TRAFFIC

ASSESSMENT

REPORT

FOR

PROPOSED REZONING

FOR

RESIDENTIAL SUBDIVISION

ANAMBAH ROAD

AND

MARLOWE AVENUE

ANAMBAH

27 FEBRUARY 2017

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1.0 INTRODUCTION

The purpose of this Traffic Assessment Report is to assess any potential traffic impacts of a proposed rezoning to enable provision of a residential subdivision at Part Lot 90, DP 785244, Anambah Road and Marlowe Avenue, Anambah.

2.0 LOCALITY DIAGRAM

(Image Courtesy of Google Earth)

SITE OF PROPOSED RESIDENTIAL SUBDIVISION

3.0 EXISTING USE OF SITE

The site of the proposed subdivision is currently vacant rural land, abutting residential subdivisions on the southern end.

There are no improvements on the site.

4.0 ADJACENT DEVELOPMENTS

There are numerous commercial, retail and hospitality and also residential developments along both sides of the New England Highway in the area surrounding this site at Rutherford.

5.0 TRAFFIC ENVIRONMENT ON NEW ENGLAND HIGHWAY

The New England Highway is a State Road forming part of the arterial route connecting major centres in NSW. The New England Highway is aligned generally east-west past the Anambah Road roundabout.

There are roundabouts at the intersections with Racecourse Road and Denton Park Drive and also at Anambah Road and Shipley Drive.

There is no kerb and gutter on either side of the New England Highway in the vicinity of the site at present.

The existing speed zone on the New England Highway past the Anambah Road roundabout is 60km/h.

The New England Highway has relatively flat gradients near the Anambah Road roundabout.

The Highway generally west of the roundabout at Anambah Road and Shipley Drive is a two-lane Highway apart from overtaking lanes and widening at intersections. The Highway generally east of Racecourse Road and Denton Park Drive consists of dual carriageways with two lanes in each direction.

6.0 TRAFFIC ENVIRONMENT ON ANAMBAH ROAD

Anambah Road is a local road aligned generally north-south that connects with the New England Highway at Rutherford and terminates further north near a quarry and rural properties.

Anambah Road has two lanes approaching the roundabout and two lanes departing the roundabout. The northbound lanes narrow to a single lane just north of Mustang Drive and the southbound lanes widen from a single lane to two lanes just north of Mustang Drive.

There is an additional left-turn deceleration lane into a now closed Masters hardware business.

The intersections with Niven Parade and Cagney Road provide BAR treatments that enable northbound traffic to safely pass vehicles turning right into those streets.

Anambah Road also provides access from the New England Highway to a growing industrial estate serviced by Mustang Drive. The industrial estate is reaching capacity near the eastern end and new areas released in recent years are also filling up.

Anambah Road has a signposted zone of 60km/h from the New England Highway roundabout to a point approximately 570 metres north of Niven Parade where the speed zone changes to 100km/h.

Traffic volumes on Anambah Road north of Niven Parade are very low.

7.0 TRAFFIC ENVIRONMENT ON NIVEN PARADE

Niven is a local road that connects with Anambah Road at its western end, loops within a residential subdivision and connects with Cagney Road within that subdivision.

There is no signposted speed zone on Niven Parade which therefore be 60km/h by default.

Niven Road has a carriageway width of approximately 7.8 metres between the inverts of layback kerbing both sides near Marlow Avenue. The southern footway has a concrete footpath and the northern footway is grassed.

There is street lighting along Niven Parade.

8.0 TRAFFIC ENVIRONMENT ON MARLOWE AVENUE

Marlowe Avenue is a short local road approximately 55 metres long. Marlowe Avenue connects with Niven Parade at its southern end an terminates at a fence pending future subdivision extensions.

Marlowe Avenue has a carriageway width of approximately 7.8 metres between the inverts of the mountable kerbs each side. There is a concrete along the eastern footway and a grassed footway along the western side.

There is no signposted speed zone on Marlowe Avenue which therefore be 60km/h by default.

9.0 TRAFFIC VOLUMES ON NEW ENGLAND HIGHWAY

Traffic Surveys were undertaken at the roundabout of New England Highway / Shipley Drive / Anambah Road on 1 February 2017.

The surveys were between 7.00 am and 10.00am and also between 3.00pm and 6.00 pm.

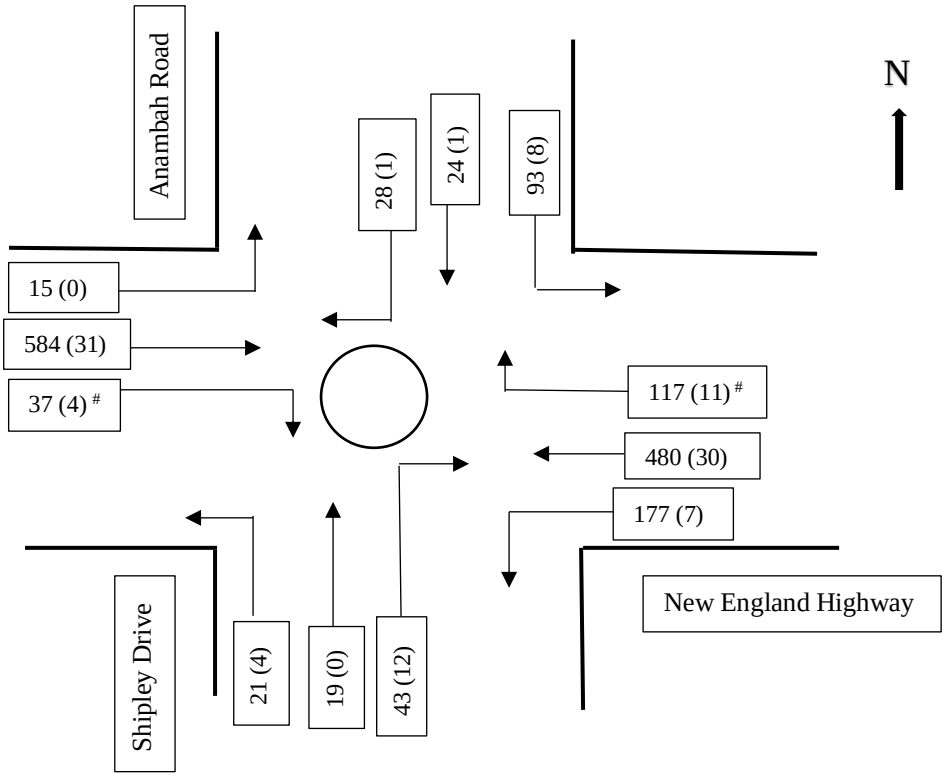
Peak hourly volumes during the survey periods were found to be between 8.00 and 9.00 am and 3.30 and 4.30 pm.

Traffic volumes on the New England Highway have also previously been recorded at various RTA counting stations every three years, with the latest published data available for 2004. RTA counting station No. 05.147 located just west of Dwyer Street and also No. 05.062 just east of Anambah Road indicated traffic volumes on the New England Highway to be as follows.

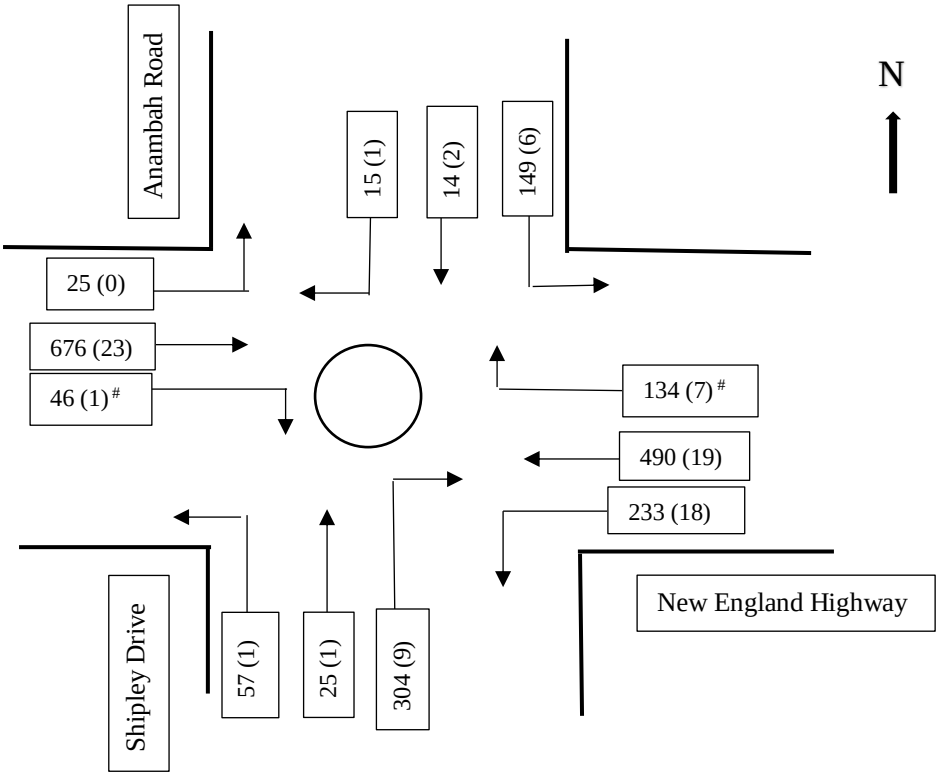
	AADT Year					
Station No.	**1995**	**1998**	**2001**	**2004**	**Average Annual Growth rate 1995-2004(%)**	**Average Annual Growth rate 2001-2004(%)**
05.062	19,301	19,599	19,276	20,287	0.57	1.75
05.147	30,029	31,478	34,438	36,326	2.33	1.83

The average traffic growth between 2001 and 2004 at both counting was approximately 1.8% per annum.

