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Traffic Impact Assessment

**Planning Proposal to Rezone Stage 10
from B2 Local Centre Zone and B4 Mixed Use Zones to R1 General Residential
Development Application for Stage 9
Warnervale Town Centre Development.**

Prepared for:	Beveridge Williams on behalf Landcorp NSW Pty Ltd.
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TABLE OF CONTENTS

INTRODUCTION.....	3
BACKGROUND AND EXISTING CONDITIONS.....	4
Subject Site Location	4
Site Description	4
Existing Road Hierarchy	5
Future Road Hierarchy	5
PROPOSED DEVELOPMENT.....	6
TRAFFIC IMPACT ASSESSMENT	7
Trip Generation	7
Peak Period Intersection Performances with Development	7
Access & Internal Design Aspects	7
Operational Impact on Surrounding Road Network and Intersections.....	9
Intersection Operation	9
Traffic Modelling Assumption	10
PUBLIC TRANSPORT	12
CONCLUSIONS.....	13
APPENDIX A – DEVELOPMENT PLAN STAGE 9 and 10.....	14
APPENDIX B – INTERSECTION ANALYSIS	16

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INTRODUCTION

Auswide Consulting was engaged by Beveridge Williams on behalf of Landcorp NSW Pty Ltd. to prepare a Traffic Impact Assessment to support a Development Application for Stage 9 and a Planning Proposal for Stage 10. This report will assess the implications of the proposed development on existing traffic, parking and transport conditions surrounding the site. The following items have been included in the subsequent sections of this report:

- Public and active transport accessibility at the site;
- Existing Traffic conditions surrounding the site;
- Pedestrian and bicycle requirements;
- Expected traffic generation characteristics of the proposed development and their impact on the surrounding road network;
- Conclusions of the above findings.

During the course of preparing this assessment, the subject site and its environment have been inspected, and all relevant traffic data collected and analysed.

This Traffic Impact Assessment (TIA) has been prepared in accordance with the relevant governmental assessment requirements, guidelines and policies, and in consultation with the relevant Government Agencies.

The TIA has been developed in accordance with:

- Austroads Guide to Traffic Management Part 3 Traffic Studies and Analysis.
- Austroads Guide to Traffic Management Part 12 Traffic Impacts of Developments; and

- NSW Roads and Maritime Services (RMS) Guide to Traffic Generating Developments (2002).

This report documents the findings of our investigations and should be read in the context of the Statement of Environmental Effects, prepared separately

It is noted that this report is supported by previous traffic reports and assessment for the subject site at the planning proposal stage, prior to the adoption of the WTC DCP. Most notably are the following documents, submitted to Council and the RMS, assessing the traffic impact of the proposed WTC development on the wider network:

- RMS Warnervale Town Centre Link Project – Traffic Modelling Report – Hyder July 2012
- 111 Sparks Road, Woongarra – Section 96 Application - Traffic Impact Statement – TRAFFIX July 2017
- 113 Sparks Road, Woongarra – Stage 5 Subdivision - Traffic Impact Statement – TRAFFIX May 2018

BACKGROUND AND EXISTING CONDITIONS

Subject Site Location

The proposed development is located off Sparkes Rd Warnervale NSW. The use of the land immediately surrounding the subject site is residential or is being developed as residential with some commercial and support services. The location of the subject site and its surrounding suburbs are depicted in Figure 1.

