



Gundy Road, Scone Residential Subdivision

Casson Planning and Development
Services

Traffic Impact Assessment

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SECAsolution 

Gundy Road, Scone

Residential Subdivision Development Application

Traffic Impact Assessment

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1. Introduction

Background

Seca Solution Pty Ltd has been commissioned by Charles David Pty Ltd to provide a traffic impact assessment to support the proposed development of a residential subdivision off Gundy Road, Scone. A development application is to be submitted to Upper Hunter Shire Council as the road authority, however, as Gundy Road connects with the New England Highway at Scone the application will also be reviewed by Roads and Maritime Services (RMS) and their concurrence will be required.

Planning Context

In preparing this document, the following guides and publications were used:

- RTA Guide to Traffic Generating Developments, Version 2.2 Dated October 2002;
- RMS Technical Direction TDT 2013/ 04a Updated traffic surveys;
- Upper Hunter Land Use Strategy April 2001;
- Upper Hunter Development Control Plan 2015;
- Australian / New Zealand Standard – Parking Facilities Part 1 : off-street car parking (AS2890.1:2004).

Proposed Development

The proposed development is for a residential subdivision comprising of 423 lots. The site has a road frontage to Gundy Road and a single vehicle access will be provided to this road. Secondary accesses are proposed to the east and west of the site but these will be dependent on the development of the adjoining properties. The site location is shown below (Figure 1).

This assessment has been undertaken for the full development of 423 lots. See Figure 2 for the proposed lot layout.

