Spotto CONSULTING

people-oriented traffic and transport solutions

Traffic Impact Assessment

Residential Subdivision

32 Burma Road

Tocumwal NSW

August 2023

Prepared by:

Spotto CONSULTING

For:

Leviens Road Property Holdings Pty Ltd

Ref	Version	Date	Revision Details	Author
P0245	A	04 August 2023	Client Review	SWS

CONTENTS

1 INTRODUCTION

Spotto Consulting have been engaged by Leviens Road Property Holdings Pty Ltd to complete a Traffic Impact Assessment. The study is in response to a proposed development at 32 Burma Road, Tocumwal. The development includes subdivision of the existing lot to create 261 residential lots, as well as construction of a new internal road network connecting to the existing road network at Hutsons Road and Burma Road.

The purpose of the assessment is to review the existing conditions in the vicinity of the site, as well as the performance of the surrounding network. An evaluation is then required of the traffic requirements for the proposed development, and the impacts on the surrounding road network.

The assessment concluded that:

- Traffic data and assessment of nearby roads show that in the vicinity of the site, key intersections and midblock sections currently operate at an excellent Level of Service (LOS A, the highest level) during the relevant AM and PM peak periods;
- The proposed development involves subdividing the property to create a total of 261 residential lots, as well as creation of an internal road network with two new T-intersections connecting to the existing road network at Hutsons Road in the north and Burma Road in the east;
- The proposed development is anticipated to generate an additional 185 vehicle trips per hour during the AM peak period, 204 vehicle trips during the PM peak period, and 1,931 vehicle trips per day;
- There is sufficient capacity in the surrounding road network and key intersections to accommodate the additional traffic generated by the proposed development. Modelling shows that all intersections and midblock sections of road will operate at a good level of service (LOS B) or better across all time periods;
- Parking requirements can be met by providing off-street parking in accordance with the *Berrigan Shire Development Control Plan*;
- There will be no significant impact on public transport service provision; and
- Adequate provision has been made for the movement of pedestrians and cyclists.

The assessment recommended that:

- Consideration be given to undertaking a speed zone review on Hutsons Road (from the limit of the existing 50km/h zone further east) and on Burma Road (from Hutsons Road to Babbingtons Road) to evaluate extending the existing 50km/h speed zone limit; and
- Curve warning and advisory speed signage be placed on approach to the intersection of Burma Road and Babbingtons Road.

2 EXISTING CONDITIONS

2.1 Site

The site is located immediately south-west of the intersection of Burma Road and Hutsons Road, approximately 2km east of the Tocumwal town centre, as shown in Figure 2-1.

Figure 2-1: Locality Plan

The site comprises a single lot, being Lot 32 DP778129. The site has a total area of approximately 21.19 hectares. The site has frontages to Hutsons Road to the north and Burma Road to the east, and is also bounded by the Tocumwal Golf Club to the south and private land to the west. Formal vehicular access to the site is currently available via a gate from Burma Road. The site is currently used for agricultural purposes, with some remnant vegetation and dams also present.

Figure 2-2: Looking south across Hutsons Road with the site in the background

Figure 2-3: Looking west along Babbingtons Road towards the site, showing existing gate providing vehicle access

2.2 Surrounding Land Use

The site is zoned RU5 Village under the *Berrigan Local Environmental Plan 2013* (as shown in Figure 2-4, below), and represents the current easternmost extent of such land in Tocumwal. Land use reflects the zoning, with properties to the west comprising primarily residential dwellings (both detached and medium density).

Other land zonings and associated uses in the area include:

- RU1 Primary Production – Agricultural properties to the north and east of the site, with some dwellings;
- RE2 Private Recreation – The Tocumwal Golf Club to the south of the site; and
- SP2 Infrastructure and E4 (IN1) General Industrial – Tocumwal Airport and associated commercial/industrial properties to the east of the site.

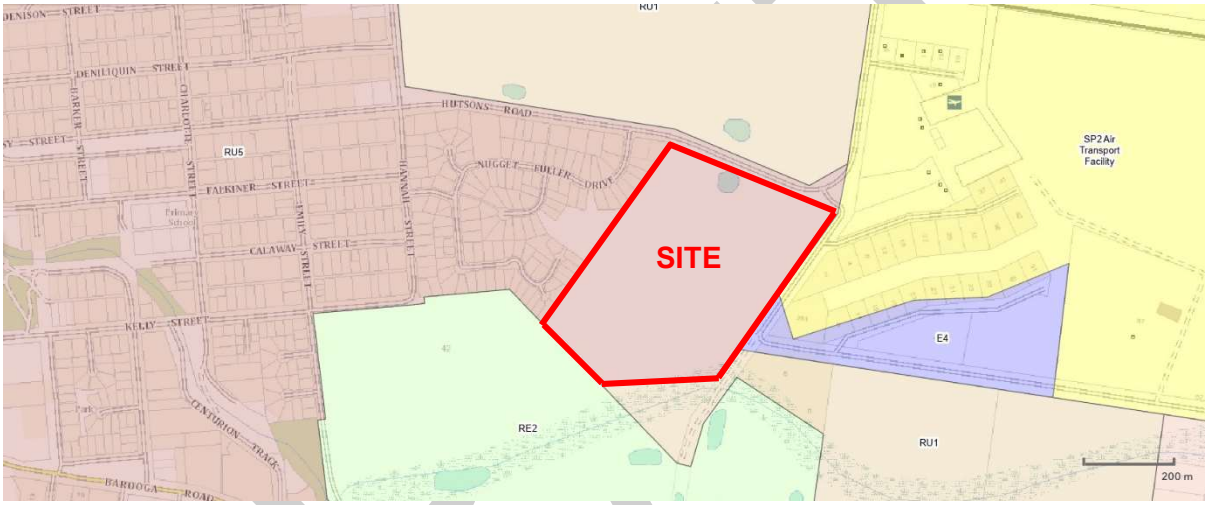

Figure 2-4: Land Zoning (Source: NSW Planning Portal Spatial Viewer)

2.3 Road Network

2.3.1 Surrounding Roads

The site is located immediately south-west of the intersection of Burma Road and Hutsons Road, with Babbingtons Road located to the east. All are local roads under the control of Berrigan Shire Council.

In the vicinity of the site, all three roads generally have a 6.0m sealed width, with gravel shoulders and roadside drainage. The exception to this is Burma Road south of Babbingtons Road, which is a gravel road with a minimum width of 3.0m providing an alternative access into the Tocumwal Golf Club. A 2.5m wide gravel path is located along all three roads (including adjacent to the site on Hutsons Road and Burma Road), providing a facility for pedestrians and cyclists. There is no overhead power or street lighting in the vicinity of the site.

Hutsons Road adjacent to the site is generally zoned at 80km/h, reducing to 50km/h near the site's western boundary. Burma Road north of Hutsons Road is also zoned at 80km/h, increasing to 100km/h north of the airport. No speed limit signs were observed on either Burma

Road south of Hutsons Road or on Babbingtons Road, with the default rural speed limit of 100km/h applying. Council data shows that travel speeds on these roads vary: travel speeds on Burma Road north of Hutsons Road and Babbingtons Road are generally in line with the posted speed limits (the 85th percentile speeds observed were 95.6km/h and 80.2km/h, respectively), while on Hutsons Road travel speeds were 68.2-78.3km/h in the 50 and 80km/h zones, respectively.

Burma Road north of the site provides access to Tocumwal Airport (including the Tocumwal Aviation Museum) and beyond to rural areas outside the Tocumwal township. Hutsons Road runs roughly east/west, and together with Hennessy Street, provides a connection between the Tocumwal Town Centre and the eastern parts of Tocumwal. Babbingtons Road provides access to commercial/industrial as well as rural residential areas to the east, ultimately connecting to Barooga-Tocumwal Road via Marian Drive and Thorburns Road.

Figure 2-5: Looking west along Hutsons Road, with the site on the left hand side

Figure 2-6: Looking east along Hutsons Road, with the site on the right hand side

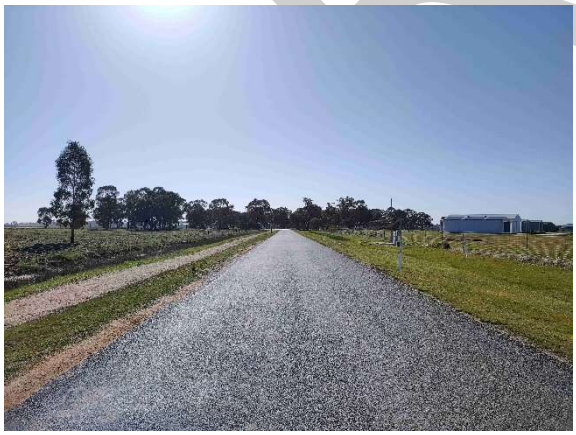

Figure 2-7: Looking north along Burma Road, with the site on the left hand side

Figure 2-8: Looking south along Burma Road towards Babbingtons Road, with the site on the right hand side

2.3.2 Arterial Road Network

The principal origin/destination for vehicular traffic is to/from the west of the site. In this direction, Hutsons Road provides the primary and most direct access route to the Tocumwal town centre (via Jerilderie Street and Deniliquin Street), and further west to the Newell Highway. The Newell Highway is a State Road (under the management of Transport for NSW or TfNSW) that connects to Melbourne in the south (via the Hume Freeway at Seymour), providing an inland north-south route across New South Wales and connecting Tocumwal to other nearby regional centres.

A lesser amount of traffic travels to/from the east of the site. In this direction, Babbingtons Road (in conjunction with Marian Drive and Thorburns Road) provides connectivity to Barooga-Tocumwal Road. This is a Regional Road (under joint management of TfNSW and Council), providing an alternative route along the northern side of the Murray River between Tocumwal and Barooga/Cobram to the east (and beyond to other centres such as Corowa).

A small amount of traffic also travels to/from the north of the site via Burma Road. This provides access to the Tocumwal Airport and Aviation Museum, and beyond to rural areas.

2.3.3 Intersections

Key intersections in the vicinity of the site include:

- Hutsons Road and Burma Road – Located north-east of the site, this is a three-leg at-grade intersection with priority given to vehicles travelling between Hutsons Road (west) and Burma Road (north) due to Give Way signage on the south-eastern leg of Burma Road. No auxiliary lanes are present on any of the intersection legs; and
- Babbingtons Road and Burma Road – Located south-east of the site, this is technically a three-leg at-grade intersection with priority given to vehicles travelling between the northern leg of Burma Road and the eastern leg of Babbingtons Road. As the southern leg of Burma Road is unformed, this intersection effectively operates as a 90 degree bend.