2017 AM Peak



2017 PM Peak

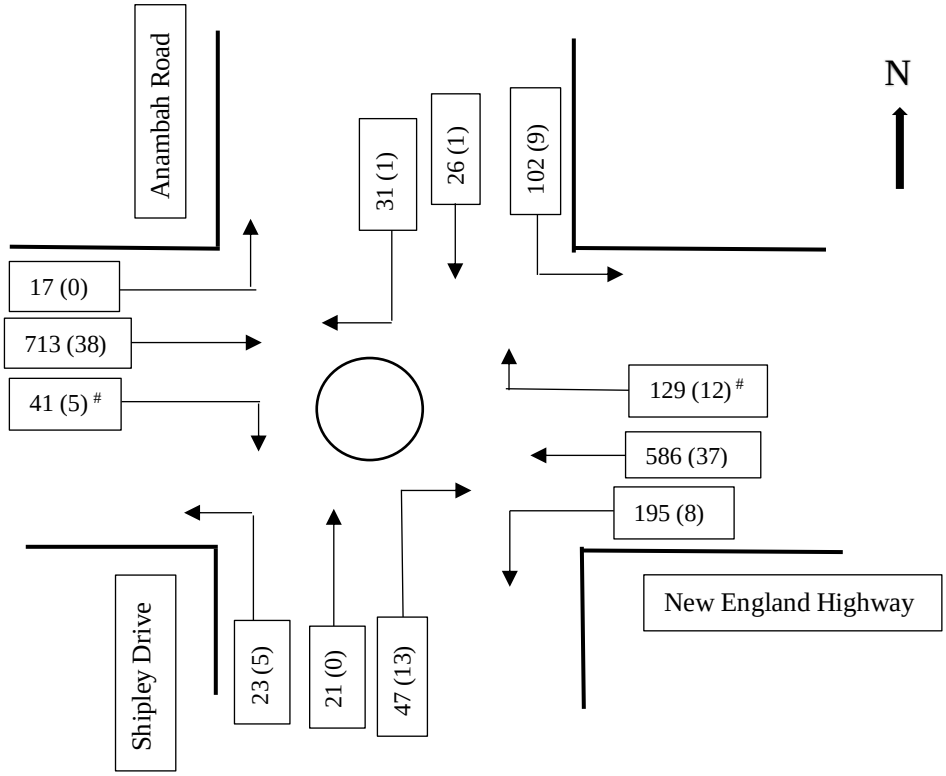


NOTE: # U-turn movements included as right-turn movements.
Numerals in brackets are heavy-vehicle movements

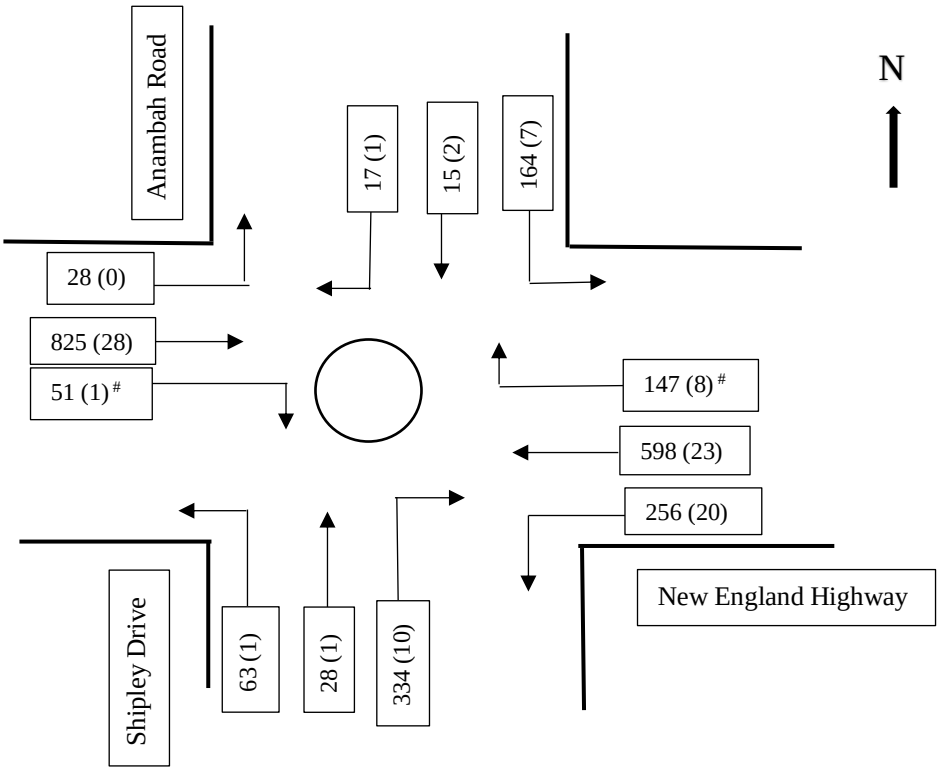
It is assumed that since the opening of the Hunter Expressway, the annual rate of rate of traffic growth along the New England Highway at Anambah will be approximately 2%. Traffic volumes on other movements are assumed to have a rate of growth of 1% per annum.

The projected 2027 traffic volumes on the New England Highway at the Anambah Road roundabout are shown on the following diagrams.

Projected 2027 – AM Peak



Projected 2027 – PM Peak



Traffic generated along Anambah Road results from numerous businesses in the adjacent industrial estate accessed via Mustang Drive and the residential subdivision at Anambah. There is not a significant number of residents or businesses at Anambah or Gosforth north of Niven Parade to generate much peak hour traffic along Anambah Road.

The total peak hour traffic generation along Anambah Road just north of the New England Highway roundabout during the recent traffic surveys was as follows:

<u>AM Peak</u>

Northbound	161 trips
Southbound	155 trips

<u>PM Peak</u>

Northbound	181 trips
Southbound	187 trips

Residents of the existing Anambah subdivision have an alternative route available towards Maitland. The travel distance to the roundabout at New England Highway / Denton Park Drive is shorter via Daniel Avenue, Richard Road, Turin Terrace and Denton Park Drive than via Niven Parade or Cagney Road and Anambah Road.

No traffic surveys were considered warranted at the intersection of Anambah Road / Niven Parade. However, the traffic volumes would be considerably lower than the traffic volumes just north of the New England Highway given the industrial

developments in the industrial estate and the access available for nearby residents via Cagney Drive. This confirms observations during a site inspection in December 2016.

In order to be conservative, it is assumed that the average traffic generation along Anambah Road north of Niven Parade would be approximately 10% of the volumes near the New England Highway, and that approximately 30% of traffic generated by the subdivision would utilise Niven Parade at Anambah Road, given the option for many residents to utilise Fonda Avenue, Sellers Avenue and Bergman Way to access Cagney Drive and Anambah Road.

10.0 SIGHT DISTANCES

Sight distance along the New England Highway at the Anambah Road / Shipley Drive roundabout are generous in both directions.

The Anambah Road / Shipley Drive roundabout has a large central island and the geometry and the turning traffic volumes provide safe conditions for traffic undertaking manoeuvres at the roundabout.

The BAR intersection at Anambah Road and Niven Parade has excellent sight distance in both directions, well in excess of 250 metres.

11.0 PROPOSED ACCESS

It is proposed that the 33 lot residential subdivision have access to the existing truncation of Marlow Avenue.

Marlowe Avenue currently provides vehicular access to six (6) dwellings.

12.0 TRAFFIC GENERATION FOR RESIDENTIAL SUBDIVISION

The traffic generation from the various potential developments in the new subdivision has been based on the RMS Technical Direction TDT 2013 / 04a.

That publication indicates traffic generation associated with residential dwellings in regional areas as follows:

Weekday morning peak hour vehicle trips (Regional) 0.71

Weekday evening peak hour vehicle trips (Regional) 0.78

That is:

AM Peak

33 lots @ 0.71 trips per dwelling = 23.4 trips
Say 24 trips

PM Peak
33 lots @ 0.78 trips per dwelling = 25.7 trips
Say 26 trips

13.0 SEPP (INFRASTRUCTURE) 2007

The proposed subdivision on the eastern side of Anambah Road would not need to be assessed under Column 3 of Schedule 3 in the SEPP (Infrastructure) 2007 State Planning document as it will provide less than 50 lots.

However, the likely developments intended to occupy the proposed subdivision would entail referral under Column 3 of Schedule 3 in the SEPP (Infrastructure) 2007 State Planning document.

The requirements of SEPP (Infrastructure) 2007 have been considered particularly regarding access and impact on the State Road – the New England Highway – approximately 1 km south.

.
The proposed subdivision has frontage to Anambah Road and also to Marlowe Avenue at Anambah. No vehicular access is available to the New England Highway some distance away.

The design and nature of the development has been prepared in consideration relevant Standards and Council requirements and the proposed development complies with the intent of Clause 101.

The existing BAR intersection of Anambah Road and Niven Parade provides good sight distances and safe provision for northbound through vehicles to pass a vehicle turning right into Niven Parade.

The proposed subdivision will introduce some additional turning movements at the roundabout at Shipley Drive / Anambah Road which will reduce the dominant flows on the New England Highway and improve the efficiency of that roundabout. SIDRA simulations demonstrate that the small additional volumes that the 33-lot residential subdivision will have no adverse impacts on the operation of the New England Highway.

In my opinion, the proposed subdivision satisfactorily complies with the intentions of Clause 101 and also Clause 104 of the SEPP (Infrastructure) 2007.

14.0 MODAL SPLIT FOR THE POTENTIAL TRAFFIC GENERATION

It is assumed that traffic movements associated with the proposed subdivision will be essentially as occurs at present (2017). That is:

Southbound on Anambah Road to New England Highway:

AM Peak
Outward

- Left onto New England Highway 65%
- Through to Shipley Drive 15%
- Right onto New England Highway 20%

Northbound on Anambah Road to New England Highway:

Inward

- Right into Anambah Road 80%
- North from Shipley Drive 10%
- Left from New England Highway 10%

Southbound on Anambah Road to New England Highway:

PM Peak
Outward

- Left onto New England Highway 83%
- Through to Shipley Drive 8%
- Right onto New England Highway 9%

Northbound on Anambah Road to New England Highway:

Inward

- Right into Anambah Road 72%
- North from Shipley Drive 14%
- Left from New England Highway 14%

15.0 PARKING CONSIDERATIONS

Maitland City Council's DCP 2011 Part C.11 Vehicular Access and Parking requirements will be assessed when individual Development Applications are eventually lodged for the individual residential lots that will occupy the proposed subdivision.

16.0 SERVICING REQUIREMENTS

The residential subdivision will not have significant servicing needs. Construction of internal roads and services will require relatively short-term access for construction traffic.

17.0 SIDRA ANALYSIS

SIDRA analyses have been undertaken for the roundabout at the New England Highway / Shipley Drive / Anambah Road for surveyed 2017 traffic volumes with the additional development traffic superimposed and for projected 2027 traffic volumes with the additional subdivision traffic superimposed.

SIDRA analyses have been undertaken for the BAR intersection of Anambah Road / Niven Parade for projected 2027 traffic volumes with the subdivision traffic superimposed.

The SIDRA program was developed in conjunction with ARRB Transport Research Ltd to analyses the operation of intersections controlled by traffic signals, Give Way signs, Stop signs, conventional roundabouts and signal controlled roundabouts. It is widely used by consulting traffic engineers and is recognised and used by the Roads and Traffic Authority of NSW. SIDRA is now owned and developed by Akcelik & Associates Pty Ltd.

The parameters used in the SIDRA program are measured against the following performance standards developed by the Roads and Traffic Authority of NSW and the American Transportation Research Board.

Table 17.1 - Level of Service for Roundabouts.

Average Delay per vehicle (secs)	Level of Service	Operational Conditions
0 to 14	A	Good
15 to 28	B	Acceptable delays and spare capacity
29 to 42	C	Satisfactory
43 to 56	D	Near capacity
57 to 70	E	At capacity and requires other control mode
> 70	F	Unsatisfactory and requires other control mode

The traffic volumes for the SIDRA analyses are shown on the following diagrams.