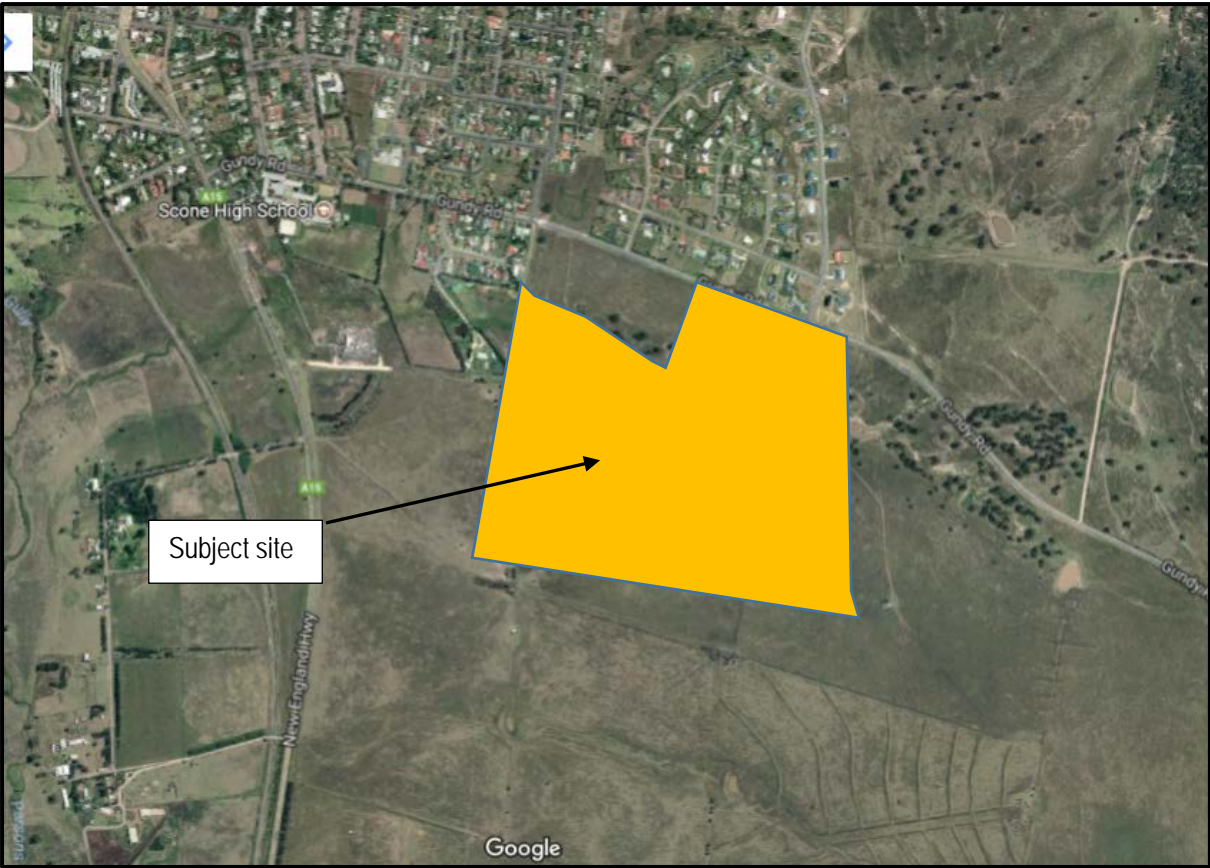


Figure 1 – Site Location

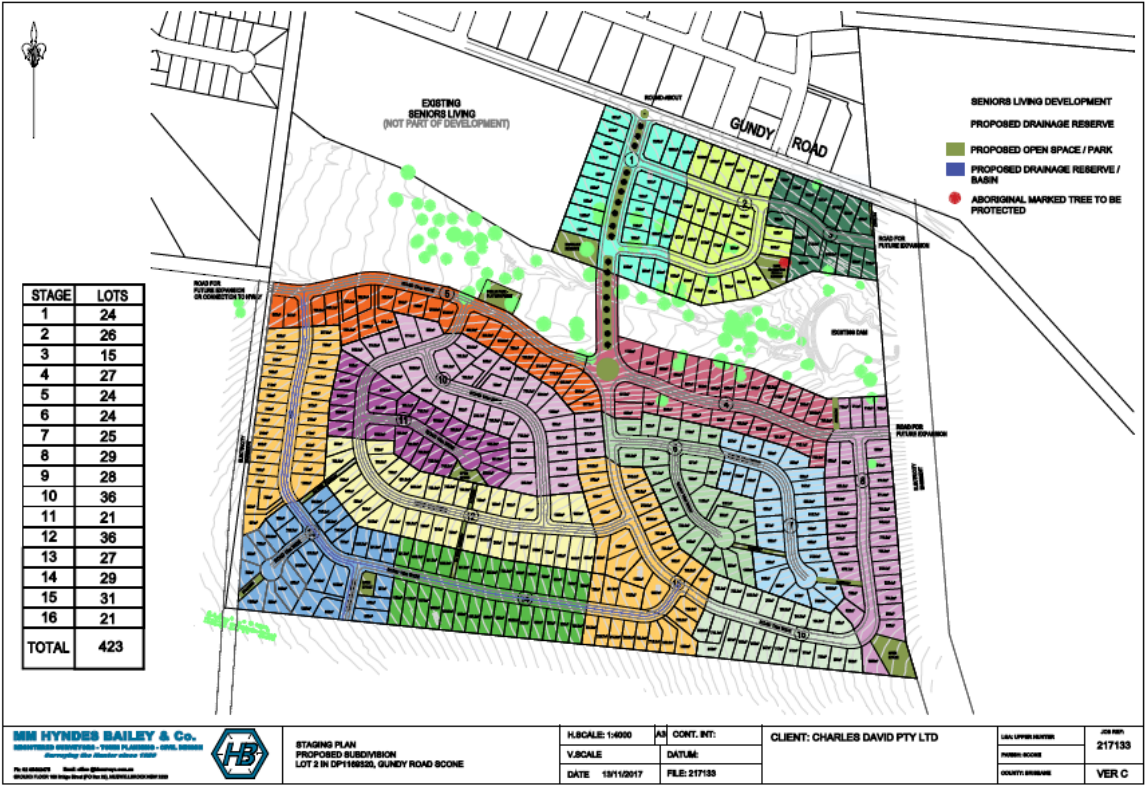


Figure 2 - proposed lot layout

2. Traffic Impact Assessment Summary

The following assessment has been completed in accordance with Austroads Guidelines and the requirements of the RTA Guide to Traffic Generating Developments, which provide the structure for the reporting of key issues to be addressed when determining the impacts of traffic associated with a development. This guide indicates that the use of this format and checklist ensures that the most significant matters are considered by the relevant road authority.

Item	Comment
Existing Situation	
2.1 Site Location and Access	The site is located off Gundy Road with this road being the only road frontage. Access will be provided direct onto Gundy Road with potential secondary accesses to connect through other 3 rd party property to the east and west.
2.2 Existing Road Network	
2.2.1 Road Hierarchy	<p>Through the town of Scone the New England Highway forms the main road, providing a connection between Newcastle to the south-east and the M1 Sydney to Newcastle Freeway and to the north towards Tamworth. The Federal and NSW Governments have committed funds to construct a New England Highway bypass of Scone to improve traffic flow, travel times and safety for road users. The southern end of the bypass will commence south of the Gundy Road intersection significantly reducing traffic volumes at this location. Shortlisted companies have been invited to submit tenders to construct the Scone bypass and it is expected that the contract will be awarded before the end of 2017.</p> <p>Access to the site is provided via Gundy Road which is an 11-metre-wide collector road. The western boundary of the site is located 850 metres east of the New England Highway. At that point Gundy Road narrows to a 7-metre-wide, two-lane rural road standard and the speed limit increases from 50km/h to 60km/h for the full frontage of the site.</p> <p>Past the subject site the speed limit on Gundy Road changes to 100km/h which continues as a sealed two-lane rural road for another 17km to the town of Gundy and beyond.</p>
2.2.2 Roadworks	None noted in vicinity of site. It is understood that there are no road works in the general locality except for Council maintenance work as required.
2.2.3 Traffic Management Works	None noted.
2.2.4 Pedestrian and Cycling Facilities	There is a concrete pedestrian footpath along the northern side of Gundy Road through the residential area from the New England Highway to the western boundary of the site. An on-road cycle lane has been provided along the northern side of Gundy Road from Barton Street to Kilgallin Close but from that point on there are no footpaths or cycling facilities along the Gundy Road frontage of the site.
2.2.5 Public Transport	There is limited public transport in the immediate vicinity of the subject site. Scone Railway Station is approximately 2.5 km from the site offering access to train services to Maitland and Newcastle as well as connections to other centres.

Item	Comment
	The only buses servicing the site are school buses travelling to and from Scone High School, Scone Primary School, Scone Grammar, St Mary's Primary and St Josephs, Aberdeen however, as other development occurs in the area there is potential for regular buses to be provided that would be able to service the subject site.
2.3 Existing Traffic Flows	
<i>2.3.1 Daily Traffic Flows</i>	<p>As part of the site work, AM and PM peak hour traffic data was collected at the New England Highway / Gundy Road intersection. The traffic surveys show that the two-way traffic flows through the existing residential section of Gundy Road during the AM peak period are in the order of 268 vehicles per hour and 288 vehicles per hour in the PM peak.</p> <p>Typically, peak hour flows represent, on average, some 10% of daily traffic flows, indicating the daily flows through the existing residential section of Gundy Road would be in the order of 2,700 vehicles per day.</p> <p>The subject site is located east of the existing residential area and Scone High School so the vast majority of this existing traffic will not pass the site. Opposite the subject site is a rural residential development consisting of around 70 lots which would generate around 55 trips per hour or 550 daily trips. When estimated trips to and from the rural areas to the east are included the existing daily traffic volumes past the subject site would be in the order of 600 vehicles per day.</p>
<i>2.3.2 Daily Traffic Flow Distribution</i>	As indicated by the AM and PM counts conducted at the New England Highway / Gundy Road intersection, daily traffic movements are reasonably balanced in both directions along Gundy Road.
<i>2.3.3 Vehicle Speeds</i>	No speed surveys were completed as part of the study work. Observations on site indicate that vehicle speeds along Gundy Road tend to be higher than the posted speed limit due to the relatively low traffic volumes and the limited interaction with intersections / driveways along its length. It provides a relatively straight alignment which allows for ease of driving and allows good forward visibility for drivers.
<i>2.3.4 Existing Site Flows</i>	The subject site is vacant and as such currently generates no traffic.
<i>2.3.5 Heavy Vehicle Flows</i>	<p>During the peak hour traffic surveys, heavy vehicle volumes accounted for 6% of the volumes along Gundy Road. This equates to around 36 heavy vehicle movements per day, however, this number would include school bus trips to and from Scone High School. The number of heavy vehicle trips past the subject site would therefore be no more than 30 vehicles per day.</p> <p>As expected, the heavy vehicle volumes on the New England Highway varied between 11% and 14% of total volumes or around 1,200 heavy vehicles per day.</p>
<i>2.3.6 Current Road Network Operation</i>	Observations on site during the morning peak periods show that the road network in the vicinity of the subject site operates well, with no traffic delays. The New England Highway / Gundy Road intersection operates very well with minimal delays for all road users.
2.4 Traffic Safety and Crash History	Crash data provided by the RMS indicates that this is not an area of high risk. During the five-year period up to the end of 2016 there were only 2 crashes along Gundy Road between the New England Highway and

