



Gerard Maher Pty Ltd ATF Maher Family Trust

Traffic Impact Assessment

Stratheden Stud DCP, Manilla Road, Oxley Vale

March 2024

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1 Introduction

Barker Ryan Stewart has been engaged by Gerard Maher Pty Ltd ATF Maher Family Trust to prepare a Traffic Impact Assessment report in accordance with the requirements of Tamworth Regional Council's DCP and the NSW '*Guide to Traffic Generating Developments*' to accompany a proposed Development Control Plan (DCP) for a residential subdivision located at Manilla Road, Oxley Vale.

The purpose of this report is to assess and address traffic and access impacts generated by the proposed development. This can be briefly outlined as follows:

- The expected traffic generation to/from the proposed development.
- The impact of the proposed development on the road network.
- Intersection analysis based on traffic counts.
- Access design requirements.
- Availability of public transport.

2 Existing Conditions

2.1 Site Description

The Stratheden DCP site is located on the corner of Manilla Road and Browns Lane in Oxley Vale, as shown below in **Figure 2.1**. The subject site incorporates:

- Lots 1, 2, 3 DP997767
- Lot 12 DP245544
- Lots 3, 5 DP209387
- Lot 3, 4 DP212658
- Lot 341 DP622077
- Lot 708 DP1252037
- Lot 777 DP1158251

The site is bound by rural residential lots to the east, south and north.

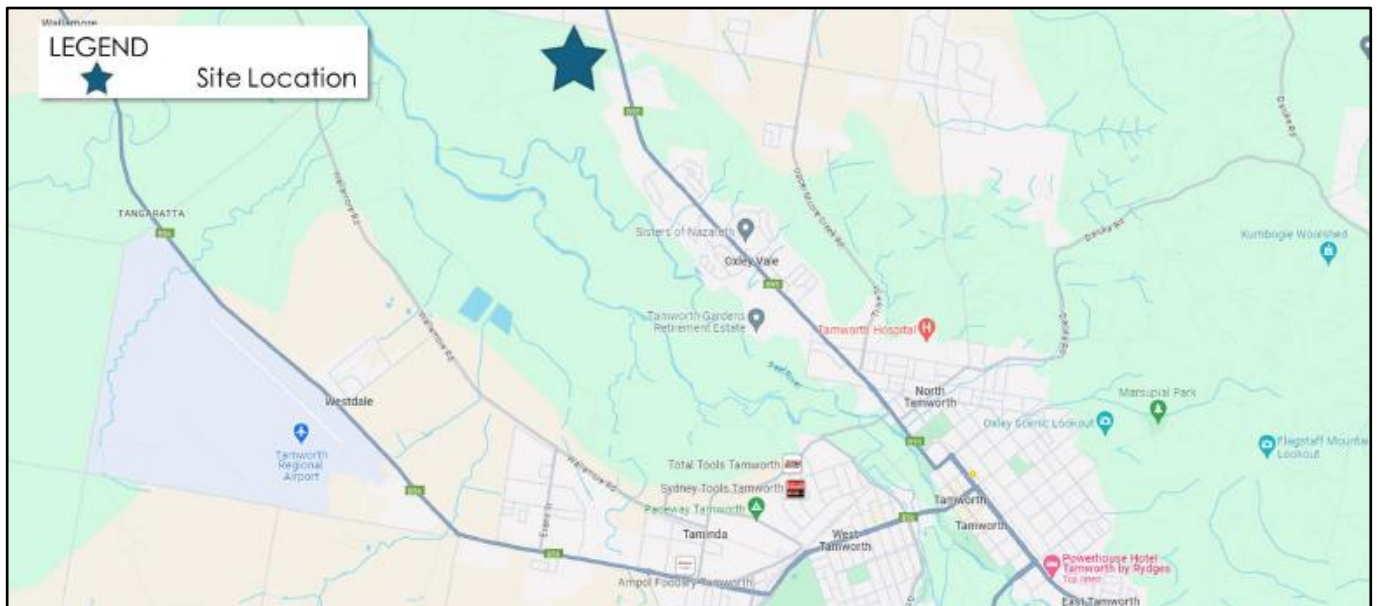


Figure 2.1: Site Location

2.2 Existing Road Network

Manilla Road

Manilla Road is a state-classified road (MR63) providing a connection between Tamworth and areas to the north-west, including Manilla and Barraba. In the vicinity of the subject site, it has a two-lane, rural road formation with an 11-metre-wide sealed pavement providing two 3.5-metre-wide travel lanes and two 2-metre-wide sealed shoulders. There are no street lights, nor pedestrian facilities, reflecting the existing limited development in the area. Manilla Road has an 80km/h posted speed limit, increasing to 100km/h 180m to the north of Browns Lane.

Browns Lane

Browns Lane is a local collector road with an east-west orientation and provides one of the main connections for local traffic accessing Manilla Road. To the west of Manilla Road, it provides a single lane of travel in each direction with a 7-metre-wide sealed pavement with grassed shoulders, widening at the intersection to allow for turning movements. No street lighting or pedestrian footpaths are provided.

The posted speed limit on Browns Lane passing the subject site is 80km/h. Development to the west of Manilla Road is primarily rural.

East of Manilla Road, Browns Lane has a recently upgraded 7-metre-wide sealed pavement with 1 metre wide gravel shoulders that provides a single travel lane in each direction. There is no line marking on Browns Lane in either direction. Development to the east of Manilla Road is a mixture of rural properties and rural- residential developments such as Windmill Valley, Windmill Downs and Windmill Hills. The posted speed limit is 60km/h.

2.3 Existing Intersections

Manilla Road / Browns Lane

The intersection of Manilla Road and Browns Lane is a 4-way unsignalized intersection with Manilla Road as the major road. There are no formal deceleration lanes, but an informal shoulder provided within close proximity to Browns Lane allows a driver to slow down. The width of the eastern and western approaches of Browns Lane allows for two vehicles to hold adjacent to one another, to allow for both right and left turning movements to occur concurrently.

It is noted that the intersection is proposed to be upgraded to a roundabout treatment in the future.

Manilla Road / Glengarvin Drive

The Manilla Road / Glengarvin Drive intersection is located 1.7km south of Browns Lane. It is a T-Intersection with Manilla Road traffic having priority. Glengarvin Drive provides a connection between Manilla Road and the residential areas to the west between Manilla Road and the Peel River.

Manilla Road / Lemon Gums Drive /Orley Drive

The Manilla Road / Lemon Gums Drive / Orley Drive intersection is under 4-way, single-lane roundabout control and is located 1.5km south of Glengarvin Drive. Lemon Gums Drive provides a connection between Manilla Road and residential areas to the east while Orley Drive provides a connection between Manilla Road and residential areas to the west.

2.4 Existing Mode Share

ABS 2021 statistics indicate that 99.7% of residents in Oxley Vale travel via personal vehicle to work. Hence, it is considered that all trips calculated are for cars. It is noted that a small portion of commuters drive trucks or motorcycles, which would increase and decrease traffic impact respectively. Nevertheless, BRS deems it suitable to consider all vehicles to be cars, as about 2% of commutes are via truck and 2% are via motorcycle.

2.5 Public Transport, Pedestrians and Cyclists

The area is very limited in terms of public transport, with the 443 – Manilla to Tamworth operating two services each direction every weekday. The nearest train station is Tamworth Station, 6.6km away. In terms of modelling, therefore, there is no requirement to consider modal distribution in traffic generation – all traffic generated will directly be vehicular traffic. Considering the low volume of buses and lack of TfNSW plans to increase, no allowance will be made to estimate increase in bus traffic.

2.6 Existing Traffic Volumes

A traffic survey has been conducted by Northern Transport Planning and Engineering to identify the existing daily and peak hour traffic volumes on Manilla Road.

The traffic survey involved the installation of a tube counter on Manilla Road, 250 metres south of Browns Lane, for two weeks from Wednesday 13 March to Tuesday 26 March 2024.

The results of the traffic survey are provided below.

- Weekday Average Volume = 5,275 vehicles per day. (2,606 Northbound and 2,669 Southbound).
- Average Weekday AM Peak (8.00am to 9.00am)= 390 vehicles per hour (117 Northbound, 273 Southbound).
- Average Weekday PM Peak (3.30pm to 4.30pm)= 401 vehicles per hour (231 Northbound, 170 Southbound).

The average proportion of heavy vehicles on Manilla Road is 14% , mainly consisting of two and three axle trucks and buses (12%), articulated vehicles (1.6%) and B-Doubles (1%).

A data set that is cause for some concern is that the 85% speed recorded on Manilla Road was 93km/h which is 13km/h above the posted speed limit of 80km/h.

Traffic counts were also conducted by BRS at the following intersections during the AM peak hour (7.30am to 9.30am) and the PM peak hour (3.00pm to 6.00pm) on Wednesday 20 March 2024.

- Manilla Road / Browns Lane;
- Manilla Road / Glengarvin Drive; and
- Manilla Road / Lemon Gums Drive / Orley Drive.

The results of the traffic surveys are provided below in Figures 2.2, 2.3 and 2.4.

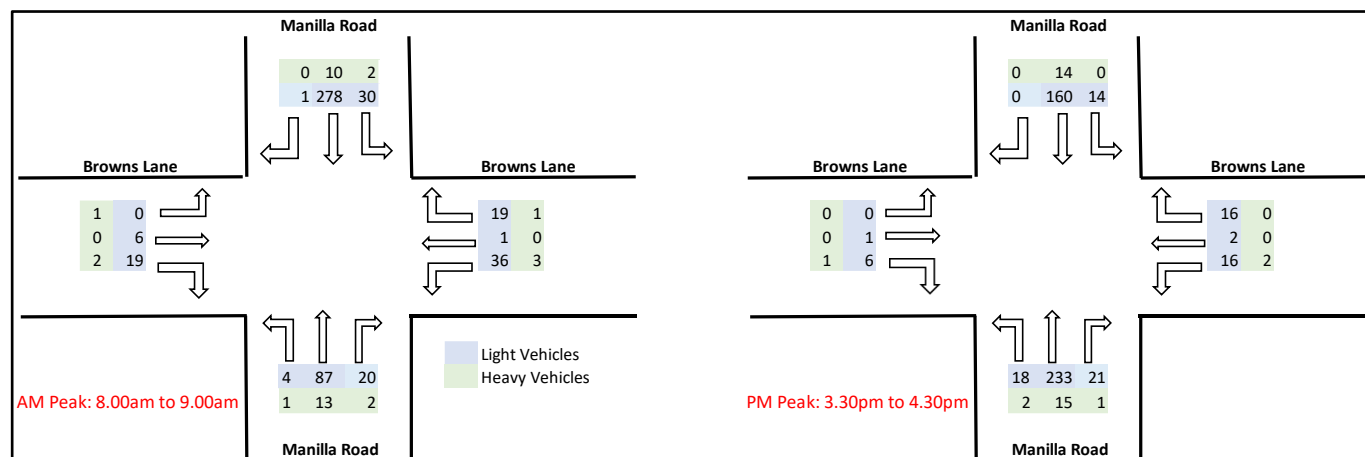


Figure 2.2: Manilla Road / Browns Lane – AM and PM Peak Traffic Volumes 2024.

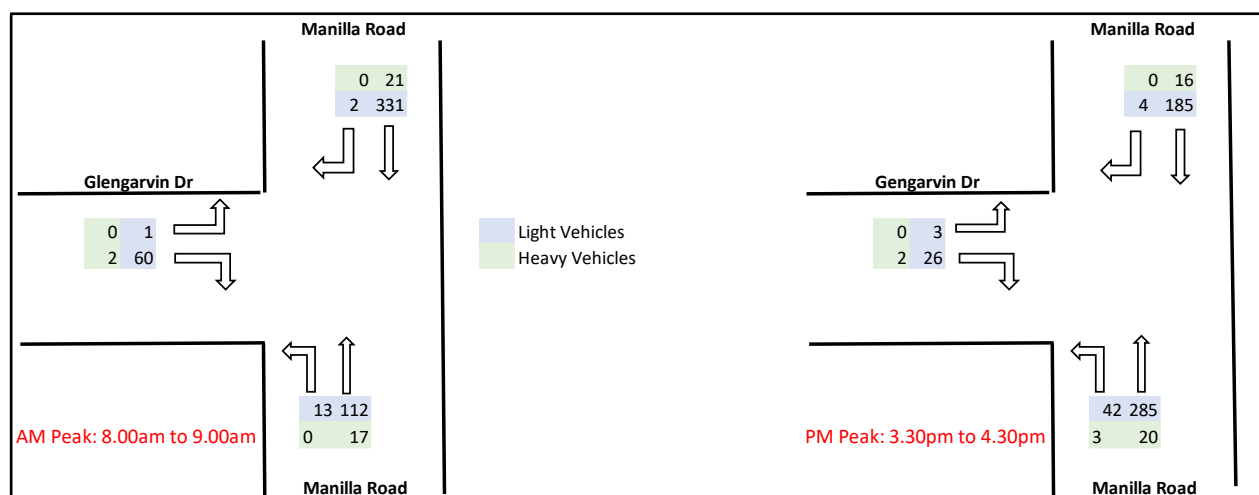


Figure 2.3: Manilla Road / Glengarvin Drive – AM and PM Peak Traffic Volumes 2024.

