TRAFFIC AND PARKING ASSESSMENT REPORT FOR A PROPOSED REZONING OF

NOS. 92, 94 AND 96 VICTORIA STREET WERRINGTON

TO

R4 HIGH DENSITY RESIDENTIAL

Ref. 16052r

May 2016

Prepared By

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1.0 INTRODUCTION

Transport and Urban Planning Pty Ltd has been engaged by Paul Lemm Planning Consultant, on behalf of the owners of Nos. 92, 94 and 96 Victoria Street, Werrington, to carry out a traffic and parking impact assessment of the proposed rezoning of these 3 properties.

The properties are currently zoned R3 Medium Density Residential and the proposal is to change the zoning to R4 High Density Residential.

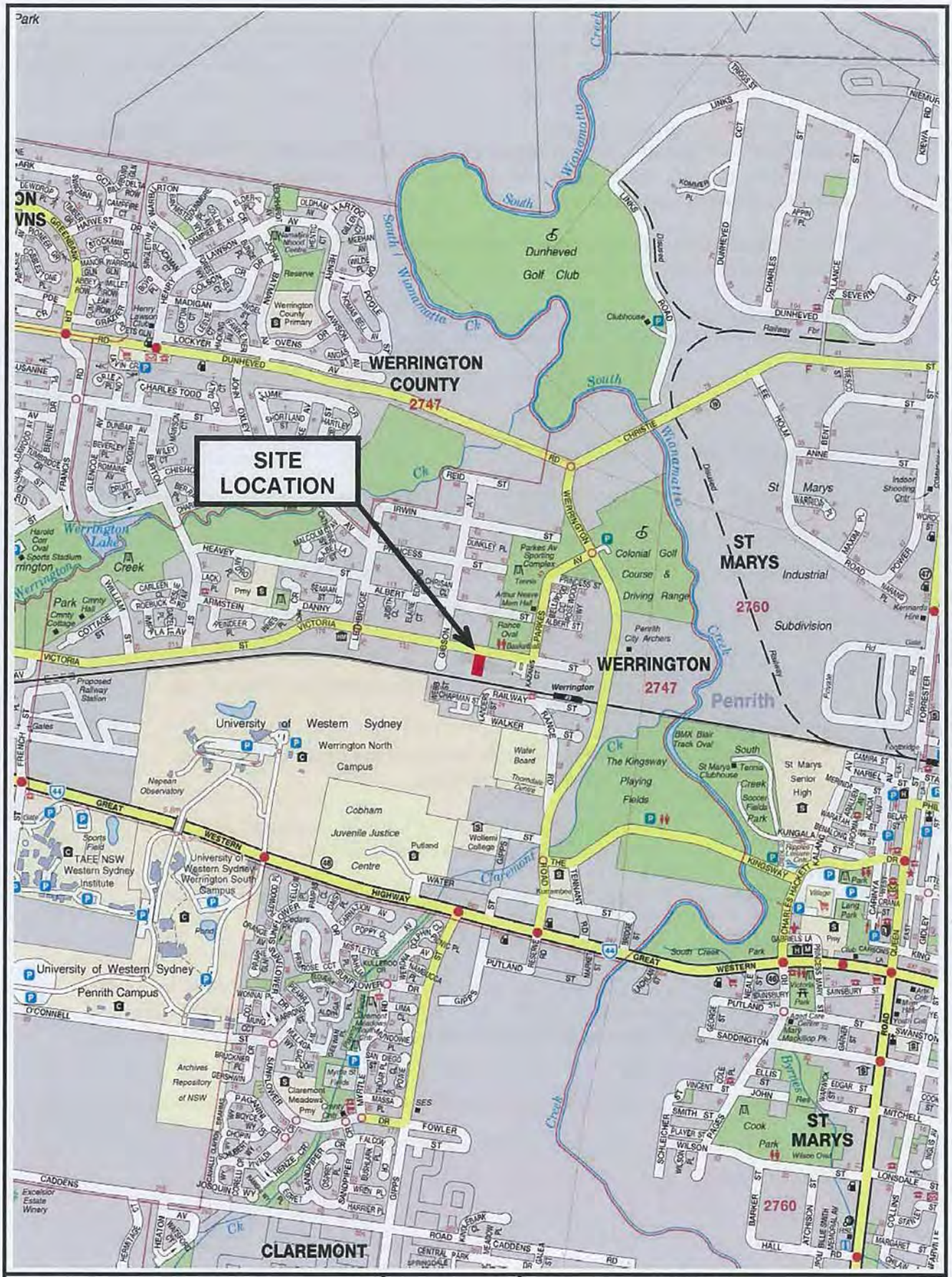
The potential future yield of the properties under R4 High Density is expected to be 170 dwellings, comprising 50 x 1 bedroom; 100 x 2 bedroom; and 20 x 3 bedroom dwellings.

The site is shown in **Figures 1** and **2**.

This report is arranged as follows:

- Section 2 describes the site, its existing uses and the future potential development;
- Section 3 details the surrounding road and transport network;
- Section 4 identifies the existing traffic volumes and traffic conditions near the site;
- Section 5 calculates the future potential traffic generation of the properties;
- Section 6 assesses the traffic impact of the future traffic on the surrounding road network;
- Section 7 considers the implications for public transport usage and potential for alternate transport modes;
- Section 8 determines the parking and site access requirements;
- Section 9 presents conclusions.

This report has been prepared in accordance with the RMS Guide to Traffic Generating Developments, 2002, its 2013 update (Technical Direction TDT2013/04a), and relevant planning policies adopted by Penrith City Council.



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N

NOT TO SCALE

FIGURE 1

REZONING APPLICATION
92-96 VICTORIA STREET, WERRINGTON

SITE LOCATION

JOB NO. 16052

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N

NOT TO SCALE

FIGURE 2

REZONING APPLICATION
92-96 VICTORIA STREET, WERRINGTON

SUBJECT SITE

JOB NO. 16052

2.0 THE SITE AND POTENTIAL DEVELOPMENT

2.1 Location

Nos. 92, 94 and 96 Victoria Street are on the south side of Victoria Street, approximately 250 metres west of Werrington railway station, and just 50 metres west of Werrington shopping centre. The site is 5.5km east of Penrith City Centre and 23km west of Parramatta.

2.2 Site Details

The properties comprise of Lots 6A, 6B and 7A in DP26950 and have a combined area of approximately 4,170sqm.

The site is rectangular in shape with a frontage of approximately 45.6 metres to Victoria Street and a depth of approximately 91.5 metres.

The rear boundary of the site adjoins the T1 main western railway line. To the east is a car park used by rail commuters and local shop customers. To the west is a medium density residential development, while other low and medium density residential developments are the main land use in the surrounding area. The UWS Werrington campus is located 1km to the southwest of the site.

The existing use of the site is a doctor's surgery at No. 96 and single dwellings on Nos. 92 and 94 Victoria Street. Nos. 92 and 96 have single driveways, while No. 94 has 2 driveways. No Stopping restrictions associated with a nearby pedestrian crossing cover the eastern half of the site's frontage, which leaves 1 unrestricted parking space on the site frontage.

2.3 Potential Future Development

The site is within an R3 Medium Density Residential zone, and is immediately adjacent to an R4 High Density Residential zone to the east. Should the rezoning application of the site be successful the anticipated yield of residential dwellings is:

50 x 1 bedroom dwellings

100 x 2 bedroom dwellings

20 x 3 bedroom dwellings

170 dwellings in total

The development would provide the required amount of car parking for residents and visitors on the site, with all vehicular access from Victoria Street.

3.0 SURROUNDING ROAD AND TRANSPORT NETWORK

The site has vehicular access from Victoria Street, which leads to Parkes Avenue approximately 180m east, which links to Werrington Road a further 500m to the north east. Werrington Road provides the main access to and from the site, linking to the Great Western Highway south of the site, and to Dunheved Road and Christie Street to the north. Victoria Street also runs west towards Kingswood.

3.1 Victoria Street

Victoria Street is a local road running east west between Parkes Avenue at Werrington and Richmond Road, Kingswood. It runs parallel and to the north of the T1 main western railway line. Near the subject site it has a 12 metre wide bitumen paved carriageway, with kerb and gutters and paved footpaths on both sides.

The street has a centreline and edgelines which provide one traffic lane of generous width in each direction. A 50km/h speed limit applies. The street is straight and level, has a good quality pavement, good delineation and lighting. Parking is generally unrestricted along both sides, other than No Stopping near the subject site, which is required for a raised pedestrian crossing located 20 metres east of No. 92 Victoria Street.