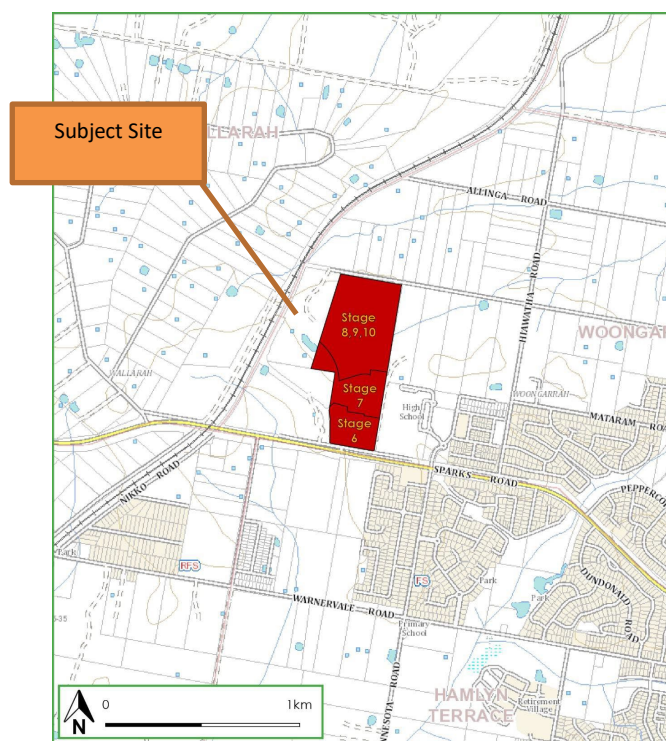


Figure 1 Location of the Subject Site

Site Description

The site is within the boundaries of the large lot known as 2 Woongarra Road Woongarra which is legally described as Lot 1 DP 1275060.

The site is approximately 18.6 ha in size and irregular in shape. The site is bordered by Hakone Road in the north, Sparks Road in the south, residential subdivisions and Mackillop Catholic College to the east, the Hilltop Park, residential subdivision and vacant land are adjoining to the west with the main northern

railway line further to the west. Further to the east and south-east are residential subdivisions that form the Warnervale-Wadalba Urban Release Area precincts identified within the Central Coast Regional Strategy by the NSW Department of Planning, Infrastructure and Environment (the Department).

The Site noted as Stage 9 is zoned as C2 Environmental Conservation, C3 Environmental Management, R1 General Residential and RE1 Public Recreation under the provisions of *Wyong Local Environmental Plan 2013 (Wyong LEP 2013)*

The Site noted as Stage 10 is zoned B2 Local Centre, B4 Mixed Use, C2 Environmental Conservation, C3 Environmental Management, R1 General Residential and RE1 Public Recreation under the provisions of *Wyong Local Environmental Plan 2013 (Wyong LEP 2013)*.

Existing Road Hierarchy

The existing road hierarchy in the locality of the site is discussed below

Sparks Road

An TfNSW State Road (MR509) Sparks Road runs in an east west direction commencing at Hue Hue Road in the west and the Pacific Highway in the east. It has a road width of 35 metres carrying two lanes of traffic in each direction in the vicinity of site, in addition to cycle lanes within the hard shoulder. Sparks Road is subject to speed zoning of 80 km/hr in the vicinity of site.

Hiawatha Road:

A local Council Road that runs in a north south direction between Mona Road (to the north) and Sparks Road (to the south). Hiawatha Road has one lane in each direction and a carriageway width of 8 metres. It is subject to a 50km/h speed zoning in the vicinity of the site.

Hakone Road:

Hakone Road is a local that generally runs east-west, commencing at Arizona Road in the east and terminating in a cul-de-sac in the west. It is subject to a 50km/h speed zoning, and carries a single lane of traffic in either direction along an undivided carriageway of 6 metres in width. It should be noted that Hakone Road currently has no road markings, it is however set to be upgraded to a 'Main Street' as set out in the *Warnervale Town Centre DCP (2012)* discussed below.

Future Road Hierarchy

Central Coast Council in collaboration with Transport for NSW (TfNSW) and the Department of Planning and Environment (DoP) have developed a proposed future road hierarchy for the precinct. This future network for the site is provided in Figure 2



Figure 2: Proposed Road Hierarchy

The *DCP* identifies a future road network hierarchy with 3 major road functions. These functions include:

First Tier Street: link with Principal Arterials incorporating a mix of public transport facilities and land service functions. Settlements and development including residential, educational, retail and business districts are associated with First Tier Streets, supporting a public transport function. They also have a higher pedestrian and cycle access function with a carriageway width of 15 metres within a road reserve width of 23.4 metres.