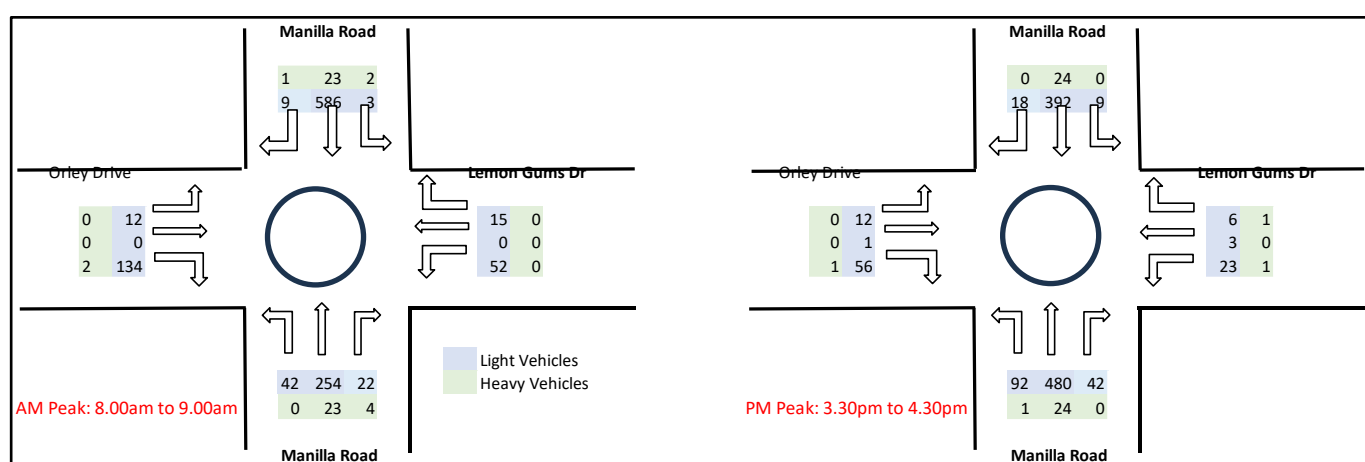


Figure 2.3: Manilla Road / Lemon Gums Drive / Orley Drive – AM and PM Peak Traffic Volumes 2024.

2.7 Road Capacity

Table 4.3 and 4.4 of the NSW "Guide to Traffic Generating Developments" below provide some guidance on mid-block capacities for urban roads and levels of service.

A desirable level of service on an urban rural road is generally considered to be a level of service (LoS) C or better however on an arterial road such as Manilla Road, a LoS D is still considered acceptable. Based on the tables below it is considered that Manilla Road would have a one-way midblock capacity of up to 2,200 vehicles per hour (at LoS D).

Table 4.3
Typical mid-block capacities for urban roads with interrupted flow

Type of Road	One-Way Mid-block Lane Capacity (pcu/hr)	
Median or inner lane:	Divided Road	1,000
	Undivided Road	900
Outer or kerb lane:	With Adjacent Parking Lane	900
	Clearway Conditions	900
	Occasional Parked Cars	600
4 lane undivided:	Occasional Parked Cars	1,500
	Clearway Conditions	1,800
4 lane divided:	Clearway Conditions	1,900

Table 4.4
Urban road peak hour flows per direction

Level of Service	One Lane (veh/hr)	Two Lanes (veh/hr)
A	200	900
B	380	1400
C	600	1800
D	900	2200
E	1400	2800

The traffic survey conducted on Manilla Road therefore indicates that it is currently operating at between 13% to 30% of capacity in the AM Peak and at 20% to 26% of capacity in the PM Peak with sufficient spare capacity of around 670 vehicles per hour northbound and southbound. The current Level of Service on Manilla Road is between LoS A and B.

2.8 Proposed Network Upgrades

The Draft Tamworth Strategic Transport Model completed by GTA Consultants on behalf of Tamworth Regional Council and TfNSW has identified the Browns Lane / Manilla Road intersection for upgrade to a roundabout as part of the future development of the land relating to this assessment (Stratheden Stud), in conjunction with the ongoing development of the Hills Plain Urban Release Area to the east of Manilla Road. Upgrading of this intersection is also identified in Council's Section 94 contributions plan however no works have commenced at this time.

Due to the semi-rural nature of the area, there is generally a low demand for pedestrian or cyclist movements. There is no existing cycling infrastructure in the vicinity. Council Section 94 plan includes an allowance for cycleways along Manilla Road, with a delivery between 2013-2023 and the Cycling Plan (Attachment E) indicates planned cycling paths south from Oxley Vale and through parts of the Hills Plains URA however makes no provision within the development lands to the west of Manilla Road.

3 Development Proposal

The proposal allows for the rezoning of land pertaining to 815 Manilla Road, Oxley Vale and incorporating Lots 1, 2 & 3 in DP 997767, Lot 12 in DP 245544, Lots 3 and 5 in DP 209387, Lots 3 and 4 in DP 212658, Lot 341 DP 622077, Lot 708 DP 1252037 and Lot 777 DP 115825 to allow for residential development.

The potential yield for the site will be in the order of 930 lots, with the proposed layout plan provided in Figure 3.1 below and **Attachment A**.

The development will be staged and constructed over a number of years in order to meet market demands. The implementation of this staging is currently undetermined. Given the size of the development it is proposed that in the long term access to the arterial road network (Manilla Road) would be provided via two intersections being:

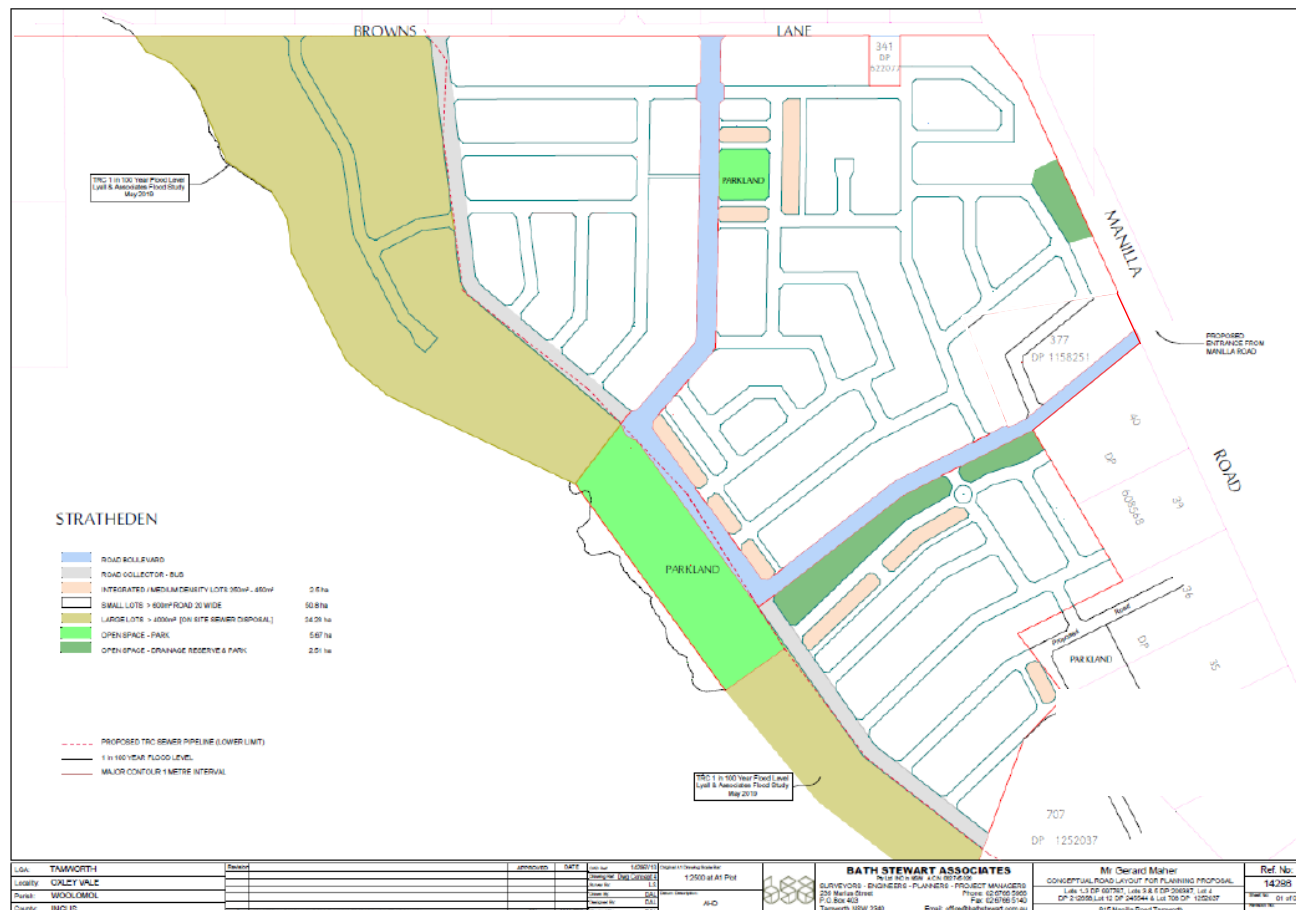
- The intersection of Manilla Road and Browns Lane; and
- A new T- intersection on Manilla Road within Lot 777 DP 115825.

As discussed above (Section 2.8), Council proposes the intersection of Manilla Road / Browns Lane to be upgraded to a roundabout. The Section 94 plan identifies this upgrade (R-205) with an indicative timeframe of 2021 however no work has commenced with no further clarification available at this point in time.

These accesses have been assessed in conjunction with this proposal.

A detailed assessment of the access options and associated Sidra modelling is provided in this report.

Figure 3.1: Concept Subdivision Layout



4 Traffic Generation and Impact

The NSW "Guide to Traffic Generating Developments" provides specific advice on the traffic generation potential of various land uses. However, the TfNSW has released a Technical Direction (TDT 2013/4) with the results of updated traffic surveys and amended land use traffic generation rates.

Regarding low density residential dwellings, the following amended advice is provided within the Technical Direction.

- Daily vehicle trips = 10.7 per dwelling in Sydney, 7.4 per dwelling in regional areas.
- Weekday average evening peak hour vehicle trips = 0.99 per dwelling in Sydney (maximum 1.39), 0.78 per dwelling in regional areas (maximum 0.90).
- Weekday average morning peak hour vehicle trips = 0.95 per dwelling in Sydney (maximum 1.32), 0.71 per dwelling in regional areas (maximum 0.85).

It is noted that the *Australian Model Code for Residential Developments (AMCORD)* assumes a daily vehicle generation of 10.0 per dwelling, with 10% of that taking place in the commuter peak period. The use of these figures provides some allowance for dual occupancy lots later in development. It is also noted that not all trips would be external, and approximately 25% of trips would be internal to the site. For an 895-lot development, therefore:

- 930 vehicle trips per hour in the AM peak (698 trips external), and
- 930 vehicle trips per hour in the PM peak (698 trips external)
- 9,300 trips per day (6,975 trips external)

4.1 Trip Distribution and Assignment

The above vehicle trips will be distributed across the two intersections providing access to the development. Based on the site layout, the following split of development traffic has been assigned to each intersection:

- 558 lots to access the site via Browns Lane (60%) = 419 trips.
- 372 lots to access the site via the new southern Site Access (40%) = 279 trips

The above gives the following traffic generation inbound/outbound during the AM and PM peaks, with a standard split for residential development of 20/80 inbound/outbound applied in the AM and the reverse in the PM.

Manilla Road / Browns Lane:

- AM = 419 trips (84 inbound / 335 outbound)
- PM = 419 trips (335 inbound / 84 outbound)

Manilla Road / Site Access:

- AM = 279 trips (56 inbound / 223 outbound)
- PM = 279 trips (223 inbound / 56 outbound)

The distribution of traffic to and from Manilla Road are illustrated below in **Table 4.1**.

The trip assignment at the Manilla Road / Browns Lane intersection has been adopted from the AM and PM traffic surveys conducted by BRS at this intersection on 20 March 2024.

The trip assignment at the Manilla Road / Subdivision access has been extracted from the 24 hour counts conducted on Manilla Road by Northern Transport Planning and Engineering

Table 4.1: Assumed Traffic Distribution at Manilla Road / Browns Lane

Peak	DA traffic	Inbound	Outbound	Peak Hour (In)	Peak Hour (Out)	Peak Hour Traffic Distribution (In)			Peak Hour Traffic Distribution (Out)		
						From North	From South	From East	To North	To South	To East
						14%	72%	14%	4%	75%	21%
					AM						
					PM	0%	90%	10%	0%	88%	12%
AM	419	20%	80%	84	335	12	60	12	15	250	70
PM	419	80%	20%	335	84	0	301	34	0	74	10

Table 4.2: Assumed Traffic Distribution at Manilla Road / Subdivision Access

Peak	DA traffic	Inbound	Outbound	Peak Hour (In)	Peak Hour (Out)	Peak Hour Traffic Distribution (In)		Peak Hour Traffic Distribution (Out)	
						From North	From South	To North	To South
						66%	34%	34%	66%
					AM				
					PM	45%	55%	55%	45%
AM	279	20%	80%	56	223	37	19	76	147
PM	279	80%	20%	223	56	100	123	31	25

The trip assignments shown in the tables above are illustrated below in **Figures 4.1 to 4.4**

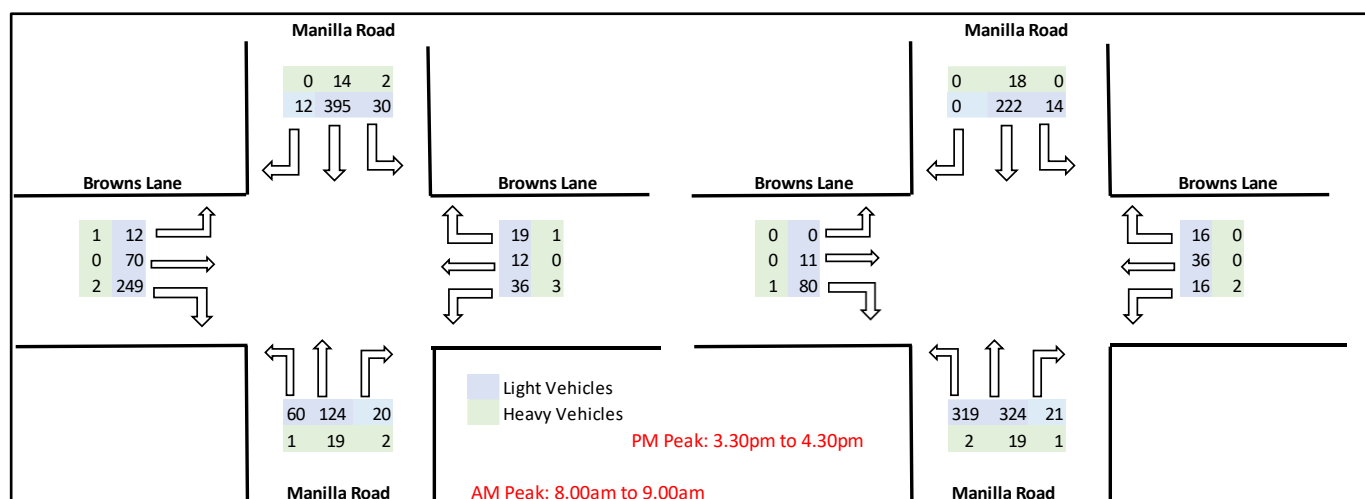


Figure 4.1: Manilla Road / Browns Lane – AM and PM Peak Traffic Volumes 2034.