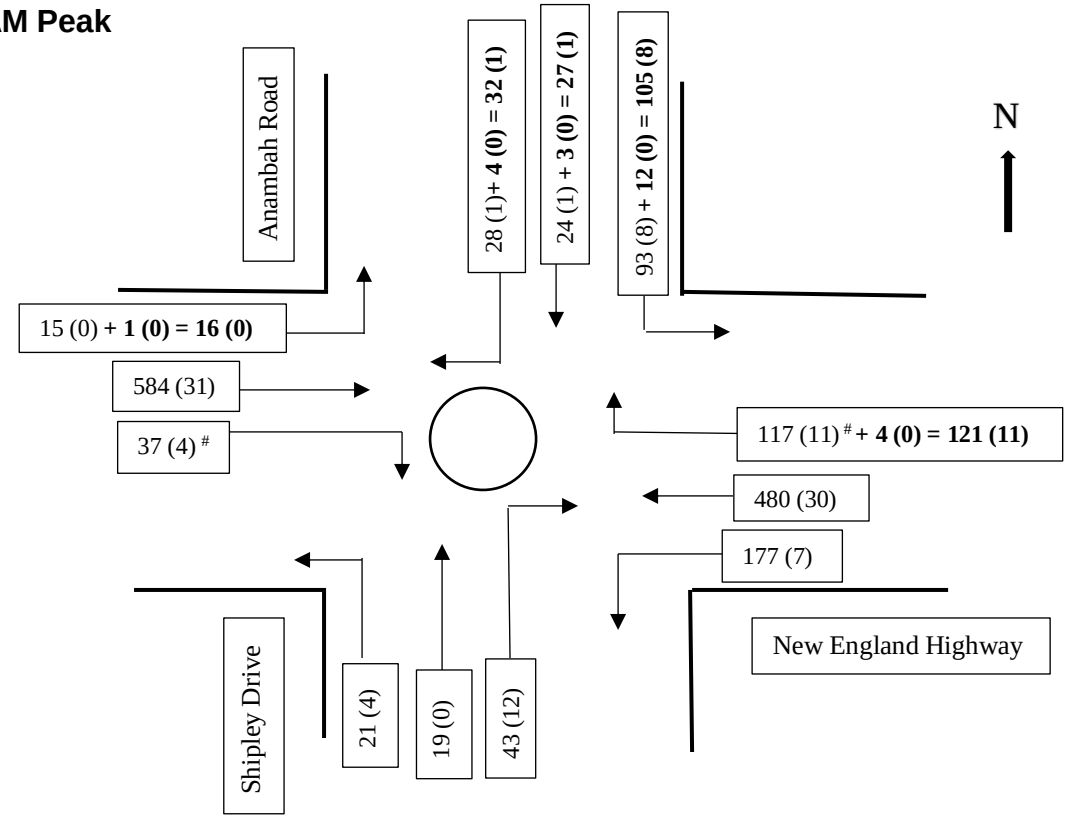
2017 AM Peak

24 trips: ➔ 19 trips outward
➔ 5 trips inward

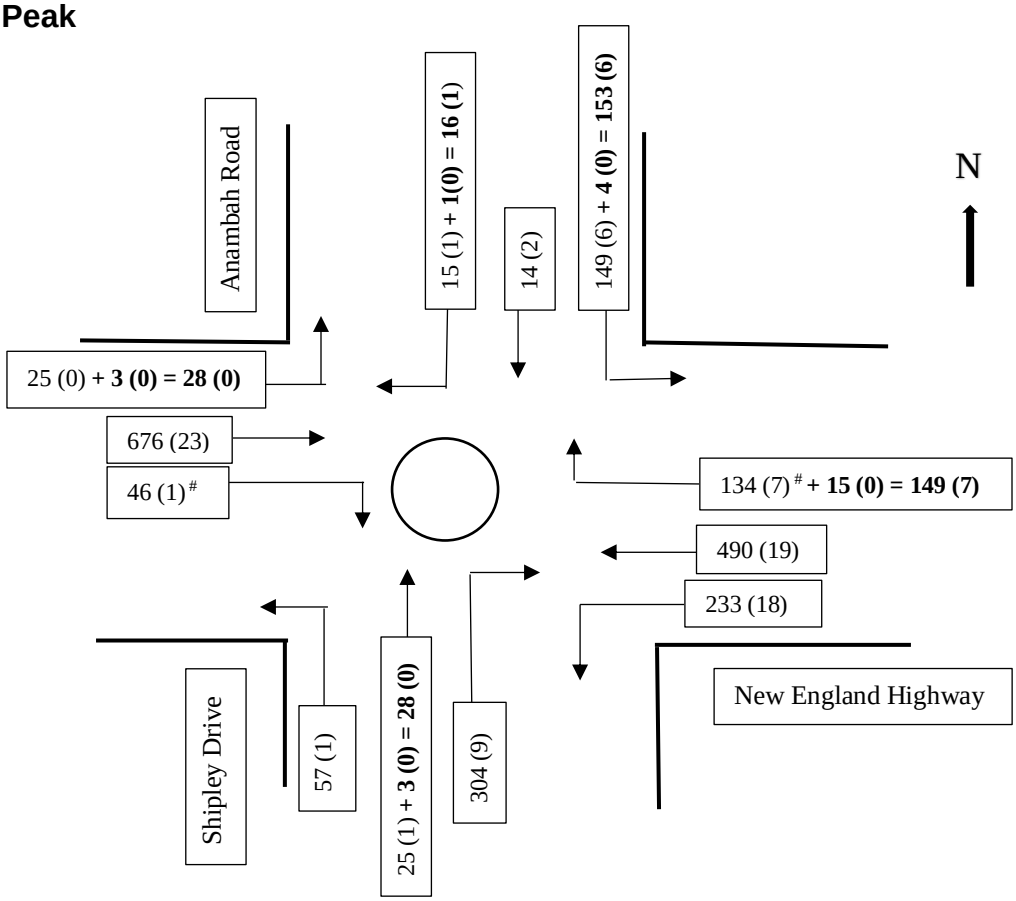
2017 PM Peak

24 trips: ➔ 5 trips outward
➔ 21 trips inward

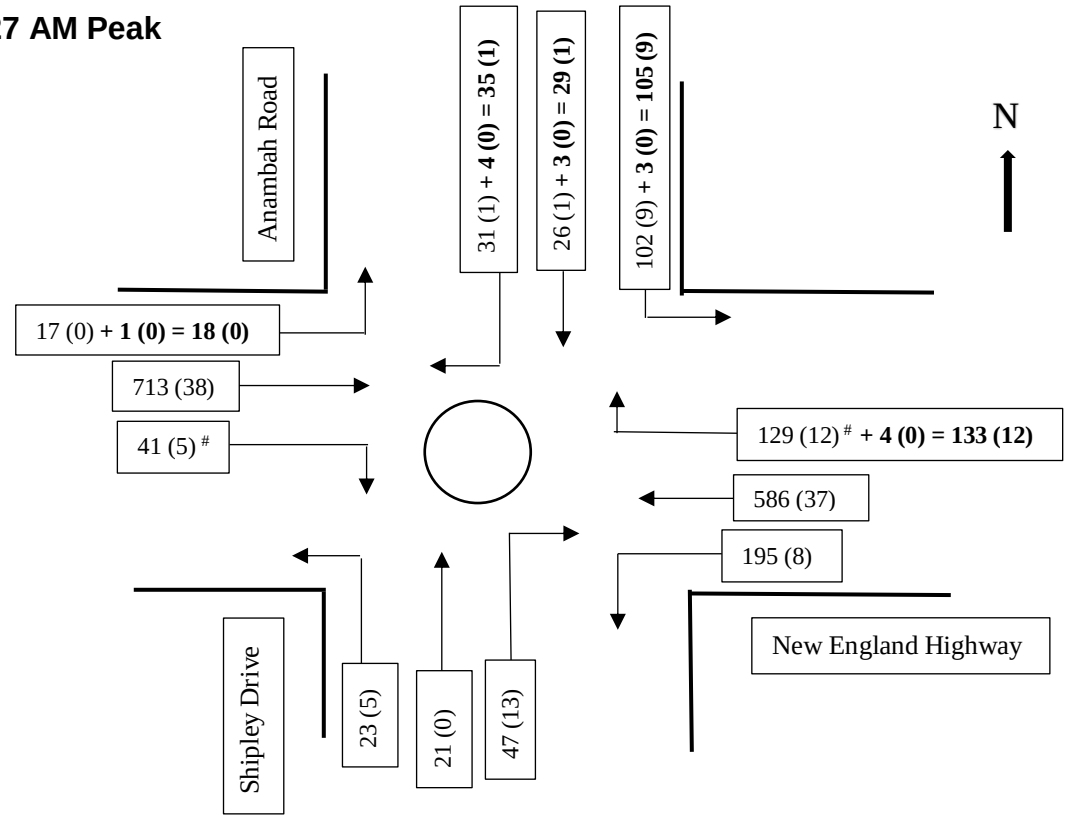
2017 AM Peak



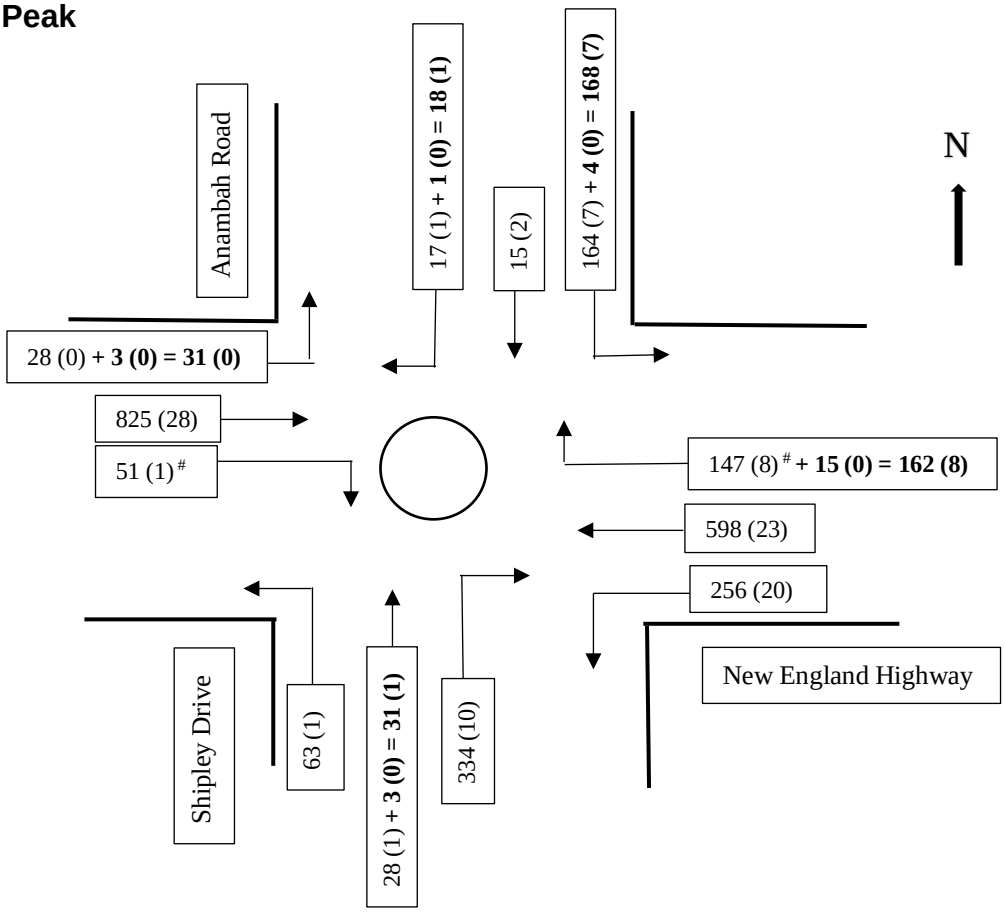
2017 PM Peak



2027 AM Peak

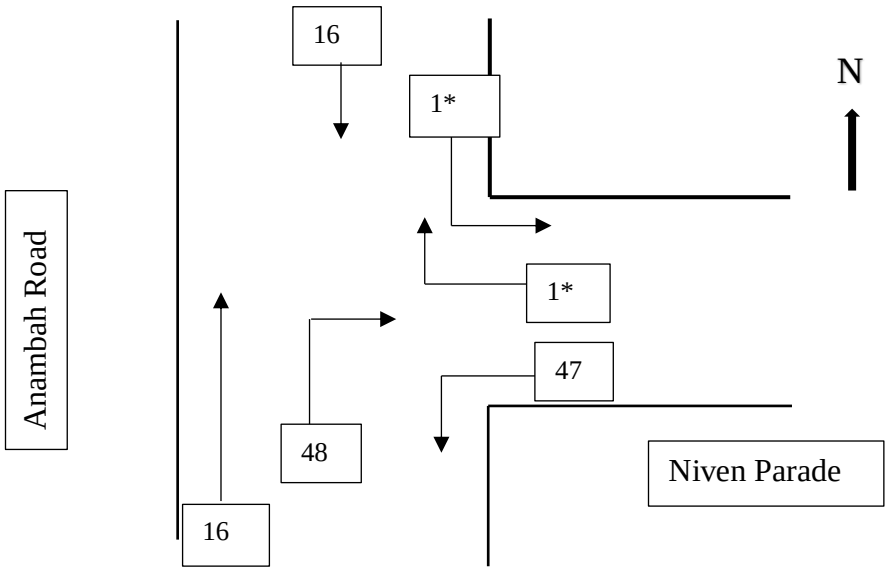


2027 PM Peak



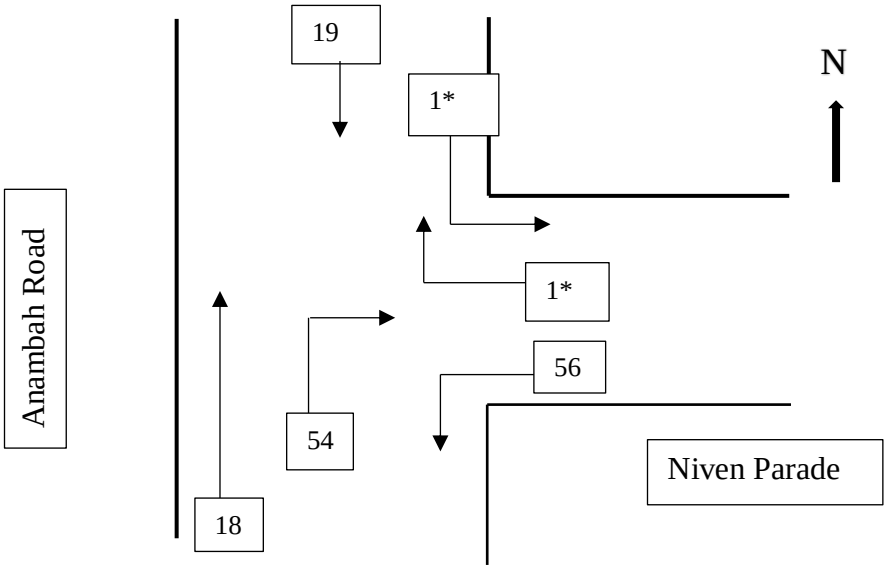
Intersection of Anambah Road with Niven Parade

2027 AM Peak

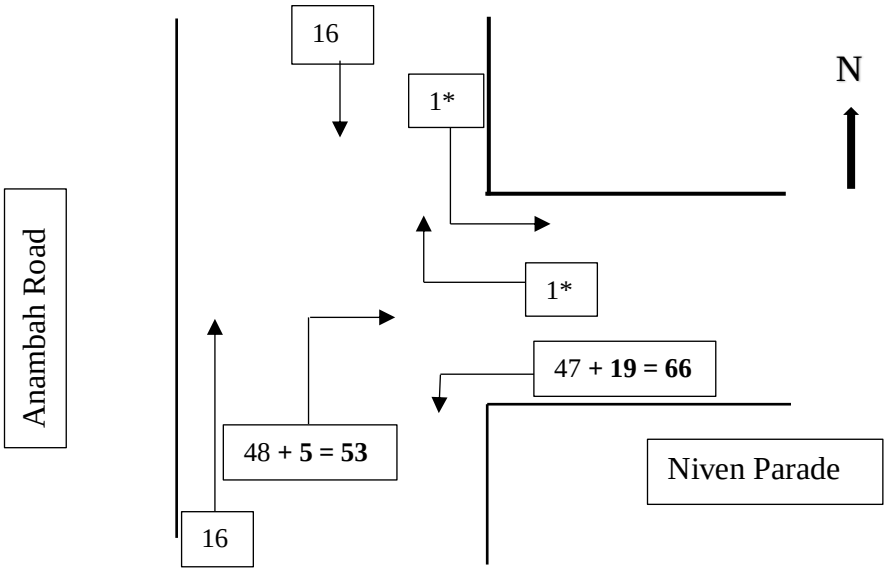


Note *:	SIDRA requires a minimum value of 1 trip per movement for successful operation

2027 PM Peak



2027 AM Peak + Subdivision Traffic



2027 PM Peak + Subdivision Traffic

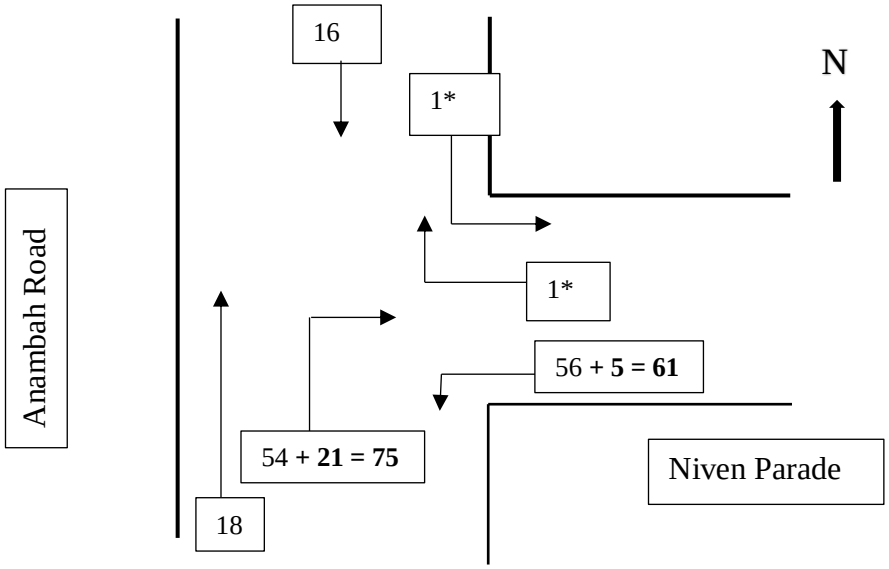


Table 17.2 – Average Delays for Movements at Anambah Road / Shipley Drive / New England Highway - AM Peak (2017)

Movement	Average Delay for Movement – Existing Traffic (secs / veh)	Level of Service	95% Queue Length (m)
Shipley Drive left onto New England Highway	4.2	A	1.4
Shipley Drive northbound to Anambah Road	3.2	A	1.4
Shipley Drive right onto New England Highway	9.2	A	1.7
Westbound on New England Highway left into Shipley Drive	3.7	A	10.5
Westbound through on New England Highway	3.4	A	11.1
Westbound on New England Highway right into Anambah Road	9.8	A	11.1
Anambah Road left into New England Highway	4.9	A	2.8
Anambah Road through to Shipley Drive	5.1	A	1.7
Anambah Road right into New England Highway	11.5	A	1.7
Eastbound on New England Highway left into Anambah Road	4.1	A	7.5
Eastbound through on New England Highway	3.8	A	9.8
Eastbound on New England Highway left into Shipley Drive	10.2	A	9.8
Overall Average Delays	4.7	A	

The SIDRA simulations indicate that the existing roundabout at the New England Highway / Anambah Road / Shipley Drive intersection provides an excellent Level of Service with low average delays for all movements in the 2017 AM peak period and relatively short 95% queue lengths.

Table 17.3 – Average Delays for Movements at Anambah Road / Shipley Drive / New England Highway - PM Peak (2017)

Movement	Average Delay for Movement – Existing Traffic (secs / veh)	Level of Service	95% Queue Length (m)
Shipley Drive left onto New England Highway	4.6	A	3.0