3.2 Parkes Avenue

Parkes Avenue is a local road which runs generally north/south between Victoria Street and Werrington Road, a total length of approximately 500m. It is of very similar character to Victoria Street, with a 12 metre wide carriageway, centreline and edgeline markings providing one traffic lane in each direction.

Parkes Avenue's intersection at Werrington Road is a large single lane roundabout. Its intersection with Victoria Street is a T-junction, with Give Way signs facing both approaches of Victoria Street. These signs provide appropriate priority for the predominant traffic flow through the intersection, which is the right turn out of Parkes Avenue and the left turn from Victoria Street into Parkes Avenue.

Two pedestrian refuges are provided on Parkes Avenue, at Victoria Street and at Princess Street. Parkes Avenue has a 50km/h speed limit.

3.3 Werrington Road

Werrington Road is a regional road, under the care and control of Penrith City Council. It runs generally north/south between the Great Western Highway and a roundabout at Dunheved Road and Christie Street, a total length of 2km. The roundabout at Parkes Avenue is located 400m south of Dunheved Road/Christie Street.

Werrington Road has a 70km/h speed limit and is a well designed road with semi rural road characteristics. It has one wide traffic lane in each direction, with centrelines, edgelines, wide sealed shoulders, no driveways to adjacent properties, long radius curves, a good vertical alignment, good pavement and delineation. Many sections of the road have continuous guardrail along both sides, particularly in the elevated sections either side of the bridge over the T1 railway line.

Werrington Road provides the main vehicular access from the subject site, to the east and west via Great Western Highway, south via Mamre Road, to the north east via Christie Street and to the north west via Dunheved Road.

3.4 Key Access Intersection

The key access intersection to the subject site is the roundabout on Werrington Road at Parkes Avenue. This intersection will be modelled using SIDRA to identify its current operation and its future operation with the additional peak hour traffic generated by the potential development of the subject site.

Our on site observations of the intersection of Parkes Avenue and Victoria Street show that this intersection currently operates with a very good level of service and a large amount of spare capacity, and will not need SIDRA modelling.

3.5 Public Transport

The subject site is well served by two modes of public transport, buses and trains. There are also good pedestrian facilities in close proximity to the site and a taxi zone is nearby. However there are currently no bicycle facilities in the local area.

3.5.1 Bus Services

Busways provide two local bus services running in both directions along Victoria Street past the site. These are:

- Route 782, Penrith – St Marys

- Route 785, Penrith – Werrington Station

Both of these services operate 30 minute services Monday to Friday and 60 minute services on Saturday, Sunday and Public Holidays.

Bus stops for these services are located within 150 metres to the east and west of the site, on Victoria Street east of Gibson Avenue, and in Kazanis Court at Werrington shops.

3.5.2 Train Services

Werrington railway station is 250 metres east of the subject site, and is an "easy access station" on the T1 main western railway line. The station has lifts from street level and to platforms, it has good pedestrian access, commuter parking and "kiss and ride" facilities. Train services operate at regular intervals 7 days per week.

3.5.3 Alternate Transport

A sheltered taxi zone is located in Kazanis Court near the railway station, which is conveniently located for future residents of the subject site.

Pedestrian facilities near the subject site include paved footpaths on both sides of Victoria Street, a raised pedestrian crossing 20 metres east of the site, a pedestrian refuge on Parkes Avenue at Victoria Street and good quality paved footpaths leading directly to Werrington railway station.

Penrith City Council adopted in 2012 the "Penrith Accessible Trails Hierarchy Strategy", which includes a future bicycle path along Werrington Road between Great Western Highway and Dunheved Road. This bicycle path has not yet been provided, and there are currently no local bicycle paths in the area.

4.0 EXISTING TRAFFIC CONDITIONS

4.1 Traffic Volumes

Traffic volume data has been surveyed using 2 methods. A peak period intersection movement count was undertaken at the key access intersection of Parkes Avenue and Werrington Road on Thursday 28 April 2016. Tube traffic counters were installed on Victoria Street at Werrington shopping centre in 2014 and provide daily and hourly counts of two way traffic along Victoria Street. A 3%p.a. growth factor has been applied to this data over the 2 years since 2014.

The results of the surveys are shown on **Figure 3**. A copy of the intersection survey data is included as Appendix A, and the Victoria Street traffic volume data is in Appendix B. (**Figure 3** and Section 4.2 use the 3%p.a. factored up volumes for Victoria Street).

4.2 Traffic Conditions on Victoria Street

The RMS Guide to Traffic Generating Developments (RMS Guide) includes urban road capacity information in Section 4.2.3. Table 4.3 shows that the typical midblock capacity of an undivided road with interrupted flow is 900 vehicles per hour each way. The existing each way peak hour volumes along Victoria Street of 375 in the AM peak hour and 499 in the PM peak hour are well below the road's capacity.

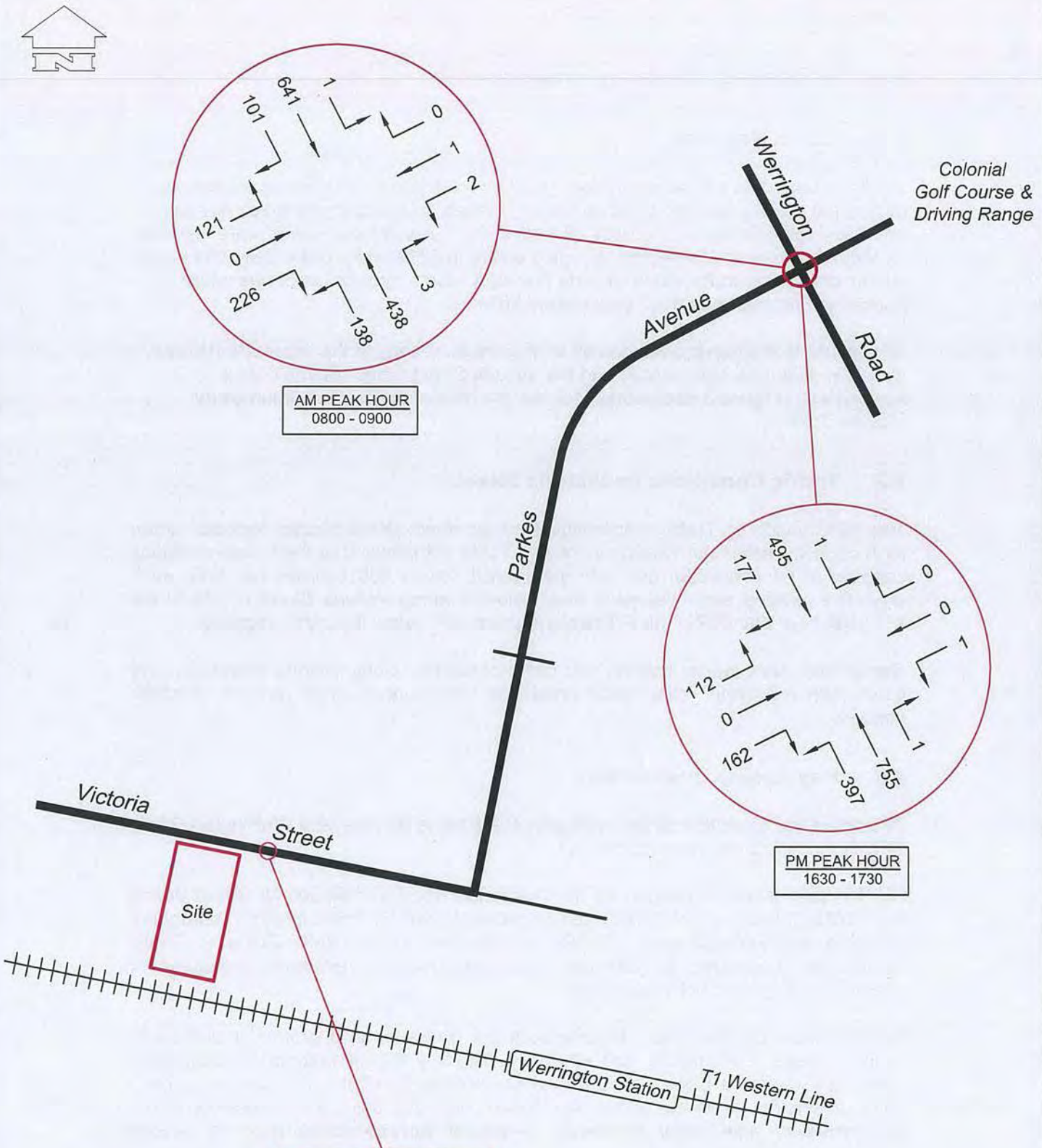
Our on site observations confirm that traffic conditions along Victoria Street are very good, with moderate flows, good breaks in traffic and a large amount of spare capacity.