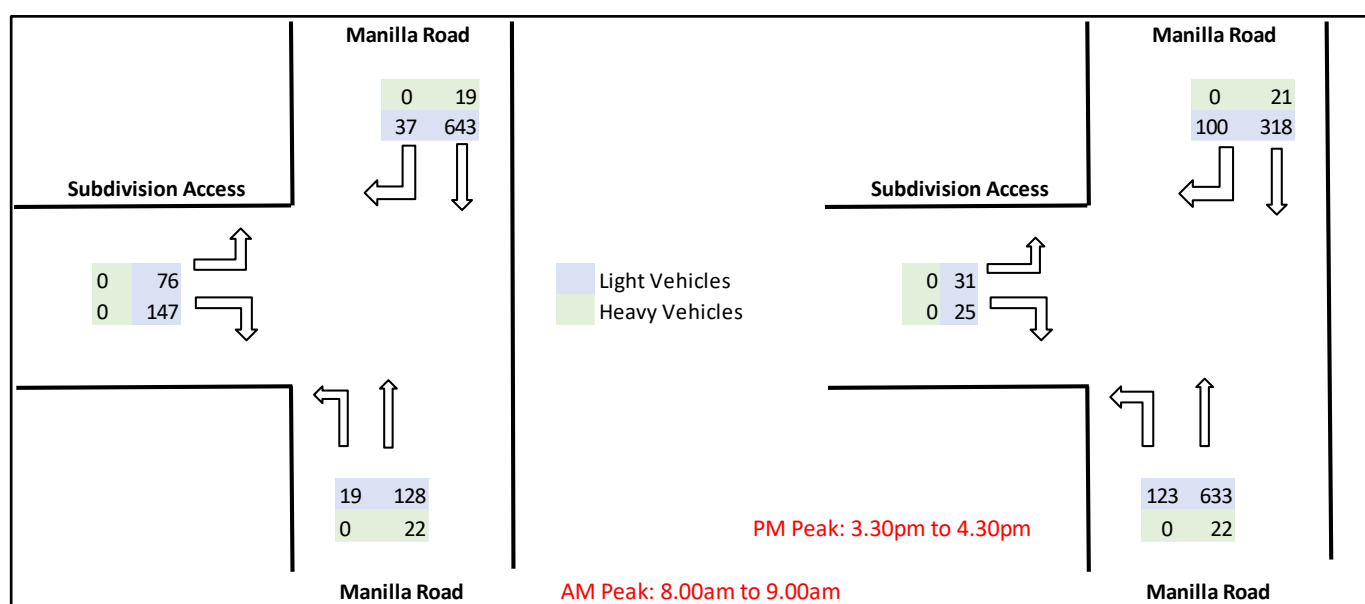


Figure 4.2: Manilla Road / Subdivision Access – AM and PM Peak Traffic Volumes 2034.

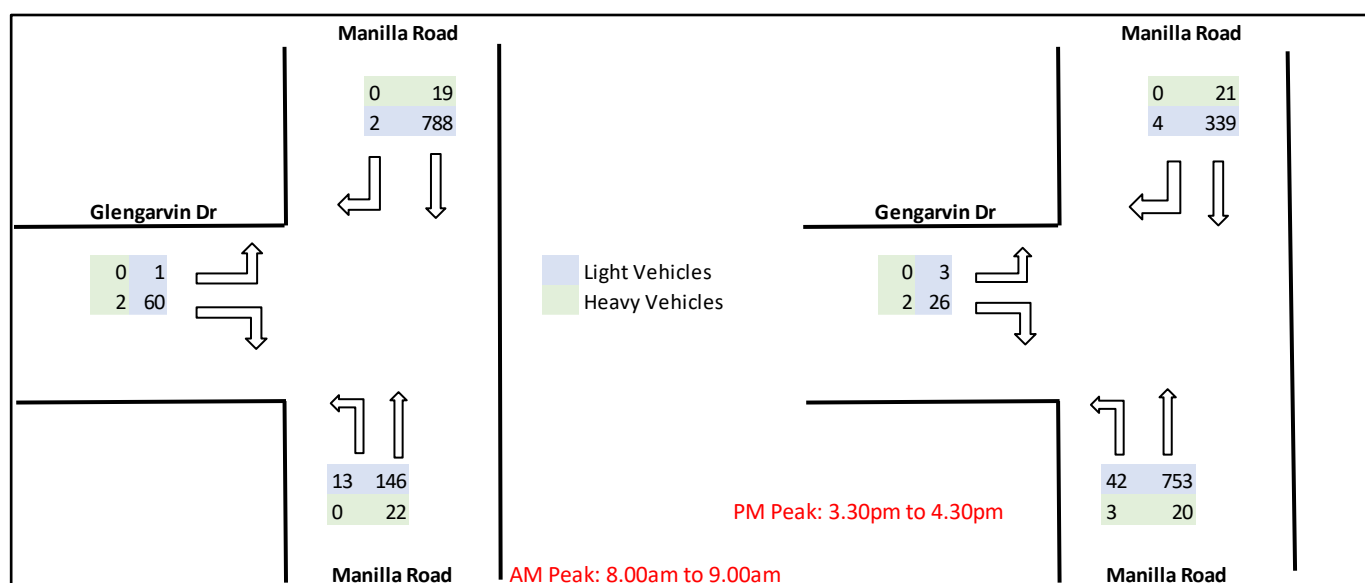


Figure 4.3: Manilla Road / Glengarvin Drive – AM and PM Peak Traffic Volumes 2034.

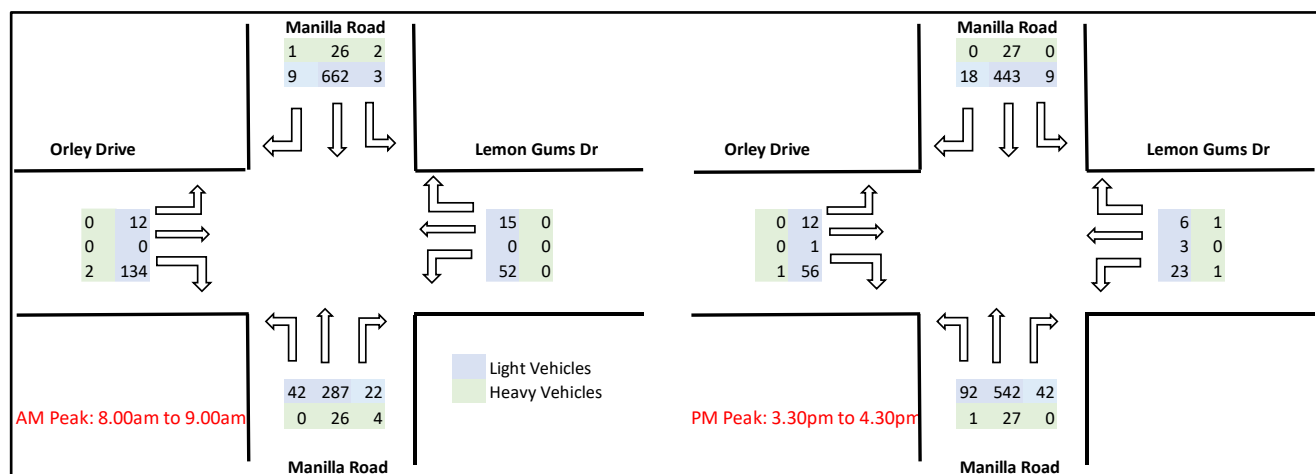


Figure 4.4: Manilla Road / Lemon Gums Drive / Orley Drive – AM and PM Peak Traffic Volumes 2034.

4.2 Impact of Generated Traffic

4.2.1 Manilla Road

The traffic survey conducted on Manilla Road indicates that it is currently operating at between 13% to 30% of capacity in the AM Peak and at 20% to 26% of capacity in the PM Peak with sufficient spare capacity of around 670 vehicles per hour northbound and southbound. The current Level of Service on Manilla Road is between LoS A and B.

The proposed development is expected to generate an additional 300 vehicles per hour per direction (north and south) onto Manilla Road, which is well within the spare capacity of this road. Background growth over 30 years will add around 100 vehicles per hour per direction.

Consequently, under the post development conditions, Manilla Road will carry a maximum of around 600 to 700 vehicles per hour per direction (Level of Service C) with spare capacity of at least 200 vehicles per hour.

4.2.2 Intersections

The capacity of urban and rural roads is generally determined by the capacity of intersections. The current and future operational performance of the intersections along Manilla Road have been assessed using SIDRA 9 modeling software which uses the level of service (delay) model adopted by Transport for NSW to assess intersection performance. Average delay is used to determine the level of service (LOS) based on the following table sourced from the TfNSW 'Traffic Modelling Guidelines'.

LoS	Average Delay / Vehicle (Sec)	Traffic Signals and Roundabouts	Give Way and Stop Signs
A	< 15	Good	Good
B	15 - 28	Good, with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	28 - 42	Satisfactory	Satisfactory, but requires accident study
D	42 - 56	Operating near capacity	Near capacity and requires accident study
E	56 - 70	At capacity, excessive delay: roundabout requires other control method	At capacity, requires other control mode
F	>70	Unsatisfactory, requires other control mode or additional capacity	Unsatisfactory, requires other control mode

Figure 4.5: Level of service criteria for intersections

For assessment purposes a LOS D or higher is considered satisfactory intersection operation.

Sidra analysis has been conducted for the 3 intersections where traffic surveys were conducted on 20 March 2024 plus the proposed new intersection on Manilla Road at the subdivision access road:

- Manilla Road / Browns Lane;
- Manilla Road / Subdivision Access;
- Manilla Road / Glengarvin Drive; and
- Manilla Road / Lemon Gums Drive / Orley Drive.

It has been assumed that the development will commence in 2024 with full development estimated to occur over a period of approximately 30 years. The initial release would consist of around 30 lots, with further development being dependent on market demand, determined by future population increases in the Tamworth area.

At a rate of 30 lots per year, full development would be reached in about 30 years. However, assuming the overall population of Tamworth increases at a higher rate, then the number of lots may increase at a similar rate.

For intersection modelling purposes, the standard period for assessing the impact of background traffic growth is 10 years as there is too much uncertainty regarding traffic growth over longer periods than 10 years. However, to ensure a conservative and robust assessment of full development of the site, a background growth of 1.3% over 30 years has been adopted for Manilla Road.

As a result, the following scenarios have been assessed assuming that the development will commence in 2024 and be completed in stages over a 30 year period.

1. Existing situation (2024);
2. Existing situation + full development (2054) + background growth for Manilla Road at 1.3% per annum.

The following assumptions were adopted in this modelling:

- The trip assignments for Manilla Road / Browns Lane and Manilla Road / Subdivision Access are as shown in Tables 4.1 and 4.2.
- Background growth of 1.3% per annum has been applied to Manilla Road traffic only.
- The residential areas contributing traffic to the Manilla Road / Glengarvin Drive intersections and the Manilla Road / Lemon Gums Drive / Orley Drive intersection are fully developed, therefore, the additional traffic at these intersections will be generated by the proposed subdivision and background growth on Manilla Road.

The results of the modelling for each intersection are summarized in **Table 4.3 to 4.6** below. Detailed SIDRA Movement Summary reports are attached in **Appendix C** of this report.

Manilla Road / Browns Lane**Table 4.3:** Manilla Road / Browns Lane – SIDRA Results

Intersection	Scenario	Peak Period	Degree of Saturation (v/c)	Worst Delay (sec)	Level of Service (LoS)	95% Queue Length (m)	Worst Approach (Delay)	Worst Approach (Queue)
Manilla Road / Browns Lane	Base 2024	AM	0.147	11.6	B	1.7	Browns Lane West (Right Turn)	Manilla Road South (Right Turn)
		PM	0.147	11.6	B	1.7	Browns Lane West (Right Turn)	Manilla Road South (Right Turn)
	Base 2024 + Background Growth to 2054 + Development	AM	0.874	42.6	D	63.6	Browns Lane West (Right Turn)	Browns Lane West (Right Turn)
		PM	0.365	24.3	C	10.6	Browns Lane West (Right Turn)	Browns Lane West (Right Turn)

The results in Table 4.3 above show that the Manilla Road / Browns Lane intersection is currently operating at a satisfactory level of service of B during the AM and PM peaks. As expected, these levels of service will reduce over the 30 year period to 2054 as a result of the additional traffic that will be generated by the proposed development and the projected growth in background traffic along Manilla Road of 1.3% per annum.