Item	Comment
	<p>Bhima Drive and no reported crashes since April 2014. Both of these were injury crashes but no fatalities. Neither of these crashes was in the immediate vicinity of the subject site access point. One was at the Gundy Road / New England Highway intersection and the other was at the Gundy Road / Waverley Street intersection.</p> <p>Gundy Road in this location is well laid out and provides a straight alignment to allow for good visibility in both directions.</p>
2.5 Parking Supply and Demand	
<i>2.5.1 On-street Parking Provision</i>	Parking is permitted along both sides of Gundy Road, along the narrow shoulders and verges.
<i>2.5.3 Parking Demand and Utilisation</i>	Observations on site show that there is very little demand for on-street parking with no on-street parking demand noted in the vicinity of the site. Vehicles are able to pull off Gundy Road and park within the various lots that front this road.
<i>2.5.4 Set down or pick up areas</i>	The only dedicated set down or pick up areas along Gundy Road are the existing bus bays at Scone High School.
2.6 Public Transport	
<i>2.6.1 Rail Station Locations</i>	Nearest railway station is located in Scone approximately 2.5 kilometres from the subject site.
<i>2.6.2 Bus Stops and Associated Facilities</i>	There are bus stops located at both Bhima Drive and Kilgallin Close, a short distance from the subject site. These bus stops cater for school bus services servicing the various local schools.
<i>2.6.3 Pedestrians</i>	<p>There is a concrete pedestrian footpath along the northern side of Gundy Road through the residential area from the New England Highway to the western boundary of the site.</p> <p>Given the low pedestrian movements in the locality it can be seen that the current provision is adequate, however as residential development expands in the locality there could be an increase demand for pedestrian facilities in line with Council design requirements.</p>
2.7 Other Proposed Developments	A limited number of additional residential lots are due to be developed in the Scone South East Residential Area identified in the Upper Hunter Land Use Strategy. The Strategy identified the potential for 500 to 900 lots as well as 4 ha for a lifestyle village catering for seniors living. This additional development would require a new access onto the New England Highway in the long term. The additional traffic that will be generated by this future development has not been included in the future background growth along Gundy Road for this assessment as any future upgrades to the network will be the responsibility of this future development.
3.1 The Development	
<i>3.1.1 Nature of Development</i>	The proposal provides for a residential subdivision with some 423 lots proposed. A single vehicle access will be provided direct onto Gundy Road with secondary accesses to adjoining properties to be provided in the future as development proceeds.
<i>3.1.2 Access and Circulation Requirements</i>	Access will be provided off Gundy Road with all turning movements allowed. All vehicles will enter and exit the site in a forward direction.
3.2 Access	
<i>3.2.1 Driveway Location</i>	The driveway locations will be determined as part of a future DA process and agreed with the road authority at that time.

Item	Comment
<i>3.2.2 Sight Distances</i>	<p>The posted speed limit along Gundy Road is 60 km/h. Based on the RTA Road Design Guide the sight visibility requirements are 123 metres. Based on site observations and given the relatively straight alignment of Gundy Road as shown in Photos 1 and 2, this visibility will be achievable and will be checked during the detailed design stage of the project.</p> <p>The internal roads will operate under a posted speed limit of 50 km/h and the sight distance requirements for this speed limit is 80 metres at intersections. This will be provided during the detailed design of the internal roadworks.</p>
<i>3.2.3 Service Vehicle Access</i>	<p>As a residential development, no specific service vehicle access is required. However, there will be a requirement for regular access for Council refuse collection vehicles as well as occasional large delivery vehicles. As the internal roads and access will be designed in accordance with Council requirements these will cater for the movements of such large service vehicles.</p>
<i>3.2.4 Queuing at entrance to site</i>	<p>No vehicle queues expected at site entry / exit point. Relatively low traffic demands associated with the future development and on the adjacent road network. The access points will be designed to ensure vehicles can enter the site with minimal delays to other road users.</p>
<i>3.2.5 Comparison with existing site access</i>	<p>There is no existing formed access to the site as it is vacant rural land however there is a gate located at the western end of the property that provides vehicular access.</p>
<i>3.2.6 Access to Public Transport</i>	<p>There are bus stops located at both Bhima Drive and Kilgallin Close that cater for the local school bus services. A pedestrian path should be provided along Gundy Road between the site access and the existing footpath along the northern side of Gundy Road through the adjoining residential area to provide a connection to bus services along the New England Highway. This path could be funded from S94 contributions applicable to the site.</p> <p>Access to Scone Railway Station will be via the existing road network using Gundy Road and the New England Highway.</p>
3.3 Circulation	
<i>3.3.1 Pattern of circulation</i>	<p>All vehicles will be able to enter and exit the site in a forward direction, with the internal site layout to be designed at the detailed design stage in accordance with Council requirements.</p>
<i>3.3.2 Road width</i>	<p>All internal roads will be designed in accordance with Upper Hunter DCP requirements, allowing for two-way traffic movements as required.</p>
<i>3.3.3 Internal Bus Movements</i>	<p>It is expected that the existing school bus route will be modified to include the streets in this subdivision. The engineering design will accommodate access for such buses</p>
<i>3.3.4 Service Area Layout</i>	<p>No dedicated service area is required, with occasional service vehicles able to park on the roads outside the specific dwellings as required.</p>
3.4 Parking	
<i>3.4.1 Proposed Supply</i>	<p>In accordance with Upper Hunter DCP requirements.</p>
<i>3.4.2 Authority Parking</i>	<p>DCP requires a minimum of one space per lot (GFA<12m²) and two spaces per lot (GFA>125m²). This will be considered during the DA stage for each lot.</p>