Figure 2-9: Looking east along Hutsons Road towards the intersection with Burma Road

Figure 2-10: Looking south along Burma Road towards the intersection with Babbingtons Road: the unsealed southern section of Burma Road is directly ahead in the background, with Babbingtons Road on the left hand side

Other intersections further from the site include:

- Henessey Street and Jerilderie Street – located approximately 2km west of the site and providing connectivity between the site and the Tocumwal town centre, this is a four leg at-grade intersection with priority given to through vehicles on the Jerilderie Street due to Give Way signage and linemarking on Hennessey Street. There is no widening or provision of auxiliary lanes on any of the legs; and
- Barooga-Tocumwal Road and Thorburns Road – located approximately 3km south-east of the site and providing connectivity between the site and towns to the east such as Cobram-Barooga and Corowa, this is a three leg at-grade intersection with priority given to through vehicles on Barooga-Tocumwal Road due to Thorburns Road being the terminating leg. There is no widening or provision of auxiliary lanes on any of the legs.

2.4 Existing Traffic Conditions

Traffic data was provided by Berrigan Shire Council, comprising Metrocount traffic surveys undertaken at several locations in the surrounding network (including Hutsons Road, Burma Road and Babbingtons Road) with dates ranging from 2006 to 2021. Although none of the data is on segments of road immediately adjacent to the site, the datasets are useful for assessing heavy vehicle percentages, travel speeds, variations across the week/day and directional splits in traffic.

Turning movement counts were undertaken at several key intersections, either in the vicinity of the site or with potential to be impacted, on Wednesday 19 July 2023, which was within NSW and Victorian school term dates and outside of any significant local COVID-19 restrictions. These surveys were undertaken across the morning and afternoon peak periods, allowing the peak hour in each period to be determined. The turning movements for the busiest one-hour period in the AM and PM peak periods are summarised for these intersections in Figure 2-11 and Figure 2-12, below.

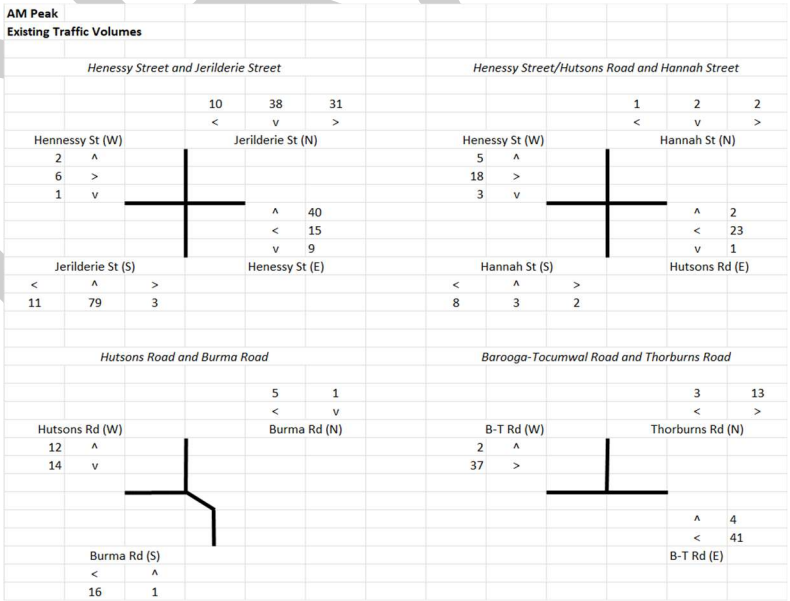

Figure 2-11: AM Peak Hour Turning Movements - Existing Conditions

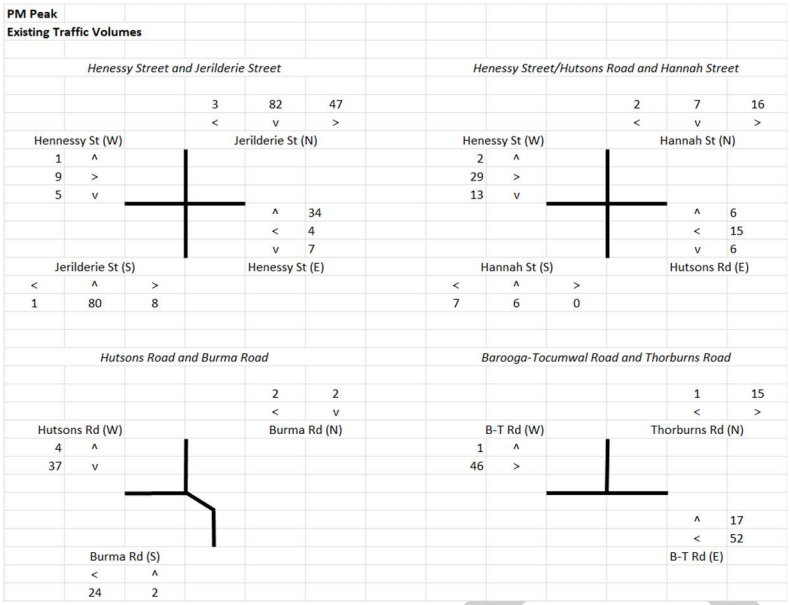

Figure 2-12: PM Peak Hour Turning Movements - Existing Conditions

The performance of these intersections were then modelled using the intersection analysis program SIDRA Intersection. Full results for the existing AM and PM peak periods are included in Appendix A, and summarised in Table 2-1 below.

Table 2-1: Intersection performance summary - existing conditions

Intersection	Total Flow (veh/h)	Degree of Saturation	Average Delay (sec) Avg/Worst	Level of Service* Avg/Worst
Henessy St & Jerilderie St				
AM	258	0.066	2.5/5.4	A/A
PM	296	0.075	2.1/5.7	A/A
Henessy/Hutsons & Hannah St				
AM	74	0.015	1.9/4.9	A/A
PM	116	0.026	2.7/5.0	A/A
Hutsons Rd & Burma Rd				
AM	52	0.015	6.7/7.0	A/A
PM	75	0.025	6.5/7.0	A/A
Barooga-Toc Rd & Thorburns Rd				
AM	105	0.025	1.8/8.1	A/A
PM	139	0.040	2.1/8.1	A/A

** Level of Service (LOS) is a qualitative assessment of the quantitative effect of factors such as speed, volume of traffic, geometric features, traffic interruptions, delays and freedom to manoeuvre. It ranges from A (best) to F (worst), and is calculated using average delay (as per TfNSW guidelines).*

The analysis demonstrates that under existing traffic volumes, key intersections in the vicinity of the site currently operate at an excellent Level of Service (LOS A, the highest level) in both the AM and PM peak periods. This indicates intersections operating with low levels of delay and saturation, and with spare capacity.

Traffic volumes midblock (ie. between intersections) can be determined for the peak periods based on the turning movement data. A summary of the midblock data for the key sections of roads in the vicinity of the site, including weekday traffic volumes (in vehicles per day), peak

hour traffic volumes (in vehicles per hour) and Level of Service (LOS) is provided in Table 2-2 below.

Table 2-2: Midblock traffic data – existing conditions

Location	Weekday[#]	Weekday AM Peak		Weekday PM Peak	
	Veh/d	Veh/h	LOS*	Veh/h	LOS*
Jerilderie Street (North of Henessy St)	2,790	200		247	
Northbound		121	A	115	A
Southbound		79	A	132	A
Henessy St (East of Jerilderie St)	1,330	104		109	
Eastbound		40	A	64	A
Westbound		64	A	45	A
Hutsons Road (East of Hannah St)	750	48		72	
Eastbound		22	A	45	A
Westbound		26	A	27	A
Burma Road (South of Hutsons Rd)	610	32		65	
Northbound		17	A	26	A
Southbound		15	A	39	A
Thorburns Road (North of Barooga-Toc Rd)	350	22		34	
Northbound		6	A	18	A
Southbound		16	A	16	A
Barooga-Tocumwal Road (East of Thorburns Rd)	1,410	95		130	
Eastbound		50	A	61	A
Westbound		45	A	69	A

[#] *Daily traffic volume determined by taking the average of the AM and PM peak hour turning movement counts and assuming this represents 8% of the total daily volume (as per Council midblock data)*

** Level of Service calculated based on typical midblock capacities for two-lane, two-way roads from Austroads Guide to Traffic Management Part 3: Traffic Studies and Analysis.*

The level of service for all roads in the vicinity of the site is excellent (LOS A, the highest level) across the AM and PM peak periods, indicating the roads generally have adequate midblock capacity for the current levels of traffic observed in the road network.

2.5 Crash Data

Data on crashes was obtained from the Transport for NSW Centre for Road Safety Interactive Crash Statistics database. In the most recent five year period for which data is available (shown in Figure 2-13, below), the database showed that the closest crashes to the site were on Hennessy Street at the intersections with Hannah Street and Jerilderie Street (approximately 800m and 1.8km west of the site, respectively). Neither of these crashes resulted in an injury. All other crashes were more distant from the site.

Figure 2-13: Crashes in vicinity of site 2017-2021 (Source: TfNSW Interactive Crash Stats)

2.6 Public Transport

There are no broad public transport services such as town buses in Tocumwal, although school buses operate, and community transport services provide free or subsidised services for eligible community members.

Regional public transport services are available from the Tocumwal Coach Stop, located at the intersection of Morris Street and Deniliquin Street approximately 2km west of the site. The stop provides access to the Albury-Echuca bus route, which allows for connection to rail services (providing access to more distant destinations such as Sydney and Melbourne).

2.7 Pedestrians and Cyclists

A 2.5m-wide gravel path is located adjacent to the site on Hutsons Road and Burma Road, providing access to the broader Tocumwal path network for pedestrians and cyclists. There are otherwise no dedicated pedestrian or cyclist facilities in the vicinity of the site.

3 PROPOSED DEVELOPMENT

The proposed development involves subdivision of the site to create 261 residential lots, with lot sizes ranging from 350m^2 to over 1,000m^2. Each lot allows for construction of a single residential property. Additional lots will be developed as reserves for open space and drainage.

An internal road network will be constructed, with connectivity to the existing road network at Hutsons Road to the north and Burma Road to the east. Paths allowing for travel by pedestrians and cyclists will also connect to the south and west.

Plans of the proposed development are included in Appendix B.

4 IMPACT OF PROPOSED DEVELOPMENT

4.1 Road Network

4.1.1 Traffic Generation and Distribution

Traffic generation levels for proposed developments can typically be determined by reference to published standards such as the *RTA Guide to Traffic Generating Developments* (and its subsequent update *RMS Technical Direction TDT2013/04a Guide to Traffic Generating Developments – Updated Traffic Surveys*).

The amount of new traffic generated by the proposed development depends on the land use, and the relevant rates for each land use are summarised in Table 4-1, below.