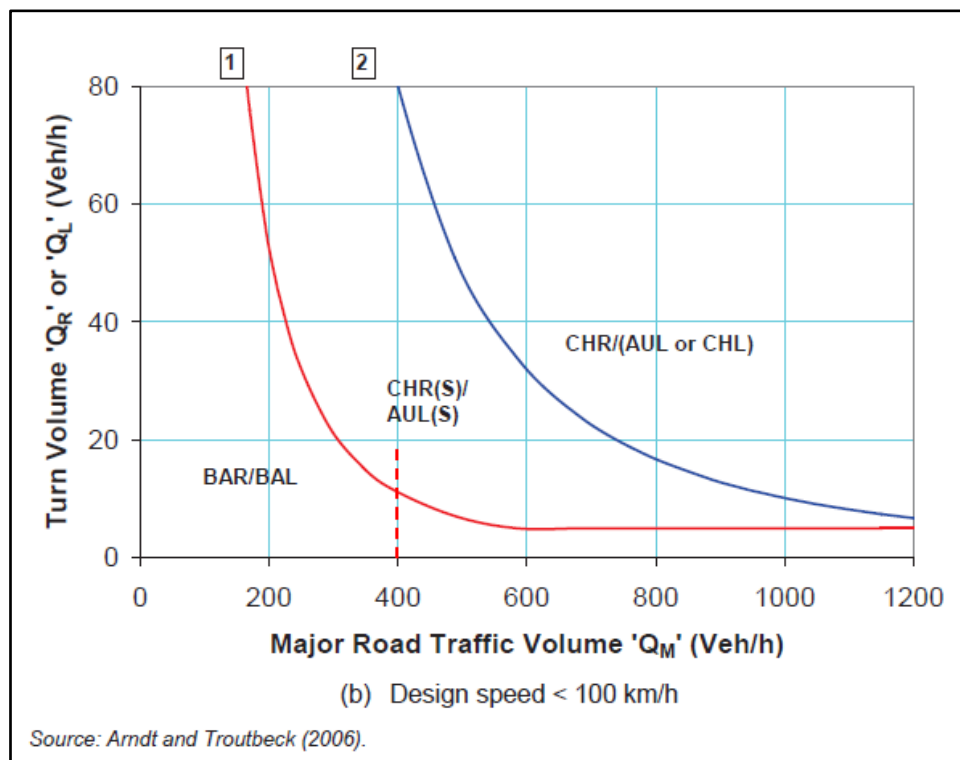
However, the intersection will continue to operate satisfactorily in its current arrangement with Level of Service of D during the AM peak and Level of Service C in the PM Peak.

Manilla Road / Subdivision Access**Table 4.4:** Manilla Road / Subdivision Access - SIDRA Results.

Intersection	Scenario	Peak Period	Degree of Saturation (v/c)	Worst Delay (sec)	Level of Service (LoS)	95% Queue Length (m)	Worst Approach (Delay)	Worst Approach (Queue)
Manilla Road / Subdivision Access	Base 2024 + Background Growth to 2054 + Development	AM	0.519	22.1	C	14	Subdivision Access (Right Turn)	Browns Lane West (Right Turn)
		PM	0.431	14.7	B	15.9	Subdivision Access (Right Turn)	Manilla Road North (Right Turn)

The results in Table 4.4 above show that the Manilla Road / Subdivision Access intersection will operate at a satisfactory level of service of B during the AM and PM peaks, post development to 2054.

The type of intersection required at this location has been assessed according to Figure A10(b) in Austroads "Guide to Road Design Part 4: Intersections and Crossings – General", reproduced below.



The selection of an appropriate intersection arrangement is based on the highest hourly through volume on the major road and the highest right turn volume into the minor road.

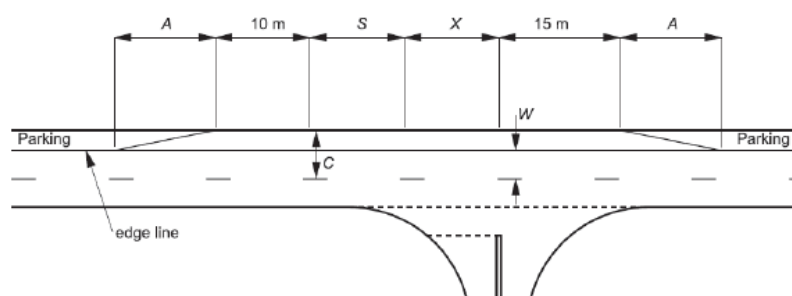
Based on the traffic survey conducted by Northern Transport Planning and Engineering in March 2024, the highest hourly volume on Manilla Road was 401 vehicle per hour during the PM peak.

The initial stage of development is expected to yield only 30 lots so the traffic volume generated at the subdivision access would only be around 22 vehicles per hour. During the PM Peak, right turns from the north into the subdivision would only amount to less than 10 vehicles per hour. Therefore, according to Figure A10(b), the initial intersection would required would be a BAR/BAL as shown in Figure 7.6 in Austroads "Guide to Road Design Part 4A: Unsignalised and Signalised Intersections", reproduced below.

7.5.1 Urban Basic Right-turn Treatment (BAR)

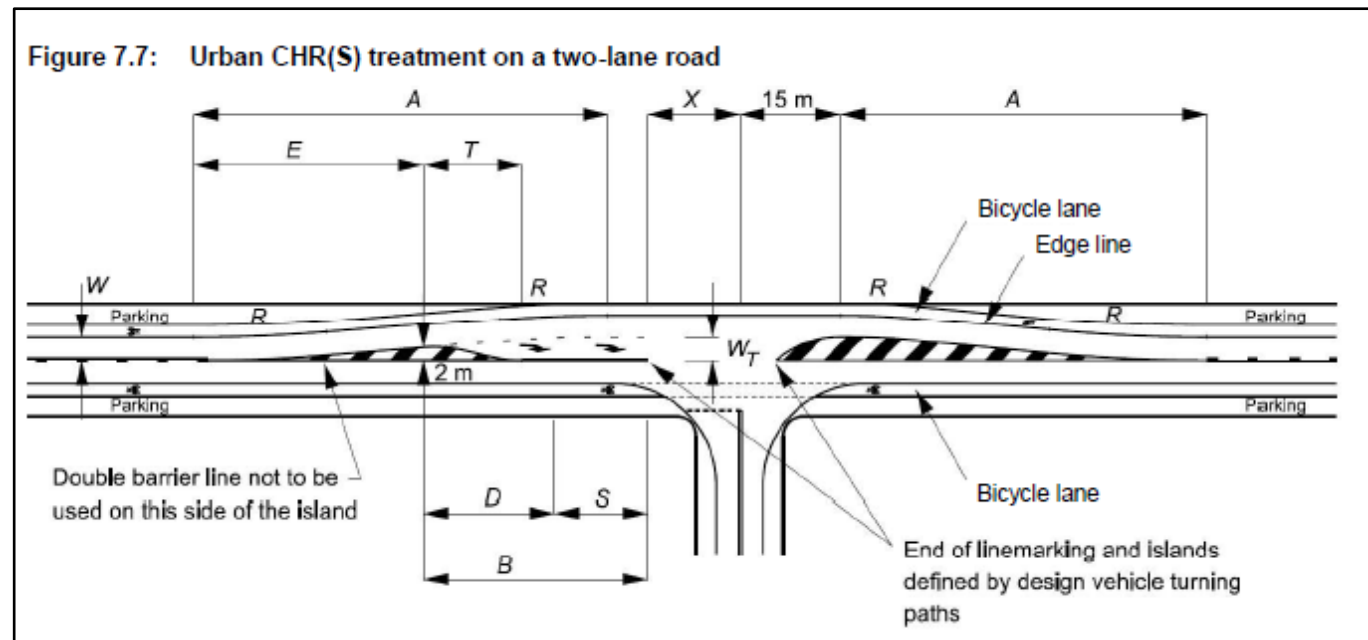
The BAR turn treatment shown in Figure 7.6 is applicable at intersections of two-lane urban roads and minor local roads where traffic volumes do not warrant a higher order treatment. It should provide sufficient pavement width for the design through vehicle to pass a vehicle waiting to turn right. The absolute minimum pavement width on a horizontal straight should be 6.0 m between the centreline and the edge of the pavement or kerb line while 6.5 m is the preferred minimum as it is adequate for heavy vehicles (excluding road trains) to pass right-turning vehicles.

Figure 7.6: Basic right-turn treatment (BAR) for a two-lane urban road



Based on an average development rate of 30 lots per year, the BAR/BAL intersection is expected to require upgrading to a CHR(s)/AUL intersection after 7 years from the commencement of development, the threshold being the development of 210 lots.

The arrangement for a CHR(s)/AUL intersection is as shown in Figure 7.7 in Austroads "Guide to Road Design Part 4A: Unsignalised and Signalised Intersections", reproduced below.



Manila Road / Glengarvin Drive

Table 4.5: Manilla Road / Glengarvin Drive - *SIDRA Results*.

Intersection	Scenario	Peak Period	Degree of Saturation (v/c)	Worst Delay (sec)	Level of Service (LoS)	95% Queue Length (m)	Worst Approach (Delay)	Worst Approach (Queue)
Manila Road / Glengarvin Drive	Base 2024	AM	0.119	8.0	A	2	Glengarvin Dr (Right Turn)	Glengarvin Dr (Right Turn)
		PM	0.198	8.4	A	1	Glengarvin Dr (Right Turn)	Glengarvin Dr (Right Turn)
	Base 2024 + Background Growth to 2054 + Development	AM	0.444	11.8	B	4.3	Glengarvin Dr (Right Turn)	Glengarvin Dr (Right Turn)
		PM	0.451	18.5	C	2.6	Glengarvin Dr (Right Turn)	Glengarvin Dr (Right Turn)

The results in Table 4.5 above show that the Manilla Road / Glengarvin Drive intersection is currently operating at a satisfactory level of service of A during the AM and PM peaks. As expected, these levels of

service will reduce over the 30 year period to 2054 as a result of the additional traffic that will be generated by the proposed development and the projected growth in background traffic along Manilla Road of 1.3% per annum.

However, the intersection will continue to operate satisfactorily in its current arrangement with Level of Service of B during the AM peak and Level of Service C during the PM peak.

Manila Road / Lemon Gums Drive / Orley Drive

Table 4.6: Manila Road / Lemon Gums Drive / Orley Drive - *SIDRA Results*

Intersection	Scenario	Peak Period	Degree of Saturation (v/c)	Worst Delay (sec)	Level of Service (LoS)	95% Queue Length (m)	Worst Approach (Delay)	Worst Approach (Queue)
Manila Road / Lemon Gums Drive / Orley Drive	Base 2024	AM	0.475	14.6	B	29.8	Lemon Gums Dr (Right Turn)	Manilla Road North (Thru / Right Turn)
		PM	0.353	12.6	B	20.1	Orley Dr (Right Turn)	Manilla Road South (Thru / Right Turn)
	Base 2024 + Background Growth to 2054 + Development	AM	0.691	20.1	C	59.6	Lemon Gums Dr (Right Turn)	Manilla Road North (Thru / Right Turn)
		PM	0.486	15.2	B	33.6	Orley Dr (Right Turn)	Manilla Road South (Thru / Right Turn)

The results in Table 4.6 above show that the Manila Road / Lemon Gums Drive / Orley Drive intersection is currently operating at a satisfactory level of service of B during the AM and PM peaks. As expected, these levels of service will reduce over the 30 year period to 2054 as a result of the additional traffic that will be generated by the proposed development and the projected growth in background traffic along Manilla Road of 1.3% per annum.

However, the intersection will continue to operate satisfactorily in its current arrangement with Level of Service of C during the AM peak and Level of Service B during the PM peak.

The full results of the Sidra modelling are provided in the SIDRA Movement Summary reports attached in **Appendix C** of this report.

5 Conclusion and Recommendations

This Traffic Impact Assessment has been prepared in accordance with the requirements of Tamworth Regional Council's DCP and the NSW 'Guide to Traffic Generating Developments' to accompany a proposed Development Control Plan (DCP) for a residential subdivision located at Manilla Road, Oxley Vale.

The proposal allows for the rezoning of land pertaining to 815 Manilla Road, Oxley Vale and incorporating Lots 1, 2 3 in DP 997767, Lot 12 in DP 245544, Lots 3 and 5 in DP 209387, Lot 4 in DP 212658, Lot 341 DP 622077, Lot 708 DP 1252037 and Lot 777 DP 1158251 to allow for residential development. The potential yield for the site will be in the order of 930 lots.

The development will be staged and constructed over a number of years in order to meet market demands. The implementation of this staging is currently undetermined. Given the size of the development it is proposed that in the long term access to the arterial road network (Manilla Road) would be provided via two intersections being:

- A new T- intersection on Manilla Road in the location of the existing driveway access,
- The intersection of Manilla Road and Browns Lane.

A traffic survey has been conducted by Northern Transport Planning and Engineering over a two-week period in March 2024 to identify the existing daily and peak hour traffic volumes on Manilla Road.

Traffic counts were also conducted by BRS at the following intersections during the AM peak hour (7.30am to 9.30am) and the PM peak hour (3.00pm to 6.00pm) on Wednesday 20 March 2024.

- Manilla Road / Browns Lane;
- Manilla Road / Glengarvin Drive; and
- Manilla Road / Lemon Gums Drive / Orley Drive.

Sidra analysis has been conducted for the 3 intersections where traffic surveys were conducted on 20 March 2024 plus the proposed new intersection on Manilla Road at the subdivision access road:

- Manilla Road / Browns Lane;
- Manilla Road / Subdivision Access;
- Manilla Road / Glengarvin Drive; and
- Manilla Road / Lemon Gums Drive / Orley Drive.

The Sidra modelling results show that each of the existing intersections is currently operating at a satisfactory level of service of during the AM and PM peaks. As expected, these levels of service will reduce over the forecast 30 year period for full development of the subdivision as a result of the additional traffic that will be generated by the proposed development and the projected growth in background traffic along Manilla Road of 1.3% per annum.