Item	Comment
<i>3.4.3 Parking Layout</i>	Driveways and parking to be designed and constructed in accordance with DCP requirements.
<i>3.4.4 Parking Demand</i>	Normal parking demands will be accommodated on site in accordance with DCP requirements. All parking shall be able to be contained within the site with no impact on the external road network.
<i>3.4.5 Service Vehicle Parking</i>	No dedicated service vehicle parking required.
<i>3.4.6 Pedestrian and Bicycle Facilities</i>	Pedestrians and cyclists will be provided for on the internal road links in accordance with the Upper Hunter DCP. This will include allowance for pedestrians, with a minimum of one footpath provided on the roads in accordance with the DCP. Cyclists will be accommodated on road with potential for off road paths to connect to future adjacent residential subdivisions that can be funded from S94 Contributions applicable to the site
4.1 Traffic Generation	
	Standard traffic generation rates provided by the RTA Guide to Traffic Generating Development should be applied to the development. The updated trip rates (TDT 2013/04a) indicates peak hour rates of 0.78 per dwelling and daily rates of 7.4 per dwelling. For the proposed 423 lots this gives some 330 movements in the peaks and 3,130 per day. In the morning peak, it is assumed 85% of the trips would be outbound whilst in the PM 85% would be inbound. The daily traffic flows would be reasonably evenly split between 1,565 outbound and 1,565 inbound trips per day.
<i>4.1.1 Daily and Seasonal Factors</i>	Limited annual variation expected.
<i>4.1.2 Pedestrian Movements</i>	Pedestrian movements would be relatively low, although connection to local residential development to the west of the precinct as well as connections to the local facilities may be popular. Pedestrian facilities shall be provided in accordance with the DCP requirements.
4.2 Traffic Distribution and Assignments	It is assumed that the highest proportion of trips generated by the development will be those having an origin / destination to the west towards the New England Highway for access to the Scone township and other major destinations in both directions along the Highway.
<i>4.2.1 Origin / destinations assignment</i>	For the purposes of this assessment, 90% of the traffic has been assumed to have an origin / destination to the west of the site via Gundy Road and 10% to the east via Gundy Road. At the New England Highway / Gundy Road intersection it has been assumed that the existing assignment of traffic will remain the same with the additional traffic generated from this site. (55% to and from the north and 45% to and from the south).
4.3 Impact on Road Safety	The major impact of the development will be increased traffic movements at the New England Highway / Gundy Road intersection, but this intersection is within the 50km/h speed zone and has a separate right turn bay for vehicles turning into Gundy Road. Good sight distance is available in both directions along the New England Highway. The new site access onto Gundy Road introduces a new conflict point where all turning movements will be permitted, however, traffic volumes along Gundy Road will be low at this location and sight distance in both

Item	Comment
	<p>directions meets Austroads requirements due to the straight alignment. The design of this intersection layout will be in accordance with Austroads requirements as well as the RTA Road Design Guide and will allow for safe entry and exit movements.</p> <p>It is considered that the additional traffic movements at this intersection will have a minimal impact upon road safety.</p> <p>With regard to the site access points, these will need to be designed and constructed in accordance with the road authority requirements. With these designed in accordance with Austroads Guidelines road safety will be maintained.</p>
4.4 Impact of Generated Traffic	
<p><i>4.4.1 Impact on the capacity of the existing road network.</i></p>	<p>The current traffic volumes along Gundy Road through the existing residential area vary between 268 and 288 vehicles per hour in the peak periods or around 2,700 vehicles per day.</p> <p>The development is expected to generate around 330 trips in the peak hour while daily traffic movements associated with the development could be in the order of 3,130 per day. With a split of 90% west and 10% east of the site access this will increase traffic volumes on Gundy Road between the site access and the New England Highway as follows:</p> <ul style="list-style-type: none"> • Peak hour (PM): increase of 297 vehicles per hour to 585 vehicles per hour • Daily: increase of 2,817 vehicles per day to around 5,517 vehicles per day. <p>The site is located towards the eastern side of Scone on the edge of the urban area and Gundy Road in this location operates as an urban road under the posted speed limit of 60 km/h. The RMS Guide to Traffic Generating Developments provides advice (Table 4.4) on the capacity and level of service for urban roads such as Gundy Road in this location. The predicted traffic flows on Gundy Road in this location, based upon the traffic surveys and the traffic generated by the project site, will be less than 300 vehicles per hour per direction. Table 4.4 from the RMS Guide indicates that the level of service would be B which provides for a good level of service with minimal delays for road users.</p>
<p><i>4.4.2 Peak Hour Impacts on Intersections</i></p>	<p>The critical intersections in relation to this development are:</p> <ul style="list-style-type: none"> • New England Highway / Gundy Road; and • Gundy Road / Site Access Road. <p>The operational performance of the New England Highway / Gundy Road intersection has been assessed for the current 2017 AM / PM volumes assuming full development and all turning movements, and the results of the Sidra analysis are presented below.</p> <p>Note: The traffic volumes in this analysis allow for the development of up to 438 lots.</p>

