TCG Planning

Life City Wollongong Stage 1

Traffic and Transport Assessment

14 October 2019

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1. Introduction

1.1 Overview

This Traffic and Transport Assessment has been prepared by GHD Pty Ltd to support the Development Application (DA) for Stage 1 of the Life City Wollongong development in Berkeley, NSW. Stage 1 of the development is proposed to consist of a medical centre and child care centre, with day surgery, respite care centre, and specialist rooms. It also includes the construction of access roads and associated car parking facilities as shown in Figure 1-1. Stage 1 of the proposal site is located at the northern section of the site, as shown at Figure 1-2.

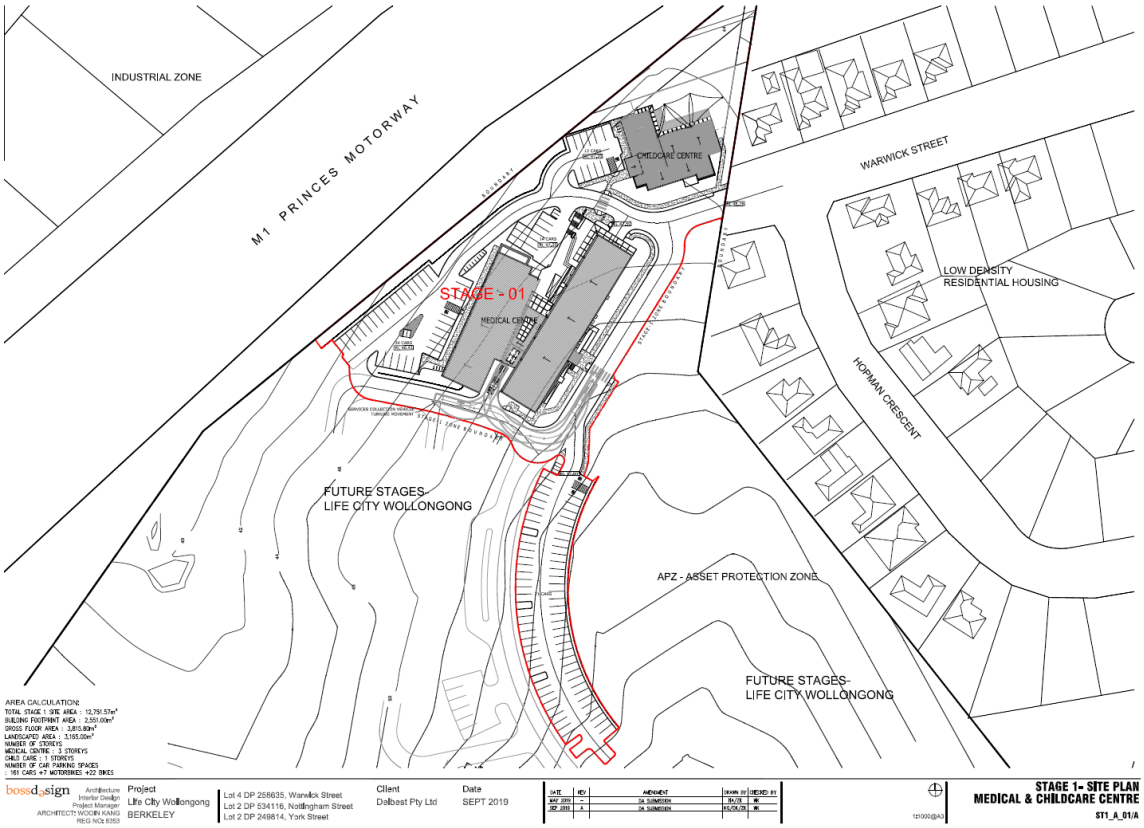


Figure 1-1 – Stage 1 Site plan

Source: Boss Design Pty Ltd (provided by TCG Planning)

This Traffic and Transport Assessment Report is a response to the Wollongong City Council's request for additional information and update of the previous Traffic and Transport Assessment Report submitted by GHD in 2013.

Stage 1 will be accessed from Warwick Street/Hopman Crescent as shown in Figure 1-3. The full Life City Wollongong development, on the other hand, includes a new access road, which would form an intersection with Nolan Street. As such, Stage 1 will result in a different traffic distribution to what was assumed in the 2013 Traffic and Transport Assessment Report prepared by GHD (24 October 2013).

This Traffic and Transport Assessment report reviews the traffic impacts associated with Stage 1 only and updates the intersection traffic surveys that were undertaken for the traffic impact analysis in 2013.