These results demonstrate that none of the existing intersections along Manilla Road will need to be upgraded to cater for the additional traffic that will be generated by the proposed development.

The initial stage of development is expected to yield only 30 lots so the traffic volume generated at the new subdivision access on Manilla Road would only be around 22 vehicles per hour. During the PM Peak, right turns from the north into the subdivision would only amount to less than 10 vehicles per hour. Therefore, according to Figure A10(b), the initial intersection requirement would be a BAR/BAL as shown in Figure 7.6 in Austroads "Guide to Road Design Part 4A: Unsignalised and Signalised Intersections".

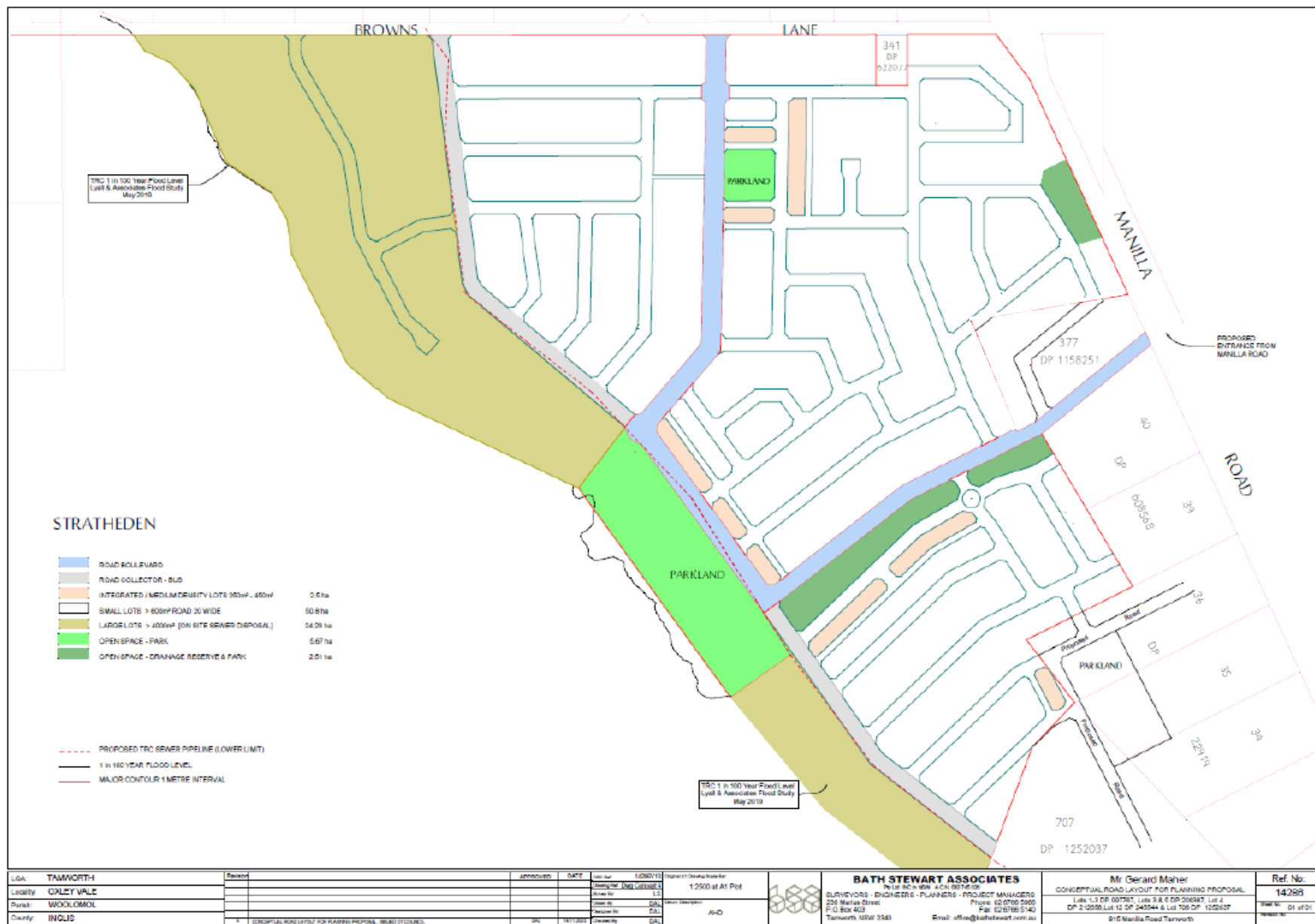
Based on an average development rate of 30 lots per year, the BAR/BAL intersection is expected to require upgrading to a CHR(s)/AUL intersection after 7 years from the commencement of development, the threshold being the development of 210 lots.

Manilla Road will continue to operate within its capacity at Level of Service C and spare capacity of at least 300 vehicles per hour per direction.

However, the 85% speed of 93km/h on Manilla Road should be addressed. it is therefore recommended that an application be submitted to Transport for NSW to lower the speed limit along Manilla Road from 80km/h to 60km/h due to the additional intersection required and to increase safety as a result of the increased traffic volumes that will be generated on Manilla Road.

Appendix A

Subdivision Layout



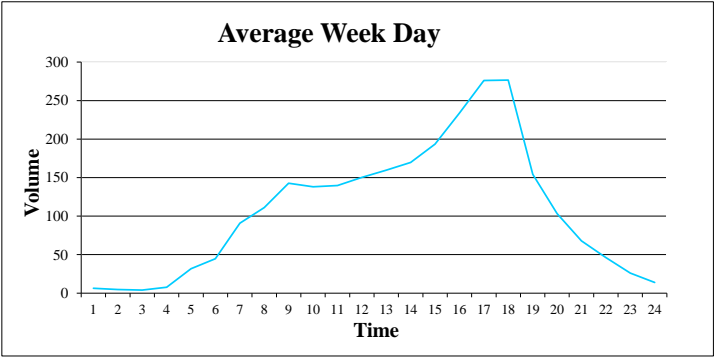
Appendix B

Traffic Survey Data

Site 1 MANILLA RD 250M S OF BROWNS LANE [80]

Northbound

Day Time	Wed 13/03/24	Thu 14/03/2024	Fri 15/03/2024	Sat 16/03/2024	Sun 17/03/2024	Mon 18/03/2024	Tue 19/03/2024	W/Day Ave.	W/End Ave.	7 Day Ave
0:00	4	10	8	10	17	5	5	6	14	8
1:00	3	6	7	8	11	4	3	5	10	6
2:00	7	3	6	2	7	2	2	4	5	4
3:00	5	10	8	9	4	6	9	8	7	7
4:00	39	32	28	10	13	25	34	32	12	26
5:00	37	56	42	26	17	53	36	45	22	38
6:00	87	108	102	41	21	74	83	91	31	74
7:00	118	133	92	64	49	102	110	111	57	95
8:00	153	142	128	94	63	138	152	143	79	124
9:00	134	140	136	137	109	140	140	138	123	134
10:00	129	142	157	179	138	126	145	140	159	145
11:00	148	136	167	185	152	148	152	150	169	155
12:00	146	160	176	214	153	157	160	160	184	167
13:00	181	173	184	202	141	141	170	170	172	170
14:00	196	186	202	178	158	189	194	193	168	186
15:00	216	234	266	153	147	224	230	234	150	210
16:00	286	270	304	155	161	268	253	276	158	242
17:00	288	269	241	127	126	270	315	277	127	234
18:00	147	199	152	100	93	128	145	154	97	138
19:00	103	131	112	64	66	82	89	103	65	92
20:00	67	86	72	73	55	48	67	68	64	67
21:00	49	63	47	40	25	34	39	46	33	42
22:00	25	22	48	37	19	16	19	26	28	27
23:00	8	19	18	19	13	13	11	14	16	14
Total	2576	2730	2703	2127	1758	2393	2563	2593	1943	2407

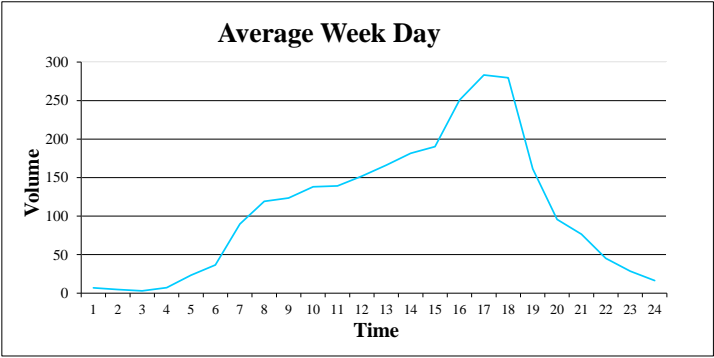


Summary			
	from	to	
AM Peak	11:00 AM	12:00 PM	167
PM Peak	5:00 PM	6:00 PM	315
Week Day Average			2593
Weekend Day Average			1943
7 Day Average			2407

Site 1 MANILLA RD 250M S OF BROWNS LANE [80]

Northbound

Day Time	Wed 20/03/24	Thu 21/03/2024	Fri 22/03/2024	Sat 23/03/2024	Sun 24/03/2024	Mon 25/03/2024	Tue 26/03/2024	W/Day Ave.	W/End Ave.	7 Day Ave
0:00	7	7	8	10	17	6	6	7	14	9
1:00	6	2	1	9	9	9	5	5	9	6
2:00	3	3	4	2	3	3	2	3	3	3
3:00	4	8	9	4	5	5	10	7	5	6
4:00	26	20	23	24	22	21	27	23	23	23
5:00	35	39	29	20	15	44	36	37	18	31
6:00	76	95	95	33	26	84	99	90	30	73
7:00	136	129	106	65	33	118	107	119	49	99
8:00	127	126	114	96	50	132	118	123	73	109
9:00	140	136	132	129	109	135	147	138	119	133
10:00	134	151	152	153	128	131	128	139	141	140
11:00	153	148	163	194	144	143	153	152	169	157
12:00	150	151	177	228	165	178	175	166	197	175
13:00	183	161	211	212	173	185	168	182	193	185
14:00	192	171	225	174	194	175	188	190	184	188
15:00	248	262	274	166	154	242	228	251	160	225
16:00	286	269	326	170	146	256	279	283	158	247
17:00	273	256	269	132	135	289	311	280	134	238
18:00	160	174	151	99	94	170	152	161	97	143
19:00	70	128	96	72	72	88	97	96	72	89
20:00	75	92	79	58	58	60	77	77	58	71
21:00	49	44	53	52	22	36	44	45	37	43
22:00	32	22	38	35	16	23	27	28	26	28
23:00	13	24	17	25	15	12	16	16	20	17
Total	2578	2618	2752	2162	1805	2545	2600	2619	1984	2437

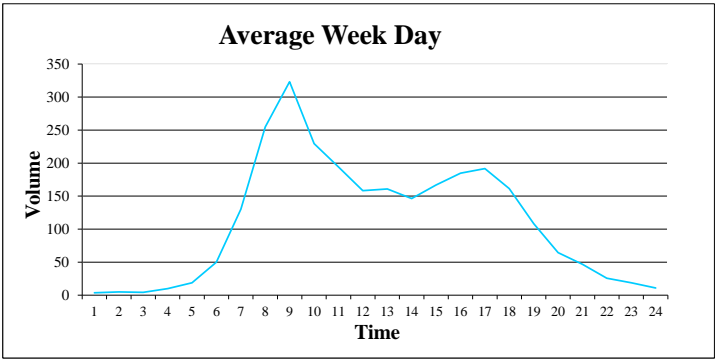


Summary			
	from	to	
AM Peak	11:00 AM	12:00 PM	163
PM Peak	4:00 PM	5:00 PM	326
Week Day Average			2619
Weekend Day Average			1984
7 Day Average			2437

Site 1 MANILLA RD 250M S OF BROWNS LANE [80]

Southbound

Day Time	Wed 13/03/24	Thu 14/03/2024	Fri 15/03/2024	Sat 16/03/2024	Sun 17/03/2024	Mon 18/03/2024	Tue 19/03/2024	W/Day Ave.	W/End Ave.	7 Day Ave
0:00	3	3	5	4	10	4	3	4	7	5
1:00	6	4	8	8	10	0	7	5	9	6
2:00	4	3	3	4	7	5	6	4	6	5
3:00	10	9	11	6	3	8	11	10	5	8
4:00	21	17	21	17	5	18	16	19	11	16
5:00	53	42	51	20	10	54	50	50	15	40
6:00	134	134	121	51	37	121	142	130	44	106
7:00	260	252	254	109	68	239	269	255	89	207
8:00	327	342	309	183	94	307	331	323	139	270
9:00	242	226	229	226	168	217	234	230	197	220
10:00	186	204	183	258	155	195	203	194	207	198
11:00	160	150	183	185	156	161	138	158	171	162
12:00	172	158	181	175	145	150	143	161	160	161
13:00	132	166	142	160	121	144	148	146	141	145
14:00	179	187	180	119	142	143	145	167	131	156
15:00	186	183	197	127	133	176	182	185	130	169
16:00	200	199	190	119	123	182	188	192	121	172
17:00	158	203	157	135	116	133	156	161	126	151
18:00	116	133	114	94	98	88	90	108	96	105
19:00	55	80	81	72	47	38	68	64	60	63
20:00	43	62	51	47	44	33	45	47	46	46
21:00	26	34	25	27	27	20	24	26	27	26
22:00	11	17	28	20	20	16	21	19	20	19
23:00	11	11	9	15	4	9	14	11	10	10
Total	2695	2819	2733	2181	1743	2461	2634	2668	1962	2467