Second Tier Streets: connect with First Tier Streets, serving more of a community role, providing access to adjacent mixed-use properties with a significant transport function. Second Tier Streets link to local roads and have a carriageway width of 12 metres within a road reserve width of 21 metres.

Third Tier Streets: connect with Second Tier Streets, serving a local traffic, providing access to adjacent residential properties. Second Tier Streets have a carriageway width of 7.6 metres within a road reserve width of 16.6 metres.

These road classifications and general layout form the basis of the future road network for the site.

PROPOSED DEVELOPMENT

This TIA covers Sages 9 and 10 of the continued development of the area as follows:

- To support a Development Application for Stage 9 (to be lodged) which requests the approval of 86 lots consistent with original Planning Approval.
- To support a proposed Planning Proposal for land encompassing Stage 10 of the Warnervale Town Centre (WTC) development. The proposed Planning Proposal, referred to as Stage 10, is for a partial rezoning of the northern section of the site currently zoned B2 Local Centre and B4 Mixed Use, requesting it to be zoned R1 General Residential. (approx. 51 lots)

TRAFFIC IMPACT ASSESSMENT

The subdivision is generally in accordance with the Warnervale District DCP (with some internal layout changes).

Initial discussions with Council have indicated that there may be some issues with the preliminary design, including:

“4-way intersection between Road 1 and Road 7. The Warnervale DCP suggests that this intersection will be signalised.”

Trip Generation

The Roads & Maritime Services Technical Direction (TDT 2013/04a) accompanying the *Guide to Traffic Generating Developments* recommends the following peak hourly traffic generation rates for residential uses in regional areas:

- 0.71 trips per hour per dwelling in the AM peak
- 0.78 trips per hour per dwelling in the PM peak

The technical direction also lists an expected daily vehicle trip rate of 7.4 per dwelling. The 252 lots proposed are expected to accommodate standard format residential dwellings. As such, the subject DA subdivision could be expected to generate a maximum generation of 197 vehicles per hour, and a total of 1,865 vehicle trips per day.

Peak Period Intersection Performances with Development

The future intersection performances for the precinct were assessed at planning proposal stage prior to the adoption of the WTC DCP and submitted to the TfNSW for review. It is noted the proposed lot subdivision is considered to be in line with the planning proposal yields.

Accordingly, the access strategy and intersection treatments proposed for the precinct shall operate satisfactorily following the development of the proposed residential lots, with all intersections in the locality operating as planned

Access & Internal Design Aspects

Under the DCP vehicle access to the external road network from the land release is proposed via nine (9) separate accesses locations. This will ensure that adequate accessibility is provided to the release area and that it is integrated with the surrounding lands

The major access to the land release will be via Sparks Road which is to form a signalised intersection in accordance with the Hyder assessment. Access to Hakone Road is proposed via five (5) separate intersections, including a roundabout controlled intersection located at the north east precinct boundary.

It is also notable a pedestrian / cycle access is proposed to the subject site from Sparks Road, located on the western boundary of the school.

The proposed subdivision development application provides access arrangements in accordance with the DCP. These access points form the basis for the proposed internal road design.

The indicative internal road network is shown in **Appendix A** (for both Stages 9 and 10). The layouts have been designed having regard for the objectives of the WTC Precinct DCP 2012 including:

- To provide a hierarchy of interconnected streets for safe, convenient, functional and legible access within and beyond the WTC.
- To ensure a hierarchy of streets clearly discernible through variations in carriageway width, on- street parking, incorporation of water sensitive urban design, street tree planting, pedestrian and cycling amenities
- To provide comfortable gradients to ensure equitable access to residents and visitors.
- To retain views and vistas to landscape features and visual connections to nodal points and centres.
- To ensure street design and character responds to existing environmental conditions including significant vegetation, topography and views.
- To minimise the need for cut and fill to assist in reducing subsoil and natural subsoil drainage disturbance.
- To optimise solar access opportunities for dwellings.