Table 4-1: Traffic Generation Rates for Proposed Development

Element	Source	Trip Generation Rate		
		AM Peak	PM Peak	Daily
		Veh/h	Veh/h	Veh/d
Residential Dwelling	RTA TDT 2013	0.71 trips per dwelling	0.78 trips per dwelling	7.4 trips per dwelling

The total traffic generated by the proposed development is summarised in Table 4-2, below.

Table 4-2: Traffic Generation – Proposed Development

Element	Scale	Total Number of Trips		
		AM Peak	PM Peak	Daily
		Veh/h	Veh/h	Veh/d
Residential Dwelling	+261 Dwellings	185	204	1,931
Total		*185*	*204*	*1,931*

Other assumptions used to determine traffic generation and distribution for the site are that:

- 70% of traffic will be outbound, and 30% inbound in the AM Peak (in line with observations from the existing traffic movements in the area as well as typical distributions for residential properties, where residents typically travel outbound in the morning to work and return in the evening), with these values reversed in the PM Peak;
- 85% of traffic will be to/from the west, 10% will be to/from the south-east and 5% will be to/from the north, in line with connectivity to the existing road network and observations of existing traffic volumes (refer to Section 2.3 and 2.4, above);
- Traffic to/from the west will be via Hutsons Road/Hennessey Street, with the majority (50%) travelling north-west to/from the Tocumwal town centre via Jerilderie Street, and lesser amounts to the south-west (25%) via Jerilderie Street and other roads to the west (10%) such as Hannah Street;
- Traffic to/from the south-east will travel via Babbingtons Road, Marian Drive and Thorburns Road to Barooga-Tocumwal Road; and
- Traffic to/from the north will be via Burma Road north of Hutsons Road.

Based on these assumptions, the traffic generated by the proposed development in the AM and PM peak periods is shown in Figure 4-1 and Figure 4-2 (respectively), below.

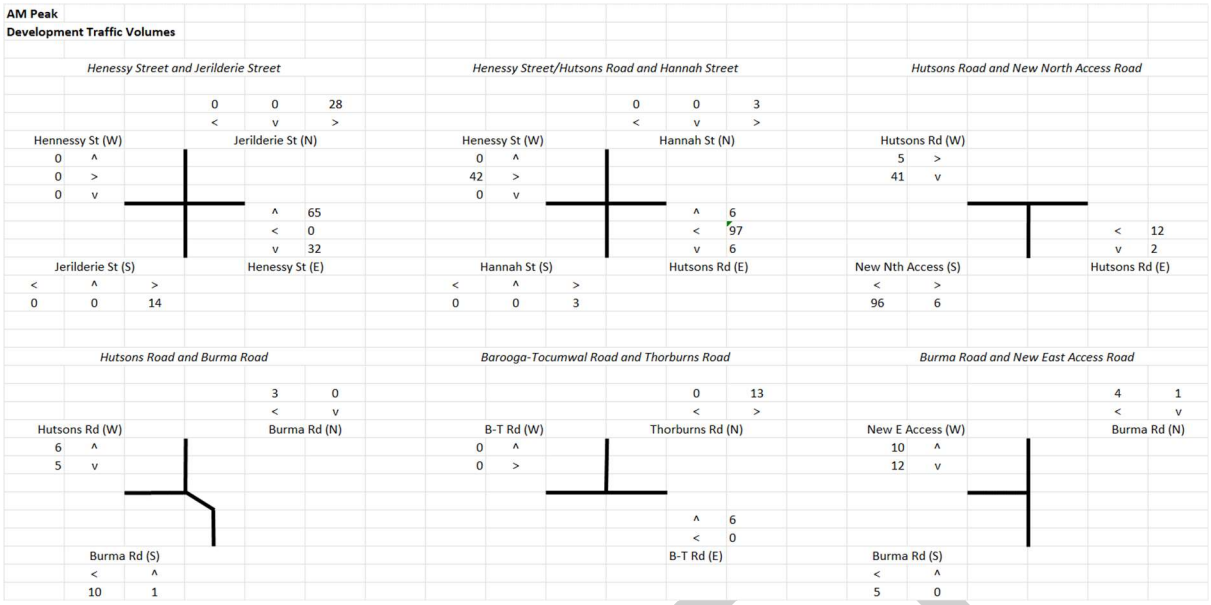

Figure 4-1: AM Peak Hour Turning Movements – Generated by Development

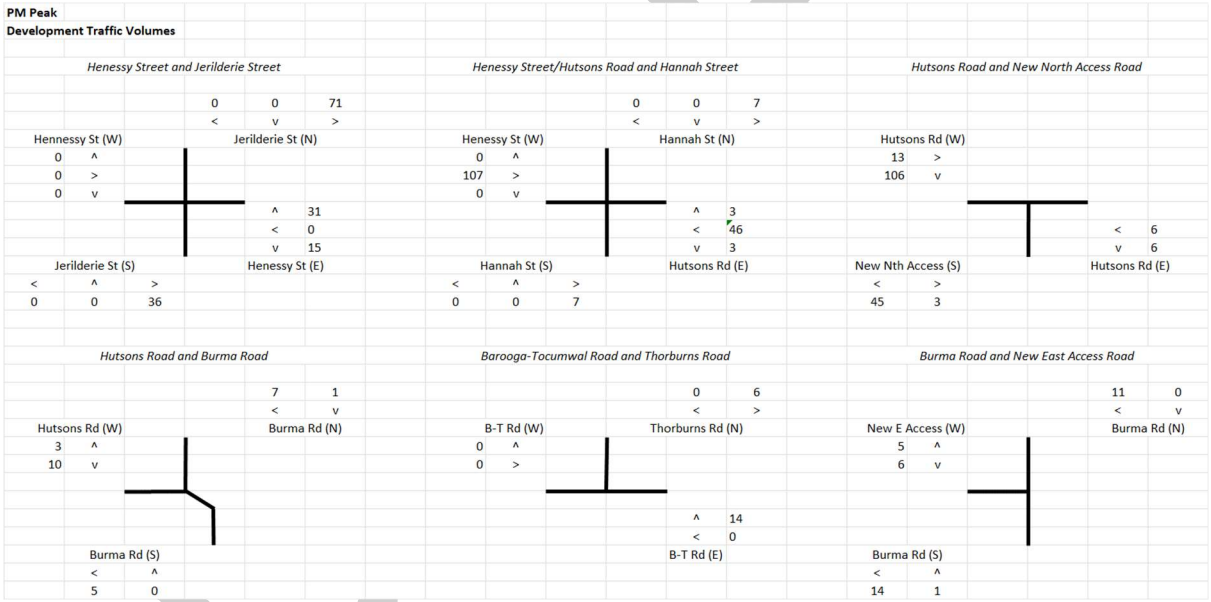

Figure 4-2: PM Peak Hour Turning Movements – Generated by Development

4.1.2 Traffic Impact at Intersections

The additional traffic generated by the proposed development, was added to the existing traffic flows at key intersections in the vicinity of, or with potential to be impacted by, the proposed development. The total flows at each of these intersections in the AM and PM peak periods is shown in Figure 4-3 and Figure 4-4 (respectively), below.

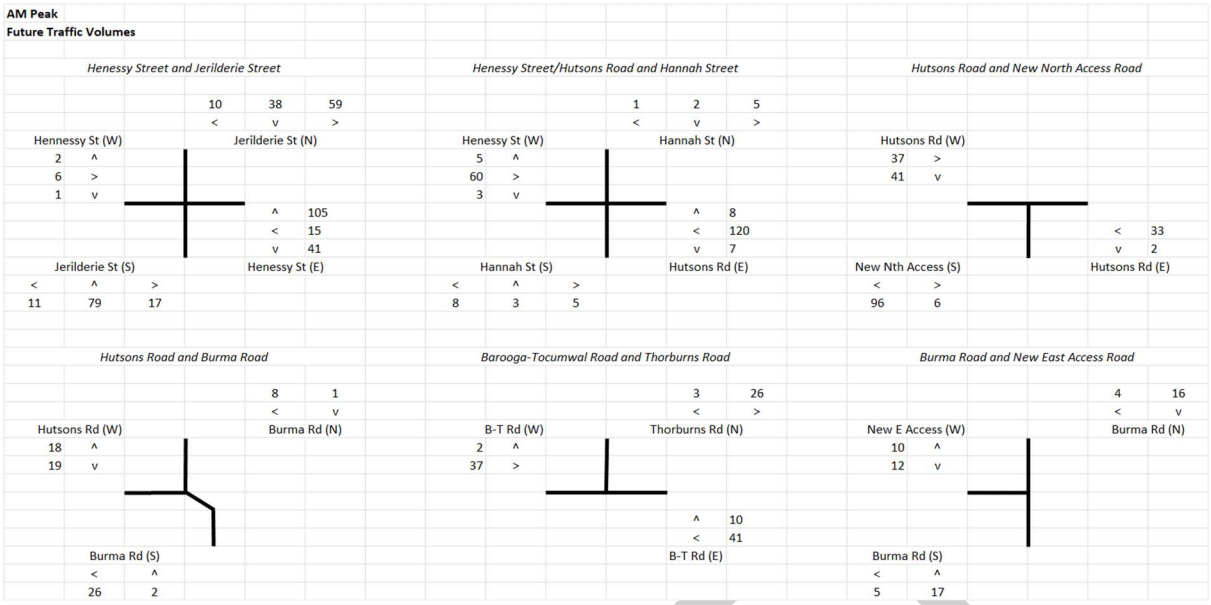

Figure 4-3: AM Peak Hour Turning Movements – With Proposed Development

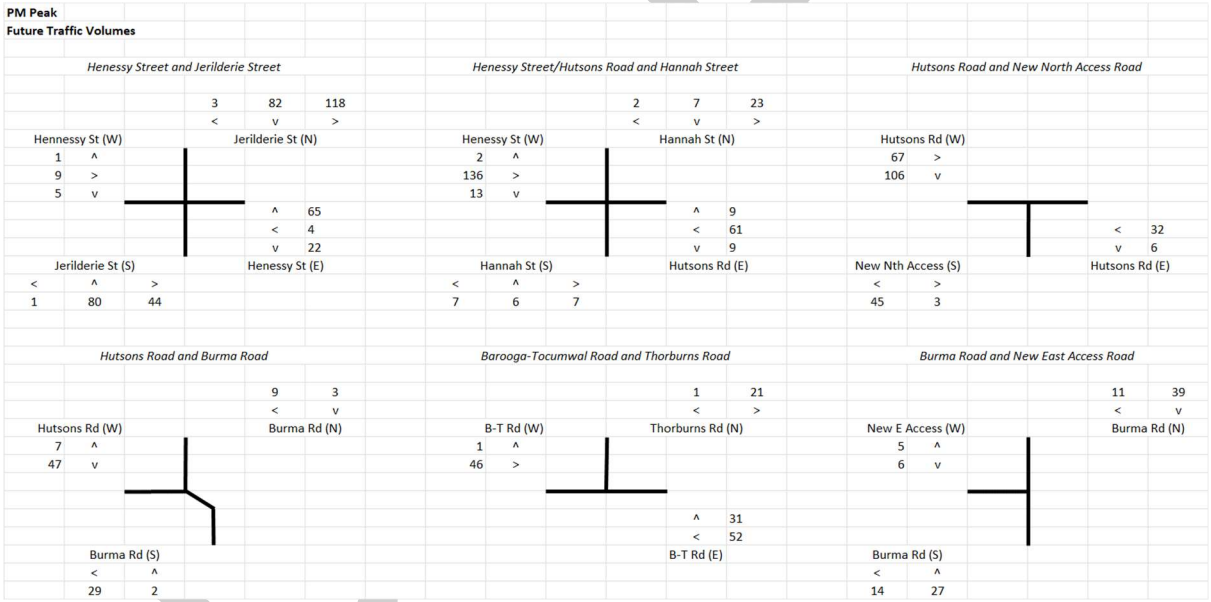

Figure 4-4: PM Peak Hour Turning Movements – With Proposed Development

The performance of these key intersections was then modelled using the intersection analysis program SIDRA Intersection. Full results for the AM and PM Peak periods are included in Appendix D, and summarised in Table 4-3, below.