4.3 Key Access Intersection

To assess the operation of the roundabout at Parkes Avenue and Werrington Road, SIDRA modelling has been carried out.

SIDRA was initially developed by the Australian Road and Research Board during the 1970's. It has continued to be developed and used for traffic analysis throughout Australia and internationally. SIDRA is endorsed in the RMS Guide to Traffic Generating Developments (Section 4.2.2, page 4-3) to determine measures of effectiveness of intersection operation.

SIDRA modelling calculates the intersection's operation and produces outputs to assess intersection capacity and efficiency. The key SIDRA outputs are Degree of Saturation, Average Delay and Level of Service (LoS). Table 4.1 shows for each Level of Service, the range of Average Delay to vehicles using the intersection and a description of operational efficiency. Levels of Service range from "A" (Good Operation) to "E" (at capacity).



	Eastbound	Westbound
AM Peak Hour (Weekday)	375	270
PM Peak Hour (Weekday)	325	499
Average Daily Traffic	4190	4285

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FIGURE 3

REZONING APPLICATION
92-96 VICTORIA STREET, WERRINGTON

EXISTING TRAFFIC VOLUMES

JOB NO.16052

TABLE 4.1

LEVEL OF SERVICE CRITERIA FOR INTERSECTIONS

Level of Service	Average Delay (seconds/vehicle)	Roundabouts
A	<14	Good operation
B	15 to 28	Good with acceptable delays and spare capacity
C	29 to 42	Satisfactory
D	43 to 56	Operating near capacity
E	57 to 70	At capacity, incidents will cause excessive delays

Source: Table 4.2 RTA Guide to Traffic Generating Developments October 2002

Degree of Saturation (DoS) is the ratio of demand flow to capacity, or volume/capacity (v/c). For intersections controlled by a roundabout, satisfactory operation is indicated by a DoS of up to about 0.90. Full saturation is 1.

The results of the SIDRA modelling are shown in the following table. SIDRA output summaries are included in Appendix C.

TABLE 4.2

PARKES AVENUE/WERRINGTON ROAD ROUNDABOUT

Period	DoS	Avg Delay (s)	LoS
AM Peak Hour	0.62	7.4	A
PM Peak Hour	0.84	8.6	A

The results show that overall the roundabout operates at a Level of Service A (good operation) in both AM and PM peak periods. While the degree of saturation on Werrington Road approaches are moderately high, the average delays are low.

5.0 FUTURE TRAFFIC GENERATION

The future traffic that will be generated by the potential high density residential use of the site can be determined by applying trip generation rates in the RMS Guide. RMS Technical Direction TD2013/04a is an update to the RMS Guide, which contains new survey information from high density residential developments across Sydney. TD2013/04a states that the trip generation rates in this document must be followed for RMS trip generation assessments.

5.1 Trip Generation Rates

RMS TD2013/04a trip generation rates for high density residential developments (Sydney averages) are:

AM peak hour trips per unit	:	0.19
AM peak hour trips per bedroom	:	0.09
PM peak hour trips per unit	:	0.15
PM peak hour trips per bedroom	:	0.07
Daily peak hour trips per unit	:	1.52
Daily peak hour trips per bedroom	:	0.72

5.2 Trip Generation Calculations

RMS provides trip rates for both total units and total bedrooms in a development. The anticipated yield of 170 units on the subject site will be 50 x 1 bedroom, 100 x 2 bedroom and 20 x 3 bedroom units, which totals 310 bedrooms. The following table shows the calculated trips for each option.

TABLE 5.1

Period	Unit Calculation		Bedroom Calculation	
	Unit Rate x Units	Trips	Bed Rate x Beds	Trips
AM Peak Hour	0.19 x 170	32.3	0.09 x 310	27.9
PM Peak Hour	0.15 x 170	25.5	0.07 x 310	21.7
Daily	1.52 x 170	258.4	0.72 x 310	223.2

The RMS trip rates produce higher trip numbers using the number of units calculation. To ensure a conservative assessment, one that considers the worst case scenario, this analysis will adopt the higher trip generation of the unit trip rates.

The AM and PM peak hour trips are expected to be split 80/20 in the peak/off peak directions. The trips are therefore split between In and Out as shown in Table 5.2.

TABLE 5.2

Period	Total Trips	Trips In to Site	Trips Out of Site
AM Peak Hour	32	6	26
PM Peak Hour	26	21	5
Daily	258	129	129

It should also be noted that the above trip volumes are the total forecast for the potential future development on the site. However the existing development on the site already generates trips. The two dwellings and doctors surgery are estimated from information in the RMS Guide to generate 6 trips (3 in, 3 out) in each peak hour.

Therefore the actual additional number of trips that will be generated by future development is:

AM Peak Hour: 32 trips – 6 existing trips = 26 additional trips
PM Peak Hour: 26 trips – 6 existing trips = 20 additional trips

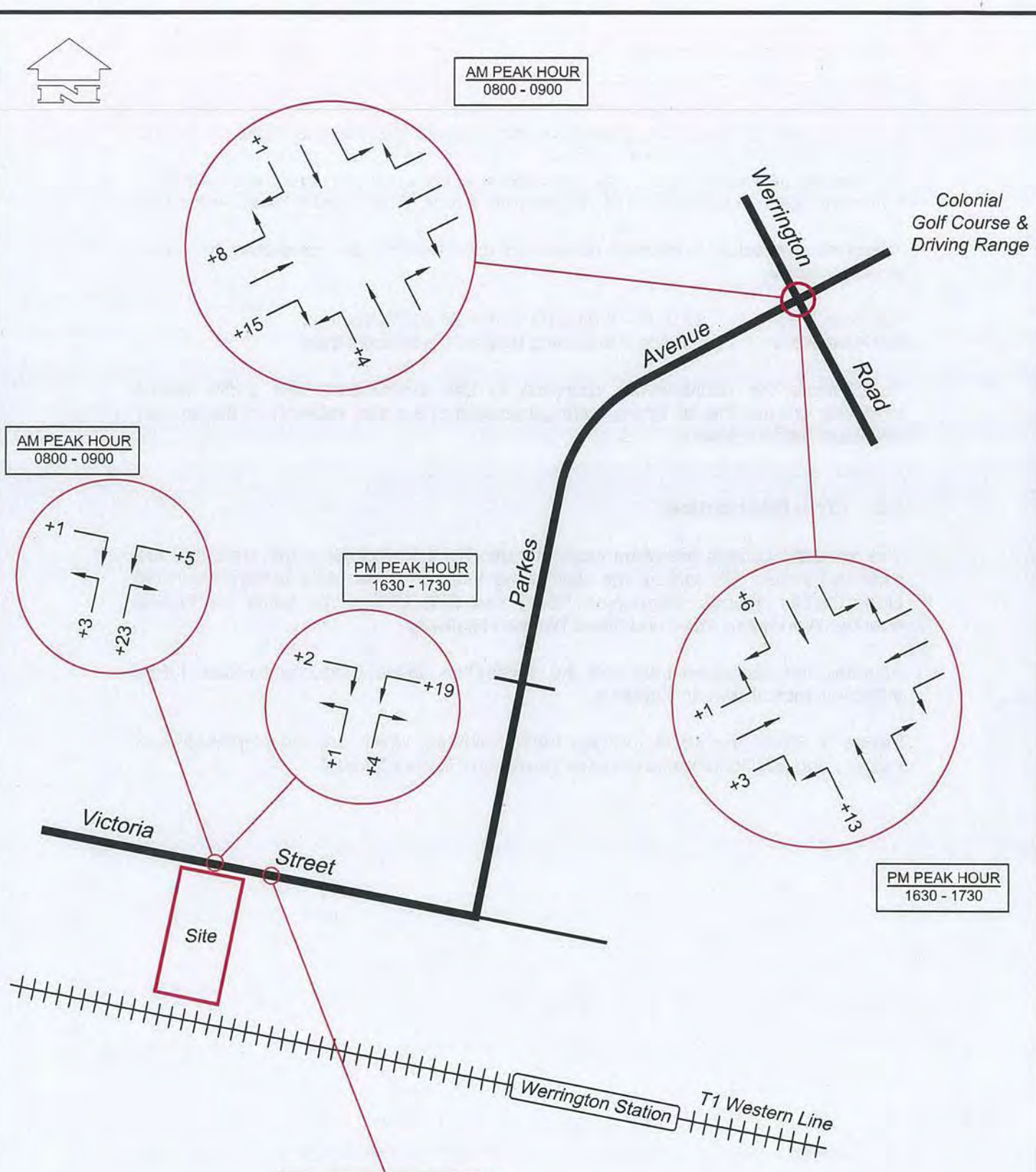
To continue the conservative approach to this assessment, the traffic impact modelling will use the full future traffic generation of the site, rather than the smaller additional traffic volumes.