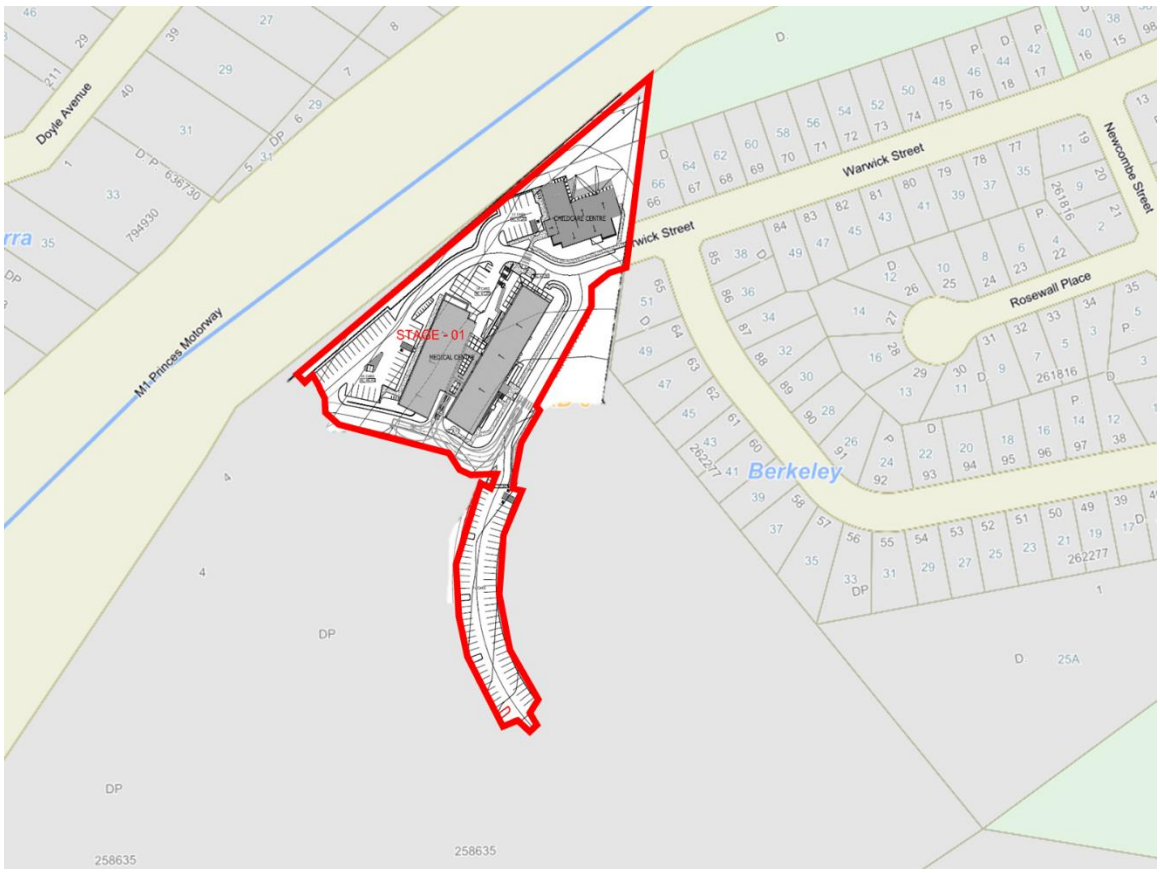


Figure 1-2 – Subject site location

Source:https://public.mapimage.net/intramaps90/default.htm?configId=3a2fbdc5-a9e4-4323-b27d-6e522a1ed8ad), modified by GHD

Figure 1-3 – Subject site location – surrounding road network

Source: Google Earth (2019), modified by GHD

1.2 Study assumptions and limitations

The following assumptions were made as part of this study:

- Trip generation for Stage 1 was based on the previous Traffic and Transport Assessment Report by GHD in 2013.
- Architectural plans provided by Boss Design Pty Ltd (2019).
- A future state base model was developed for 2029, allowing ten year future growth. The future base traffic model was developed utilising an assumed growth rate of two percent per annum.

This study has been limited by the following:

- The analysis is a desktop study and no site visits have been undertaken.
- The conditions of the surrounding network are based on information either supplied by the traffic surveys and Google Maps / Streetview.
- Traffic surveys conducted by Matrix Traffic and Transport Data Pty Ltd at the following intersections (as shown in Figure 1-4) on Tuesday 3 September 2019 between 6-9 AM and 3-6 PM:
  - Nolan Street / Northcliffe Drive (roundabout)
  - Nolan Street / Hopman Crescent
  - Nolan Street / Warwick Street

Figure 1-4 – Traffic survey locations

Source: Google Earth (2019), modified by GHD

1.3 Study scope

This Traffic and Transport Assessment addresses the following:

- Existing Conditions – a review of the existing road and transport conditions, adjacent developments, traffic volumes and crash data.
- Proposed Development – a review of the proposed Stage 1 of the Life City Wollongong development and its access arrangements.
- Traffic Assessment – an assessment of the trip generation characteristics of the proposed facility and the performance of the intersections following its development.
- Parking Assessment – an assessment of potential parking demand that will be generated by the development and a review of its parking arrangement.

2. Existing conditions

2.1 Land use

The proposed land use within the vicinity of the proposed development, as shown in Figure 2-1, consists of low density residential, areas for environmental management and public recreation.