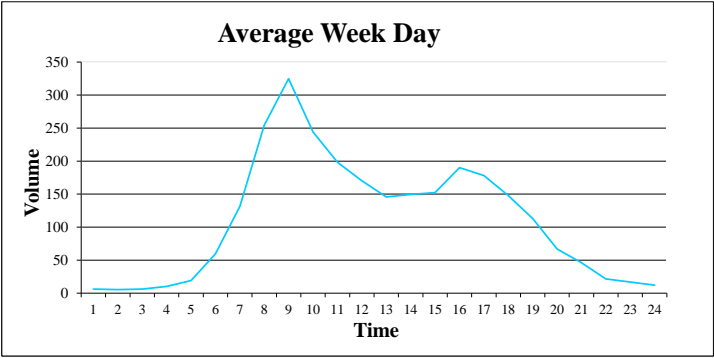


Summary			
	from	to	
AM Peak	8:00 AM	9:00 AM	342
PM Peak	5:00 PM	6:00 PM	203
Week Day Average			2668
Weekend Day Average			1962
7 Day Average			2467

Site 1 MANILLA RD 250M S OF BROWNS LANE [80]

Southbound

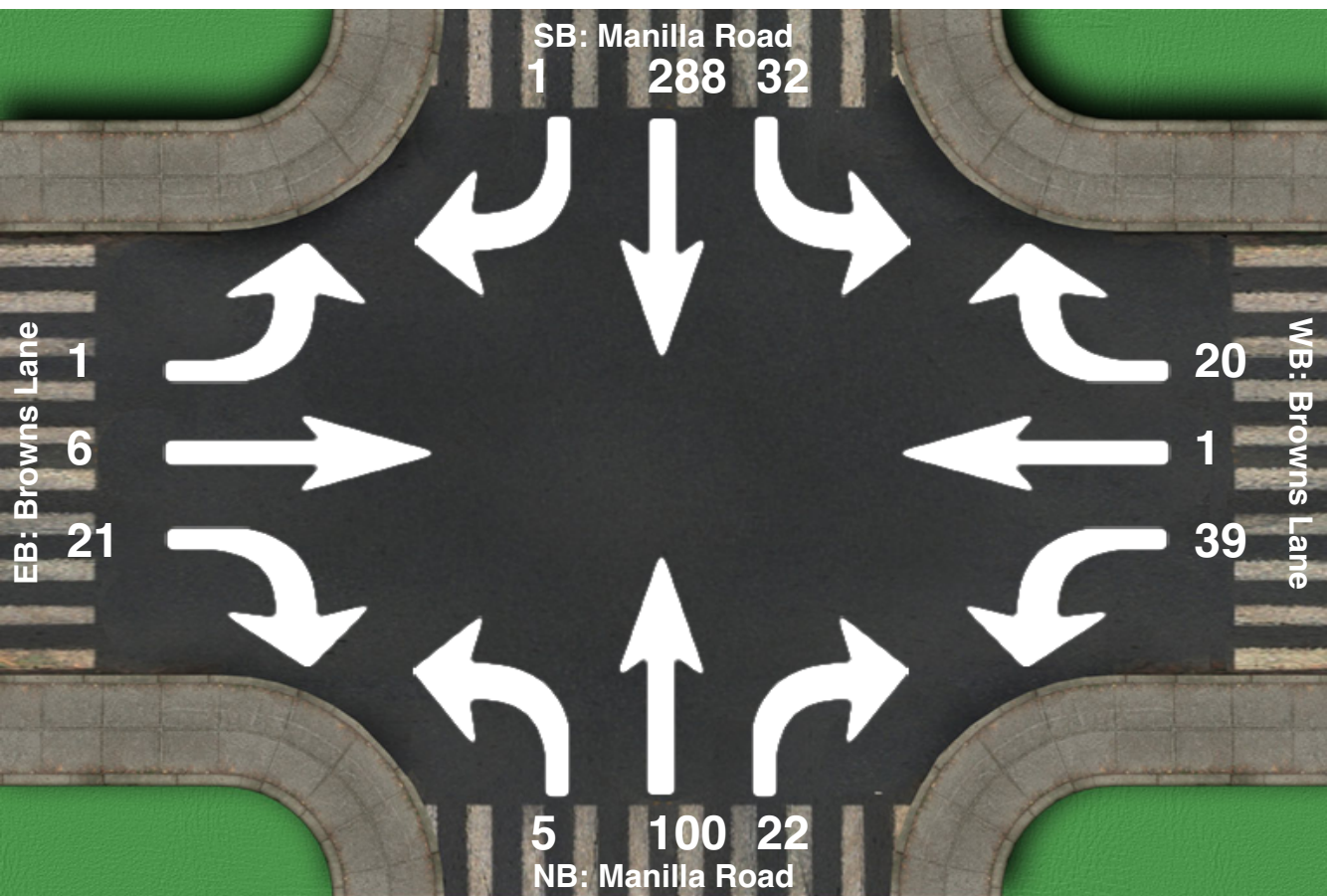
Day Time	Wed 20/03/24	Thu 21/03/2024	Fri 22/03/2024	Sat 23/03/2024	Sun 24/03/2024	Mon 25/03/2024	Tue 26/03/2024	W/Day Ave.	W/End Ave.	7 Day Ave
0:00	7	7	6	7	13	3	7	6	10	7
1:00	2	4	8	7	3	5	8	5	5	5
2:00	6	10	6	5	6	5	3	6	6	6
3:00	10	12	9	8	1	12	8	10	5	9
4:00	18	24	16	14	5	17	21	19	10	16
5:00	66	59	57	31	16	57	58	59	24	49
6:00	136	139	123	59	42	125	134	131	51	108
7:00	261	256	237	101	66	263	255	254	84	206
8:00	350	342	293	187	122	313	326	325	155	276
9:00	234	257	234	234	161	245	250	244	198	231
10:00	180	201	227	231	164	181	202	198	198	198
11:00	164	184	178	203	167	170	155	170	185	174
12:00	143	148	162	153	143	134	142	146	148	146
13:00	129	151	155	125	145	158	155	150	135	145
14:00	137	172	157	128	140	131	165	152	134	147
15:00	197	200	202	130	137	165	186	190	134	174
16:00	173	184	173	116	135	188	173	178	126	163
17:00	139	160	133	128	116	147	161	148	122	141
18:00	106	132	112	115	73	94	120	113	94	107
19:00	61	65	77	70	61	67	65	67	66	67
20:00	45	51	52	49	41	41	41	46	45	46
21:00	13	22	21	31	29	26	26	22	30	24
22:00	14	15	23	20	15	18	15	17	18	17
23:00	11	11	17	15	14	11	10	12	15	13
Total	2602	2806	2678	2167	1815	2576	2686	2670	1991	2476



Summary			
	from	to	
AM Peak	8:00 AM	9:00 AM	350
PM Peak	3:00 PM	4:00 PM	202
Week Day Average			2670
Weekend Day Average			1991
7 Day Average			2476

Intersection Peak Hour

Location: Manilla Road at Browns Lane, Tamworth
GPS Coordinates: Lat=-31.093702, Lon=150.923180
Date: 2024-03-20
Day of week: Wednesday
Weather: Clear
Analyst: Glenn



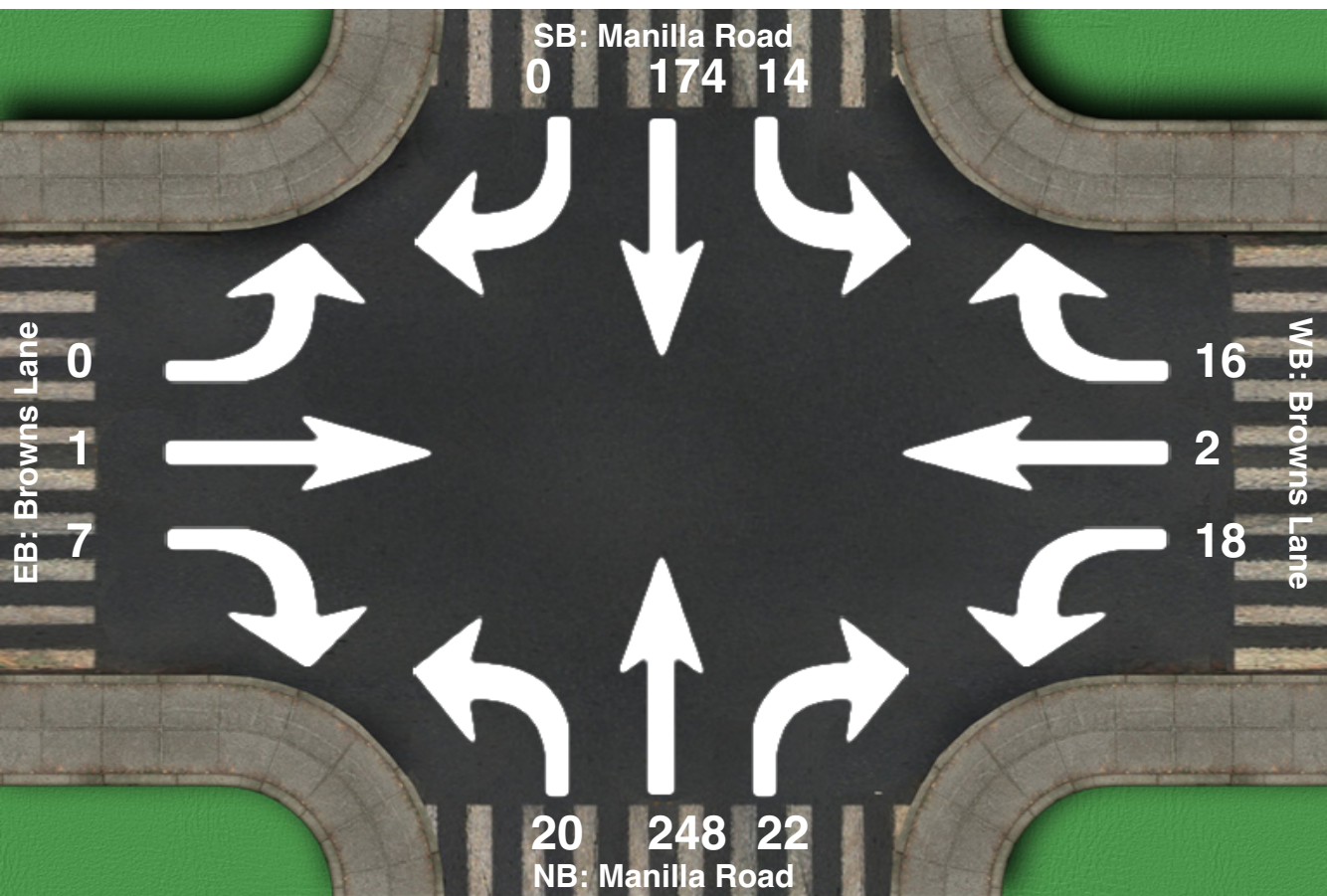
Intersection Peak Hour

08:00 - 09:00

	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	32	288	1	39	1	20	5	100	22	1	6	21	536
Factor	0.73	0.94	0.25	0.89	0.25	0.56	0.42	0.74	0.61	0.25	0.50	0.66	0.96
Approach Factor	0.92			0.88			0.84			0.78			

Intersection Peak Hour

Location: Manilla Road at Browns Lane, Tamworth
GPS Coordinates: Lat=-31.065152, Lon=150.903669
Date: 2024-03-20
Day of week: Wednesday
Weather: Light Rain
Analyst: Glenn



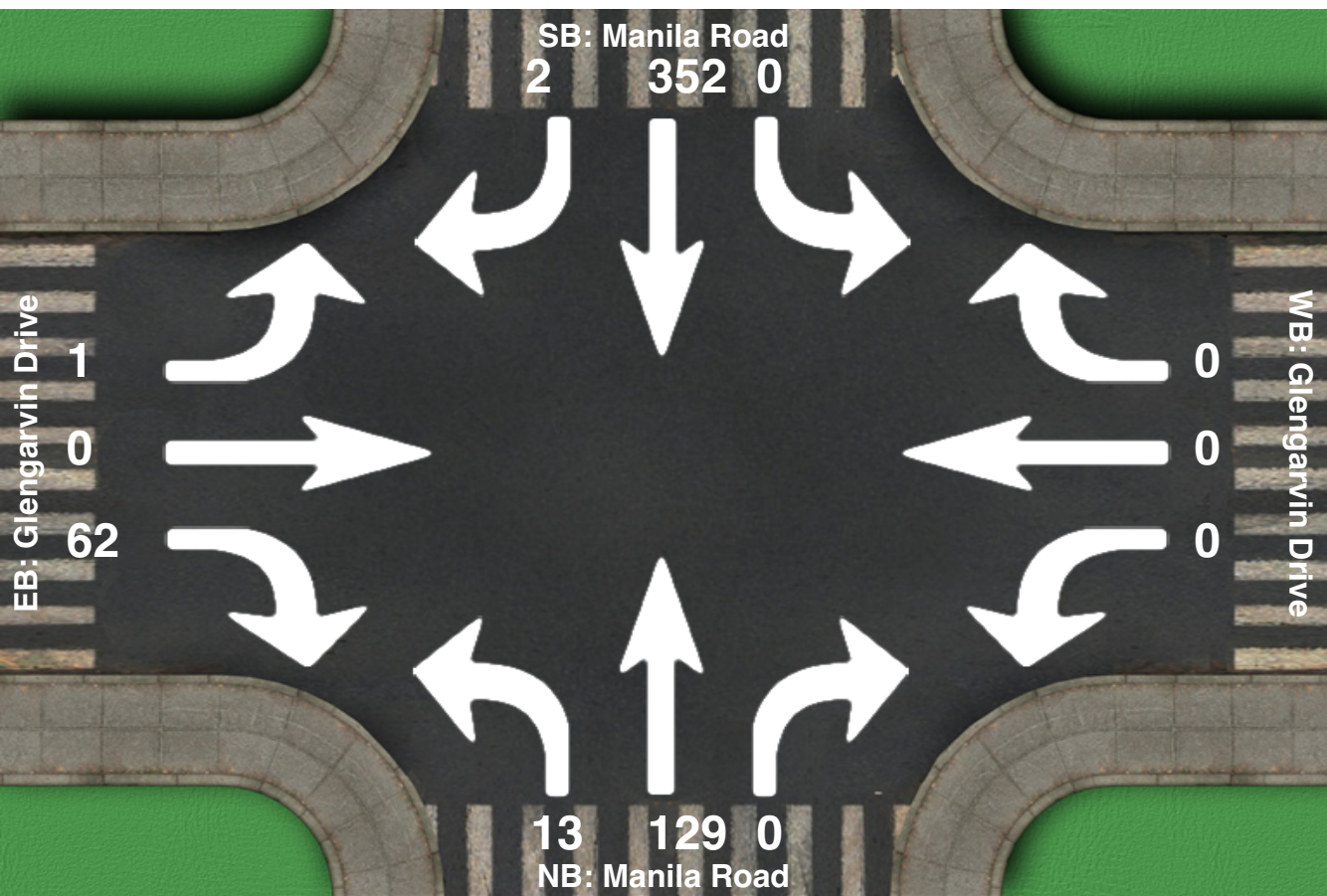
Intersection Peak Hour

15:30 - 16:30

	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	14	174	0	18	2	16	20	248	22	0	1	7	522
Factor	0.70	0.84	0.00	0.64	0.50	0.67	0.62	0.83	0.55	0.00	0.25	0.58	0.91
Approach Factor	0.85			0.64			0.88			0.67			