Table 4-3: Intersection performance summary – with proposed development

Intersection	Total Flow (veh/h)	Degree of Saturation	Average Delay (sec) Avg/Worst	Level of Service* Avg/Worst
Henessy St & Jerilderie St				
AM	404	0.166	3.6/5.7	A/A
PM	457	0.117	3.3/6.3	A/A
Henessy/Hutsons & Hannah St				
AM	239	0.076	1.0/5.7	A/A
PM	297	0.086	1.5/6.0	A/A
Hutsons Rd & Burma Rd				
AM	78	0.022	6.7/7.0	A/A
PM	102	0.032	6.5/7.0	A/A
Barooga-Toc Rd & Thorburns Rd				
AM	125	0.029	2.8/8.1	A/A
PM	160	0.049	2.8/8.1	A/A
Hutsons Rd & New Nth Access Rd				
AM	226	0.071	3.6/7.0	A/A
PM	273	0.104	3.9/7.0	A/A
New East Access Rd & Burma Rd				
AM	67	0.017	2.6/7.0	A/A
PM	107	0.029	2.2/7.0	A/A

The analysis demonstrates that all intersections will operate at an excellent LOS (LOS A, the highest level) in both the AM and PM peak periods, even with the additional traffic generated by the proposed development. This indicates the intersections will operate within capacity.

As vehicles travel further throughout the network, traffic generated by the proposed development becomes more dispersed, and hence has a lower net impact on other intersections. Hence if the impact at nearby intersections is within acceptable limits, then beyond these the impact will be even lower.

It is concluded that traffic from the proposed development can be accommodated at key intersections in the vicinity of the site, and that there will be no significant impacts on intersections as a result of the proposed development.

4.1.3 Traffic Impact Midblock

The additional traffic generated by the proposed development was added to the existing traffic volumes on streets in the vicinity of, or with potential to be impacted by, the proposed development. A summary of the midblock data for the key sections of roads, including weekday traffic volumes (in vehicles per day), peak hour traffic volumes (in vehicles per hour) and Level of Service (LOS) is provided in Table 4-4, below.

Table 4-4: Midblock traffic data – with proposed development

Location	Weekday	Weekday AM Peak		Weekday PM Peak	
	Veh/d	Veh/h	LOS	Veh/h	LOS
Jerilderie Street (North of Henessy St)	3,560	293		349	
Northbound		186	B	146	A
Southbound		107	A	203	B
Henessy St (East of Jerilderie St)	2,800	243		262	
Eastbound		82	A	171	A
Westbound		161	A	91	A
Hutsons Road (East of Hannah St)	2,490	204		245	
Eastbound		69	A	166	A
Westbound		135	A	78	A
Burma Road (South of Hutsons Rd)	710	47		81	
Northbound		27	A	31	A
Southbound		20	A	50	A
Thorburns Road (North of Barooga-Toc Rd)	530	41		54	
Northbound		12	A	32	A
Southbound		29	A	22	A
Barooga-Tocumwal Road (East of Thorburns Rd)	1,470	114		150	
Eastbound		63	A	67	A
Westbound		51	A	83	A
New North Access Road (South of Hutsons Rd)	1,700	146		160	
Northbound		102	A	48	A
Southbound		44	A	112	A
New East Access Road (West of Burma Rd)	370	32		35	
Eastbound		22	A	10	A
Westbound		10	A	24	A

The level of service for all roads in the vicinity of the site is good (LOS B) or better across the AM and PM peak periods, even with the additional traffic generated by the proposed development, indicating the roads generally have adequate midblock capacity for the anticipated levels of traffic in the road network.

As vehicles travel further throughout the network, traffic generated by the proposed development becomes more dispersed, and hence has a lower net impact on other intersections. Hence if the impact at nearby intersections and midblock sections is within acceptable limits, then beyond these the impact will be even lower.

It is concluded that there will be no significant adverse impact on roads or intersections in the vicinity of the site or further afield as a result of the proposed development.

4.2 Internal Road Network

The internal road network for the proposed development connects to the existing road network via two new intersections (one with Hutsons Road to the north and another with Burma Road to the east). In relation to these intersections, the following is noted:

- Both intersections are T-intersections, with the new access roads intersecting with the existing roads at angles of, or close to, 90^{O} (the northern access road intersects with Hutsons Road at an angle of exactly 90^{O}, while the eastern access road intersects with Burma road at an angle of 87^{O}). This is in line with good design principles for intersections of angles of not less than 70^{O}, in order to maximise sight distance from the side road along the main road;
- Both intersections are clear of other nearby intersections by at least 60m (the northern access road is approximately 210m from Nugget Fuller Drive and 225m from Burma Road, while the eastern access road is approximately 60m from Babbingtons Road and 270m from Hutsons Road). This is in line with good design principles for intersections, which require a minimum separation from other nearby intersections of at least 50m; and
- Both intersections provide clear sight distance in all directions. The northern access road provides approximately 170m to the west and 180m to the east – for an 80 km/h zone, Table 3.2 of the *Austroads Guide to Road Design Part 4A: Signalised and Unsignalised Intersections* (AGRD 4A) recommends a Safe Intersection Sight Distance (SISD) of 181m be provided. It should be noted that the approach to the west is zoned at 50km/h for part of the approach, and hence the slight shortfall in SISD against the requirements for an 80km/h zone to the west is considered acceptable. The eastern access road provides approximately 270m to the north and 60m to the south, indicating an acceptable sight distance to the north. Vehicles approaching from the south will do so after turning a sharp curve from Babbingtons Road – this curve is currently posted with a curve warning sign but no advisory speed, and vehicles are likely to be travelling at 30-40km/h. The sight distance to the south is considered acceptable under these circumstances. In order to improve safety at these two intersections, it is recommended that curve warning signs with advisory speeds be posted on both legs of the Burma Road and Babbingtons Road intersection, and that a speed zone review be considered for extension of the 50km/h zone on Hutsons Road, along with posting of an appropriate speed limit for Burma Road and Babbingtons Road.

In relation to the internal road network, the following is noted:

- The principal access road (being the new northern access road connecting to Hutsons Road) has been designed with a 24m-wide road reserve, with other roads within the subdivision generally having a 20m-wide road reserve. This provides a clear road hierarchy within the subdivision, allowing the principal access road to be clearly identified from lower order roads;
- There are no four-way intersections within the subdivision, thereby eliminating risks associated with these types of intersections;
- Some traffic calming measures have been incorporated within the subdivision, such as the narrow (16m-wide) road reserve in the southern part of the site to discourage through traffic and “rat-running”; and
- The use of cul-de-sacs has been minimised, with only two present, and the use of loop roads to encourage a more equal distribution of traffic within the subdivision.

The internal road network therefore generally complies with principles of good road design.

4.3 Car Parking Requirements and Impact

The *Berrigan Shire Development Control Plan* specifies the minimum parking spaces required for a development, depending on the land use type. Given that the development will be a residential subdivision, and all future development will need to provide off-street parking to meet Council's requirements, it is not anticipated that there will be any significant impact to parking in the estate or surrounding areas as a result of the proposed development.

4.4 Public Transport

As detailed in Section 2.6, above, public transport in the vicinity of the proposed development is provided by an on-demand service, as well as school buses. There is no change to the accessibility of these services arising from the proposed development. It is concluded that the proposed development will have no significant impact on the provision of public transport.

4.5 Pedestrian and Cyclist Impact

Council's design standards for subdivisions requires local roads in urban areas to have a 1.5m-wide footpath on one side, with cyclists accommodated on-road (which does not require dedicated cycleways to be marked).

The proposed development is able to provide footpaths within the nominated road reserve widths. In addition, connectivity is provided to external areas in all directions, providing accessibility from within the proposed development to existing paths on Hutsons Road and Burma Road, as well as adjoining recreational areas to the west and south.

It is considered that the provision of pedestrian and cyclist facilities is consistent with existing Council services, and that there will be no significant adverse impact for pedestrians and cyclists.

5 CONCLUSIONS AND RECOMMENDATIONS

It is concluded that:

- Traffic data and assessment of nearby roads show that in the vicinity of the site, key intersections and midblock sections currently operate at an excellent Level of Service (LOS A, the highest level) during the relevant AM and PM peak periods;
- The proposed development involves subdividing the property to create a total of 261 residential lots, as well as creation of an internal road network with two new T-intersections connecting to the existing road network at Hutsons Road in the north and Burma Road in the east;
- The proposed development is anticipated to generate an additional 185 vehicle trips per hour during the AM peak period, 204 vehicle trips during the PM peak period, and 1,931 vehicle trips per day;
- There is sufficient capacity in the surrounding road network and key intersections to accommodate the additional traffic generated by the proposed development. Modelling shows that all intersections and midblock sections of road will operate at a good level of service (LOS B) or better across all time periods;
- Parking requirements can be met by providing off-street parking in accordance with the *Berrigan Shire Development Control Plan*;
- There will be no significant impact on public transport service provision; and
- Adequate provision has been made for the movement of pedestrians and cyclists.

It is recommended that:

- Consideration be given to undertaking a speed zone review on Hutsons Road (from the limit of the existing 50km/h zone further east) and on Burma Road (from Hutsons Road to Babbingtons Road) to evaluate extending the existing 50km/h speed zone limit; and
- Curve warning and advisory speed signage be placed on approach to the intersection of Burma Road and Babbingtons Road.