The proposed internal geometric road design and street types as envisioned by the DCP is shown in **Figure 3**



Figure 3: Street Types

The key components of the road types located within the subject site area are summarised in **Table 1**

Road Type	Road Reserve	Carriage way	Nature Strip
Type 3	21.0m	12.0m	2x4.5m
Type 6	23.4m	15.0m	2x4.2m
Type 9	17.6m	7.6m	1x5.5m & 1x 4.5
Type 10	19.9m	5.4m	1x5.5m & 1x10.5m
Type 11	16.6m	7.6m	2x4.5m
Type 11a	16.6m	7.6m	2x4.5m

Table 1: Internal Road Hierarchy and Geometric Design

A review of the subdivision plan indicates all road reserves within the subject site will be constructed in line with the road type envisioned within the DCP, with all road reserve widths meeting the requirements of **Table 1** above.

Based on the above, the proposed road layout reflects the requirements of Council's DCP and is therefore considered supportable and it can be seen the proposed lot boundary layout maintains the broad road hierarchy and road location objectives as envisioned by the DCP and as such shall operate satisfactorily.

Operational Impact on Surrounding Road Network and Intersections

Council in its PreDA meeting noted that

“4-way intersection between Road 1 and Road 7. The Warnervale DCP suggests that this intersection will be signalised.

To address this concern an intersection analysis was carried utilising the analysis tool SIDRA to assess the intersection of Roads 1 and 7 performances under the following criteria:

- Existing intersection with the develop, and
- AM and PM peak Hour

Intersection Operation

How adequate the capacity of an intersection is judged by whether it can physically and operationally cater for the traffic using it.

The performances of the intersections relevant to the proposal have been assessed using the intersection modelling SIDRA software. The model provides parameters of the performance of an intersection including the degree of saturation (DoS) and the average delay per vehicle. It provides an accurate and consistent guide to the performance of an intersection under the different traffic flow scenarios. The recommended criteria for evaluating capacity of intersections are shown in Table 2

Level of Service	Degree of Saturation (DoS)	Ave. Delay/ Veh. (Secs)
A/B good operation	less than 0.80	Less than 28
C satisfactory	0.80 to 0.85	29-42
D poor but manageable	0.85 to 0.90	43-56
E at capacity	0.90 to 1.0	57-70
F unsatisfactory, extra capacity required	Over 1.0	Over 70

Table 2 Criteria for Evaluating Capacity of Intersection

Traffic Modelling Assumption

- Analysis was carried out for the maximum hour flow as shown in table 3 only as this is worst case scenario for traffic,
- Standard Stop Sign Control of a cross s intersection
- SIDRA default values were adopted,
- Level of Services Method is set to RTA NSW,
- Speed environment 50 km/hr,
- Subdivision of area accessing this intersection (including the adjacent lots either proposed or under construction by other land owners) is fully developed (i.e. worst case)
- Separation between vehicle class has not been made as it is unwarranted due to the residential nature of the street layout and heavy vehicles numbers will be low restricted to construction and household deliveries.

Based on the lot layout in Appendix A and the conversion of all lots in Stage 10 to residential it is anticipated that traffic movements at the intersection of Roads 1 and 7 will be as shown in Figure 4 and Table 3