5.3 Trip Distribution

The trip distribution is based on existing traffic flows in and out of the area, and are expected to be: 10% to/from the west along Victoria Street; 30% to/from the north along Parkes Avenue, Werrington Road; and 60% to/from the south via Parkes Avenue, Werrington Road and Great Western Highway.

Adopting the calculated trips and the distribution above produces forecast future traffic volumes shown on **Figure 4**.

Figure 5 shows the future forecast traffic volumes, which are the combination of existing and additional traffic volumes shown on **Figures 3** and **4**.



	Eastbound	Westbound
AM Peak Hour (Weekday)	+23	+5
PM Peak Hour (Weekday)	+4	+19
Average Daily Traffic	+116	+116

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FIGURE 4

REZONING APPLICATION
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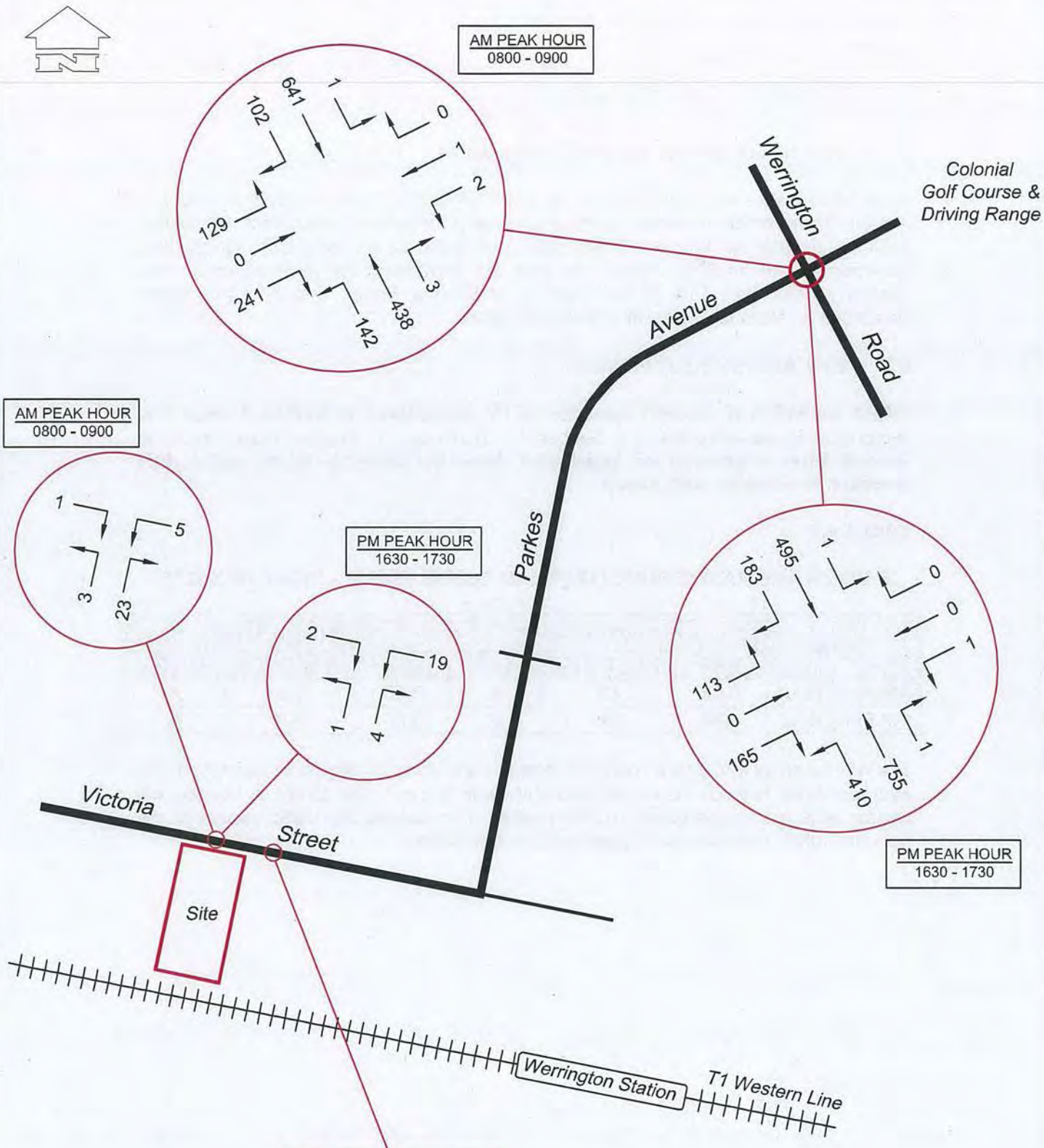
FORECAST ADDITIONAL TRAFFIC VOLUME

JOB NO.16052



	Eastbound	Westbound
AM Peak Hour (Weekday)	398	275
PM Peak Hour (Weekday)	329	518
Average Daily Traffic	4306	4401

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FIGURE 5

REZONING APPLICATION
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FUTURE TRAFFIC VOLUMES

JOB NO.16052

6.0 FUTURE TRAFFIC IMPACT

6.1 Traffic Conditions on Victoria Street

As identified in Section 4.2 of this report, the RMS Guide shows midblock capacity of Victoria Street is 900 vehicles per hour each way. **Figure 5** shows that the busiest peak hourly flow on Victoria Street after completion of the potential high density development will be 518 vehicles, which is the westbound PM peak volume. This volume is less than 58% of the capacity of Victoria Street, and so future traffic conditions on Victoria Street will remain very good.

6.2 Key Access Intersections

SIDRA modelling of existing operation of the roundabout at Parkes Avenue and Werrington Road was detailed in Section 4.3 of this report. Further modelling of the forecast future volumes at the roundabout shows the following results, with current operation included for comparison.

TABLE 6.1

PARKES AVENUE/WERRINGTON ROAD ROUNDABOUT – SIDRA RESULTS

Period	Existing Operation			Future Operation		
	DoS	Avg Delay	LoS	DoS	Avg Delay	LoS
AM Peak Hour	0.62	7.4	A	0.63	7.5	A
PM Peak Hour	0.84	8.6	A	0.85	8.9	A

The results show that only a marginal increase will occur in degree of saturation and average delay in both future AM and PM peak hours. The Level of Service will remain at A (good operation) in both peaks. This means the traffic impact of the potential future development is assessed as satisfactory.

7.0 PUBLIC AND ALTERNATE TRANSPORT MODES

The site is currently well served by Sydney's urban rail network and by local buses which link to nearby suburbs and to Penrith City Centre. The introduction of approximately 170 new dwellings will increase the usage of these services, which will increase the support and viability of these two public transport modes.

Pedestrians are already well catered for in the vicinity of the site. There are direct footpath connections to nearby shops and public transport, while the raised pedestrian crossing in Victoria Street, 20 metres east of the site, provides good, safe access to the recreational parklands to the north.

While there are no Council plans for dedicated bicycle facilities in the immediate vicinity of the site, cycling will be encouraged by the provision of bicycle parking facilities within the planned development. This will be in accordance with Table C10.2 and Section 10.7 of Penrith Development Control Plan 2014, and the Planning Guidelines for Walking and Cycling, Department of Planning, December 2004.

8.0 PARKING AND ACCESS

The Penrith City Development Control Plan 2014 (DCP) provides the requirements for off street parking provision and site access for proposed developments in Section C10. The RMS Guide also provides parking rates and AS2890.1 details access and carpark design requirements. The following section will detail the likely future parking and site access requirements.