Item	Comment			
	Approach	Level service	of	Delay (secs)
				Queue (m)
	New England Hwy (South)	A / A		1.3 / 3.1
	Gundy Road	B / B		2.7 / 9.7
	New England Hwy (north)	A / A		15.3 / 24.9
	Overall	A / A		1.3 / 1.7
	Overall	A / A		5.8 / 5.7
	Overall	A / A		29.4 / 22.2
	Overall	A / A		29.4 / 22.2
	Overall	A / A		29.4 / 22.2
	Overall	A / A		29.4 / 22.2
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	Overall	A / A		29.4 / 22.2
	Overall	A / A		29.4 / 2

Item	Comment
4.4.3 Impact of Construction Traffic	<p>The majority of the construction work will be contained within the site so minimal impact upon external road network. There will be a requirement for construction machinery to access site and traffic associated with workers. A Traffic Management Plan will be required for work on site and to provide access controls. This will be completed as part of the design process by the contractor on site.</p> <p>During the construction of the site access there will be a need to manage traffic flows along Gundy Road during the connection works and will require a reduced speed zone and temporary safety barriers. The Traffic Control Plan for this work will be prepared as part of the detailed design stage of the project.</p>
4.4.4 Other Developments	<p>There is potential for a limited number of additional residential lots to be developed in the Scone South East Residential Area identified in the Upper Hunter Land Use Strategy. The Strategy identified the potential for 500 to 900 lots as well as 4 ha for a lifestyle village catering for seniors living. This additional development would require a new access onto the New England Highway in the long term. The additional traffic that will be generated by this future development has not been included in the future background growth along Gundy Road for this assessment.</p>
4.5 Public Transport	
4.5.1 Options for improving services	<p>Limited options specific to this site. Demands for public transport may increase in conjunction with the overall development of Scone South East Residential area and the proposed subject site forms part of this planning.</p>
4.5.2 Pedestrian Access to Bus Stops	<p>Access to the existing bus stops on Gundy Road will be improved by providing a pedestrian footpath connection along the frontage of the site to connect with an existing footpath through the existing residential area. New bus routes / stops will be developed as the surrounding area is developed and demand increases.</p>
4.6 Recommended Works	
4.6.1 Improvements to Access and Circulation	<p>Ensure driveway crossings and internal roads / driveways are designed and constructed in accordance with Upper Hunter DCP and UHSC Draft Engineering Guidelines for Subdivisions and Developments.</p>
4.6.2 Improvements to External Road Network	<p>A new access will be constructed on Gundy Road as part of this development which will allow for all turning movements.</p>
4.6.3 Improvements to Pedestrian and Cyclist Facilities	<p>The provision of a footpath along the Gundy Road frontage of the site to connect with the existing footpath on the northern side of Gundy Road through the existing residential area shall improve pedestrian access. The existing on-road cycle lane along the northern side of Gundy Road should be extended from Kilgallin Close along the site frontage to Bhima Drive. Funding could be provided for these facilities through the S94 contributions applicable to this site.</p>
4.6.4 Effect of Recommended Works on Adjacent Developments	<p>No impact on adjacent development.</p>
4.6.5 Effect of Recommended Works on Public Transport Services	<p>Nil</p>
4.6.6 Provision of LATM Measures	<p>None required</p>

Item	Comment
4.6.7 Funding	The site access, new footpath, cycle lane extension and line marking will be funded as part of the S94 contributions assigned to the subject site.

Site Photos



Photo 1 Gundy Road looking right (east) from site access showing site distances



Photo 2 Gundy Road looking left (west) from site access showing site distances

3. Conclusion

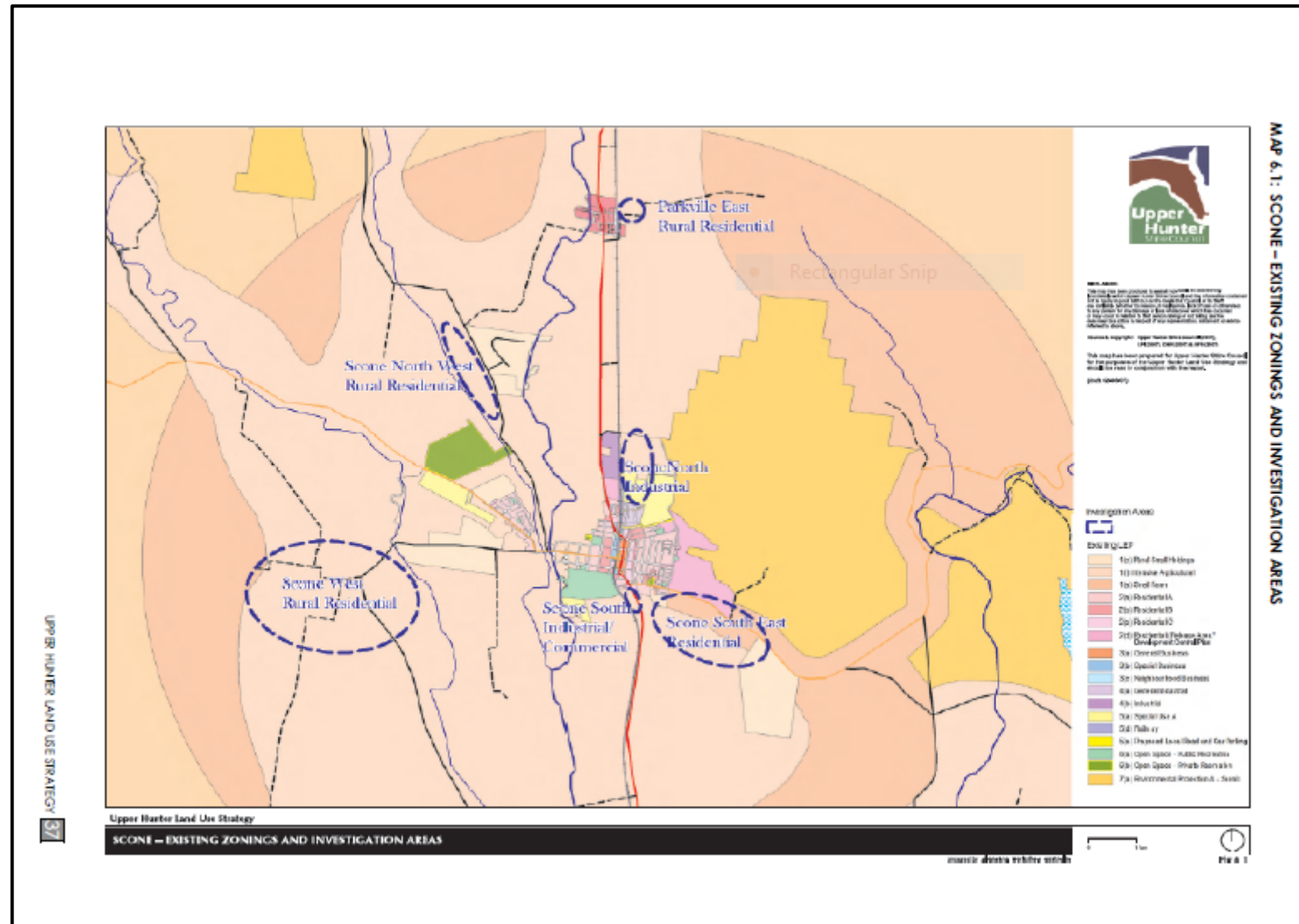
The subject site is a proposed residential subdivision consisting of 423 lots located within the Scone South-East Residential Investigation Area, which has been identified in the Upper Hunter Land Use Strategy 2011. Access to the site has been identified on Gundy Road, a collector road that provides direct access onto the New England Highway south of the Scone town centre. The site is located around 850 metres east of the New England Highway and adjacent to the existing Scone south-eastern residential area.