Intersection Peak Hour

Location: Manila Road at Glengarvin Drive, Tamworth
GPS Coordinates: Lat=-31.093695, Lon=150.923204
Date: 2024-03-20
Day of week: Wednesday
Weather: Clear
Analyst: Elske



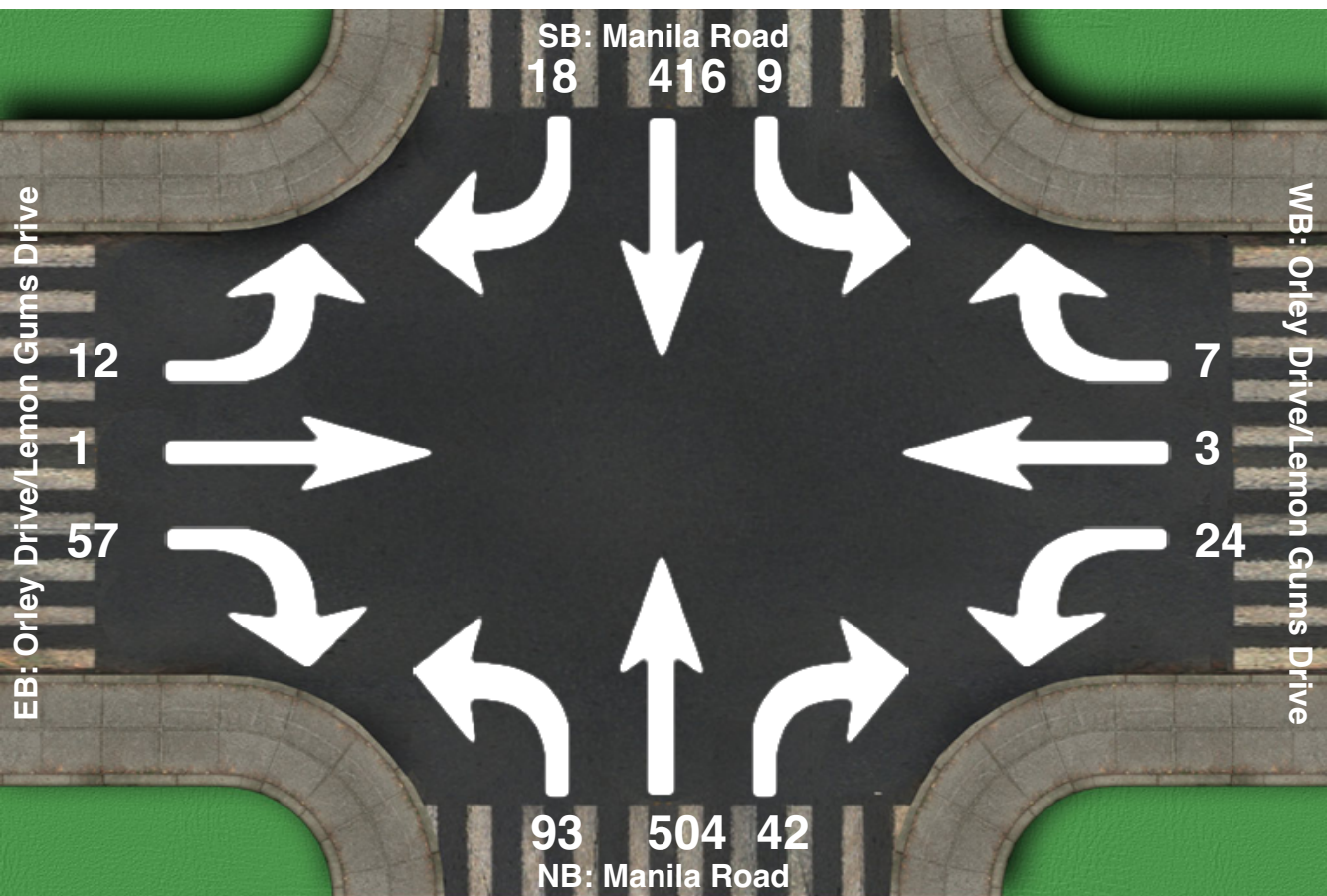
Intersection Peak Hour

07:45 - 08:45

	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	0	352	2	0	0	0	13	129	0	1	0	62	559
Factor	0.00	0.85	0.50	0.00	0.00	0.00	0.65	0.77	0.00	0.25	0.00	0.82	0.95
Approach Factor	0.85			0.00			0.76			0.83			

Intersection Peak Hour

Location: Manila Road at Orley Drive/Lemon Gums Drive, Tamworth
GPS Coordinates:
Date: 2024-03-20
Day of week: Wednesday
Weather: Overcast/light rain
Analyst: Finn



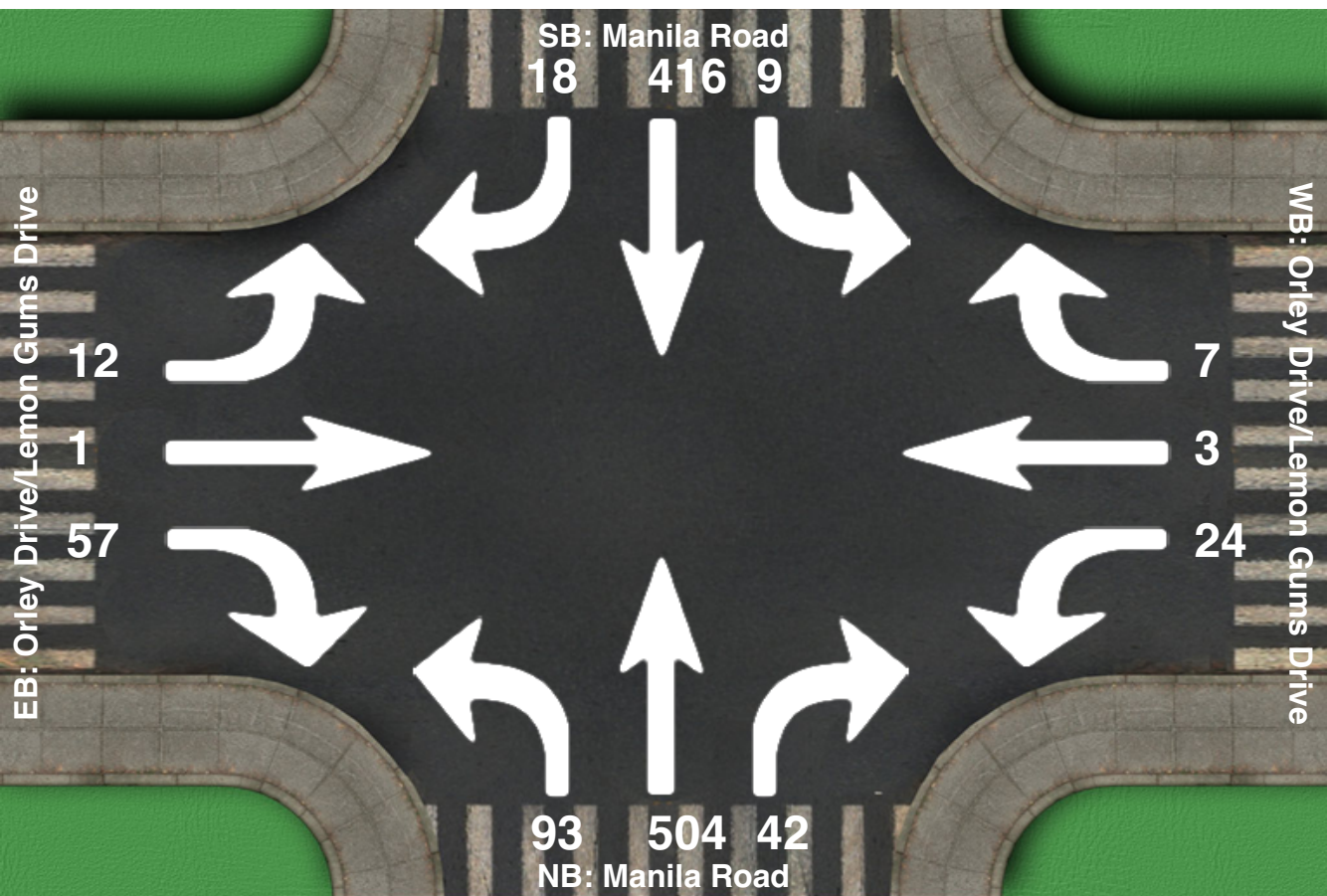
Intersection Peak Hour

15:30 - 16:30

	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	9	416	18	24	3	7	93	504	42	12	1	57	1186
Factor	0.38	0.71	0.32	0.67	0.38	0.58	0.80	0.92	0.62	0.75	0.25	0.71	0.80
Approach Factor	0.67			0.71			0.90			0.76			

Intersection Peak Hour

Location: Manila Road at Orley Drive/Lemon Gums Drive, Tamworth
GPS Coordinates:
Date: 2024-03-20
Day of week: Wednesday
Weather: Overcast/light rain
Analyst: Finn



Intersection Peak Hour

15:30 - 16:30

	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	9	416	18	24	3	7	93	504	42	12	1	57	1186
Factor	0.38	0.71	0.32	0.67	0.38	0.58	0.80	0.92	0.62	0.75	0.25	0.71	0.80
Approach Factor	0.67			0.71			0.90			0.76			

Appendix C

SIDRA Movement Summaries

MOVEMENT SUMMARY

▼ Site: MB [Manilla Road / Browns Lane AM 2054 (Site Folder: Post Development 2054)]

Manilla Road / Browns Lane AM 2054
Site Category: Future Conditions
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Manilla Road														
1	L2	61	1	64	1.6	0.035	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	53.5
2	T1	143	19	151	13.3	0.113	0.7	LOS A	0.3	2.3	0.18	0.09	0.18	58.3
3	R2	22	2	23	9.1	0.113	8.4	LOS A	0.3	2.3	0.18	0.09	0.18	56.3
Approach		226	22	238	9.7	0.113	2.8	NA	0.3	2.3	0.13	0.22	0.13	56.8
East: Browns Lane														
4	L2	39	3	41	7.7	0.034	7.3	LOS A	0.1	0.9	0.13	0.54	0.13	52.9
5	T1	12	0	13	0.0	0.107	12.9	LOS A	0.4	2.7	0.71	0.87	0.71	47.2
6	R2	20	1	21	5.0	0.107	17.0	LOS B	0.4	2.7	0.71	0.87	0.71	46.7
Approach		71	4	75	5.6	0.107	11.0	LOS A	0.4	2.7	0.39	0.69	0.39	50.0
North: Manilla Road														
7	L2	32	2	34	6.3	0.045	5.7	LOS A	0.0	0.0	0.00	0.24	0.00	56.1
8	T1	409	14	431	3.4	0.210	0.2	LOS A	0.1	0.9	0.03	0.04	0.03	59.5
9	R2	12	0	13	0.0	0.210	6.7	LOS A	0.1	0.9	0.03	0.02	0.03	58.1
Approach		453	16	477	3.5	0.210	0.8	NA	0.1	0.9	0.02	0.06	0.02	59.2
West: Browns Lane														
10	L2	13	1	14	7.7	0.189	5.9	LOS A	0.7	4.9	0.00	0.52	0.00	48.8
11	T1	70	0	74	0.0	0.874	13.9	LOS A	9.0	63.6	0.03	0.55	0.10	48.8
12	R2	251	2	264	0.8	0.874	42.6	LOS D	9.0	63.6	0.94	1.56	3.02	34.7
Approach		334	3	352	0.9	0.874	35.1	LOS C	9.0	63.6	0.72	1.31	2.29	37.4
All Vehicles		1084	45	1141	4.2	0.874	12.5	NA	9.0	63.6	0.28	0.52	0.77	49.3

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: MB [Manilla Road / Browns Lane PM 2054 (Site Folder: Post Development 2054)]