Shipley Drive northbound to Anambah Road	4.0	A	3.0
Shipley Drive right onto New England Highway	9.2	A	9.0
Westbound on New England Highway left into Shipley Drive	3.7	A	11.8
Westbound through on New England Highway	3.4	A	12.1
Westbound on New England Highway right into Anambah Road	9.7	A	12.1
Anambah Road left into New England Highway	6.0	A	6.1
Anambah Road through to Shipley Drive	7.1	A	1.7
Anambah Road right into New England Highway	13.3	A	1.7
Eastbound on New England Highway left into Anambah Road	5.2	A	11.4
Eastbound through on New England Highway	4.9	A	15.6
Eastbound on New England Highway left into Shipley Drive	11.1	A	15.6
Overall Average Delays	5.6	A	

The SIDRA simulations indicate that the existing roundabout at the New England Highway / Anambah Road / Shipley Drive intersection provides an excellent Level of Service with low average delays for all movements in the 2017 PM peak period and relatively short 95% queue lengths.

Table 17.4 – Average Delays for Movements at Anambah Road / Shipley Drive / New England Highway + Subdivision Traffic - AM Peak (2017)

Movement	Average Delay for Movement – Existing Traffic (secs / veh)	Level of Service	95% Queue Length (m)
Shipley Drive left onto New England Highway	4.2	A	1.4
Shipley Drive northbound to Anambah Road	3.2	A	1.4
Shipley Drive right onto New England Highway	9.3	A	1.8
Westbound on New England Highway left into Shipley Drive	7.7	A	10.8
Westbound through on New England Highway	3.5	A	11.3
Westbound on New England Highway right into Anambah Road	9.8	A	11.3
Anambah Road left into New England Highway	4.9	A	3.1
Anambah Road through to Shipley Drive	5.1	A	2.0
Anambah Road right into New England Highway	11.5	A	2.0
Eastbound on New England Highway left into Anambah Road	4.1	A	7.5
Eastbound through on New England Highway	3.8	A	9.9
Eastbound on New England Highway left into Shipley Drive	10.3	A	9.9
Overall Average Delays	4.7	A	

The SIDRA simulations indicate that the existing roundabout at the New England Highway / Anambah Road / Shipley Drive intersection provides an excellent Level of Service with low average delays for all movements in the 2017 AM peak period and relatively short 95% queue lengths, even with the additional subdivision traffic included.