8.1 Parking

Council's DCP requires the following on site parking for "residential flat buildings":

- 1 space per each one or two bedroom dwelling, plus
- 2 spaces per each three bedroom dwelling, plus
- 1 visitor space for every five dwellings, plus
- 1 car wash bay for every 50 dwellings (maximum of 4), plus
- 1 service vehicle bay for every 40 dwellings.

For the anticipated site yield of 50 x 1 bedroom, 100 x 2 bedroom and 20 x 3 bedroom dwellings, the DCP rates produce a requirement of;

190 resident car spaces;
34 visitor spaces;
4 car wash bays; and
4 service vehicle spaces.

The RMS Guide provides car parking rates for "high density residential buildings" as follows;

- 0.6 spaces per one bedroom dwelling, plus
- 0.9 spaces per two bedroom dwelling, plus
- 1.4 spaces per three bedroom dwelling, plus
- 1 visitor space per five dwellings.

These rates produce a parking requirement of;

148 resident car spaces;
34 visitor spaces.

(Note, the RMS Guide does not include car wash bays or service vehicle bays, however, most Council's do require these to ensure correct environmental treatment of waste water and to eliminate on-street parking of delivery and removalist vehicles. We concur with the DCP requirement in this regard).

Council's DCP also indicates in Section 10.5.1 C4 that Council has discretion to reduce car space number requirements if a reduced provision can be justified in a Traffic Impact Statement, in terms of proximity to public transport or similar reasons. Such an analysis is beyond the scope of a rezoning application, and so the notional car parking requirement for the potential future high density residential development is in accordance with Council's DCP rates for residential flat buildings totalling 224 car spaces, plus four car wash bays and four service vehicle bays.

All car parking will be required to fully comply with AS2890.1 in regard to space and aisle dimensions, manoeuvring areas, grades, ramps and clearances. All accessible car parking spaces will be required to fully comply with AS2890.6.

8.2 Site Access

Vehicular access to the site will be from Victoria Street. A driveway in this location will be in accordance with DCP Section 10.5.2 A and B. The DCP also requires the access to comply with AS2890.1-2004, Parking Facilities, Off Street Car Parking.

Under AS2890.1, the future development's car park will be a Class 1A facility. Table 3.1 indicates the access will be a Category 2 driveway, and Table 3.2 indicates a combined entry/exit driveway of between 6 and 9 metres width is appropriate.

Given the site frontage to Victoria Street is on a straight, level roadway, with no nearby intersections and good sight distances in both directions, the entry/exit driveway could be located at any point along the site frontage. If the driveway is to be located towards the eastern side of the property, it should be separated from the adjacent car park driveway by a minimum of three metres to avoid conflicts between vehicles using both driveways at the same time.

9.0 CONCLUSIONS

This Traffic and Parking Assessment has been carried out on a proposed rezoning of No's 92, 94 and 96 Victoria Street, Werrington, from its current R3 Medium Density Residential to R4 High Density Residential. The site is located within 250 metres of Werrington railway station and shopping centre, on the southern side of Victoria Street. It is immediately adjacent to an existing R4 zone covering Werrington town centre.

The potential future high density yield of the site is anticipated to be 170 dwellings, comprising 50 x 1 bedroom, 100 x 2 bedroom and 20 x 3 bedroom dwellings.

The site is well served by public transport, in particular Sydney's urban rail network via Werrington Station, and by local bus services linking to nearby suburbs and town centres.

The future traffic generated by the potential development is forecast to be up to 32 trips in the AM peak hour and 26 trips in the PM peak hour. These trips will be split between incoming and departing traffic and will distribute onto the surrounding road network as shown on **Figure 4.** However it should be noted that the existing dwellings and doctors surgery currently on the site generate 6 trips each peak hour, so the additional traffic would only be 26 trips in the AM peak hour and 20 trips in the PM peak hour.

Intersection modelling of the key access intersection, the roundabout at Parkes Avenue and Werrington Road, shows that there will be only a minor increase in average delay, and current Level of Service will remain at A (good operation) under the future forecast traffic flows during both AM and PM peak hours. The traffic impact of the potential development is therefore assessed as satisfactory.

The on site parking required for the potential development, under Council's DCP, would be;

190 resident spaces;
34 visitor spaces;
4 car wash bays; and
4 service vehicle bays

There may be scope for this amount of parking to be reduced in accordance with the DCP provisions, and in relation to RMS guidelines which indicate a slightly lower car parking requirement for high density residential developments near public transport facilities. This would be a matter for a Traffic and Parking Impact report associated with a future development application.

The site will require a combined entry/exit access driveway of 6 to 9 metres width. The driveway can be located in any position along the Victoria Street frontage.

In summary, the proposed rezoning is supported from a traffic impact and parking perspective, because potential future development will produce moderate traffic generation that will have a low, satisfactory traffic impact. The site will be able to provide good access to adequate on site car parking to meet standard requirements. There would be no justification for any upgrade or capacity improvement works on the surrounding road or transport network.

APPENDIX A

R.O.A.R. DATA

Reliable, Original & Authentic Results

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Client : TUPA
Job No/Name : 6029 WERRINGTON Parkes Ave
Day/Date : Thursday 28th April 2016

Lights

Time Per	NORTH Werrington Rd			WEST Parkes Ave			SOUTH Werrington Rd			EAST Picnic / Golf			TOT
	L	T	R	L	T	R	L	T	R	L	T	R	
0700 - 0715	0	115	8	25	0	43	13	78	0	0	0	0	282
0715 - 0730	0	150	6	36	0	62	26	97	0	0	0	0	377
0730 - 0745	0	154	17	32	0	63	29	106	0	0	0	0	401
0745 - 0800	0	143	24	48	0	67	22	97	0	0	0	0	401
0800 - 0815	0	174	19	34	0	42	28	109	0	1	0	0	407
0815 - 0830	0	161	29	29	0	62	40	92	1	0	1	0	415
0830 - 0845	1	146	22	22	0	52	28	95	2	1	0	0	369
0845 - 0900	0	141	30	36	0	70	40	122	0	0	0	0	439
Period End	**1**	**1184**	**155**	**262**	**0**	**461**	**226**	**796**	**3**	**2**	**1**	**0**	**3091**

Heavies

Time Per	NORTH Werrington Rd			WEST Parkes Ave			SOUTH Werrington Rd			EAST Picnic / Golf			TOT
	L	T	R	L	T	R	L	T	R	L	T	R	
0700 - 0715	0	4	0	0	0	1	1	3	0	0	0	0	9
0715 - 0730	0	4	1	1	0	1	0	3	0	0	0	0	10
0730 - 0745	0	2	0	0	0	1	1	2	0	0	0	0	6
0745 - 0800	0	5	0	0	0	0	0	3	0	0	0	0	8
0800 - 0815	0	3	0	0	0	0	0	3	0	0	0	0	6
0815 - 0830	0	7	0	0	0	0	0	4	0	0	0	0	11
0830 - 0845	0	4	0	0	0	0	1	7	0	0	0	0	12
0845 - 0900	0	5	1	0	0	0	1	6	0	0	0	0	13
Period End	**0**	**34**	**2**	**1**	**0**	**3**	**4**	**31**	**0**	**0**	**0**	**0**	**75**

Lights

Peak Time	NORTH Werrington Rd			WEST Parkes Ave			SOUTH Werrington Rd			EAST Picnic / Golf			TOT
	L	T	R	L	T	R	L	T	R	L	T	R	
0700 - 0800	0	562	55	141	0	235	90	378	0	0	0	0	1461
0715 - 0815	0	621	66	150	0	234	105	409	0	1	0	0	1586
0730 - 0830	0	632	89	143	0	234	119	404	1	1	1	0	1624
0745 - 0845	1	624	94	133	0	223	118	393	3	2	1	0	1592
0800 - 0900	1	622	100	121	0	226	136	418	3	2	1	0	1630
PEAK HOUR	**1**	**622**	**100**	**121**	**0**	**226**	**136**	**418**	**3**	**2**	**1**	**0**	**1630**

Heavies

Peak Time	NORTH Werrington Rd			WEST Parkes Ave			SOUTH Werrington Rd			EAST Picnic / Golf			TOT
	L	T	R	L	T	R	L	T	R	L	T	R	
0700 - 0800	0	15	1	1	0	3	2	11	0	0	0	0	33
0715 - 0815	0	14	1	1	0	2	1	11	0	0	0	0	30
0730 - 0830	0	17	0	0	0	1	1	12	0	0	0	0	31
0745 - 0845	0	19	0	0	0	0	1	17	0	0	0	0	37
0800 - 0900	0	19	1	0	0	0	2	20	0	0	0	0	42
PEAK HOUR	**0**	**19**	**1**	**0**	**0**	**0**	**2**	**20**	**0**	**0**	**0**	**0**	**42**