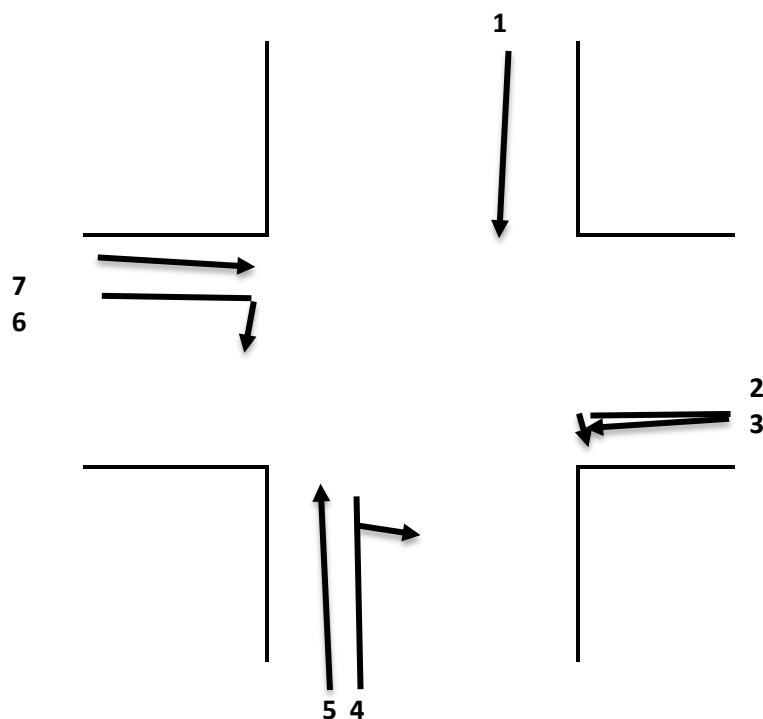


Figure 4 Intersection layout

Path	Movements Am Peak	Movements PM Peak
1 - LV	34	37.
2 - LV	0	0
3 - LV	24	27
4 - LV	24	27
5 - LV	34	37
6 - LV	2	2
7 - LV	0	0

Table 3 Projected Traffic Movements

The result of the SDIRA analysis of the above intersection is summarised in Table 4 and Table 5 below with full details of the outputs provided in are found in **Appendix B**.

Movement	Av. Delay (sec)	Level of Service	Que Length (no of Vehicles)
1 - LV	0.018	A	0
2 - LV	0.001	A	0
3 - LV	0.018	A	0
4 - LV	0.014	A	0
5 - LV	0.018	A	0
6 - LV	0.003	A	0
7 - LV	0.001	A	0

Table 4 Intersection Performance (AM Peak)

Movement	Av. Delay (sec)	Level of Service	Que Length
1 - LV	0.020	A	0
2 - LV	0.001	A	0
3 - LV	0.020	A	0
4 - LV	0.016	A	0
5 - LV	0.020	A	0
6 - LV	0.003	A	0
7 - LV	0.001	A	0

Table 5 Intersection Performance (PM peak)

The modelling outputs as shown in Table 4 and Table 5 illustrate that once these two stages are fully developed and linked to the adjacent subdivisions the operation of the intersection remains (with standard stop sign control) as a Level of Service A with no que length occurring in either the AM and / or PM peak Time Periods.

Consequently, there is no need to upgrade this intersection to Traffic Lights Controlled a result of the development of these two stages in the residential mode that is being proposed

PUBLIC TRANSPORT

This area of the central coast in serviced by a number of bus routes that to either Warnervale Station, Wyong or Gosford giving wider access to the wider transport network

Figure 5 and 6 below displays the public transport map around the site.



Figure 5 Public Transport Map (Source – (<https://transportnsw.info/travel-info>))

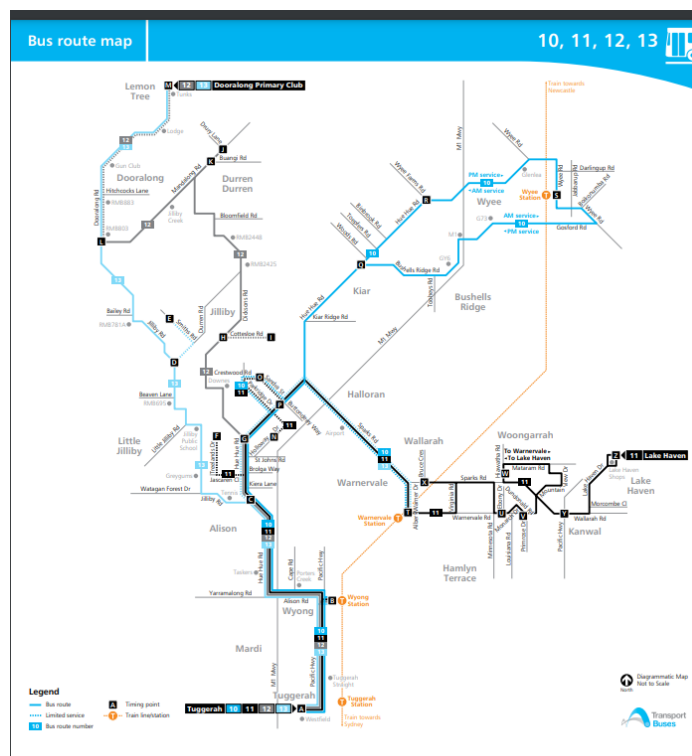


Figure 6 Public Transport Map (Source – (<https://transportnsw.info/travel-info>))