Table 17.5 – Average Delays for Movements at Anambah Road / Shipley Drive / New England Highway + Subdivision Traffic - PM Peak (2017)

Movement	Average Delay for Movement – Existing Traffic (secs / veh)	Level of Service	95% Queue Length (m)
Shipley Drive left onto New England Highway	4.6	A	3.1
Shipley Drive northbound to Anambah Road	4.0	A	3.1
Shipley Drive right onto New England Highway	9.3	A	9.1
Westbound on New England Highway left into Shipley Drive	3.7	A	12.1
Westbound through on New England Highway	3.4	A	12.2
Westbound on New England Highway right into Anambah Road	9.7	A	12.3
Anambah Road left into New England Highway	6.0	A	6.3
Anambah Road through to Shipley Drive	7.1	A	1.8
Anambah Road right into New England Highway	13.3	A	1.8
Eastbound on New England Highway left into Anambah Road	5.3	A	11.6
Eastbound through on New England Highway	5.0	A	15.8
Eastbound on New England Highway left into Shipley Drive	11.2	A	15.8
Overall Average Delays	5.7	A	

The SIDRA simulations indicate that the existing roundabout at the New England Highway / Anambah Road / Shipley Drive intersection provides an excellent Level of Service with low average delays for all movements in the 2017 PM peak period and relatively short 95% queue lengths, even with the additional subdivision traffic included.

Table 17.6 – Average Delays for Movements at Anambah Road / Shipley Drive / New England Highway - AM Peak (2027)

Movement	Average Delay for Movement – 2027 Traffic (secs / veh)	Level of Service	95% Queue Length (m)
Shipley Drive left onto New England Highway	4.7	A	1.7
Shipley Drive northbound to Anambah Road	3.6	A	1.7
Shipley Drive right onto New England Highway	9.5	A	2.1
Westbound on New England Highway left into Shipley Drive	3.8	A	13.4
Westbound through on New England Highway	3.5	A	14.0
Westbound on New England Highway right into Anambah Road	9.9	A	14.0
Anambah Road left into New England Highway	5.2	A	3.4
Anambah Road through to Shipley Drive	5.6	A	2.1
Anambah Road right into New England Highway	11.9	A	2.1
Eastbound on New England Highway left into Anambah Road	4.2	A	9.8
Eastbound through on New England Highway	3.9	A	13.1
Eastbound on New England Highway left into Shipley Drive	10.3	A	13.1
Overall Average Delays	4.8	A	

The SIDRA simulations indicate that the existing roundabout at the New England Highway / Anambah Road / Shipley Drive intersection provides an excellent Level of Service with low average delays for all movements in the 2027 AM peak period and relatively short 95% queue lengths.

Table 17.7 – Average Delays for Movements at Anambah Road / Shipley Drive / New England Highway - PM Peak (2027)

Movement	Average Delay for Movement – Existing Traffic (secs / veh)	Level of Service	95% Queue Length (m)
Shipley Drive left onto New England Highway	5.1	A	3.6
Shipley Drive northbound to Anambah Road	4.4	A	3.6
Shipley Drive right onto New England Highway	9.7	A	11.0
Westbound on New England Highway left into Shipley Drive	3.8	A	15.3
Westbound through on New England Highway	3.4	A	15.7
Westbound on New England Highway right into Anambah Road	9.8	A	15.7
Anambah Road left into New England Highway	6.8	A	8.3
Anambah Road through to Shipley Drive	7.9	A	2.2
Anambah Road right into New England Highway	14.0	A	2.2
Eastbound on New England Highway left into Anambah Road	5.7	A	15.6
Eastbound through on New England Highway	5.4	A	22.5
Eastbound on New England Highway left into Shipley Drive	11.7	A	22.5
Overall Average Delays	5.9	A	

The SIDRA simulations indicate that the existing roundabout at the New England Highway / Anambah Road / Shipley Drive intersection provides an excellent Level of Service with low average delays for all movements in the 2027 AM peak period and relatively short 95% queue lengths.

Table 17.8 – Average Delays for Movements at Anambah Road / Shipley Drive / New England Highway -+ Subdivision AM Peak (2027)

Movement	Average Delay for Movement – 2027 Traffic + Subdivision (secs / veh)	Level of Service	95% Queue Length (m)
Shipley Drive left onto New England Highway	4.7	A	1.8
Shipley Drive northbound to Anambah Road	3.6	A	1.8
Shipley Drive right onto New England Highway	9.6	A	2.1
Westbound on New England Highway left into Shipley Drive	3.8	A	13.6
Westbound through on New England Highway	3.6	A	14.3
Westbound on New England Highway right into Anambah Road	9.9	A	14.3
Anambah Road left into New England Highway	5.2	A	3.5
Anambah Road through to Shipley Drive	5.5	A	2.4
Anambah Road right into New England Highway	11.9	A	2.4
Eastbound on New England Highway left into Anambah Road	4.2	A	9.9
Eastbound through on New England Highway	4.0	A	13.1
Eastbound on New England Highway left into Shipley Drive	10.4	A	13.1
Overall Average Delays	4.8	A	

The SIDRA simulations indicate that the existing roundabout at the New England Highway / Anambah Road / Shipley Drive intersection provides an excellent Level of Service with low average delays for all movements in the 2027 AM peak period and relatively short 95% queue lengths, even with the additional subdivision traffic included.

Table 17.9 – Average Delays for Movements at Anambah Road / Shipley Drive / New England Highway + Subdivision - PM Peak (2027)

Movement	Average Delay for Movement – 2027 Traffic + Subdivision (secs / veh)	Level of Service	95% Queue Length (m)
Shipley Drive left onto New England Highway	5.1	A	3.7
Shipley Drive northbound to Anambah Road	4.5	A	3.7
Shipley Drive right onto New England Highway	9.7	A	11.1
Westbound on New England Highway left into Shipley Drive	3.8	A	15.6
Westbound through on New England Highway	3.4	A	16.0
Westbound on New England Highway right into Anambah Road	9.8	A	16.0
Anambah Road left into New England Highway	6.9	A	8.6
Anambah Road through to Shipley Drive	7.9	A	2.3
Anambah Road right into New England Highway	14.0	A	2.3
Eastbound on New England Highway left into Anambah Road	5.8	A	15.8
Eastbound through on New England Highway	5.6	A	23.1
Eastbound on New England Highway left into Shipley Drive	11.8	A	23.1
Overall Average Delays	6.0	A	

The SIDRA simulations indicate that the existing roundabout at the New England Highway / Anambah Road / Shipley Drive intersection provides an excellent Level of Service with low average delays for all movements in the 2027 PM peak period and relatively short 95% queue lengths, even with the additional subdivision traffic included.

Table 17.10 - Level of Service for Unsignalised Intersections Controlled by Stop or Give Way Signs.

Average Delay per vehicle (secs)	Level of Service	Operational Conditions
0 to 14	A	Good
15 to 28	B	Acceptable delays and spare capacity
29 to 42	C	Satisfactory but accident study required
43 to 56	D	Near capacity and accident study required
57 to 70	E	At capacity and requires other control mode
> 70	F	Unsatisfactory and requires other control mode

Table 17.11 – Average Delays for Movements at Anambah Road / Niven Parade - AM Peak (2027)

Movement	Average Delay for Movement – 2027 Traffic (secs / veh)	Level of Service	95% Queue Length (m)
Northbound through on Anambah Road	0	A	0
Northbound on Anambah Road right into Niven Parade	5.6	A	0.9
Niven Parade left onto Anambah Road	5.6	A	0.9
Niven Parade right onto Anambah Road	6.0	A	0.9
Anambah Road left into Niven Parade	5.5	A	0
Southbound through on Anambah Road	0	A	0
Overall Average Delays	4.2	NA	-

The SIDRA analysis indicates there will be negligible average delays for all movements in the 2027 morning peak hour with negligible 95% queue lengths.

Table 17.12 – Average Delays for Movements at Anambah Road / Niven Parade - PM Peak (2027)

Movement	Average Delay for Movement – 2027 Traffic (secs / veh)	Level of Service	95% Queue Length (m)
Northbound through on Anambah Road	0	A	0
Northbound on Anambah Road right into Niven Parade	5.6	A	1.1
Niven Parade left onto Anambah Road	5.6	A	1.1
Niven Parade right onto Anambah Road	6.1	A	1.1
Anambah Road left into Niven Parade	5.5	A	0
Southbound through on Anambah Road	0	A	0
Overall Average Delays	4.2	NA	-

The SIDRA analysis indicates there will be negligible average delays for all movements in the 2027 evening peak hour with negligible 95% queue lengths.

Table 17.13 – Average Delays for Movements at Anambah Road / Niven Parade + Subdivision - AM Peak (2027)

Movement	Average Delay for Movement – 2027 Traffic + Subdivision (secs / veh)	Level of Service	95% Queue Length (m)
Northbound through on Anambah Road	0	A	0
Northbound on Anambah Road right into Niven Parade	5.6	A	1.0
Niven Parade left onto Anambah Road	5.6	A	1.3
Niven Parade right onto Anambah Road	6.0	A	1.3
Anambah Road left into Niven Parade	5.5	A	0
Southbound through on Anambah Road	0	A	0
Overall Average Delays	4.4	NA	-

The SIDRA analysis indicates there will be negligible average delays for all movements in the 2027 morning peak hour with negligible 95% queue lengths even with the projected additional subdivision traffic added.

Table 17.14 – Average Delays for Movements at Anambah Road / Niven Parade + Subdivision - PM Peak (2027)

Movement	Average Delay for Movement – 2027 Traffic + Subdivision (secs / veh)	Level of Service	95% Queue Length (m)
Northbound through on Anambah Road	0	A	0
Northbound on Anambah Road right into Niven Parade	5.6	A	1.5
Niven Parade left onto Anambah Road	5.6	A	1.2
Niven Parade right onto Anambah Road	6.2	A	1.2
Anambah Road left into Niven Parade	5.5	A	0
Southbound through on Anambah Road	0	A	0
Overall Average Delays	4.4	NA	-

The SIDRA analysis indicates there will be negligible average delays for all movements in the 2027 evening peak hour with negligible 95% queue lengths even with the projected additional subdivision traffic added.

18.0 SUMMARY

- The proposed thirty-three (33) lot subdivision will accommodate additional residential dwellings in the Anambah area already containing residential subdivisions.

- The estimated traffic generation from the proposed residential subdivision is approximately 24 trips in the weekday morning peak and approximately 26 trips in the weekday evening peak based on traffic generation data in the RMS Technical Direction 2013 – 04a.

- The proposed subdivision will have access to Anambah Road via Marlowe Avenue and Niven Parade and also the New England Highway at a large existing roundabout at Anambah Road and Shipley Drive, capable of catering for the relatively small volume of additional traffic that will be generated by the proposed residential subdivision, as demonstrated by the SIDRA simulations for existing traffic volumes and projected 2027 traffic volumes.

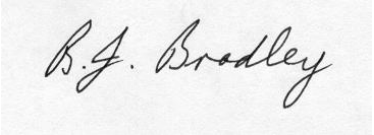
- The additional turning volumes that are likely to occur at the roundabout on the New England Highway at Shipley Drive / Anambah Road will improve the efficiency at that roundabout by creating more balanced flows and preventing Highway traffic dominating the overall flows.

- SIDRA analyses confirm that even for projected 2027 traffic volumes, the existing BAR intersection at Anambah Road and Niven Parade will not be adversely affected by the additional subdivision traffic, when fully occupied.

- The relatively recent opening of the Hunter Expressway to Branxton has significantly reduced traffic volumes on the New England Highway through Rutherford.

19.0 RECOMMENDATION

I recommend approval to the proposed 33-lot residential subdivision on the eastern side of Anambah Road approximately 1km north of the New England Highway as the additional tuning movements that will occur at the roundabout at Anambah Road and Shipley Drive on the New England Highway will benefit by having more balanced traffic flows.