Combined

Time Per	NORTH Werrington Rd			WEST Parkes Ave			SOUTH Werrington Rd			EAST Picnic / Golf			TOT
	L	T	R	L	T	R	L	T	R	L	T	R	
0700 - 0715	0	119	8	25	0	44	14	81	0	0	0	0	291
0715 - 0730	0	154	7	37	0	63	26	100	0	0	0	0	387
0730 - 0745	0	156	17	32	0	64	30	108	0	0	0	0	407
0745 - 0800	0	148	24	48	0	67	22	100	0	0	0	0	409
0800 - 0815	0	177	19	34	0	42	28	112	0	1	0	0	413
0815 - 0830	0	168	29	29	0	62	40	96	1	0	1	0	426
0830 - 0845	1	150	22	22	0	52	29	102	2	1	0	0	381
0845 - 0900	0	146	31	36	0	70	41	128	0	0	0	0	452
Period End	**1**	**1218**	**157**	**263**	**0**	**464**	**230**	**827**	**3**	**2**	**1**	**0**	**3166**

Peds

Time Per	NORTH Werrington Rd	WEST Parkes Ave	SOUTH Werrington Rd	EAST Picnic / Golf	TOT
	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	
0700 - 0715					0
0715 - 0730					0
0730 - 0745	*Not*	*Not*	*Not*	*Not*	0
0745 - 0800	*Required*	*Required*	*Required*	*Required*	0
0800 - 0815					0
0815 - 0830					0
0830 - 0845					0
0845 - 0900					0
Period End	**0**	**0**	**0**	**0**	**0**

Combined

Peak Time	NORTH Werrington Rd			WEST Parkes Ave			SOUTH Werrington Rd			EAST Picnic / Golf			TOT
	L	T	R	L	T	R	L	T	R	L	T	R	
0700 - 0800	0	577	56	142	0	238	92	389	0	0	0	0	1494
0715 - 0815	0	635	67	151	0	236	106	420	0	1	0	0	1616
0730 - 0830	0	649	89	143	0	235	120	416	1	1	1	0	1655
0745 - 0845	1	643	94	133	0	223	119	410	3	2	1	0	1629
0800 - 0900	1	641	101	121	0	226	138	438	3	2	1	0	1672
PEAK HOUR	**1**	**641**	**101**	**121**	**0**	**226**	**138**	**438**	**3**	**2**	**1**	**0**	**1672**

Peds

Peak Per	NORTH Werrington Rd	WEST Parkes Ave	SOUTH Werrington Rd	EAST Picnic / Golf	TOT
	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	
0700 - 0800	0	0	0	0	0
0715 - 0815	0	0	0	0	0
0730 - 0830	0	0	0	0	0
0745 - 0845	0	0	0	0	0
0800 - 0900	0	0	0	0	0
PEAK HR	**0**	**0**	**0**	**0**	**0**

R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849, Mob. 0418 239019

Client : TUPA
Job No/Name : 6029 WERRINGTON Parkes Ave
Day/Date : Thursday 28th April 2016

Lights

Time Per	NORTH Werrington Rd			WEST Parkes Ave			SOUTH Werrington Rd			EAST Picnic / Golf			TOT
	L	T	R	L	T	R	L	T	R	L	T	R	
1530 - 1545	0	120	29	25	0	55	80	180	0	1	0	0	490
1545 - 1600	0	131	36	32	0	35	84	185	1	1	0	0	505
1600 - 1615	0	116	33	14	0	50	95	196	0	0	0	0	504
1615 - 1630	0	141	41	33	0	51	78	196	0	0	0	0	540
1630 - 1645	0	132	42	19	0	40	90	173	1	0	0	0	497
1645 - 1700	0	134	52	30	0	27	81	192	0	0	0	0	516
1700 - 1715	1	95	42	30	0	46	99	198	0	0	0	0	511
1715 - 1730	0	125	39	33	0	49	124	182	0	1	0	0	553
Period End	**1**	**994**	**314**	**216**	**0**	**353**	**731**	**1502**	**2**	**3**	**0**	**0**	**4116**

Heavies

Time Per	NORTH Werrington Rd			WEST Parkes Ave			SOUTH Werrington Rd			EAST Picnic / Golf			TOT
	L	T	R	L	T	R	L	T	R	L	T	R	
1530 - 1545	0	3	1	1	0	1	1	6	0	0	0	0	13
1545 - 1600	0	4	0	0	0	1	1	9	0	0	0	0	15
1600 - 1615	0	2	1	0	0	0	1	4	0	0	0	0	8
1615 - 1630	0	1	1	1	0	0	1	3	0	0	0	0	7
1630 - 1645	0	2	1	0	0	0	1	3	0	0	0	0	7
1645 - 1700	0	3	0	0	0	0	0	4	0	0	0	0	7
1700 - 1715	0	3	1	0	0	0	1	3	0	0	0	0	8
1715 - 1730	0	1	0	0	0	0	1	0	0	0	0	0	2
Period End	**0**	**19**	**5**	**2**	**0**	**2**	**7**	**32**	**0**	**0**	**0**	**0**	**67**

Lights

Peak Time	NORTH Werrington Rd			WEST Parkes Ave			SOUTH Werrington Rd			EAST Picnic / Golf			TOT
	L	T	R	L	T	R	L	T	R	L	T	R	
1530 - 1630	0	508	139	104	0	191	337	757	1	2	0	0	2039
1545 - 1645	0	520	152	98	0	176	347	750	2	1	0	0	2046
1600 - 1700	0	523	168	96	0	168	344	757	1	0	0	0	2057
1615 - 1715	1	502	177	112	0	164	348	759	1	0	0	0	2064
1630 - 1730	1	486	175	112	0	162	394	745	1	1	0	0	2077
PEAK HOUR	**1**	**486**	**175**	**112**	**0**	**162**	**394**	**745**	**1**	**1**	**0**	**0**	**2077**

Heavies

Peak Time	NORTH Werrington Rd			WEST Parkes Ave			SOUTH Werrington Rd			EAST Picnic / Golf			TOT
	L	T	R	L	T	R	L	T	R	L	T	R	
1530 - 1630	0	10	3	2	0	2	4	22	0	0	0	0	43
1545 - 1645	0	9	3	1	0	1	4	19	0	0	0	0	37
1600 - 1700	0	8	3	1	0	0	3	14	0	0	0	0	29
1615 - 1715	0	9	3	1	0	0	3	13	0	0	0	0	29
1630 - 1730	0	9	2	0	0	0	3	10	0	0	0	0	24
PEAK HOUR	**0**	**9**	**2**	**0**	**0**	**0**	**3**	**10**	**0**	**0**	**0**	**0**	**24**

Combined

Time Per	NORTH Werrington Rd			WEST Parkes Ave			SOUTH Werrington Rd			EAST Picnic / Golf			TOT
	L	T	R	L	T	R	L	T	R	L	T	R	
1530 - 1545	0	123	30	26	0	56	81	186	0	1	0	0	503
1545 - 1600	0	135	36	32	0	36	85	194	1	1	0	0	520
1600 - 1615	0	118	34	14	0	50	96	200	0	0	0	0	512
1615 - 1630	0	142	42	34	0	51	79	199	0	0	0	0	547
1630 - 1645	0	134	43	19	0	40	91	176	1	0	0	0	504
1645 - 1700	0	137	52	30	0	27	81	196	0	0	0	0	523
1700 - 1715	1	98	43	30	0	46	100	201	0	0	0	0	519
1715 - 1730	0	126	39	33	0	49	125	182	0	1	0	0	555
Period End	**1**	**1013**	**319**	**218**	**0**	**355**	**738**	**1534**	**2**	**3**	**0**	**0**	**4183**

Peds

Time Per	NORTH Werrington Rd	WEST Parkes Ave	SOUTH Werrington Rd	EAST Picnic / Golf	TOT
	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	
1600 - 1615					0
1615 - 1630					0
1630 - 1645	*Not*	*Not*	*Not*	*Not*	0
1645 - 1700	*Required*	*Required*	*Required*	*Required*	0
1700 - 1715					0
1715 - 1730					0
1730 - 1745					0
1745 - 1800					0
Period End	**0**	**0**	**0**	**0**	**0**

