1103	3.2	0.702	3.3	LOS A	8.6	62.1	0.29	0.34	48.0
North: Appin Road											
8	T1	525	5.6	0.363	3.1	LOS A	3.0	22.2	0.17	0.35	48.2
9	R2	32	3.3	0.363	7.4	LOS A	3.0	22.2	0.17	0.35	48.3
Approach		557	5.5	0.363	3.3	LOS A	3.0	22.2	0.17	0.35	48.2
West: Rixon Road											
10	L2	59	3.6	0.166	13.3	LOS A	1.1	7.9	0.89	0.87	41.7
12	R2	21	0.0	0.166	17.3	LOS B	1.1	7.9	0.89	0.87	42.6
Approach		80	2.6	0.166	14.4	LOS A	1.1	7.9	0.89	0.87	41.9
All Vehicles		1740	3.9	0.702	3.8	LOS A	8.6	62.1	0.28	0.37	47.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.
Roundabout Capacity Model: SIDRA Standard.
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: 4 [Appin Road/ Rixon Road - PM]

Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand 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: Appin Road											
1	L2	29	0.0	0.389	3.3	LOS A	2.7	19.9	0.26	0.36	47.1
2	T1	520	5.1	0.389	3.3	LOS A	2.7	19.9	0.26	0.36	48.1
3u	U	1	0.0	0.389	9.3	LOS A	2.7	19.9	0.26	0.36	52.1
Approach		551	4.8	0.389	3.3	LOS A	2.7	19.9	0.26	0.36	48.0
North: Appin Road											
8	T1	929	1.5	0.616	3.1	LOS A	7.2	50.9	0.22	0.35	48.1
9	R2	60	3.5	0.616	7.4	LOS A	7.2	50.9	0.22	0.35	48.1
Approach		989	1.6	0.616	3.4	LOS A	7.2	50.9	0.22	0.35	48.1
West: Rixon Road											
10	L2	34	3.1	0.064	5.8	LOS A	0.3	2.4	0.59	0.65	45.3
12	R2	22	0.0	0.064	10.0	LOS A	0.3	2.4	0.59	0.65	46.3
Approach		56	1.9	0.064	7.5	LOS A	0.3	2.4	0.59	0.65	45.7
All Vehicles		1596	2.7	0.616	3.5	LOS A	7.2	50.9	0.25	0.36	48.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.
Roundabout Capacity Model: SIDRA Standard.
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: 1 [Appin Road/ Macquariedale Road - AM]

Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand 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: Macquariedale Road											
1	L2	64	1.6	0.550	3.9	LOS A	0.0	0.0	0.00	0.03	48.7
2	T1	983	3.3	0.550	0.0	LOS A	0.0	0.0	0.00	0.03	49.6
Approach		1047	3.2	0.550	0.2	NA	0.0	0.0	0.00	0.03	49.5
North: Macquariedale Road											
8	T1	499	5.1	0.264	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
9	R2	40	5.3	0.104	13.8	LOS A	0.4	2.6	0.80	0.91	41.3
Approach		539	5.1	0.264	1.0	NA	0.4	2.6	0.06	0.07	48.7
West: Appin Road											
10	L2	25	0.0	0.378	20.0	LOS B	1.2	9.0	0.93	1.02	30.9
12	R2	18	17.6	0.378	78.8	LOS F	1.2	9.0	0.93	1.02	23.2
Approach		43	7.3	0.378	44.4	LOS D	1.2	9.0	0.93	1.02	28.3
All Vehicles		1629	3.9	0.550	1.7	NA	1.2	9.0	0.04	0.07	47.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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: 1 [Appin Road/ Macquariedale Road - PM]

Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand 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: Macquariedale Road											
1	L2	46	0.0	0.291	3.9	LOS A	0.0	0.0	0.00	0.05	48.7
2	T1	503	5.0	0.291	0.0	LOS A	0.0	0.0	0.00	0.05	49.5
Approach		549	4.6	0.291	0.3	NA	0.0	0.0	0.00	0.05	49.5
North: Macquariedale Road											
8	T1	928	1.9	0.482	0.1	LOS A	0.0	0.0	0.00	0.00	49.9
9	R2	57	0.0	0.057	6.9	LOS A	0.2	1.6	0.53	0.69	44.9
Approach		985	1.8	0.482	0.5	NA	0.2	1.6	0.03	0.04	49.3
West: Appin Road											
10	L2	18	0.0	0.194	7.0	LOS A	0.6	4.2	0.82	0.88	36.7
12	R2	15	7.1	0.194	48.5	LOS D	0.6	4.2	0.82	0.88	29.6
Approach		33	3.2	0.194	25.7	LOS B	0.6	4.2	0.82	0.88	34.1
All Vehicles		1567	2.8	0.482	0.9	NA	0.6	4.2	0.04	0.06	48.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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: 2 [Appin Road/ King Street - AM]

Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand 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: Appin Road											
1	L2	1	0.0	0.545	4.6	LOS A	0.0	0.0	0.00	0.00	49.0
2	T1	1039	3.2	0.545	0.0	LOS A	0.0	0.0	0.00	0.00	49.9
3	R2	3	0.0	0.003	6.7	LOS A	0.0	0.1	0.52	0.57	43.5
Approach		1043	3.2	0.545	0.1	NA	0.0	0.1	0.00	0.00	49.8
East: King Street											
4	L2	1	0.0	0.405	24.7	LOS B	1.1	8.0	0.97	1.02	18.9
5	T1	1	0.0	0.405	149.2	LOS F	1.1	8.0	0.97	1.02	21.2
6	R2	20	0.0	0.405	83.7	LOS F	1.1	8.0	0.97	1.02	15.0
Approach		22	0.0	0.405	84.0	LOS F	1.1	8.0	0.97	1.02	15.5
North: Appin Road											
7	L2	3	0.0	0.290	3.9	LOS A	0.0	0.0	0.00	0.00	49.1
8	T1	543	5.2	0.290	0.0	LOS A	0.0	0.0	0.00	0.00	49.9
9	R2	6	16.7	0.019	13.9	LOS A	0.1	0.5	0.80	0.88	33.0
Approach		553	5.3	0.290	0.2	NA	0.1	0.5	0.01	0.01	49.4
West: King Street											
10	L2	4	0.0	0.078	20.7	LOS B	0.2	1.5	0.93	0.97	13.8
11	T1	1	0.0	0.078	126.7	LOS F	0.2	1.5	0.93	0.97	28.8
12	R2	1	0.0	0.078	63.2	LOS E	0.2	1.5	0.93	0.97	23.4
Approach		6	0.0	0.078	45.4	LOS D	0.2	1.5	0.93	0.97	17.7
All Vehicles		1624	3.9	0.545	1.4	NA	1.1	8.0	0.02	0.02	46.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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: 2 [Appin Road/ King Street - PM]

Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand 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: Appin Road											
1	L2	2	0.0	0.293	4.6	LOS A	0.0	0.0	0.00	0.00	49.1
2	T1	553	4.4	0.293	0.0	LOS A	0.0	0.0	0.00	0.00	49.9
3	R2	1	0.0	0.002	10.9	LOS A	0.0	0.1	0.73	0.69	40.6
Approach		556	4.4	0.293	0.1	NA	0.0	0.1	0.00	0.00	49.8
East: King Street											
4	L2	1	0.0	0.168	15.3	LOS B	0.5	3.2	0.94	0.98	24.1
5	T1	1	0.0	0.168	101.2	LOS F	0.5	3.2	0.94	0.98	26.5
6	R2	9	0.0	0.168	54.0	LOS D	0.5	3.2	0.94	0.98	19.2
Approach		12	0.0	0.168	54.7	LOS D	0.5	3.2	0.94	0.98	20.3
North: Appin Road											
7	L2	17	0.0	0.510	3.9	LOS A	0.0	0.0	0.00	0.01	48.9
8	T1	965	1.9	0.510	0.0	LOS A	0.0	0.0	0.00	0.01	49.7
9	R2	1	100.0	0.002	9.6	LOS A	0.0	0.1	0.61	0.60	35.7
Approach		983	1.9	0.510	0.1	NA	0.0	0.1	0.00	0.01	49.6
West: King Street											
10	L2	4	25.0	0.053	9.8	LOS A	0.1	1.2	0.84	0.89	15.8
11	T1	1	0.0	0.053	100.6	LOS F	0.1	1.2	0.84	0.89	33.1
12	R2	1	0.0	0.053	50.4	LOS D	0.1	1.2	0.84	0.89	27.9
Approach		6	16.7	0.053	31.7	LOS C	0.1	1.2	0.84	0.89	20.4
All Vehicles		1557	2.8	0.510	0.6	NA	0.5	3.2	0.01	0.02	48.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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: 3 [Appin Road/ Church Street - AM]

Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand 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: Appin Road											
1	L2	1	0.0	0.296	11.9	LOS A	2.2	16.1	0.93	0.91	47.7
2	T1	134	6.3	0.296	12.6	LOS A	2.2	16.1	0.93	0.91	46.6
3	R2	18	11.8	0.296	17.6	LOS B	2.2	16.1	0.93	0.91	49.8
Approach		153	6.9	0.296	13.2	LOS A	2.2	16.1	0.93	0.91	47.1
East: Church Street											
4	L2	40	10.5	0.676	5.2	LOS A	8.0	57.6	0.55	0.59	50.3
5	T1	1	0.0	0.676	5.3	LOS A	8.0	57.6	0.55	0.59	50.6
6	R2	912	2.8	0.676	10.0	LOS A	8.0	57.6	0.55	0.59	48.8
Approach		953	3.1	0.676	9.8	LOS A	8.0	57.6	0.55	0.59	48.9
North: Appin Road											
7	L2	455	3.5	0.348	4.0	LOS A	3.2	23.6	0.17	0.43	53.2
8	T1	95	12.2	0.348	4.4	LOS A	3.2	23.6	0.17	0.43	54.9
9	R2	1	0.0	0.348	8.9	LOS A	3.2	23.6	0.17	0.43	54.1
Approach		551	5.0	0.348	4.1	LOS A	3.2	23.6	0.17	0.43	53.5
West: Church Street											
10	L2	1	0.0	0.006	11.9	LOS A	0.0	0.3	0.88	0.64	42.6
11	T1	1	0.0	0.006	12.2	LOS A	0.0	0.3	0.88	0.64	48.5
12	R2	1	0.0	0.006	16.8	LOS B	0.0	0.3	0.88	0.64	48.4
Approach		3	0.0	0.006	13.7	LOS A	0.0	0.3	0.88	0.64	46.8
All Vehicles		1659	4.1	0.676	8.2	LOS A	8.0	57.6	0.46	0.56	50.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.
Roundabout Capacity Model: SIDRA Standard.
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: 3 [Appin Road/ Church Street - PM]

Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand 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: Appin Road											
1	L2	1	0.0	0.194	6.5	LOS A	1.3	9.0	0.64	0.66	51.0
2	T1	142	0.7	0.194	6.9	LOS A	1.3	9.0	0.64	0.66	51.0
3	R2	38	2.8	0.194	11.6	LOS A	1.3	9.0	0.64	0.66	53.2
Approach		181	1.2	0.194	7.9	LOS A	1.3	9.0	0.64	0.66	51.6
East: Church Street											
4	L2	44	4.8	0.378	5.1	LOS A	2.9	21.2	0.49	0.63	50.9
5	T1	1	0.0	0.378	5.4	LOS A	2.9	21.2	0.49	0.63	51.1
6	R2	416	5.6	0.378	10.1	LOS A	2.9	21.2	0.49	0.63	49.0
Approach		461	5.5	0.378	9.6	LOS A	2.9	21.2	0.49	0.63	49.3
North: Appin Road											
7	L2	795	2.1	0.614	4.3	LOS A	7.9	56.0	0.34	0.43	52.4
8	T1	165	1.3	0.614	4.6	LOS A	7.9	56.0	0.34	0.43	54.3
9	R2	1	0.0	0.614	9.2	LOS A	7.9	56.0	0.34	0.43	53.0
Approach		961	2.0	0.614	4.3	LOS A	7.9	56.0	0.34	0.43	52.7
West: Church Street											
10	L2	1	0.0	0.004	6.7	LOS A	0.0	0.1	0.62	0.55	47.3
11	T1	1	0.0	0.004	6.9	LOS A	0.0	0.1	0.62	0.55	52.4
12	R2	1	0.0	0.004	11.6	LOS A	0.0	0.1	0.62	0.55	52.4
Approach		3	0.0	0.004	8.4	LOS A	0.0	0.1	0.62	0.55	51.0
All Vehicles		1606	2.9	0.614	6.3	LOS A	7.9	56.0	0.42	0.51	51.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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