APPENDIX A – INTERSECTION ANALYSIS: EXISTING

MOVEMENT SUMMARY

Site: [Hennessy and Jerilderie_Existing_AM (Site Folder: General)]

Hennessy Street and Jerilderie Street, Tocumwal
Existing Conditions
AM Peak Period
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Jerilderie (S)														
1	L2	11	5.0	12	5.0	0.052	4.7	LOS A	0.0	0.2	0.02	0.08	0.02	48.9
2	T1	79	5.0	83	5.0	0.052	0.0	LOS A	0.0	0.2	0.02	0.08	0.02	49.5
3	R2	3	5.0	3	5.0	0.052	4.8	LOS A	0.0	0.2	0.02	0.08	0.02	48.4
Approach		93	5.0	98	5.0	0.052	0.7	NA	0.0	0.2	0.02	0.08	0.02	49.4
East: Henessy (E)														
4	L2	9	5.0	9	5.0	0.066	4.7	LOS A	0.2	1.7	0.20	0.53	0.20	46.3
5	T1	15	5.0	16	5.0	0.066	3.9	LOS A	0.2	1.7	0.20	0.53	0.20	46.4
6	R2	40	5.0	42	5.0	0.066	5.4	LOS A	0.2	1.7	0.20	0.53	0.20	45.9
Approach		64	5.0	67	5.0	0.066	5.0	LOS A	0.2	1.7	0.20	0.53	0.20	46.0
North: Jerilderie (N)														
7	L2	31	5.0	33	5.0	0.046	4.7	LOS A	0.1	0.6	0.07	0.27	0.07	47.7
8	T1	38	5.0	40	5.0	0.046	0.1	LOS A	0.1	0.6	0.07	0.27	0.07	48.2
9	R2	10	5.0	11	5.0	0.046	4.9	LOS A	0.1	0.6	0.07	0.27	0.07	47.2
Approach		79	5.0	83	5.0	0.046	2.5	NA	0.1	0.6	0.07	0.27	0.07	47.9
West: Henessy (W)														
10	L2	2	5.0	2	5.0	0.008	4.8	LOS A	0.0	0.2	0.23	0.48	0.23	46.6
11	T1	6	5.0	6	5.0	0.008	3.9	LOS A	0.0	0.2	0.23	0.48	0.23	46.7
12	R2	1	5.0	1	5.0	0.008	5.4	LOS A	0.0	0.2	0.23	0.48	0.23	46.2
Approach		9	5.0	9	5.0	0.008	4.3	LOS A	0.0	0.2	0.23	0.48	0.23	46.6
All Vehicles		245	5.0	258	5.0	0.066	2.5	NA	0.2	1.7	0.09	0.27	0.09	47.9

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

MOVEMENT SUMMARY

Site: [Hennessy/Hutsons and Hannah_Existing_AM (Site Folder: General)]

Hennessy Street/Hutsons Road and Hannah Street, Tocumwal
Existing Conditions
AM Peak Period
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hannah (S)														
1	L2	8	5.0	8	5.0	0.010	4.7	LOS A	0.0	0.3	0.09	0.49	0.09	46.5
2	T1	3	5.0	3	5.0	0.010	3.4	LOS A	0.0	0.3	0.09	0.49	0.09	46.6
3	R2	2	5.0	2	5.0	0.010	4.8	LOS A	0.0	0.3	0.09	0.49	0.09	46.1
Approach		13	5.0	14	5.0	0.010	4.4	LOS A	0.0	0.3	0.09	0.49	0.09	46.5
East: Hutsons (E)														
4	L2	1	5.0	1	5.0	0.015	4.7	LOS A	0.0	0.1	0.02	0.06	0.02	49.0
5	T1	23	5.0	24	5.0	0.015	0.0	LOS A	0.0	0.1	0.02	0.06	0.02	49.6
6	R2	2	5.0	2	5.0	0.015	4.7	LOS A	0.0	0.1	0.02	0.06	0.02	48.5
Approach		26	5.0	27	5.0	0.015	0.5	NA	0.0	0.1	0.02	0.06	0.02	49.5
North: Hannah (N)														
7	L2	2	5.0	2	5.0	0.004	4.7	LOS A	0.0	0.1	0.08	0.49	0.08	46.7
8	T1	2	5.0	2	5.0	0.004	3.4	LOS A	0.0	0.1	0.08	0.49	0.08	46.8
9	R2	1	5.0	1	5.0	0.004	4.9	LOS A	0.0	0.1	0.08	0.49	0.08	46.2
Approach		5	5.0	5	5.0	0.004	4.2	LOS A	0.0	0.1	0.08	0.49	0.08	46.6
West: Henessy (W)														
10	L2	5	5.0	5	5.0	0.015	4.6	LOS A	0.0	0.2	0.03	0.17	0.03	48.4
11	T1	18	5.0	19	5.0	0.015	0.0	LOS A	0.0	0.2	0.03	0.17	0.03	49.0
12	R2	3	5.0	3	5.0	0.015	4.7	LOS A	0.0	0.2	0.03	0.17	0.03	48.0
Approach		26	5.0	27	5.0	0.015	1.4	NA	0.0	0.2	0.03	0.17	0.03	48.7
All Vehicles		70	5.0	74	5.0	0.015	1.9	NA	0.0	0.3	0.04	0.21	0.04	48.4

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

MOVEMENT SUMMARY

Site: [Hutsons and Burma_Existing_AM (Site Folder: General)]

Hutsons Road and Burma Road, Tocumwal
Existing Conditions
AM Peak Period
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Burma (S)														
21a	L1	16	5.0	17	5.0	0.011	6.6	LOS A	0.0	0.3	0.03	0.62	0.03	63.5
23a	R1	1	5.0	1	5.0	0.011	6.5	LOS A	0.0	0.3	0.03	0.62	0.03	63.7
Approach		17	5.0	18	5.0	0.011	6.6	LOS A	0.0	0.3	0.03	0.62	0.03	63.5
North: Burma (N)														
7a	L1	1	5.0	1	5.0	0.004	6.6	LOS A	0.0	0.1	0.06	0.61	0.06	63.3
9	R2	5	5.0	5	5.0	0.004	6.7	LOS A	0.0	0.1	0.06	0.61	0.06	63.3
Approach		6	5.0	6	5.0	0.004	6.7	NA	0.0	0.1	0.06	0.61	0.06	63.3
West: Hutsons (W)														
10	L2	12	5.0	13	5.0	0.015	7.0	LOS A	0.1	0.5	0.01	0.62	0.01	64.0
12a	R1	14	5.0	15	5.0	0.015	6.3	LOS A	0.1	0.5	0.01	0.62	0.01	63.7
Approach		26	5.0	27	5.0	0.015	6.7	NA	0.1	0.5	0.01	0.62	0.01	63.9
All Vehicles		49	5.0	52	5.0	0.015	6.7	NA	0.1	0.5	0.02	0.62	0.02	63.7

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

MOVEMENT SUMMARY

Site: [Barooga-Tocumwal and Thorburns_Existing_AM (Site Folder: General)]

Barooga-Tocumwal Road and Thorburns Road, Tocumwal
Existing Conditions
AM Peak Period
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Barooga-Tocumwal (E)														
5	T1	41	5.0	43	5.0	0.025	0.0	LOS A	0.0	0.2	0.02	0.06	0.02	97.9
6	R2	4	5.0	4	5.0	0.025	7.7	LOS A	0.0	0.2	0.02	0.06	0.02	83.8
Approach		45	5.0	47	5.0	0.025	0.7	NA	0.0	0.2	0.02	0.06	0.02	96.5
North: Thorburns (N)														
7	L2	13	5.0	14	5.0	0.012	8.1	LOS A	0.0	0.3	0.11	0.62	0.11	72.1
9	R2	3	5.0	3	5.0	0.012	7.8	LOS A	0.0	0.3	0.11	0.62	0.11	71.7
Approach		16	5.0	17	5.0	0.012	8.0	LOS A	0.0	0.3	0.11	0.62	0.11	72.1
West: Barooga-Tocumwal (W)														
10	L2	2	5.0	2	5.0	0.022	8.0	LOS A	0.0	0.0	0.00	0.04	0.00	85.2
11	T1	37	5.0	39	5.0	0.022	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	98.9
Approach		39	5.0	41	5.0	0.022	0.4	NA	0.0	0.0	0.00	0.04	0.00	98.1
All Vehicles		100	5.0	105	5.0	0.025	1.8	NA	0.0	0.3	0.03	0.14	0.03	92.0

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: [Hennessy and Jerilderie_Existing_PM (Site Folder: General)]

Hennessy Street and Jerilderie Street, Tocumwal
Existing Conditions
PM Peak Period
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Jerilderie (S)														
1	L2	1	5.0	1	5.0	0.051	5.0	LOS A	0.1	0.4	0.05	0.06	0.05	49.0
2	T1	80	5.0	84	5.0	0.051	0.1	LOS A	0.1	0.4	0.05	0.06	0.05	49.5
3	R2	8	5.0	8	5.0	0.051	5.0	LOS A	0.1	0.4	0.05	0.06	0.05	48.5
Approach		89	5.0	94	5.0	0.051	0.6	NA	0.1	0.4	0.05	0.06	0.05	49.4
East: Henessy (E)														
4	L2	7	5.0	7	5.0	0.050	4.9	LOS A	0.2	1.2	0.27	0.56	0.27	46.0
5	T1	4	5.0	4	5.0	0.050	4.1	LOS A	0.2	1.2	0.27	0.56	0.27	46.1
6	R2	34	5.0	36	5.0	0.050	5.7	LOS A	0.2	1.2	0.27	0.56	0.27	45.6
Approach		45	5.0	47	5.0	0.050	5.5	LOS A	0.2	1.2	0.27	0.56	0.27	45.7
North: Jerilderie (N)														
7	L2	47	5.0	49	5.0	0.075	4.6	LOS A	0.0	0.2	0.01	0.20	0.01	48.3
8	T1	82	5.0	86	5.0	0.075	0.0	LOS A	0.0	0.2	0.01	0.20	0.01	48.8
9	R2	3	5.0	3	5.0	0.075	4.9	LOS A	0.0	0.2	0.01	0.20	0.01	47.8
Approach		132	5.0	139	5.0	0.075	1.8	NA	0.0	0.2	0.01	0.20	0.01	48.6
West: Henessy (W)														
10	L2	1	5.0	1	5.0	0.016	4.9	LOS A	0.1	0.4	0.28	0.51	0.28	46.4
11	T1	9	5.0	9	5.0	0.016	4.1	LOS A	0.1	0.4	0.28	0.51	0.28	46.5
12	R2	5	5.0	5	5.0	0.016	5.6	LOS A	0.1	0.4	0.28	0.51	0.28	46.0
Approach		15	5.0	16	5.0	0.016	4.7	LOS A	0.1	0.4	0.28	0.51	0.28	46.3
All Vehicles		281	5.0	296	5.0	0.075	2.1	NA	0.2	1.2	0.08	0.23	0.08	48.2