Combined

Peak Time	NORTH Werrington Rd			WEST Parkes Ave			SOUTH Werrington Rd			EAST Picnic / Golf			TOT
	L	T	R	L	T	R	L	T	R	L	T	R	
1530 - 1630	0	518	142	106	0	193	341	779	1	2	0	0	2082
1545 - 1645	0	529	155	99	0	177	351	769	2	1	0	0	2083
1600 - 1700	0	531	171	97	0	168	347	771	1	0	0	0	2086
1615 - 1715	1	511	180	113	0	164	351	772	1	0	0	0	2093
1630 - 1730	1	495	177	112	0	162	397	755	1	1	0	0	2101
PEAK HOUR	**1**	**495**	**177**	**112**	**0**	**162**	**397**	**755**	**1**	**1**	**0**	**0**	**2101**

Peds

Peak Per	NORTH Werrington Rd	WEST Parkes Ave	SOUTH Werrington Rd	EAST Picnic / Golf	TOT
	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED	
1530 - 1630	0	0	0	0	0
1545 - 1645	0	0	0	0	0
1600 - 1700	0	0	0	0	0
1615 - 1715	0	0	0	0	0
1630 - 1730	0	0	0	0	0
PEAK HR	**0**	**0**	**0**	**0**	**0**

CfeIT bob.white@cfeit.com (02) 9740 8600 APPENDIX B

Traffic Count Summary Report

Count Number	**262**	Ref : **PEN**	**Lat/Long : S33.75791 / E150.75664**	**UBD 165 A-12**
Street	**VICTORIA STREET, WERRINGTON : From RICHMOND ROAD to CUL DE SAC : EAST BOUND**			
Location	Opposite Newsagent/Bottleshop, On No Stopping/Parking Pole			*Carriageway*

TOTAL COUNT MATRIX

Start Date	06-MAR-14
Start Time	100
Duration	7 DAYS
Interval	1 HOUR

Weekly 50th Percentile Speed	35
Weekly 85th Percentile Speed	43
Five Day AADT	4203
Seven Day AADT	3954

	MON *10TH*	TUE *11TH*	WED *12TH*	THU *6TH*	FRI *7TH*	SAT *8TH*	SUN *9TH*	5 Day Total	5 Day Average	7 Day Total	7 Day Average
Midnight - 1am	6	16	12	21	31	32	37	**86**	**17**	**155**	**22**
1am - 2am	14	7	11	5	12	36	37	**49**	**10**	**122**	**17**
2am - 3am	13	13	5	9	14	19	10	**54**	**11**	**83**	**12**
3am - 4am	14	28	34	18	25	15	17	**119**	**24**	**151**	**22**
4am - 5am	74	70	72	81	75	35	13	**372**	**74**	**420**	**60**
5am - 6am	211	209	223	203	194	76	27	**1040**	**208**	**1143**	**163**
6am - 7am	280	276	272	298	267	114	38	**1393**	**279**	**1545**	**221**
7am - 8am	**346**	331	326	340	310	120	84	**1653**	**331**	**1857**	**265**
8am - 9am	336	**359**	**361**	**357**	**359**	212	148	**1772**	**354**	**2132**	**305**
9am - 10am	246	284	260	244	254	296	208	**1288**	**258**	**1792**	**256**
10am - 11am	174	183	199	197	192	278	259	**945**	**189**	**1482**	**212**
11am - Midday	203	194	179	183	201	**315**	**280**	**960**	**192**	**1555**	**222**
Midday - 1pm	171	186	192	190	195	**300**	**259**	**934**	**187**	**1493**	**213**
1pm - 2pm	179	182	220	194	212	267	235	**987**	**197**	**1489**	**213**
2pm - 3pm	213	223	221	218	249	229	194	**1124**	**225**	**1547**	**221**
3pm - 4pm	**287**	292	**306**	**307**	**343**	196	199	**1535**	**307**	**1930**	**276**
4pm - 5pm	263	**295**	281	281	296	199	207	**1416**	**283**	**1822**	**260**
5pm - 6pm	271	283	304	296	316	211	187	**1470**	**294**	**1868**	**267**
6pm - 7pm	217	254	271	252	260	203	146	**1254**	**251**	**1603**	**229**
7pm - 8pm	157	169	195	187	187	156	148	**895**	**179**	**1199**	**171**
8pm - 9pm	91	144	131	138	132	123	116	**636**	**127**	**875**	**125**
9pm - 10pm	83	123	102	124	129	97	94	**561**	**112**	**752**	**107**
10pm - 11pm	46	44	67	65	91	80	32	**313**	**63**	**425**	**61**
11pm - Midnight	29	33	24	31	44	49	27	**161**	**32**	**237**	**34**
Total	**3924**	**4198**	**4268**	**4239**	**4388**	**3658**	**3002**	**21017**	**4203**	**27677**	**3953**

Data displayed has been compiled from pneumatic traffic count processes and is subject to the documented limitations

CfeIT bob.white@cfeit.com (02) 9740 8600

Traffic Count Summary Report

Count Number	**262**	Ref : **PEN**	**Lat/Long : S33.75791 / E150.75664**	**UBD 165 A-12**
Street	**VICTORIA STREET, WERRINGTON : From CUL DE SAC to RICHMOND ROAD : WEST BOUND**			
Location	Opposite Newsagent/Bottleshop, On No Stopping/Parking Pole			*Carriageway*

TOTAL COUNT MATRIX

Start Date	06-MAR-14
Start Time	100
Duration	7 DAYS
Interval	1 HOUR

Weekly 50th Percentile Speed	34
Weekly 85th Percentile Speed	41
Five Day AADT	4322
Seven Day AADT	4043

	MON *10TH*	TUE *11TH*	WED *12TH*	THU *6TH*	FRI *7TH*	SAT *8TH*	SUN *9TH*	5 Day Total	5 Day Average	7 Day Total	7 Day Average
Midnight - 1am	16	35	24	18	32	57	69	**125**	**25**	**251**	**36**
1am - 2am	15	8	12	11	16	32	31	**62**	**12**	**125**	**18**
2am - 3am	8	15	9	12	15	21	15	**59**	**12**	**95**	**14**
3am - 4am	11	11	14	7	15	18	11	**58**	**12**	**87**	**12**
4am - 5am	17	18	13	16	20	15	6	**84**	**17**	**105**	**15**
5am - 6am	41	47	52	47	40	21	14	**227**	**45**	**262**	**37**
6am - 7am	106	108	109	117	120	46	24	**560**	**112**	**630**	**90**
7am - 8am	148	172	164	169	144	64	41	**797**	**159**	**902**	**129**
8am - 9am	**244**	**264**	**256**	**255**	**249**	169	106	**1268**	**254**	**1543**	**220**
9am - 10am	215	204	217	180	176	226	180	**992**	**198**	**1398**	**200**
10am - 11am	164	176	177	151	180	271	**238**	**848**	**170**	**1357**	**194**
11am - Midday	194	181	197	232	201	**322**	209	**1005**	**201**	**1536**	**219**
Midday - 1pm	186	183	212	198	211	**318**	**264**	**990**	**198**	**1572**	**225**
1pm - 2pm	185	211	211	203	269	312	248	**1079**	**216**	**1639**	**234**
2pm - 3pm	291	352	316	306	358	242	225	**1623**	**325**	**2090**	**299**
3pm - 4pm	381	404	422	395	379	229	229	**1981**	**396**	**2439**	**348**
4pm - 5pm	**453**	443	463	413	426	241	207	**2198**	**440**	**2646**	**378**
5pm - 6pm	434	**474**	**476**	**470**	**501**	247	237	**2355**	**471**	**2839**	**406**
6pm - 7pm	311	360	375	427	391	214	198	**1864**	**373**	**2276**	**325**
7pm - 8pm	206	247	246	244	248	191	162	**1191**	**238**	**1544**	**221**
8pm - 9pm	151	182	194	204	139	132	133	**870**	**174**	**1135**	**162**
9pm - 10pm	118	133	118	132	125	111	90	**626**	**125**	**827**	**118**
10pm - 11pm	60	70	80	106	125	114	47	**441**	**88**	**602**	**86**
11pm - Midnight	38	45	52	80	93	67	26	**308**	**62**	**401**	**57**
Total	**3993**	**4343**	**4409**	**4393**	**4473**	**3680**	**3010**	**21611**	**4322**	**28301**	**4043**