Due to location of the existing routes and the road hierarchy of interconnected streets detailed in the DCP the road layouts proposed will provide for safe, convenient, functional and well-connected neighbourhood both within and beyond the WTC.

Further such a layout and connectivity will allow for the extension of these bus routes seamlessly into the operators / providers timetable as development expands and the need for access increases.

CONCLUSIONS

Based on the findings of this report, AusWide Consulting is of the opinion there are no traffic engineering related matters that should preclude approval of this Development Application and Planning Proposal for Stages 9 and 10.



APPENDIX B – INTERSECTION ANALYSIS

SITE LAYOUT

 **Site: 101 [Warnervale_AM_Base (Site Folder: General)]**

Warnervale

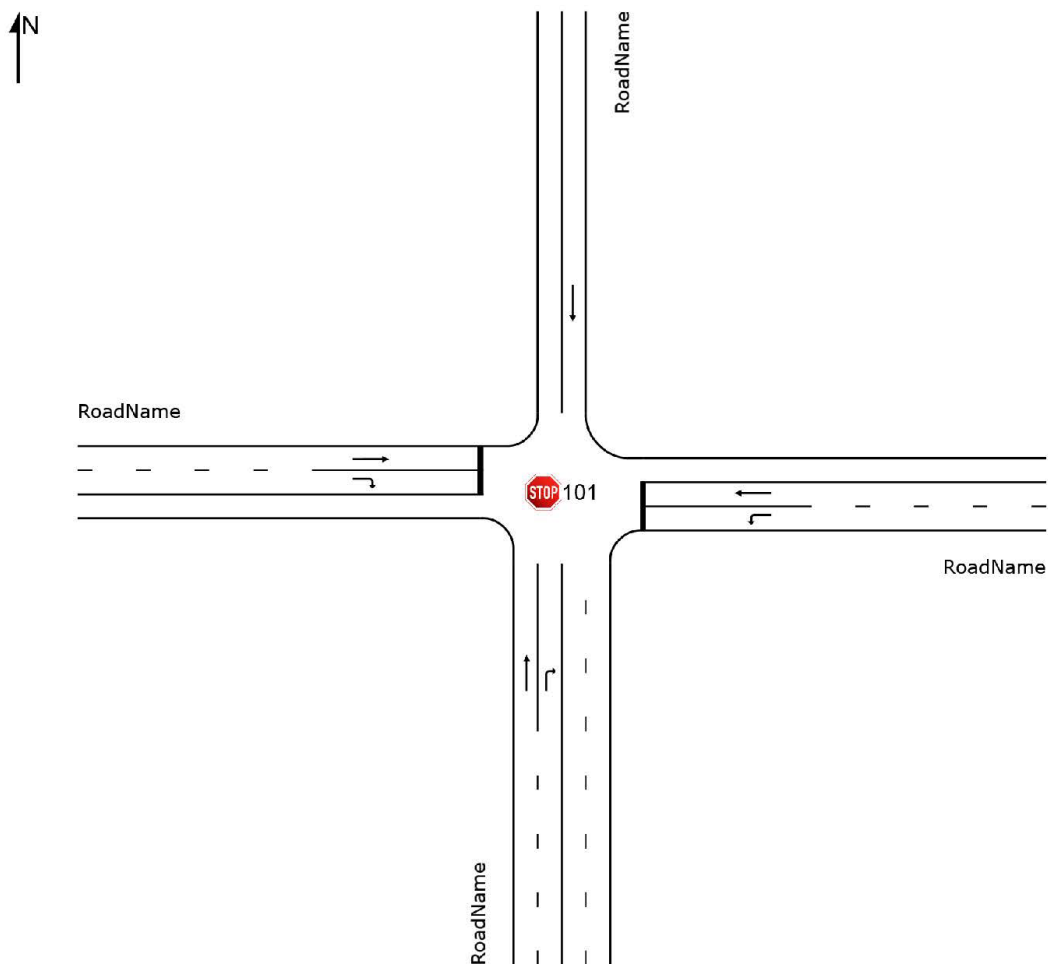
AM

Base

Site Category: (None)