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: [Hennessy/Hutsons and Hannah_Existing_PM (Site Folder: General)]

Hennessy Street/Hutsons Road and Hannah Street, Tocumwal
Existing Conditions
PM Peak Period
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hannah (S)														
1	L2	7	5.0	7	5.0	0.011	4.7	LOS A	0.0	0.3	0.07	0.49	0.07	46.7
2	T1	6	5.0	6	5.0	0.011	3.5	LOS A	0.0	0.3	0.07	0.49	0.07	46.8
3	R2	1	5.0	1	5.0	0.011	5.0	LOS A	0.0	0.3	0.07	0.49	0.07	46.3
Approach		14	5.0	15	5.0	0.011	4.2	LOS A	0.0	0.3	0.07	0.49	0.07	46.8
East: Hutsons (E)														
4	L2	6	5.0	6	5.0	0.016	4.7	LOS A	0.0	0.3	0.06	0.23	0.06	48.0
5	T1	15	5.0	16	5.0	0.016	0.0	LOS A	0.0	0.3	0.06	0.23	0.06	48.5
6	R2	6	5.0	6	5.0	0.016	4.7	LOS A	0.0	0.3	0.06	0.23	0.06	47.5
Approach		27	5.0	28	5.0	0.016	2.1	NA	0.0	0.3	0.06	0.23	0.06	48.1
North: Hannah (N)														
7	L2	16	5.0	17	5.0	0.019	4.7	LOS A	0.1	0.5	0.10	0.49	0.10	46.6
8	T1	7	5.0	7	5.0	0.019	3.5	LOS A	0.1	0.5	0.10	0.49	0.10	46.6
9	R2	2	5.0	2	5.0	0.019	5.0	LOS A	0.1	0.5	0.10	0.49	0.10	46.1
Approach		25	5.0	26	5.0	0.019	4.4	LOS A	0.1	0.5	0.10	0.49	0.10	46.5
West: Henessy (W)														
10	L2	2	5.0	2	5.0	0.026	4.7	LOS A	0.1	0.6	0.05	0.19	0.05	48.3
11	T1	29	5.0	31	5.0	0.026	0.0	LOS A	0.1	0.6	0.05	0.19	0.05	48.8
12	R2	13	5.0	14	5.0	0.026	4.7	LOS A	0.1	0.6	0.05	0.19	0.05	47.8
Approach		44	5.0	46	5.0	0.026	1.6	NA	0.1	0.6	0.05	0.19	0.05	48.5
All Vehicles		110	5.0	116	5.0	0.026	2.7	NA	0.1	0.6	0.07	0.30	0.07	47.7

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

MOVEMENT SUMMARY

Site: [Hutsons and Burma_Existing_PM (Site Folder: General)]

Hutsons Road and Burma Road, Tocumwal
Existing Conditions
PM Peak Period
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Burma (S)														
21a	L1	24	5.0	25	5.0	0.018	6.6	LOS A	0.1	0.5	0.01	0.63	0.01	63.6
23a	R1	2	5.0	2	5.0	0.018	6.5	LOS A	0.1	0.5	0.01	0.63	0.01	63.8
Approach		26	5.0	27	5.0	0.018	6.6	LOS A	0.1	0.5	0.01	0.63	0.01	63.6
North: Burma (N)														
7a	L1	2	5.0	2	5.0	0.002	6.7	LOS A	0.0	0.1	0.10	0.59	0.10	63.2
9	R2	2	5.0	2	5.0	0.002	6.8	LOS A	0.0	0.1	0.10	0.59	0.10	63.1
Approach		4	5.0	4	5.0	0.002	6.7	NA	0.0	0.1	0.10	0.59	0.10	63.2
West: Hutsons (W)														
10	L2	4	5.0	4	5.0	0.025	7.0	LOS A	0.1	0.8	0.02	0.62	0.02	64.3
12a	R1	37	5.0	39	5.0	0.025	6.3	LOS A	0.1	0.8	0.02	0.62	0.02	63.9
Approach		41	5.0	43	5.0	0.025	6.4	NA	0.1	0.8	0.02	0.62	0.02	64.0
All Vehicles		71	5.0	75	5.0	0.025	6.5	NA	0.1	0.8	0.02	0.62	0.02	63.8

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

MOVEMENT SUMMARY

Site: [Barooga-Tocumwal and Thorburns_Existing_PM (Site Folder: General)]

Barooga-Tocumwal Road and Thorburns Road, Tocumwal
Existing Conditions
PM Peak Period
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Barooga-Tocumwal (E)														
5	T1	52	5.0	55	5.0	0.040	0.1	LOS A	0.1	0.7	0.07	0.16	0.07	94.4
6	R2	17	5.0	18	5.0	0.040	7.7	LOS A	0.1	0.7	0.07	0.16	0.07	81.3
Approach		69	5.0	73	5.0	0.040	1.9	NA	0.1	0.7	0.07	0.16	0.07	90.8
North: Thorburns (N)														
7	L2	15	5.0	16	5.0	0.011	8.1	LOS A	0.0	0.3	0.12	0.61	0.12	72.0
9	R2	1	5.0	1	5.0	0.011	7.9	LOS A	0.0	0.3	0.12	0.61	0.12	71.6
Approach		16	5.0	17	5.0	0.011	8.1	LOS A	0.0	0.3	0.12	0.61	0.12	72.0
West: Barooga-Tocumwal (W)														
10	L2	1	5.0	1	5.0	0.026	8.0	LOS A	0.0	0.0	0.00	0.01	0.00	85.6
11	T1	46	5.0	48	5.0	0.026	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	99.5
Approach		47	5.0	49	5.0	0.026	0.2	NA	0.0	0.0	0.00	0.01	0.00	99.2
All Vehicles		132	5.0	139	5.0	0.040	2.1	NA	0.1	0.7	0.05	0.16	0.05	90.6

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

APPENDIX B – PLANS OF PROPOSED DEVELOPMENT

LOT 32 ON DP778129

TOTAL SITE AREA: 21.19ha

OVERALL AREA 21.19ha
261 Lots @ 491m² average

DENSITY: 14.5 LOTS/ha

LAND BUDGET			
	SITE AREA	21.19ha	
	ENCUMBERED LAND	AREA	% SITE
	CONSERVATION RESERVE	3.24ha	15.3%
	TOTAL	3.24ha	15.3%
	NET DEVELOPABLE AREA	17.95ha	0%
	LAND USES		% NET DEV. AREA
	LOCAL ROADS	4.98ha	27.7%
	RESERVE	0.76ha	0.9%
	41 RESIDENTIAL LOTS 300-399m²	1.51ha	8.4%
	144 RESIDENTIAL LOTS 400-499m²	6.24ha	34.8%
	61 RESIDENTIAL LOTS 500-799m²	3.33ha	18.5%
	10 RESIDENTIAL LOTS 800m²+	1.74ha	9.7%
	TOTAL AREA	17.95ha	100.0%

LEGEND:

- Zone boundary
- Reserve
- Conservation reserve
- < 399sqm lots
- 400-499sqm lots
- 500-799sqm lots
- 800sqm + lots
- Pedestrian/buggy link
- Rear lot interface
- Indicative building footprint 16m x 25m
- Tree to be removed
- Tree to be retained

DRAFT

THIS PLAN IS SUBJECT TO THE APPROVAL OF VARIOUS STATUTORY AUTHORITIES.

DIMENSIONS SHOWN HEREON ARE SUBJECT TO SURVEY.

THE CONTOURS SHOWN HEREON HAVE BEEN INTERPOLATED FROM ON-SITE LEVELS TAKEN BY THIS COMPANY ON 27/2/2007 TO THE AUSTRALIAN HEIGHT DATUM.

CONTOUR VERTICAL INTERVAL 0·2 METRE.

No.	Revision Description	Drawn	Appd	Date
1	Prepared for town planning purposes	MG,AHV		15/12/2023

FOR DISCUSSION PURPOSES

Millar | Merrigan
Land Development Consultants

Civil Engineering
Land Surveying
Landscape Architecture
Project Management
Town Planning
Urban Design

Millar & Merrigan Pty Ltd ACN 005 541 668
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MGA2020 North

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Original sheet size A1

PROPOSED SUBDIVISION PLAN

LOT 32 ON DP778129

HUTSONS ROAD, TOCUMWAL
SHIRE OF BERRIGAN

12263P2
VERSION 1
SHEET 1 OF 1

APPENDIX C – INTERSECTION ANALYSIS: WITH DEVELOPMENT

MOVEMENT SUMMARY

Site: [Hennessy and Jerilderie_Future_AM (Site Folder: General)]

Hennessy Street and Jerilderie Street, Tocumwal
Future Conditions - With Proposed Development
AM Peak Period
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Jerilderie (S)														
1	L2	11	5.0	12	5.0	0.062	4.8	LOS A	0.1	1.0	0.09	0.14	0.09	48.4
2	T1	79	5.0	83	5.0	0.062	0.1	LOS A	0.1	1.0	0.09	0.14	0.09	49.0
3	R2	17	5.0	18	5.0	0.062	4.9	LOS A	0.1	1.0	0.09	0.14	0.09	47.9
Approach		107	5.0	113	5.0	0.062	1.3	NA	0.1	1.0	0.09	0.14	0.09	48.7
East: Henessy (E)														
4	L2	41	5.0	43	5.0	0.166	4.7	LOS A	0.6	4.6	0.19	0.55	0.19	46.1
5	T1	15	5.0	16	5.0	0.166	4.1	LOS A	0.6	4.6	0.19	0.55	0.19	46.2
6	R2	105	5.0	111	5.0	0.166	5.7	LOS A	0.6	4.6	0.19	0.55	0.19	45.7
Approach		161	5.0	169	5.0	0.166	5.3	LOS A	0.6	4.6	0.19	0.55	0.19	45.8
North: Jerilderie (N)														
7	L2	59	5.0	62	5.0	0.062	4.7	LOS A	0.1	0.7	0.06	0.33	0.06	47.4
8	T1	38	5.0	40	5.0	0.062	0.1	LOS A	0.1	0.7	0.06	0.33	0.06	47.9
9	R2	10	5.0	11	5.0	0.062	4.9	LOS A	0.1	0.7	0.06	0.33	0.06	46.9
Approach		107	5.0	113	5.0	0.062	3.1	NA	0.1	0.7	0.06	0.33	0.06	47.5
West: Henessy (W)														
10	L2	2	5.0	2	5.0	0.009	4.8	LOS A	0.0	0.2	0.24	0.48	0.24	46.6
11	T1	6	5.0	6	5.0	0.009	4.1	LOS A	0.0	0.2	0.24	0.48	0.24	46.6
12	R2	1	5.0	1	5.0	0.009	5.7	LOS A	0.0	0.2	0.24	0.48	0.24	46.1
Approach		9	5.0	9	5.0	0.009	4.4	LOS A	0.0	0.2	0.24	0.48	0.24	46.6
All Vehicles		384	5.0	404	5.0	0.166	3.6	NA	0.6	4.6	0.12	0.37	0.12	47.1