APPENDIX C

MOVEMENT SUMMARY

Site: 1 [Werrington Rd / Parkes Ave - Existing AM]

8am - 9am
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Werrington Rd (south)											
21	L2	145	1.4	0.408	5.5	LOS A	2.9	21.1	0.34	0.51	52.3
22	T1	461	4.6	0.408	5.9	LOS A	2.9	21.1	0.34	0.51	59.7
23	R2	3	0.0	0.408	9.9	LOS A	2.9	21.1	0.34	0.51	53.6
Approach		609	3.8	0.408	5.8	LOS A	2.9	21.1	0.34	0.51	57.7
NorthEast: Golf Access Rd											
24	L2	2	0.0	0.008	11.6	LOS A	0.1	0.4	0.88	0.65	47.4
25	T1	1	0.0	0.008	11.6	LOS A	0.1	0.4	0.88	0.65	43.5
26	R2	1	0.0	0.008	15.6	LOS B	0.1	0.4	0.88	0.65	48.0
Approach		4	0.0	0.008	12.2	LOS A	0.1	0.4	0.88	0.65	46.3
NorthWest: Werrington Rd (north)											
27	L2	1	0.0	0.620	6.7	LOS A	6.1	43.7	0.70	0.65	50.6
28	T1	675	3.0	0.620	7.2	LOS A	6.1	43.7	0.70	0.65	57.8
29	R2	106	1.0	0.620	11.3	LOS A	6.1	43.7	0.70	0.65	51.8
Approach		782	2.7	0.620	7.8	LOS A	6.1	43.7	0.70	0.65	56.9
SouthWest: Parkes Ave											
30	L2	127	0.0	0.409	6.4	LOS A	2.7	19.0	0.70	0.78	49.4
31	T1	1	0.0	0.409	6.4	LOS A	2.7	19.0	0.70	0.78	45.2
32	R2	238	0.0	0.409	10.5	LOS A	2.7	19.0	0.70	0.78	50.0
Approach		366	0.0	0.409	9.1	LOS A	2.7	19.0	0.70	0.78	49.8
All Vehicles		1761	2.5	0.620	7.4	LOS A	6.1	43.7	0.58	0.63	55.5

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.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [Werrington Rd / Parkes Ave - Existing PM]

4.30pm - 5.30pm
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Werrington Rd (south)											
21	L2	418	0.8	0.838	7.6	LOS A	13.2	93.2	0.80	0.65	50.7
22	T1	795	1.3	0.838	8.0	LOS A	13.2	93.2	0.80	0.65	58.4
23	R2	1	0.0	0.838	12.1	LOS A	13.2	93.2	0.80	0.65	51.9
Approach		1214	1.1	0.838	7.9	LOS A	13.2	93.2	0.80	0.65	55.5
NorthEast: Golf Access Rd											
24	L2	1	0.0	0.004	9.2	LOS A	0.0	0.2	0.81	0.59	48.6
25	T1	1	0.0	0.004	9.2	LOS A	0.0	0.2	0.81	0.59	44.5
26	R2	1	0.0	0.004	13.3	LOS A	0.0	0.2	0.81	0.59	49.2
Approach		2	0.0	0.004	10.2	LOS A	0.0	0.2	0.81	0.59	47.7
NorthWest: Werrington Rd (north)											
27	L2	1	0.0	0.523	6.0	LOS A	5.1	35.9	0.58	0.59	50.9
28	T1	521	1.8	0.523	6.5	LOS A	5.1	35.9	0.58	0.59	58.4
29	R2	186	1.1	0.523	10.6	LOS A	5.1	35.9	0.58	0.59	52.0
Approach		708	1.6	0.523	7.6	LOS A	5.1	35.9	0.58	0.59	56.5
SouthWest: Parkes Ave											
30	L2	118	0.0	0.507	11.7	LOS A	4.4	30.7	0.95	1.04	46.3
31	T1	1	0.0	0.507	11.6	LOS A	4.4	30.7	0.95	1.04	42.6
32	R2	171	0.0	0.507	15.7	LOS B	4.4	30.7	0.95	1.04	46.9
Approach		289	0.0	0.507	14.0	LOS A	4.4	30.7	0.95	1.04	46.6
All Vehicles		2213	1.1	0.838	8.6	LOS A	13.2	93.2	0.75	0.68	54.5

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.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [Werrington Rd / Parkes Ave - Future AM]

8am - 9am with development trafic included
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Werrington Rd (south)											
21	L2	149	1.4	0.412	5.5	LOS A	3.0	21.5	0.34	0.51	52.3
22	T1	461	4.6	0.412	5.9	LOS A	3.0	21.5	0.34	0.51	59.7
23	R2	3	0.0	0.412	9.9	LOS A	3.0	21.5	0.34	0.51	53.6
Approach		614	3.8	0.412	5.8	LOS A	3.0	21.5	0.34	0.51	57.7
NorthEast: Golf Access Rd											
24	L2	2	0.0	0.009	11.9	LOS A	0.1	0.4	0.89	0.66	47.2
25	T1	1	0.0	0.009	11.9	LOS A	0.1	0.4	0.89	0.66	43.3
26	R2	1	0.0	0.009	16.0	LOS B	0.1	0.4	0.89	0.66	47.8
Approach		4	0.0	0.009	12.5	LOS A	0.1	0.4	0.89	0.66	46.1
NorthWest: Werrington Rd (north)											
27	L2	1	0.0	0.632	7.0	LOS A	6.4	45.5	0.73	0.67	50.5
28	T1	675	3.0	0.632	7.5	LOS A	6.4	45.5	0.73	0.67	57.6
29	R2	107	1.0	0.632	11.5	LOS A	6.4	45.5	0.73	0.67	51.6
Approach		783	2.7	0.632	8.0	LOS A	6.4	45.5	0.73	0.67	56.7
SouthWest: Parkes Ave											
30	L2	136	0.0	0.437	6.5	LOS A	3.0	20.8	0.71	0.79	49.3
31	T1	1	0.0	0.437	6.5	LOS A	3.0	20.8	0.71	0.79	45.1
32	R2	254	0.0	0.437	10.5	LOS A	3.0	20.8	0.71	0.79	50.0
Approach		390	0.0	0.437	9.1	LOS A	3.0	20.8	0.71	0.79	49.7
All Vehicles		1791	2.5	0.632	7.5	LOS A	6.4	45.5	0.59	0.64	55.3

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.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [Werrington Rd / Parkes Ave - Future PM]

4.30pm - 5.30pm with development trafic included
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: Werrington Rd (south)											
21	L2	432	0.7	0.853	8.1	LOS A	14.5	102.2	0.83	0.67	50.6
22	T1	795	1.3	0.853	8.5	LOS A	14.5	102.2	0.83	0.67	58.3
23	R2	1	0.0	0.853	12.5	LOS A	14.5	102.2	0.83	0.67	51.8
Approach		1227	1.1	0.853	8.3	LOS A	14.5	102.2	0.83	0.67	55.3
NorthEast: Golf Access Rd											
24	L2	1	0.0	0.004	9.3	LOS A	0.0	0.2	0.81	0.59	48.5
25	T1	1	0.0	0.004	9.4	LOS A	0.0	0.2	0.81	0.59	44.4
26	R2	1	0.0	0.004	13.4	LOS A	0.0	0.2	0.81	0.59	49.1
Approach		2	0.0	0.004	10.4	LOS A	0.0	0.2	0.81	0.59	47.6
NorthWest: Werrington Rd (north)											
27	L2	1	0.0	0.530	6.1	LOS A	5.2	36.6	0.59	0.60	50.8
28	T1	521	1.8	0.530	6.5	LOS A	5.2	36.6	0.59	0.60	58.3
29	R2	193	1.1	0.530	10.6	LOS A	5.2	36.6	0.59	0.60	52.0
Approach		715	1.6	0.530	7.6	LOS A	5.2	36.6	0.59	0.60	56.4
SouthWest: Parkes Ave											
30	L2	119	0.0	0.521	12.0	LOS A	4.6	32.2	0.96	1.05	46.1
31	T1	1	0.0	0.521	12.0	LOS A	4.6	32.2	0.96	1.05	42.4
32	R2	174	0.0	0.521	16.0	LOS B	4.6	32.2	0.96	1.05	46.7
Approach		293	0.0	0.521	14.3	LOS A	4.6	32.2	0.96	1.05	46.4
All Vehicles		2237	1.1	0.853	8.9	LOS A	14.5	102.2	0.77	0.70	54.3

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.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.