A limited number of additional residential lots are due to be developed in the Scone South-East Residential Investigation Area. The Upper Hunter Land Use Strategy has identified the potential for 500 to 900 lots as well as 4 ha for a lifestyle village catering for seniors living. This additional development would require a new access onto the New England Highway in the long term. The additional traffic that will be generated by this future development has not been included in the future background growth along Gundy Road for this assessment as any future upgrades to the network will be the responsibility of this future development.

From the site work completed and the review of the development proposal against the requirements of the RTA Guide to Traffic Generating Developments, it is considered that the proposal should be approved on traffic and access grounds. The additional traffic movements generated by the development will have an acceptable impact upon the local road network and the traffic movements associated with the development can be accommodated within the existing New England Highway / Gundy Road intersection.

Recommended improvements associated with this development consist of improved pedestrian and cyclist connections funded as part of the S94 contributions assigned to the subject site and a new access onto Gundy Road from the subject site.

Appendix A UPPER HUNTER LAND USE STRATEGY



Appendix B Crash Data



Detailed Crash Report - sorted

Crash No.	Data Source	Date	Day of Week	Time	Distance	ID Feature	Loc Type	Alignment	Weather	Surface Condition	Speed Limit	No. of Tus	Tu Type/Obj	Age/Sex	Street Travelling	Speed Travelling	Manoeuvre	Degree of Crash	Killed	Injured	Factors	
Natural Lighting																					S F	
Hunter Region		Upper Hunter LGA				Scone				Rect Gundy Rd												
830517 P	02/03/2013	Sat	00:50		at WAVERLEY ST	TJN	STR	Raining	Wet	50	1	UTE	M26	S	In WAVERLEY ST	50	Turning left		1	0	1	S
E51268343					Darkness	RUM:	85	Off rt/lft bnd-->obj					Tree/bush									
Hunter Region		Upper Hunter LGA				Scone				New England Hwy												
1024511 P	29/04/2014	Tue	13:20		at GUNDY RD	TJN	STR	Fine	Dry	50	2	TRK	F20	W	In GUNDY RD	5	Turning right		1	0	1	
E55417541					Daylight	RUM:	13	Right near					CAR	F18	S	In NEW ENGLAND HWY	50	Proceeding in lane				
Report Totals:		Total Crashes: 2				Fatal Crashes: 0				Injury Crashes: 2				Killed: 0				Injured: 2				

Crashid dataset Gundy Rd, between Bhima Dr & NEH, Scone - Crash Data between 01/01/2012 to 31/12/2016

Note: Ordered by: Crash Date, Crash Time, Crash No.

Crash self reporting, including self reported injuries began in Oct 2014. Trends from 2014 are expected to vary from previous years. More unknowns are expected in self reported data. For further information refer to Data Manual or report provider.

Appendix C Traffic Survey Results

Turn Count Summary

Location: New England Highway at Gundy Road, Scone
GPS Coordinates: Lat=-32.055976, Lon=150.869330
Date: 2017-09-19
Day of week: Tuesday
Weather:
Analyst: TN

Total vehicle traffic

Interval starts	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
06:59	1	1	0	0	0	0	0	4	1	0	0	0	7
07:00	11	53	0	9	0	9	0	47	3	0	0	0	132
07:15	15	53	0	9	0	5	0	43	6	0	0	0	131
07:30	10	59	0	10	0	6	0	63	10	0	0	0	158
07:45	16	57	0	13	0	13	0	80	14	0	0	0	193
08:00	19	79	0	12	0	11	0	69	9	0	0	0	199
08:15	15	65	0	12	0	16	0	84	19	0	0	0	211
08:30	23	79	0	20	0	19	0	89	18	0	0	0	248
08:45	21	56	0	16	0	22	0	100	16	0	0	0	231
09:00	19	60	0	10	0	16	0	75	16	0	0	0	196
09:15	1	10	0	2	0	2	0	13	1	0	0	0	29

Turn Count Summary

Location: New England Highway at Gundy Road, Scone
GPS Coordinates: Lat=-32.055996, Lon=150.869360
Date: 2017-09-18
Day of week: Monday
Weather:
Analyst: TN