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

MOVEMENT SUMMARY

Site: [Hennessy/Hutsons and Hannah_Future_AM (Site Folder: General)]

Hennessy Street/Hutsons Road and Hannah Street, Tocumwal
Future Conditions - With Proposed Development
AM Peak Period
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hannah (S)														
1	L2	8	5.0	8	5.0	0.015	5.0	LOS A	0.1	0.4	0.25	0.51	0.25	46.1
2	T1	3	5.0	3	5.0	0.015	4.0	LOS A	0.1	0.4	0.25	0.51	0.25	46.2
3	R2	5	5.0	5	5.0	0.015	5.7	LOS A	0.1	0.4	0.25	0.51	0.25	45.7
Approach		16	5.0	17	5.0	0.015	5.0	LOS A	0.1	0.4	0.25	0.51	0.25	46.0
East: Hutsons (E)														
4	L2	7	5.0	7	5.0	0.076	4.7	LOS A	0.1	0.5	0.03	0.06	0.03	49.0
5	T1	120	5.0	126	5.0	0.076	0.0	LOS A	0.1	0.5	0.03	0.06	0.03	49.6
6	R2	8	5.0	8	5.0	0.076	4.8	LOS A	0.1	0.5	0.03	0.06	0.03	48.5
Approach		135	5.0	142	5.0	0.076	0.5	NA	0.1	0.5	0.03	0.06	0.03	49.5
North: Hannah (N)														
7	L2	5	5.0	5	5.0	0.007	4.8	LOS A	0.0	0.2	0.15	0.49	0.15	46.4
8	T1	2	5.0	2	5.0	0.007	4.0	LOS A	0.0	0.2	0.15	0.49	0.15	46.5
9	R2	1	5.0	1	5.0	0.007	5.7	LOS A	0.0	0.2	0.15	0.49	0.15	46.0
Approach		8	5.0	8	5.0	0.007	4.7	LOS A	0.0	0.2	0.15	0.49	0.15	46.4
West: Henessy (W)														
10	L2	5	5.0	5	5.0	0.038	4.8	LOS A	0.0	0.2	0.03	0.06	0.03	49.0
11	T1	60	5.0	63	5.0	0.038	0.0	LOS A	0.0	0.2	0.03	0.06	0.03	49.5
12	R2	3	5.0	3	5.0	0.038	5.0	LOS A	0.0	0.2	0.03	0.06	0.03	48.5
Approach		68	5.0	72	5.0	0.038	0.6	NA	0.0	0.2	0.03	0.06	0.03	49.5
All Vehicles		227	5.0	239	5.0	0.076	1.0	NA	0.1	0.5	0.05	0.11	0.05	49.1

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

MOVEMENT SUMMARY

Site: [Hutsons and Burma_Future_AM (Site Folder: General)]

Hutsons Road and Burma Road, Tocumwal
Future Conditions - With Proposed Development
AM Peak Period
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Burma (S)														
21a	L1	26	5.0	27	5.0	0.019	6.6	LOS A	0.1	0.5	0.04	0.62	0.04	63.5
23a	R1	2	5.0	2	5.0	0.019	6.5	LOS A	0.1	0.5	0.04	0.62	0.04	63.7
Approach		28	5.0	29	5.0	0.019	6.6	LOS A	0.1	0.5	0.04	0.62	0.04	63.5
North: Burma (N)														
7a	L1	1	5.0	1	5.0	0.005	6.7	LOS A	0.0	0.2	0.08	0.61	0.08	63.2
9	R2	8	5.0	8	5.0	0.005	6.8	LOS A	0.0	0.2	0.08	0.61	0.08	63.2
Approach		9	5.0	9	5.0	0.005	6.8	NA	0.0	0.2	0.08	0.61	0.08	63.2
West: Hutsons (W)														
10	L2	18	5.0	19	5.0	0.022	7.0	LOS A	0.1	0.6	0.01	0.62	0.01	64.0
12a	R1	19	5.0	20	5.0	0.022	6.3	LOS A	0.1	0.6	0.01	0.62	0.01	63.7
Approach		37	5.0	39	5.0	0.022	6.7	NA	0.1	0.6	0.01	0.62	0.01	63.9
All Vehicles		74	5.0	78	5.0	0.022	6.7	NA	0.1	0.6	0.03	0.62	0.03	63.6

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: [Barooga-Tocumwal and Thorburns_Future_AM (Site Folder: General)]

Barooga-Tocumwal Road and Thorburns Road, Tocumwal
Future Conditions - With Proposed Development
AM Peak Period
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Barooga-Tocumwal (E)														
5	T1	41	5.0	43	5.0	0.029	0.0	LOS A	0.1	0.4	0.05	0.13	0.05	95.5
6	R2	10	5.0	11	5.0	0.029	7.7	LOS A	0.1	0.4	0.05	0.13	0.05	82.1
Approach		51	5.0	54	5.0	0.029	1.5	NA	0.1	0.4	0.05	0.13	0.05	92.5
North: Thorburns (N)														
7	L2	26	5.0	27	5.0	0.020	8.1	LOS A	0.1	0.6	0.11	0.62	0.11	72.1
9	R2	3	5.0	3	5.0	0.020	7.9	LOS A	0.1	0.6	0.11	0.62	0.11	71.7
Approach		29	5.0	31	5.0	0.020	8.1	LOS A	0.1	0.6	0.11	0.62	0.11	72.0
West: Barooga-Tocumwal (W)														
10	L2	2	5.0	2	5.0	0.022	8.0	LOS A	0.0	0.0	0.00	0.04	0.00	85.2
11	T1	37	5.0	39	5.0	0.022	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	98.9
Approach		39	5.0	41	5.0	0.022	0.4	NA	0.0	0.0	0.00	0.04	0.00	98.1
All Vehicles		119	5.0	125	5.0	0.029	2.8	NA	0.1	0.6	0.05	0.22	0.05	88.0

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: [Hutsons and New North Access_Future_AM (Site Folder: General)]

Hutsons Road and New Subivision Northern Access Road, Tocumwal
Future Conditions - With Proposed Development
AM Peak Period
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: New North Access (S)														
1	L2	96	5.0	101	5.0	0.071	4.7	LOS A	0.3	2.1	0.10	0.50	0.10	52.7
3	R2	6	5.0	6	5.0	0.071	5.1	LOS A	0.3	2.1	0.10	0.50	0.10	52.4
Approach		102	5.0	107	5.0	0.071	4.7	LOS A	0.3	2.1	0.10	0.50	0.10	52.7
East: Hutsons (E)														
4	L2	2	5.0	2	5.0	0.020	7.0	LOS A	0.0	0.0	0.00	0.04	0.00	71.9
5	T1	33	5.0	35	5.0	0.020	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	79.3
Approach		35	5.0	37	5.0	0.020	0.4	NA	0.0	0.0	0.00	0.04	0.00	78.8
West: Henessy (W)														
11	T1	37	5.0	39	5.0	0.047	0.1	LOS A	0.2	1.4	0.10	0.33	0.10	73.7
12	R2	41	5.0	43	5.0	0.047	6.8	LOS A	0.2	1.4	0.10	0.33	0.10	56.4
Approach		78	5.0	82	5.0	0.047	3.6	NA	0.2	1.4	0.10	0.33	0.10	63.5
All Vehicles		215	5.0	226	5.0	0.071	3.6	NA	0.3	2.1	0.09	0.36	0.09	59.6

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: [New East Access and Burma_Future_AM (Site Folder: General)]

New Subdivision Eastern Access Road and Burma Road, Tocumwal
Future Conditions - With Proposed Development
AM Peak Period
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Burma (S)														
1	L2	5	5.0	5	5.0	0.012	7.0	LOS A	0.0	0.0	0.00	0.15	0.00	70.2
2	T1	17	5.0	18	5.0	0.012	0.0	LOS A	0.0	0.0	0.00	0.15	0.00	77.3
Approach		22	5.0	23	5.0	0.012	1.6	NA	0.0	0.0	0.00	0.15	0.00	75.6
North: Burma (N)														
8	T1	16	5.0	17	5.0	0.011	0.0	LOS A	0.0	0.2	0.04	0.13	0.04	77.5
9	R2	4	5.0	4	5.0	0.011	6.8	LOS A	0.0	0.2	0.04	0.13	0.04	58.6
Approach		20	5.0	21	5.0	0.011	1.4	NA	0.0	0.2	0.04	0.13	0.04	72.8
West: New East Access (W)														
10	L2	10	5.0	11	5.0	0.017	4.7	LOS A	0.1	0.4	0.08	0.52	0.08	52.8
12	R2	12	5.0	13	5.0	0.017	4.7	LOS A	0.1	0.4	0.08	0.52	0.08	52.5
Approach		22	5.0	23	5.0	0.017	4.7	LOS A	0.1	0.4	0.08	0.52	0.08	52.6
All Vehicles		64	5.0	67	5.0	0.017	2.6	NA	0.1	0.4	0.04	0.27	0.04	65.0

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: [Hennessy and Jerilderie_Future_PM (Site Folder: General)]