Stop (Two-Way)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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MOVEMENT SUMMARY

Site: 101 [Warnervale_AM_Base (Site Folder: General)]

Warnervale

AM

Base

Site Category: (None)

Stop (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 %]	[Total veh/h]	[HV %]				[Veh. veh]	[Dist m]				
South: RoadName														
2	T1	34	0.0	36	0.0	0.018	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	24	0.0	25	0.0	0.014	5.6	LOS A	0.1	0.5	0.11	0.54	0.11	53.3
Approach		58	0.0	61	0.0	0.018	2.3	NA	0.1	0.5	0.04	0.22	0.04	57.0
East: RoadName														
4	L2	24	0.0	25	0.0	0.018	8.1	LOS A	0.1	0.5	0.11	0.92	0.11	51.8
5	T1	1	0.0	1	0.0	0.001	8.7	LOS A	0.0	0.0	0.23	0.84	0.23	51.6
Approach		25	0.0	26	0.0	0.018	8.2	LOS A	0.1	0.5	0.11	0.92	0.11	51.7
North: RoadName														
8	T1	34	0.0	36	0.0	0.018	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		34	0.0	36	0.0	0.018	0.0	NA	0.0	0.0	0.00	0.00	0.00	60.0
West: RoadName														
11	T1	1	0.0	1	0.0	0.001	8.7	LOS A	0.0	0.0	0.23	0.84	0.23	51.6
12	R2	2	0.0	2	0.0	0.003	8.6	LOS A	0.0	0.1	0.26	0.84	0.26	51.4
Approach		3	0.0	3	0.0	0.003	8.6	LOS A	0.0	0.1	0.25	0.84	0.25	51.5
All Vehicles		120	0.0	126	0.0	0.018	3.0	NA	0.1	0.5	0.05	0.32	0.05	56.5

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: 101 [Warnervale_PM_Base (Site Folder: General)]

Warnervale
PM
Base
Site Category: (None)
Stop (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] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: RoadName														
2	T1	37	0.0	39	0.0	0.020	0.0	LOSA	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	27	0.0	28	0.0	0.016	5.6	LOSA	0.1	0.5	0.11	0.54	0.11	53.3
Approach		64	0.0	67	0.0	0.020	2.4	NA	0.1	0.5	0.05	0.23	0.05	56.9
East: RoadName														
4	L2	27	0.0	28	0.0	0.020	8.1	LOSA	0.1	0.6	0.11	0.92	0.11	51.8
5	T1	1	0.0	1	0.0	0.001	8.7	LOSA	0.0	0.0	0.24	0.83	0.24	51.6
Approach		28	0.0	29	0.0	0.020	8.2	LOSA	0.1	0.6	0.12	0.91	0.12	51.7
North: RoadName														
8	T1	37	0.0	39	0.0	0.020	0.0	LOSA	0.0	0.0	0.00	0.00	0.00	60.0
Approach		37	0.0	39	0.0	0.020	0.0	NA	0.0	0.0	0.00	0.00	0.00	60.0
West: RoadName														
11	T1	1	0.0	1	0.0	0.001	8.7	LOSA	0.0	0.0	0.24	0.83	0.24	51.6
12	R2	2	0.0	2	0.0	0.003	8.7	LOSA	0.0	0.1	0.28	0.83	0.28	51.4
Approach		3	0.0	3	0.0	0.003	8.7	LOSA	0.0	0.1	0.27	0.83	0.27	51.5
All Vehicles		132	0.0	139	0.0	0.020	3.1	NA	0.1	0.6	0.05	0.32	0.05	56.4

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.

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