• Rectangular Snip

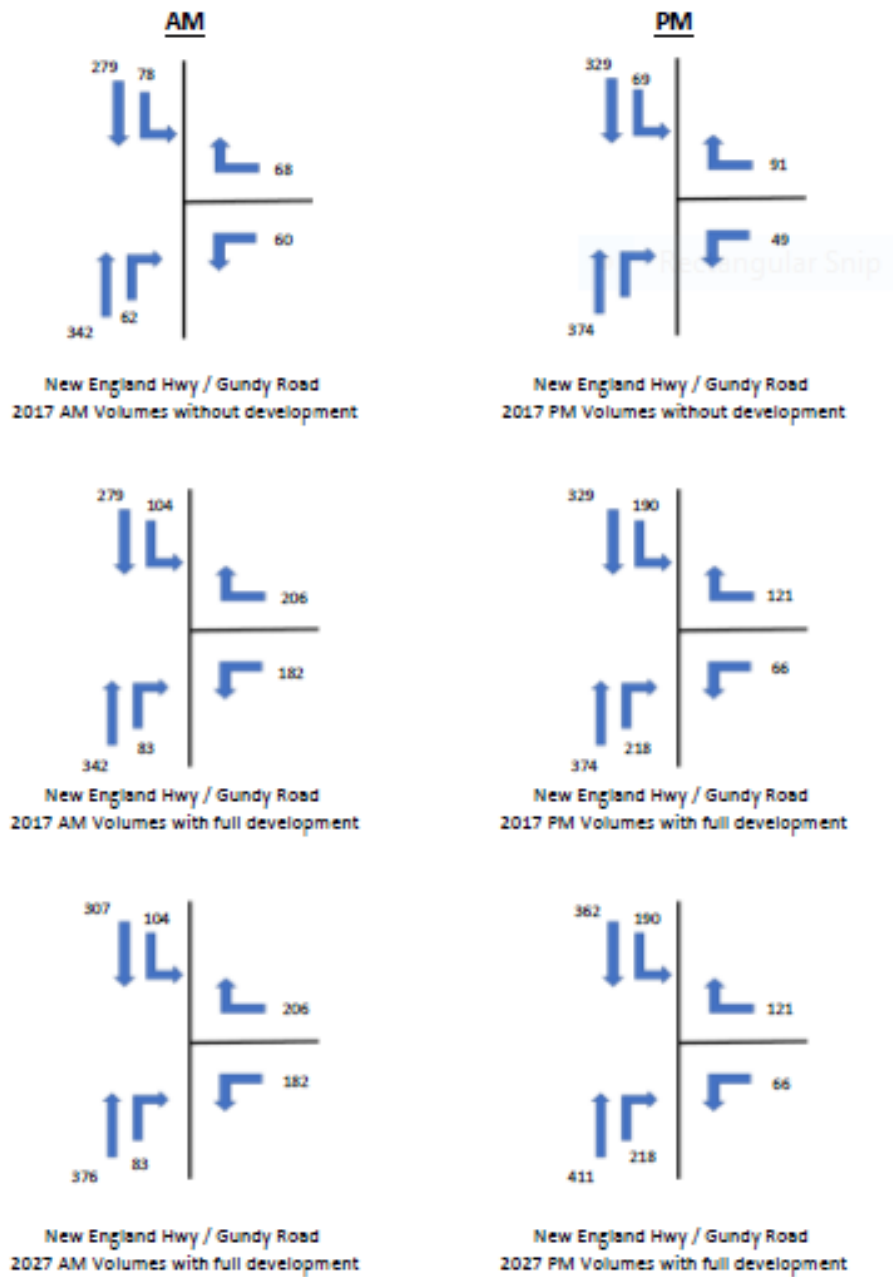
Total vehicle traffic

Interval starts	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
15:14	0	0	0	0	0	0	0	1	0	0	0	0	1
15:15	26	70	0	11	0	11	0	80	11	0	0	1	210
15:30	18	89	0	23	0	26	0	82	21	0	0	0	259
15:45	18	81	0	11	0	28	0	98	22	0	0	0	258
16:00	15	75	0	8	0	16	0	109	17	0	0	0	240
16:15	18	84	0	7	0	21	0	85	19	0	0	0	234
16:30	28	91	0	4	0	26	0	87	17	0	0	0	253
16:45	20	84	0	10	0	19	0	91	18	0	0	0	242
17:00	24	103	0	12	0	16	0	79	24	0	0	0	258
17:15	24	72	0	6	0	19	0	80	14	0	0	0	215
17:30	19	70	0	4	0	15	0	79	20	0	0	0	207
17:45	24	52	0	14	0	17	0	69	17	0	0	0	193
18:00	10	14	0	1	0	5	0	30	3	0	0	0	63

Appendix D Intersection Turning Movements

L turns

NEW ENGLAND HWY / GUNDY ROAD



Appendix E Sidra Results

Criteria for interpreting results of SIDRA

1-Level of Service (LoS)

LoS	Traffic Signals and Roundabouts	Give Way and Stop Signs
A	Good	Good
B	Good, with acceptable delays and spare capacity	Acceptable delays and spare
C	Satisfactory	Satisfactory, but requires accident study
D	Operating near capacity	Near capacity and requires accident study
E	At capacity, excessive delay: roundabout requires other control method	At capacity, requires other control mode
F	Unsatisfactory, requires other control mode or additional capacity	Unsatisfactory, requires other control mode

2-Average Vehicle Delay (AVD)

The AVD is a measure of operational performance of an intersection relating to its LoS. The average delay should be taken as a guide only for an average intersection. Longer delays may be tolerated at some intersections where delays are expected by motorists (e.g. those in inner city areas or major arterial roads).

LoS	Average Delay / Vehicle (secs)	Traffic Signals and Roundabouts	Give Way and Stop Signs
A	Less than 15	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	28 to 42	Satisfactory	Satisfactory but accident study required
D	42 to 56	Operating near capacity	Near capacity, accident study required
E	56 to 70	At capacity, excessive delays: roundabout requires other control mode	At capacity; requires other control mode
F	Exceeding 70	Unsatisfactory, requires additional capacity	Unsatisfactory, requires other control mode

3-Degree of Saturation (D/S)

The D/S of an intersection is usually taken as the highest ratio of traffic volumes on an approach to an intersection compared with the theoretical capacity, and is a measure of the utilisation of available green time. For intersections controlled by traffic signals, both queues and delays increase rapidly as DS approaches 1.0. An intersection operates satisfactorily when its D/S is kept below 0.75. When D/S exceeds 0.9, queues are expected.