B J Bradley BE Grad Dip Man MIEAust

APPENDIX A

SITE PHOTOGRAPHS

Photo No. 1: Looking left (generally south) along Anambah Road from Niven Parade showing the existing traffic environment and available sight distance.

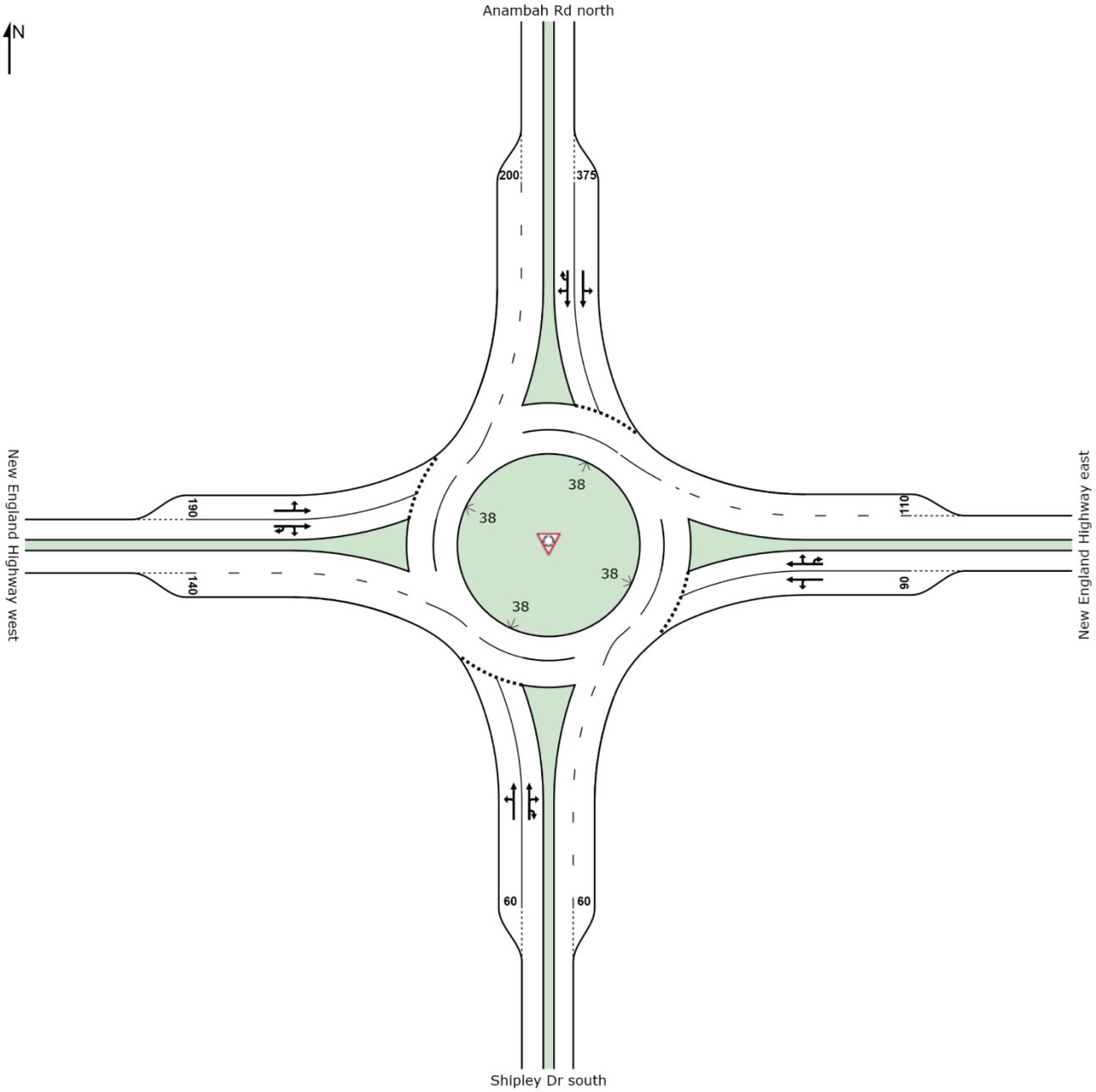
Photo No. 2: Looking right (generally north) along Anambah Road from Niven Parade showing the existing traffic environment and available sight distance.

Photo No. 3: Looking generally east along Niven Street from Anambah Road showing the existing traffic environment.

Photo No. 4: Looking generally north along Marlowe Avenue from Niven Parade showing the existing traffic environment and the future access point for the proposed residential subdivision.

APPENDIX B

SIDRA DATA


N
Anambah Rd north
200
375
New England Highway west
190
140
38
38
38
38
110
90
New England Highway east
60
60
Shipley Dr south

MOVEMENT SUMMARY

Site: HW9_Anambah Rd 2017 AM Peak

Roundabout at HW9_Anambah Rd
Roundabout

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Ship Dr south											
1	L2	25	16.0	0.048	4.2	LOS A	0.2	1.4	0.49	0.48	50.8
2	T1	19	0.0	0.048	3.2	LOS A	0.2	1.4	0.49	0.48	53.0
3	R2	55	21.8	0.054	9.2	LOS A	0.2	1.7	0.48	0.67	49.3
3u	U	1	0.0	0.054	10.9	LOS A	0.2	1.7	0.48	0.67	48.9
Approach		100	16.0	0.054	6.8	LOS A	0.2	1.7	0.48	0.58	50.3
East: New England Highway east											
4	L2	184	3.8	0.286	3.7	LOS A	1.4	10.5	0.25	0.38	52.1
5	T1	510	5.9	0.289	3.4	LOS A	1.5	11.1	0.24	0.42	57.4
6	R2	128	8.6	0.289	9.8	LOS A	1.5	11.1	0.24	0.44	57.4
6u	U	1	0.0	0.289	12.3	LOS A	1.5	11.1	0.24	0.44	59.7
Approach		823	5.8	0.289	4.5	LOS A	1.5	11.1	0.24	0.41	56.2
North: Anambah Rd north											
7	L2	101	7.9	0.091	4.9	LOS A	0.4	2.8	0.50	0.58	54.9
8	T1	25	4.0	0.063	5.1	LOS A	0.2	1.7	0.51	0.65	51.1
9	R2	29	3.4	0.063	11.5	LOS A	0.2	1.7	0.51	0.65	55.1
9u	U	1	0.0	0.063	13.9	LOS A	0.2	1.7	0.51	0.65	57.1
Approach		156	6.4	0.091	6.2	LOS A	0.4	2.8	0.50	0.61	54.3
West: New England Highway west											
10	L2	16	0.0	0.232	4.1	LOS A	1.0	7.5	0.34	0.39	55.6
11	T1	615	5.0	0.282	3.8	LOS A	1.3	9.8	0.33	0.40	57.4
12	R2	32	12.5	0.282	10.2	LOS A	1.3	9.8	0.33	0.41	54.4
12u	U	9	0.0	0.282	12.6	LOS A	1.3	9.8	0.33	0.41	60.1
Approach		672	5.2	0.282	4.2	LOS A	1.3	9.8	0.33	0.40	57.2
All Vehicles		1751	6.2	0.289	4.7	LOS A	1.5	11.1	0.31	0.43	56.0

Level of Service (LOS) Method: Delay (RTA NSW).
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: HW9_Anambah Rd 2017 PM Peak

Roundabout at HW9_Anambah Rd
Roundabout

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Shipley Dr south											
1	L2	58	1.7	0.108	4.6	LOS A	0.4	3.0	0.52	0.56	51.0
2	T1	26	3.8	0.108	4.0	LOS A	0.4	3.0	0.52	0.56	52.9
3	R2	313	2.9	0.268	9.2	LOS A	1.3	9.0	0.54	0.73	49.6
3u	U	1	0.0	0.268	11.3	LOS A	1.3	9.0	0.54	0.73	48.8
Approach		398	2.8	0.268	8.2	LOS A	1.3	9.0	0.53	0.69	50.0
East: New England Highway east											
4	L2	251	7.2	0.306	3.7	LOS A	1.6	11.8	0.23	0.38	52.1
5	T1	509	3.7	0.310	3.4	LOS A	1.7	12.1	0.22	0.42	57.4
6	R2	130	4.6	0.310	9.7	LOS A	1.7	12.1	0.22	0.44	57.6
6u	U	11	9.1	0.310	12.3	LOS A	1.7	12.1	0.22	0.44	59.5
Approach		901	4.9	0.310	4.5	LOS A	1.7	12.1	0.23	0.41	55.9
North: Anambah Rd north											
7	L2	155	3.9	0.166	6.0	LOS A	0.8	6.1	0.67	0.72	54.3
8	T1	16	12.5	0.055	7.1	LOS A	0.2	1.7	0.65	0.76	50.1
9	R2	16	6.3	0.055	13.3	LOS A	0.2	1.7	0.65	0.76	54.0
9u	U	1	0.0	0.055	15.6	LOS B	0.2	1.7	0.65	0.76	55.9
Approach		188	4.8	0.166	6.8	LOS A	0.8	6.1	0.67	0.73	53.9
West: New England Highway west											
10	L2	25	0.0	0.313	5.2	LOS A	1.6	11.4	0.55	0.52	54.4
11	T1	699	3.3	0.381	4.9	LOS A	2.2	15.6	0.56	0.51	56.1
12	R2	44	2.3	0.381	11.1	LOS A	2.2	15.6	0.56	0.51	53.4
12u	U	3	0.0	0.381	13.6	LOS A	2.2	15.6	0.56	0.51	58.7
Approach		771	3.1	0.381	5.3	LOS A	2.2	15.6	0.56	0.51	55.9
All Vehicles		2258	3.9	0.381	5.6	LOS A	2.2	15.6	0.43	0.52	54.6

Level of Service (LOS) Method: Delay (RTA NSW).
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: HW9_Anambah Rd 2027 AM Peak

Roundabout at HW9_Anambah Rd
Roundabout

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Shipley Dr south											
1	L2	28	17.9	0.058	4.7	LOS A	0.2	1.7	0.54	0.53	50.6
2	T1	21	0.0	0.058	3.6	LOS A	0.2	1.7	0.54	0.53	52.8
3	R2	60	21.7	0.062	9.5	LOS A	0.3	2.1	0.53	0.70	49.2
3u	U	1	0.0	0.062	11.2	LOS A	0.3	2.1	0.53	0.70	48.8
Approach		110	16.4	0.062	7.2	LOS A	0.3	2.1	0.53	0.62	50.1
East: New England Highway east											
4	L2	203	3.9	0.341	3.8	LOS A	1.8	13.4	0.29	0.39	51.9
5	T1	623	5.9	0.345	3.5	LOS A	1.9	14.0	0.28	0.42	57.3
6	R2	141	8.5	0.345	9.9	LOS A	1.9	14.0	0.28	0.44	57.3
6u	U	1	0.0	0.345	12.4	LOS A	1.9	14.0	0.28	0.44	59.6
Approach		968	5.9	0.345	4.5	LOS A	1.9	14.0	0.28	0.42	56.1
North: Anambah Rd north											
7	L2	111	8.1	0.107	5.2	LOS A	0.5	3.4	0.56	0.62	54.7
8	T1	27	3.7	0.074	5.6	LOS A	0.3	2.1	0.56	0.69	50.8
9	R2	32	3.1	0.074	11.9	LOS A	0.3	2.1	0.56	0.69	54.8
9u	U	1	0.0	0.074	14.4	LOS A	0.3	2.1	0.56	0.69	56.7
Approach		171	6.4	0.107	6.6	LOS A	0.5	3.4	0.56	0.65	54.1
West: New England Highway west											
10	L2	18	0.0	0.287	4.2	LOS A	1.3	9.8	0.37	0.40	55.4
11	T1	751	5.1	0.350	3.9	LOS A	1.8	13.1	0.37	0.41	57.2
12	R2	46	10.9	0.350	10.3	LOS A	1.8	13.1	0.37	0.42	54.2
12u	U	9	0.0	0.350	12.7	LOS A	1.8	13.1	0.37	0.42	59.8
Approach		824	5.2	0.350	4.4	LOS A	1.8	13.1	0.37	0.42	57.0
All Vehicles		2073	6.2	0.350	4.8	LOS A	1.9	14.0	0.35	0.45	55.9