Hennessy Street and Jerilderie Street, Tocumwal
Future Conditions - With Proposed Development
PM Peak Period
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Jerilderie (S)														
1	L2	1	5.0	1	5.0	0.078	5.3	LOS A	0.3	2.2	0.24	0.20	0.24	47.8
2	T1	80	5.0	84	5.0	0.078	0.4	LOS A	0.3	2.2	0.24	0.20	0.24	48.3
3	R2	44	5.0	46	5.0	0.078	5.4	LOS A	0.3	2.2	0.24	0.20	0.24	47.3
Approach		125	5.0	132	5.0	0.078	2.2	NA	0.3	2.2	0.24	0.20	0.24	47.9
East: Henessy (E)														
4	L2	22	5.0	23	5.0	0.105	4.9	LOS A	0.4	2.7	0.28	0.58	0.28	45.8
5	T1	4	5.0	4	5.0	0.105	4.5	LOS A	0.4	2.7	0.28	0.58	0.28	45.9
6	R2	65	5.0	68	5.0	0.105	6.3	LOS A	0.4	2.7	0.28	0.58	0.28	45.4
Approach		91	5.0	96	5.0	0.105	5.9	LOS A	0.4	2.7	0.28	0.58	0.28	45.5
North: Jerilderie (N)														
7	L2	118	5.0	124	5.0	0.117	4.6	LOS A	0.0	0.2	0.01	0.32	0.01	47.6
8	T1	82	5.0	86	5.0	0.117	0.0	LOS A	0.0	0.2	0.01	0.32	0.01	48.2
9	R2	3	5.0	3	5.0	0.117	4.9	LOS A	0.0	0.2	0.01	0.32	0.01	47.2
Approach		203	5.0	214	5.0	0.117	2.8	NA	0.0	0.2	0.01	0.32	0.01	47.9
West: Henessy (W)														
10	L2	1	5.0	1	5.0	0.017	4.9	LOS A	0.1	0.4	0.32	0.53	0.32	46.2
11	T1	9	5.0	9	5.0	0.017	4.7	LOS A	0.1	0.4	0.32	0.53	0.32	46.3
12	R2	5	5.0	5	5.0	0.017	5.9	LOS A	0.1	0.4	0.32	0.53	0.32	45.8
Approach		15	5.0	16	5.0	0.017	5.1	LOS A	0.1	0.4	0.32	0.53	0.32	46.1
All Vehicles		434	5.0	457	5.0	0.117	3.3	NA	0.4	2.7	0.14	0.35	0.14	47.3

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

MOVEMENT SUMMARY

Site: [Hennessy/Hutsons and Hannah_Future_PM (Site Folder: General)]

Hennessy Street/Hutsons Road and Hannah Street, Tocumwal
Future Conditions - With Proposed Development
PM Peak Period
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hannah (S)														
1	L2	7	5.0	7	5.0	0.020	4.8	LOS A	0.1	0.5	0.20	0.52	0.20	46.3
2	T1	6	5.0	6	5.0	0.020	4.2	LOS A	0.1	0.5	0.20	0.52	0.20	46.4
3	R2	7	5.0	7	5.0	0.020	6.0	LOS A	0.1	0.5	0.20	0.52	0.20	45.9
Approach		20	5.0	21	5.0	0.020	5.0	LOS A	0.1	0.5	0.20	0.52	0.20	46.2
East: Hutsons (E)														
4	L2	9	5.0	9	5.0	0.046	4.9	LOS A	0.1	0.6	0.08	0.12	0.08	48.5
5	T1	61	5.0	64	5.0	0.046	0.1	LOS A	0.1	0.6	0.08	0.12	0.08	49.1
6	R2	9	5.0	9	5.0	0.046	5.1	LOS A	0.1	0.6	0.08	0.12	0.08	48.0
Approach		79	5.0	83	5.0	0.046	1.2	NA	0.1	0.6	0.08	0.12	0.08	48.9
North: Hannah (N)														
7	L2	23	5.0	24	5.0	0.027	5.0	LOS A	0.1	0.7	0.25	0.51	0.25	46.1
8	T1	7	5.0	7	5.0	0.027	4.2	LOS A	0.1	0.7	0.25	0.51	0.25	46.2
9	R2	2	5.0	2	5.0	0.027	5.9	LOS A	0.1	0.7	0.25	0.51	0.25	45.7
Approach		32	5.0	34	5.0	0.027	4.9	LOS A	0.1	0.7	0.25	0.51	0.25	46.1
West: Henessy (W)														
10	L2	2	5.0	2	5.0	0.086	4.8	LOS A	0.1	0.7	0.04	0.06	0.04	49.0
11	T1	136	5.0	143	5.0	0.086	0.0	LOS A	0.1	0.7	0.04	0.06	0.04	49.6
12	R2	13	5.0	14	5.0	0.086	4.8	LOS A	0.1	0.7	0.04	0.06	0.04	48.5
Approach		151	5.0	159	5.0	0.086	0.5	NA	0.1	0.7	0.04	0.06	0.04	49.5
All Vehicles		282	5.0	297	5.0	0.086	1.5	NA	0.1	0.7	0.09	0.16	0.09	48.7

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

MOVEMENT SUMMARY

Site: [Hutsons and Burma_Future_PM (Site Folder: General)]

Hutsons Road and Burma Road, Tocumwal
Future Conditions - With Proposed Development
PM Peak Period
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Burma (S)														
21a	L1	29	5.0	31	5.0	0.021	6.6	LOS A	0.1	0.6	0.04	0.62	0.04	63.5
23a	R1	2	5.0	2	5.0	0.021	6.6	LOS A	0.1	0.6	0.04	0.62	0.04	63.6
Approach		31	5.0	33	5.0	0.021	6.6	LOS A	0.1	0.6	0.04	0.62	0.04	63.5
North: Burma (N)														
7a	L1	3	5.0	3	5.0	0.007	6.7	LOS A	0.0	0.2	0.13	0.59	0.13	63.0
9	R2	9	5.0	9	5.0	0.007	6.8	LOS A	0.0	0.2	0.13	0.59	0.13	63.0
Approach		12	5.0	13	5.0	0.007	6.8	NA	0.0	0.2	0.13	0.59	0.13	63.0
West: Hutsons (W)														
10	L2	7	5.0	7	5.0	0.032	7.0	LOS A	0.1	1.1	0.03	0.61	0.03	64.2
12a	R1	47	5.0	49	5.0	0.032	6.4	LOS A	0.1	1.1	0.03	0.61	0.03	63.9
Approach		54	5.0	57	5.0	0.032	6.4	NA	0.1	1.1	0.03	0.61	0.03	63.9
All Vehicles		97	5.0	102	5.0	0.032	6.5	NA	0.1	1.1	0.04	0.61	0.04	63.7

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

MOVEMENT SUMMARY

Site: [Barooga-Tocumwal and Thorburns_Future_PM (Site Folder: General)]

Barooga-Tocumwal Road and Thorburns Road, Tocumwal
Future Conditions - With Proposed Development
PM Peak Period
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Barooga-Tocumwal (E)														
5	T1	52	5.0	55	5.0	0.049	0.1	LOS A	0.2	1.3	0.10	0.24	0.10	91.9
6	R2	31	5.0	33	5.0	0.049	7.7	LOS A	0.2	1.3	0.10	0.24	0.10	79.4
Approach		83	5.0	87	5.0	0.049	2.9	NA	0.2	1.3	0.10	0.24	0.10	86.8
North: Thorburns (N)														
7	L2	21	5.0	22	5.0	0.015	8.1	LOS A	0.1	0.4	0.12	0.61	0.12	72.0
9	R2	1	5.0	1	5.0	0.015	8.0	LOS A	0.1	0.4	0.12	0.61	0.12	71.5
Approach		22	5.0	23	5.0	0.015	8.1	LOS A	0.1	0.4	0.12	0.61	0.12	71.9
West: Barooga-Tocumwal (W)														
10	L2	1	5.0	1	5.0	0.026	8.0	LOS A	0.0	0.0	0.00	0.01	0.00	85.6
11	T1	46	5.0	48	5.0	0.026	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	99.5
Approach		47	5.0	49	5.0	0.026	0.2	NA	0.0	0.0	0.00	0.01	0.00	99.2
All Vehicles		152	5.0	160	5.0	0.049	2.8	NA	0.2	1.3	0.07	0.23	0.07	87.5

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: [Hutsons and New North Access_Future_PM (Site Folder: General)]

Hutsons Road and New Subivision Northern Access Road, Tocumwal
Future Conditions - With Proposed Development
PM Peak Period
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: New North Access (S)														
1	L2	45	5.0	47	5.0	0.034	4.7	LOS A	0.1	1.0	0.09	0.50	0.09	52.8
3	R2	3	5.0	3	5.0	0.034	5.4	LOS A	0.1	1.0	0.09	0.50	0.09	52.4
Approach		48	5.0	51	5.0	0.034	4.8	LOS A	0.1	1.0	0.09	0.50	0.09	52.7
East: Hutsons (E)														
4	L2	6	5.0	6	5.0	0.021	7.0	LOS A	0.0	0.0	0.00	0.10	0.00	70.9
5	T1	32	5.0	34	5.0	0.021	0.0	LOS A	0.0	0.0	0.00	0.10	0.00	78.1
Approach		38	5.0	40	5.0	0.021	1.1	NA	0.0	0.0	0.00	0.10	0.00	76.9
West: Henessy (W)														
11	T1	67	5.0	71	5.0	0.104	0.1	LOS A	0.5	3.6	0.12	0.38	0.12	72.7
12	R2	106	5.0	112	5.0	0.104	6.8	LOS A	0.5	3.6	0.12	0.38	0.12	55.9
Approach		173	5.0	182	5.0	0.104	4.2	NA	0.5	3.6	0.12	0.38	0.12	61.4
All Vehicles		259	5.0	273	5.0	0.104	3.9	NA	0.5	3.6	0.10	0.36	0.10	61.3

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

MOVEMENT SUMMARY

Site: [New East Access and Burma_Future_PM (Site Folder: General)]

New Subdivision Eastern Access Road and Burma Road, Tocumwal
Future Conditions - With Proposed Development
PM Peak Period
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Burma (S)														
1	L2	14	5.0	15	5.0	0.023	7.0	LOS A	0.0	0.0	0.00	0.22	0.00	69.2
2	T1	27	5.0	28	5.0	0.023	0.0	LOS A	0.0	0.0	0.00	0.22	0.00	76.0
Approach		41	5.0	43	5.0	0.023	2.4	NA	0.0	0.0	0.00	0.22	0.00	73.5
North: Burma (N)														
8	T1	39	5.0	41	5.0	0.029	0.0	LOS A	0.1	0.5	0.06	0.14	0.06	77.1
9	R2	11	5.0	12	5.0	0.029	6.8	LOS A	0.1	0.5	0.06	0.14	0.06	58.4
Approach		50	5.0	53	5.0	0.029	1.5	NA	0.1	0.5	0.06	0.14	0.06	72.0
West: New East Access (W)														
10	L2	5	5.0	5	5.0	0.009	4.7	LOS A	0.0	0.2	0.10	0.52	0.10	52.8
12	R2	6	5.0	6	5.0	0.009	4.9	LOS A	0.0	0.2	0.10	0.52	0.10	52.4
Approach		11	5.0	12	5.0	0.009	4.8	LOS A	0.0	0.2	0.10	0.52	0.10	52.6
All Vehicles		102	5.0	107	5.0	0.029	2.2	NA	0.1	0.5	0.04	0.21	0.04	69.8

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