Manilla Road / Browns Lane PM 2054
Site Category: Future Conditions 1
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	veh/h	veh/h	%				v/c	sec				
South: Manilla Road														
1	L2	321	2	338	0.6	0.183	5.7	LOS A	0.0	0.0	0.00	0.58	0.00	53.5
2	T1	343	19	361	5.5	0.214	0.1	LOS A	0.3	1.9	0.06	0.04	0.06	59.4
3	R2	22	1	23	4.5	0.214	7.1	LOS A	0.3	1.9	0.06	0.04	0.06	57.5
Approach		686	22	722	3.2	0.214	2.9	NA	0.3	1.9	0.03	0.29	0.03	56.4
East: Browns Lane														
4	L2	18	2	19	11.1	0.038	6.3	LOS A	0.1	1.0	0.10	0.55	0.10	50.8
5	T1	36	0	38	0.0	0.178	19.4	LOS C	0.6	4.5	0.67	0.84	0.67	46.6
6	R2	16	0	17	0.0	0.178	14.7	LOS B	0.6	4.5	0.77	0.89	0.77	45.4
Approach		70	2	74	2.9	0.178	15.0	LOS B	0.6	4.5	0.55	0.78	0.55	47.3
North: Manilla Road														
7	L2	16	2	17	12.5	0.026	5.7	LOS A	0.0	0.0	0.00	0.21	0.00	56.0
8	T1	236	14	248	5.9	0.118	0.1	LOS A	0.0	0.1	0.01	0.03	0.01	59.7
9	R2	1	0	1	0.0	0.118	10.0	LOS B	0.0	0.1	0.01	0.00	0.01	58.3
Approach		253	16	266	6.3	0.118	0.5	NA	0.0	0.1	0.01	0.04	0.01	59.4
West: Browns Lane														
10	L2	1	0	1	0.0	0.037	6.2	LOS A	0.1	0.9	0.00	0.51	0.00	47.8
11	T1	11	0	12	0.0	0.037	14.7	LOS B	0.1	0.9	0.00	0.51	0.00	48.1
12	R2	81	1	85	1.2	0.365	24.3	LOS C	1.5	10.6	0.83	0.99	1.06	42.0
Approach		93	1	98	1.1	0.365	23.0	LOS C	1.5	10.6	0.73	0.93	0.92	42.7
All Vehicles		1102	41	1160	3.7	0.365	4.8	NA	1.5	10.6	0.12	0.32	0.14	54.9

Site Level of Service (LOS) Method: Delay (SIDRA). 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: MS [Manilla Road / Subdivision Access AM 2054 (Site Folder: Post Development 2054)]

Manilla Road / Subdivision Access AM 2054
Site Category: Future Conditions 1
Give-Way (Two-Way)
Design Life Analysis (Final Year): Results for 20 years

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	veh/h	veh/h	%				v/c	sec				
South: Manilla Road														
1	L2	19	0	20	0.0	0.123	7.0	LOS A	0.0	0.0	0.00	0.06	0.00	73.5
2	T1	150	22	199	14.7	0.123	0.0	LOS A	0.0	0.0	0.00	0.06	0.00	78.7
Approach		169	22	219	13.3	0.123	0.7	NA	0.0	0.0	0.00	0.06	0.00	78.2
North: Manilla Road														
8	T1	662	19	878	2.9	0.486	3.3	LOS A	0.6	4.0	0.05	0.40	0.06	58.2
9	R2	37	0	39	0.0	0.486	8.3	LOS A	0.6	4.0	0.05	0.40	0.06	69.4
Approach		699	19	917	2.7	0.486	3.5	NA	0.6	4.0	0.05	0.40	0.06	58.6
West: Subdivision Access														
10	L2	76	0	80	0.0	0.059	5.2	LOS A	0.2	1.6	0.30	0.54	0.30	45.9
12	R2	147	0	155	0.0	0.519	22.1	LOS C	2.0	14.2	0.87	1.04	1.27	51.1
Approach		223	0	235	0.0	0.519	16.3	LOS C	2.0	14.2	0.68	0.87	0.94	49.2
All Vehicles		1091	41	1371	4.0	0.519	5.2	NA	2.0	14.2	0.15	0.43	0.20	59.1

Site Level of Service (LOS) Method: Delay (SIDRA). 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: MS [Manilla Road / Subdivision Access PM 2054 (Site Folder: Post Development 2054)]

Manilla Road / Subdivision Access PM 2054
Site Category: Future Conditions 1
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	veh/h	veh/h	%				v/c	sec				
South: Manilla Road														
1	L2	123	0	129	0.0	0.431	7.0	LOS A	0.0	0.0	0.00	0.10	0.00	72.7
2	T1	655	22	689	3.4	0.431	0.1	LOS A	0.0	0.0	0.00	0.10	0.00	77.7
Approach		778	22	819	2.8	0.431	1.2	NA	0.0	0.0	0.00	0.10	0.00	76.9
North: Manilla Road														
8	T1	302	21	318	7.0	0.330	3.6	LOS A	2.2	15.9	0.52	0.22	0.67	70.5
9	R2	100	0	105	0.0	0.330	13.4	LOS B	2.2	15.9	0.52	0.22	0.67	55.1
Approach		402	21	423	5.2	0.330	6.0	NA	2.2	15.9	0.52	0.22	0.67	65.9
West: Subdivision Access														
10	L2	31	0	33	0.0	0.043	7.8	LOS A	0.2	1.1	0.56	0.73	0.56	51.7
12	R2	25	0	26	0.0	0.087	14.7	LOS B	0.3	1.8	0.78	0.90	0.78	46.8
Approach		56	0	59	0.0	0.087	10.9	LOS B	0.3	1.8	0.66	0.80	0.66	49.4
All Vehicles		1236	43	1301	3.5	0.431	3.2	NA	2.2	15.9	0.20	0.17	0.25	71.2

Site Level of Service (LOS) Method: Delay (SIDRA). 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: MG [Manilla Road / Glengarvin Drive AM 2054 (Site Folder: Post Development 2054)]**

Manilla Road / Glengarvin Drive AM 2054
Site Category: Future Conditions 1
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	veh/h	veh/h	%	v/c	sec		veh	m				km/h
South: Manilla Road														
1	L2	13	0	14	0.0	0.106	5.6	LOS A	0.0	0.0	0.00	0.04	0.00	57.9
2	T1	168	22	177	13.1	0.106	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	59.5
Approach		181	22	191	12.2	0.106	0.4	NA	0.0	0.0	0.00	0.04	0.00	59.4
North: Manilla Road														
8	T1	807	19	849	2.4	0.444	0.0	LOS A	0.0	0.2	0.00	0.00	0.00	60.0
9	R2	2	0	2	0.0	0.444	6.7	LOS A	0.0	0.2	0.00	0.00	0.00	58.1
Approach		809	19	852	2.3	0.444	0.0	NA	0.0	0.2	0.00	0.00	0.00	60.0
West: Glengarvin Drive														
10	L2	1	0	1	0.0	0.001	6.1	LOS A	0.0	0.0	0.27	0.51	0.27	52.8
12	R2	62	2	65	3.2	0.191	14.8	LOS B	0.6	4.3	0.77	0.92	0.80	46.7
Approach		63	2	66	3.2	0.191	14.7	LOS B	0.6	4.3	0.76	0.91	0.79	46.7
All Vehicles		1053	43	1108	4.1	0.444	1.0	NA	0.6	4.3	0.05	0.06	0.05	58.9

Site Level of Service (LOS) Method: Delay (SIDRA). 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.

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MOVEMENT SUMMARY

▼ Site: MG [Manilla Road / Glengarvin Drive PM 2054 (Site Folder: Post Development 2054)]

Manilla Road / Glengarvin Drive PM 2054

Site Category: Base Year

Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	veh/h	veh/h	%				v/c	sec				
South: Manilla Road														
1	L2	45	3	47	6.7	0.451	5.8	LOS A	0.0	0.0	0.00	0.03	0.00	57.5
2	T1	773	20	814	2.6	0.451	0.2	LOS A	0.0	0.0	0.00	0.03	0.00	59.4
Approach		818	23	861	2.8	0.451	0.5	NA	0.0	0.0	0.00	0.03	0.00	59.3
North: Manilla Road														
8	T1	360	21	379	5.8	0.209	0.2	LOS A	0.1	0.8	0.03	0.01	0.03	59.7
9	R2	4	0	4	0.0	0.209	12.2	LOS B	0.1	0.8	0.03	0.01	0.03	57.8
Approach		364	21	383	5.8	0.209	0.3	NA	0.1	0.8	0.03	0.01	0.03	59.7
West: Glengarvin Drive														
10	L2	3	0	3	0.0	0.005	9.7	LOS A	0.0	0.1	0.62	0.69	0.62	50.5
12	R2	28	2	29	7.1	0.120	18.5	LOS C	0.3	2.6	0.82	0.93	0.82	44.5
Approach		31	2	33	6.5	0.120	17.6	LOS C	0.3	2.6	0.80	0.91	0.80	45.0
All Vehicles		1213	46	1277	3.8	0.451	0.9	NA	0.3	2.6	0.03	0.05	0.03	58.9

Site Level of Service (LOS) Method: Delay (SIDRA). 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: MLO [Manilla Road / Lemon Gums Dr / Orley Dr AM 2054 (Site Folder: Post Development 2054)]**

Manilla Road / Lemon Gums Dr / Orley Dr AM 2054

Site Category: Base Year

Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Manilla Road														
1	L2	42	0	44	0.0	0.044	4.7	LOS A	0.3	1.8	0.17	0.50	0.17	54.0
2	T1	395	33	416	8.4	0.280	4.6	LOS A	2.2	16.8	0.18	0.44	0.18	54.7
3	R2	26	4	27	15.4	0.280	8.6	LOS A	2.2	16.8	0.18	0.44	0.18	54.0
Approach		463	37	487	8.0	0.280	4.9	LOS A	2.2	16.8	0.18	0.45	0.18	54.6
East: Lemon Gums Dr														
4	L2	52	0	55	0.0	0.197	16.0	LOS B	1.4	9.8	0.96	0.93	0.96	46.1
5	T1	1	0	1	0.0	0.197	16.3	LOS B	1.4	9.8	0.96	0.93	0.96	46.9
6	R2	15	0	16	0.0	0.197	20.1	LOS C	1.4	9.8	0.96	0.93	0.96	46.7
Approach		68	0	72	0.0	0.197	16.9	LOS B	1.4	9.8	0.96	0.93	0.96	46.2
North: Manilla Road														
7	L2	5	2	5	40.0	0.008	6.8	LOS A	0.0	0.4	0.43	0.53	0.43	51.5
8	T1	867	33	913	3.8	0.691	6.3	LOS A	8.2	59.6	0.72	0.59	0.72	52.7
9	R2	10	1	11	10.0	0.691	10.3	LOS B	8.2	59.6	0.72	0.59	0.72	52.1
Approach		882	36	928	4.1	0.691	6.3	LOS A	8.2	59.6	0.72	0.59	0.72	52.7
West: Orley Drive														
10	L2	12	0	13	0.0	0.190	7.6	LOS A	1.1	8.1	0.64	0.76	0.64	49.7
11	T1	1	0	1	0.0	0.190	7.9	LOS A	1.1	8.1	0.64	0.76	0.64	50.5
12	R2	136	2	143	1.5	0.190	11.8	LOS B	1.1	8.1	0.64	0.76	0.64	50.3
Approach		149	2	157	1.3	0.190	11.5	LOS B	1.1	8.1	0.64	0.76	0.64	50.2
All Vehicles		1562	75	1644	4.8	0.691	6.8	LOS A	8.2	59.6	0.56	0.58	0.56	52.6

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

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.


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: MLO [Manilla Road / Lemon Gums Dr / Orley Dr PM 2054 (Site Folder: Post Development 2054)]**

Manilla Road / Lemon Gums Dr / Orley Dr PM 2054
Site Category: Base Year
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	veh/h	veh/h	%	v/c	sec		veh	m				km/h
South: Manilla Road														
1	L2	93	1	98	1.1	0.094	4.7	LOS A	0.5	3.9	0.17	0.50	0.17	54.0
2	T1	717	34	755	4.7	0.486	4.7	LOS A	4.6	33.6	0.21	0.44	0.21	54.6
3	R2	42	0	44	0.0	0.486	8.5	LOS A	4.6	33.6	0.21	0.44	0.21	54.5
Approach		852	35	897	4.1	0.486	4.9	LOS A	4.6	33.6	0.21	0.45	0.21	54.5
East: Lemon Gums Dr														
4	L2	24	1	25	4.2	0.058	9.6	LOS A	0.4	2.6	0.75	0.73	0.75	50.0
5	T1	3	0	3	0.0	0.058	9.7	LOS A	0.4	2.6	0.75	0.73	0.75	51.1
6	R2	7	1	7	14.3	0.058	14.3	LOS B	0.4	2.6	0.75	0.73	0.75	50.3
Approach		34	2	36	5.9	0.058	10.6	LOS B	0.4	2.6	0.75	0.73	0.75	50.2
North: Manilla Road														
7	L2	9	0	9	0.0	0.011	5.4	LOS A	0.1	0.4	0.33	0.50	0.33	53.5
8	T1	592	34	623	5.7	0.449	5.2	LOS A	4.0	29.4	0.42	0.48	0.42	53.8
9	R2	18	0	19	0.0	0.449	9.0	LOS A	4.0	29.4	0.42	0.48	0.42	53.7
Approach		619	34	652	5.5	0.449	5.3	LOS A	4.0	29.4	0.42	0.48	0.42	53.8
West: Orley Drive														
10	L2	12	0	13	0.0	0.123	11.0	LOS B	0.8	5.4	0.79	0.82	0.79	47.7
11	T1	1	0	1	0.0	0.123	11.3	LOS B	0.8	5.4	0.79	0.82	0.79	48.6
12	R2	57	1	60	1.8	0.123	15.2	LOS B	0.8	5.4	0.79	0.82	0.79	48.3
Approach		70	1	74	1.4	0.123	14.4	LOS B	0.8	5.4	0.79	0.82	0.79	48.2
All Vehicles		1575	72	1658	4.6	0.486	5.6	LOS A	4.6	33.6	0.33	0.48	0.33	53.8

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

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

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.