Level of Service (LOS) Method: Delay (RTA NSW).
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: HW9_Anambah Rd 2027 PM Peak

Roundabout at HW9_Anambah Rd
Roundabout

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	Demand Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Shipley Dr south											
1	L2	64	1.6	0.125	5.1	LOS A	0.5	3.6	0.57	0.61	50.8
2	T1	29	3.4	0.125	4.4	LOS A	0.5	3.6	0.57	0.61	52.6
3	R2	344	2.9	0.311	9.7	LOS A	1.5	11.0	0.60	0.76	49.4
3u	U	1	0.0	0.311	11.7	LOS A	1.5	11.0	0.60	0.76	48.6
Approach		438	2.7	0.311	8.7	LOS A	1.5	11.0	0.59	0.73	49.8
East: New England Highway east											
4	L2	276	7.2	0.364	3.8	LOS A	2.1	15.3	0.27	0.39	52.0
5	T1	621	3.7	0.369	3.4	LOS A	2.2	15.7	0.26	0.42	57.3
6	R2	155	5.2	0.369	9.8	LOS A	2.2	15.7	0.26	0.44	57.4
6u	U	11	9.1	0.369	12.4	LOS A	2.2	15.7	0.26	0.44	59.3
Approach		1063	4.9	0.369	4.5	LOS A	2.2	15.7	0.26	0.42	55.9
North: Anambah Rd north											
7	L2	171	4.1	0.208	6.8	LOS A	1.1	8.3	0.76	0.82	54.0
8	T1	17	11.8	0.065	7.9	LOS A	0.3	2.2	0.71	0.81	49.7
9	R2	18	5.6	0.065	14.0	LOS A	0.3	2.2	0.71	0.81	53.5
9u	U	1	0.0	0.065	16.3	LOS B	0.3	2.2	0.71	0.81	55.4
Approach		207	4.8	0.208	7.6	LOS A	1.1	8.3	0.75	0.82	53.6
West: New England Highway west											
10	L2	28	0.0	0.396	5.7	LOS A	2.2	15.6	0.62	0.56	54.0
11	T1	853	3.3	0.482	5.4	LOS A	3.1	22.5	0.63	0.57	55.7
12	R2	52	1.9	0.482	11.7	LOS A	3.1	22.5	0.64	0.57	53.0
12u	U	3	0.0	0.482	14.2	LOS A	3.1	22.5	0.64	0.57	58.2
Approach		936	3.1	0.482	5.8	LOS A	3.1	22.5	0.63	0.57	55.5
All Vehicles		2644	3.9	0.482	5.9	LOS A	3.1	22.5	0.49	0.55	54.4

Level of Service (LOS) Method: Delay (RTA NSW).
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: HW9_Anambah Rd 2017 AM Peak + Subdivision

Roundabout at HW9_Anambah Rd
Roundabout

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Shipley Dr south											
1	L2	25	16.0	0.049	4.2	LOS A	0.2	1.4	0.49	0.48	50.8
2	T1	19	0.0	0.049	3.2	LOS A	0.2	1.4	0.49	0.48	52.9
3	R2	55	21.8	0.054	9.3	LOS A	0.2	1.8	0.48	0.67	49.3
3u	U	1	0.0	0.054	10.9	LOS A	0.2	1.8	0.48	0.67	48.9
Approach		100	16.0	0.054	6.9	LOS A	0.2	1.8	0.49	0.59	50.3
East: New England Highway east											
4	L2	184	3.8	0.289	3.7	LOS A	1.5	10.8	0.26	0.38	52.1
5	T1	510	5.9	0.293	3.5	LOS A	1.5	11.3	0.25	0.42	57.3
6	R2	132	8.3	0.293	9.8	LOS A	1.5	11.3	0.25	0.44	57.4
6u	U	1	0.0	0.293	12.3	LOS A	1.5	11.3	0.25	0.44	59.6
Approach		827	5.8	0.293	4.6	LOS A	1.5	11.3	0.25	0.42	56.1
North: Anambah Rd north											
7	L2	113	7.1	0.101	4.9	LOS A	0.4	3.1	0.50	0.58	55.0
8	T1	28	3.6	0.070	5.1	LOS A	0.3	2.0	0.51	0.66	51.1
9	R2	33	3.0	0.070	11.5	LOS A	0.3	2.0	0.51	0.66	55.1
9u	U	1	0.0	0.070	13.9	LOS A	0.3	2.0	0.51	0.66	57.0
Approach		175	5.7	0.101	6.2	LOS A	0.4	3.1	0.50	0.61	54.3
West: New England Highway west											
10	L2	16	0.0	0.233	4.1	LOS A	1.0	7.5	0.34	0.39	55.5
11	T1	615	5.0	0.283	3.8	LOS A	1.3	9.9	0.34	0.40	57.4
12	R2	32	12.5	0.283	10.3	LOS A	1.3	9.9	0.33	0.41	54.4
12u	U	9	0.0	0.283	12.6	LOS A	1.3	9.9	0.33	0.41	60.0
Approach		672	5.2	0.283	4.3	LOS A	1.3	9.9	0.34	0.40	57.2
All Vehicles		1774	6.1	0.293	4.7	LOS A	1.5	11.3	0.32	0.44	56.0

Level of Service (LOS) Method: Delay (RTA NSW).
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: HW9_Anambah Rd 2017 PM Peak + Subdivision

Roundabout at HW9_Anambah Rd
Roundabout

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Shipley Dr south											
1	L2	58	1.7	0.111	4.6	LOS A	0.4	3.1	0.52	0.56	51.0
2	T1	29	3.4	0.111	4.0	LOS A	0.4	3.1	0.52	0.56	52.8
3	R2	313	2.9	0.269	9.3	LOS A	1.3	9.1	0.54	0.73	49.6
3u	U	1	0.0	0.269	11.3	LOS A	1.3	9.1	0.54	0.73	48.8
Approach		401	2.7	0.269	8.2	LOS A	1.3	9.1	0.54	0.69	50.0
East: New England Highway east											
4	L2	251	7.2	0.311	3.7	LOS A	1.6	12.1	0.24	0.38	52.1
5	T1	509	3.7	0.315	3.4	LOS A	1.7	12.3	0.23	0.42	57.3
6	R2	145	4.1	0.315	9.7	LOS A	1.7	12.3	0.22	0.45	57.5
6u	U	11	9.1	0.315	12.3	LOS A	1.7	12.3	0.22	0.45	59.3
Approach		916	4.8	0.315	4.6	LOS A	1.7	12.3	0.23	0.42	55.9
North: Anambah Rd north											
7	L2	159	3.8	0.171	6.0	LOS A	0.9	6.3	0.68	0.72	54.3
8	T1	16	12.5	0.056	7.1	LOS A	0.2	1.8	0.65	0.77	50.1
9	R2	17	5.9	0.056	13.3	LOS A	0.2	1.8	0.65	0.77	53.9
9u	U	1	0.0	0.056	15.6	LOS B	0.2	1.8	0.65	0.77	55.8
Approach		193	4.7	0.171	6.8	LOS A	0.9	6.3	0.67	0.73	53.9
West: New England Highway west											
10	L2	28	0.0	0.317	5.3	LOS A	1.6	11.6	0.56	0.52	54.4
11	T1	699	3.3	0.386	5.0	LOS A	2.2	15.8	0.57	0.52	56.1
12	R2	44	2.3	0.386	11.2	LOS A	2.2	15.8	0.57	0.51	53.4
12u	U	3	0.0	0.386	13.7	LOS A	2.2	15.8	0.57	0.51	58.6
Approach		774	3.1	0.386	5.4	LOS A	2.2	15.8	0.57	0.52	55.9
All Vehicles		2284	3.9	0.386	5.7	LOS A	2.2	15.8	0.43	0.53	54.6

Level of Service (LOS) Method: Delay (RTA NSW).
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: HW9_Anambah Rd 2027 AM Peak + Subdivision

Roundabout at HW9_Anambah Rd
Roundabout

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	Demand Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Shipley Dr south											
1	L2	28	17.9	0.059	4.7	LOS A	0.2	1.8	0.54	0.53	50.6
2	T1	21	0.0	0.059	3.6	LOS A	0.2	1.8	0.54	0.53	52.7
3	R2	60	21.7	0.062	9.6	LOS A	0.3	2.1	0.53	0.70	49.1
3u	U	1	0.0	0.062	11.2	LOS A	0.3	2.1	0.53	0.70	48.8
Approach		110	16.4	0.062	7.2	LOS A	0.3	2.1	0.54	0.62	50.1
East: New England Highway east											
4	L2	203	3.9	0.344	3.8	LOS A	1.9	13.6	0.30	0.40	51.9
5	T1	623	5.9	0.349	3.6	LOS A	1.9	14.3	0.29	0.42	57.2
6	R2	145	8.3	0.349	9.9	LOS A	1.9	14.3	0.29	0.44	57.3
6u	U	1	0.0	0.349	12.4	LOS A	1.9	14.3	0.29	0.44	59.5
Approach		972	5.9	0.349	4.6	LOS A	1.9	14.3	0.29	0.42	56.0
North: Anambah Rd north											
7	L2	114	7.9	0.109	5.2	LOS A	0.5	3.5	0.56	0.62	54.7
8	T1	30	3.3	0.082	5.5	LOS A	0.3	2.4	0.56	0.69	50.8
9	R2	36	2.8	0.082	11.9	LOS A	0.3	2.4	0.56	0.69	54.8
9u	U	1	0.0	0.082	14.3	LOS A	0.3	2.4	0.56	0.69	56.7
Approach		181	6.1	0.109	6.6	LOS A	0.5	3.5	0.56	0.65	54.0
West: New England Highway west											
10	L2	18	0.0	0.288	4.2	LOS A	1.4	9.9	0.37	0.41	55.4
11	T1	751	5.1	0.351	4.0	LOS A	1.8	13.1	0.37	0.42	57.1
12	R2	46	10.9	0.351	10.4	LOS A	1.8	13.1	0.37	0.42	54.2
12u	U	9	0.0	0.351	12.7	LOS A	1.8	13.1	0.37	0.42	59.8
Approach		824	5.2	0.351	4.4	LOS A	1.8	13.1	0.37	0.42	57.0
All Vehicles		2087	6.2	0.351	4.8	LOS A	1.9	14.3	0.36	0.45	55.9

Level of Service (LOS) Method: Delay (RTA NSW).
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