MOVEMENT SUMMARY

Site: 101 [2017 AM + Development]

Intersection of Gundy Rd / New England Hwy
2017 AM Base with Full Development
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h	
South: New England Highway												
2	T1	360	14.6	0.202	0.0	LOS A	0.0	0.0	0.00	0.00	50.0	
3	R2	87	2.4	0.094	6.6	LOS A	0.4	2.7	0.46	0.64	45.5	
Approach		447	12.2	0.202	1.3	NA	0.4	2.7	0.09	0.13	49.0	
East: Gundy Road												
4	L2	192	3.3	0.160	5.0	LOS A	0.6	4.6	0.21	0.52	46.1	
6	R2	217	1.9	0.666	24.5	LOS B	4.1	29.4	0.87	1.20	37.2	
Approach		408	2.6	0.666	15.3	LOS B	4.1	29.4	0.56	0.88	40.9	
North: New England Highway												
7	L2	109	2.9	0.109	4.6	LOS A	0.0	0.0	0.00	0.29	47.8	
8	T1	294	10.0	0.109	0.0	LOS A	0.0	0.0	0.00	0.09	49.4	
Approach		403	8.1	0.109	1.3	NA	0.0	0.0	0.00	0.15	49.0	
All Vehicles		1259	7.8	0.666	5.8	NA	4.1	29.4	0.21	0.38	46.0	

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.

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MOVEMENT SUMMARY

▽ Site: 101 [2017 PM + Development]

Intersection of Gundy Rd / New England Hwy
2017 PM Base with Full Development
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h	
South: New England Highway												
2	T1	394	8.3	0.213	0.0	LOS A	0.0	0.0	0.00	0.00	50.0	
3	R2	229	1.8	0.293	8.3	LOS A	1.4	9.7	0.59	0.82	44.5	
Approach		623	5.9	0.293	3.1	NA	1.4	9.7	0.22	0.30	47.8	
East: Gundy Road												
4	L2	69	3.0	0.057	4.9	LOS A	0.2	1.5	0.17	0.51	46.2	
6	R2	127	4.1	0.637	35.8	LOS C	3.1	22.2	0.92	1.16	33.3	
Approach		197	3.7	0.637	24.9	LOS B	3.1	22.2	0.66	0.93	37.0	
North: New England Highway												
7	L2	200	1.6	0.149	4.6	LOS A	0.0	0.0	0.00	0.39	47.3	
8	T1	346	11.9	0.149	0.0	LOS A	0.0	0.0	0.00	0.08	49.5	
Approach		546	8.1	0.149	1.7	NA	0.0	0.0	0.00	0.20	48.7	
All Vehicles		1366	6.5	0.637	5.7	NA	3.1	22.2	0.19	0.35	46.2	

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.

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MOVEMENT SUMMARY

Site: 101 [2027 AM Future Design Year]

Intersection of Gundy Rd / New England Hwy
 2027 AM Future Design Year
 Allowing 1% p.a. growth along New England Hwy
 Giveaway / Yield (Two-Way)
 Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Deg. Satn HV % v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h	
South: New England Highway											
2	T1	396	14.6	0.222	0.0	LOS A	0.0	0.00	0.00	50.0	
3	R2	87	2.4	0.097	6.8	LOS A	0.4	2.7	0.48	0.66	45.4
Approach		483	12.4	0.222	1.2	NA	0.4	2.7	0.09	0.12	49.1
East: Gundy Road											
4	L2	192	3.3	0.162	5.1	LOS A	0.6	4.6	0.23	0.52	46.0
6	R2	217	1.9	0.753	31.6	LOS C	5.1	36.2	0.92	1.32	34.7
Approach		408	2.6	0.753	19.1	LOS B	5.1	36.2	0.59	0.95	39.2
North: New England Highway											
7	L2	109	2.9	0.117	4.6	LOS A	0.0	0.0	0.00	0.27	47.9
8	T1	323	10.0	0.117	0.0	LOS A	0.0	0.0	0.00	0.09	49.5
Approach		433	8.2	0.117	1.2	NA	0.0	0.0	0.00	0.14	49.0
All Vehicles		1324	8.0	0.753	6.7	NA	5.1	36.2	0.21	0.38	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.

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MOVEMENT SUMMARY

Site: 101 [2027 PM Future Design Year]

Intersection of Gundy Rd / New England Hwy
 2027 PM Future Design Year
 Allowing 1% p.a. growth along New England Hwy
 Giveaway / Yield (Two-Way)
 Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: New England Highway											
2	T1	433	8.3	0.234	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
3	R2	229	1.8	0.307	8.7	LOS A	1.5	10.3	0.60	0.85	44.3
Approach		663	6.1	0.307	3.0	NA	1.5	10.3	0.21	0.29	47.8
East: Gundy Road											
4	L2	69	3.0	0.058	5.0	LOS A	0.2	1.5	0.19	0.51	46.1
6	R2	127	4.1	0.748	49.3	LOS D ¹¹	3.9	28.3	0.95	1.25	29.7
Approach		197	3.7	0.748	33.7	LOS C	3.9	28.3	0.69	0.99	34.0
North: New England Highway											
7	L2	200	1.6	0.158	4.6	LOS A	0.0	0.0	0.00	0.37	47.4
8	T1	381	11.9	0.158	0.0	LOS A	0.0	0.0	0.00	0.09	49.5
Approach		581	8.3	0.158	1.6	NA	0.0	0.0	0.00	0.18	48.7
All Vehicles		1440	6.7	0.748	6.6	NA	3.9	28.3	0.19	0.34	45.6

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.

¹¹ Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.

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