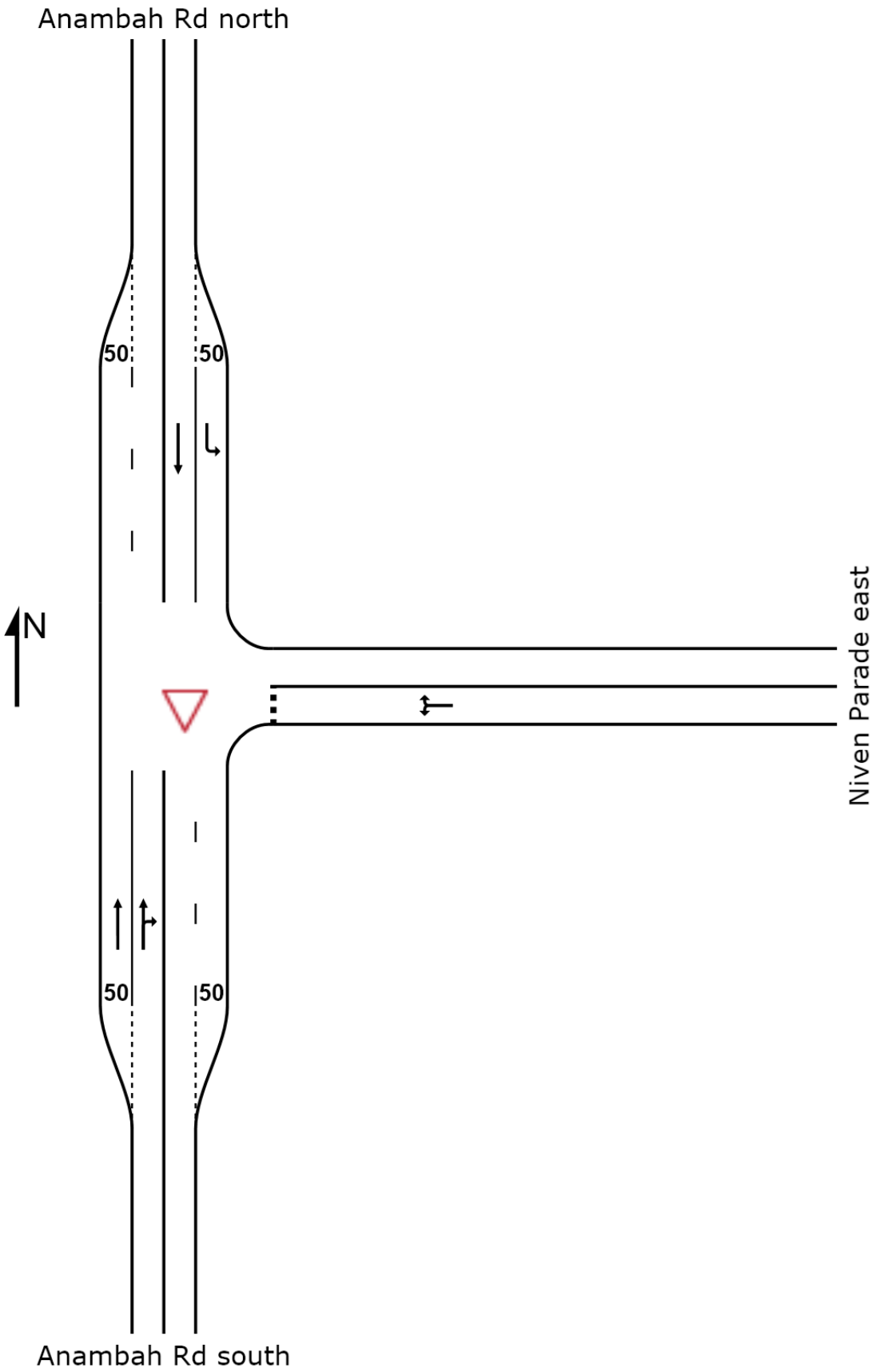
Site: HW9_Anambah Rd 2027 PM Peak + Subdivision

Roundabout at HW9_Anambah Rd
Roundabout

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	Demand Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Shipley Dr south											
1	L2	64	1.6	0.129	5.1	LOS A	0.5	3.7	0.57	0.61	50.8
2	T1	32	3.1	0.129	4.5	LOS A	0.5	3.7	0.57	0.61	52.6
3	R2	344	2.9	0.313	9.7	LOS A	1.5	11.1	0.61	0.76	49.4
3u	U	1	0.0	0.313	11.7	LOS A	1.5	11.1	0.61	0.76	48.6
Approach		441	2.7	0.313	8.7	LOS A	1.5	11.1	0.60	0.73	49.8
East: New England Highway east											
4	L2	276	7.2	0.369	3.8	LOS A	2.1	15.6	0.27	0.39	52.0
5	T1	621	3.7	0.374	3.4	LOS A	2.2	16.0	0.26	0.43	57.2
6	R2	170	4.7	0.374	9.8	LOS A	2.2	16.0	0.26	0.45	57.3
6u	U	11	9.1	0.374	12.4	LOS A	2.2	16.0	0.26	0.45	59.1
Approach		1078	4.8	0.374	4.6	LOS A	2.2	16.0	0.27	0.42	55.8
North: Anambah Rd north											
7	L2	175	4.0	0.213	6.9	LOS A	1.2	8.6	0.76	0.82	54.0
8	T1	17	11.8	0.067	7.9	LOS A	0.3	2.3	0.71	0.82	49.6
9	R2	19	5.3	0.067	14.0	LOS A	0.3	2.3	0.71	0.82	53.4
9u	U	1	0.0	0.067	16.3	LOS B	0.3	2.3	0.71	0.82	55.3
Approach		212	4.7	0.213	7.6	LOS A	1.2	8.6	0.75	0.82	53.5
West: New England Highway west											
10	L2	31	0.0	0.401	5.8	LOS A	2.2	15.8	0.63	0.57	54.0
11	T1	853	3.3	0.488	5.6	LOS A	3.2	23.1	0.64	0.58	55.7
12	R2	52	1.9	0.488	11.8	LOS A	3.2	23.1	0.65	0.59	52.9
12u	U	3	0.0	0.488	14.3	LOS A	3.2	23.1	0.65	0.59	58.1
Approach		939	3.1	0.488	5.9	LOS A	3.2	23.1	0.64	0.58	55.4
All Vehicles		2670	3.9	0.488	6.0	LOS A	3.2	23.1	0.49	0.56	54.4

Level of Service (LOS) Method: Delay (RTA NSW).
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.


Anambah Rd north
50
50
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Niven Parade east
50
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Anambah Rd south

MOVEMENT SUMMARY

Site: Anambah Road and Niven Parade. 2027 AM Peak

Anambah Rd and Niven Parade, Anambah
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total	Demand Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Anambah Rd south											
2	T1	16	1.0	0.008	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
3	R2	48	0.0	0.034	5.6	LOS A	0.1	0.9	0.07	0.56	53.2
Approach		64	0.3	0.034	4.2	NA	0.1	0.9	0.05	0.42	54.7
East: Niven Parade east											
4	L2	47	0.0	0.037	5.6	LOS A	0.1	0.9	0.06	0.55	53.4
6	R2	1	0.0	0.037	6.0	LOS A	0.1	0.9	0.06	0.55	53.2
Approach		48	0.0	0.037	5.6	LOS A	0.1	0.9	0.06	0.55	53.4
North: Anambah Rd north											
7	L2	1	0.0	0.001	5.5	LOS A	0.0	0.0	0.00	0.58	53.6
8	T1	16	1.0	0.008	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		17	0.9	0.008	0.3	NA	0.0	0.0	0.00	0.03	59.6
All Vehicles		129	0.2	0.037	4.2	NA	0.1	0.9	0.05	0.42	54.8

Level of Service (LOS) Method: Delay (RTA NSW).
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: Anambah Road and Niven Parade. 2027 PM Peak

Anambah Rd and Niven Parade, Anambah
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total	Demand Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Anambah Rd south											
2	T1	18	1.0	0.009	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
3	R2	54	0.0	0.038	5.6	LOS A	0.2	1.1	0.08	0.56	53.2
Approach		72	0.3	0.038	4.2	NA	0.2	1.1	0.06	0.42	54.7
East: Niven Parade east											
4	L2	56	0.0	0.044	5.6	LOS A	0.2	1.1	0.07	0.55	53.4
6	R2	1	0.0	0.044	6.1	LOS A	0.2	1.1	0.07	0.55	53.2
Approach		57	0.0	0.044	5.6	LOS A	0.2	1.1	0.07	0.55	53.4
North: Anambah Rd north											
7	L2	1	0.0	0.001	5.5	LOS A	0.0	0.0	0.00	0.58	53.6
8	T1	19	1.0	0.010	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		20	1.0	0.010	0.3	NA	0.0	0.0	0.00	0.03	59.6
All Vehicles		149	0.2	0.044	4.2	NA	0.2	1.1	0.05	0.42	54.8

Level of Service (LOS) Method: Delay (RTA NSW).
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: Anambah Road and Niven Parade. 2027 AM Peak + Subdivision

Anambah Rd and Niven Parade, Anambah
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Anambah Rd south											
2	T1	16	1.0	0.008	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
3	R2	53	0.0	0.037	5.6	LOS A	0.1	1.0	0.07	0.56	53.2
Approach		69	0.2	0.037	4.3	NA	0.1	1.0	0.05	0.43	54.6
East: Niven Parade east											
4	L2	66	0.0	0.051	5.6	LOS A	0.2	1.3	0.06	0.55	53.4
6	R2	1	0.0	0.051	6.0	LOS A	0.2	1.3	0.06	0.55	53.2
Approach		67	0.0	0.051	5.6	LOS A	0.2	1.3	0.06	0.55	53.4
North: Anambah Rd north											
7	L2	1	0.0	0.001	5.5	LOS A	0.0	0.0	0.00	0.58	53.6
8	T1	16	1.0	0.008	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		17	0.9	0.008	0.3	NA	0.0	0.0	0.00	0.03	59.6
All Vehicles		153	0.2	0.051	4.4	NA	0.2	1.3	0.05	0.44	54.6

Level of Service (LOS) Method: Delay (RTA NSW).
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: Anambah Road and Niven Parade. 2027 PM Peak + Subdivision

Anambah Rd and Niven Parade, Anambah
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Anambah Rd south											
2	T1	18	1.0	0.009	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
3	R2	75	0.0	0.053	5.6	LOS A	0.2	1.5	0.08	0.56	53.2
Approach		93	0.2	0.053	4.5	NA	0.2	1.5	0.06	0.45	54.4
East: Niven Parade east											
4	L2	61	0.0	0.048	5.6	LOS A	0.2	1.2	0.07	0.55	53.4
6	R2	1	0.0	0.048	6.2	LOS A	0.2	1.2	0.07	0.55	53.2
Approach		62	0.0	0.048	5.6	LOS A	0.2	1.2	0.07	0.55	53.4
North: Anambah Rd north											
7	L2	1	0.0	0.001	5.5	LOS A	0.0	0.0	0.00	0.58	53.6
8	T1	19	1.0	0.010	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		20	1.0	0.010	0.3	NA	0.0	0.0	0.00	0.03	59.6
All Vehicles		175	0.2	0.053	4.4	NA	0.2	1.5	0.06	0.44	54.6

Level of Service (LOS) Method: Delay (RTA NSW).
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.