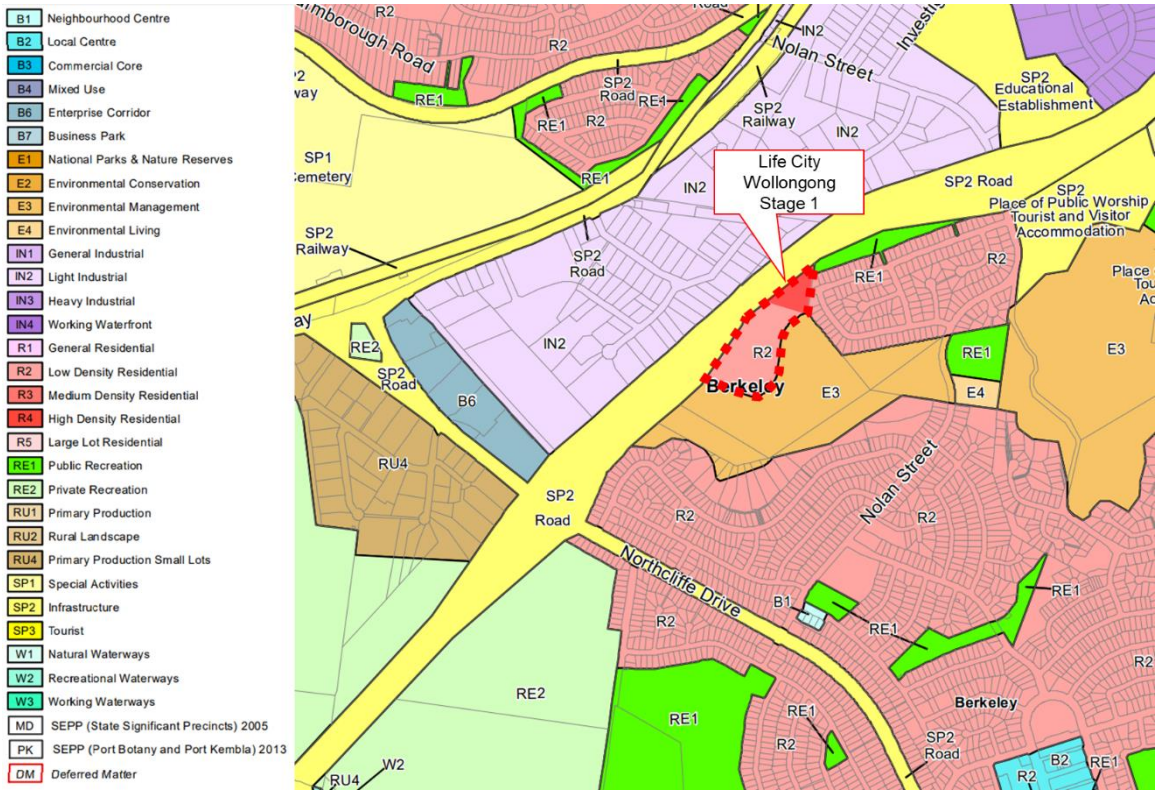


Figure 2-1 – Land zoning in proximity to the Life City Wollongong Stage 1
Source: Wollongong Local Environmental Plan (2009)

2.2 Road network characteristics

2.2.1 Road hierarchy

Roads within NSW are categorised in the following two ways:

- By Classification (ownership)
- By the function that they perform

Road classification

Roads are classified (as defined by the Roads Act 1993) based on their importance to the movement of people and goods within NSW (as a primary means of communication).

The classification of a road allows Roads and Maritime Services (Roads and Maritime) to exercise authority of all or part of the road. Classified roads include Main Roads, State Highways, Tourist Roads, Secondary Roads, Tollways, Freeways and Transitways.

For management purposes, Roads and Maritime has three administrative classes of roads. These are:

- **State Roads –** Major arterial links through NSW and within major urban areas. They are the principle traffic carrying roads and fully controlled by Roads and Maritime with maintenance

fully funded by Roads and Maritime. State Roads include all Tollways, Freeways and Transitways; and all or part of a Main Road, Tourist Road or State Highway.

- **Regional Roads** – Roads of secondary importance between State Roads and Local Roads which, with State Roads provide the main connections to and between smaller towns and perform a sub arterial function in major urban areas. Regional roads are the responsibility of councils for maintenance funding, though Roads and Maritime funds some maintenance based on traffic and infrastructure. Traffic management on Regional Roads is controlled under the delegations to local government from Roads and Maritime.
- **Local Roads** – The remainder of the council controlled roads. Local Roads are the responsibility of councils for maintenance funding. Roads and Maritime may fund some maintenance and improvements based on specific programs (e.g. urban bus routes, road safety programs). Traffic management on Local Roads is controlled under the delegations to local government from Roads and Maritime.

Functional hierarchy

Functional road classification involves the relative balance of the mobility and access functions. Roads and Maritime define four levels in a typical functional road hierarchy, ranking from high mobility and low accessibility to high accessibility and low mobility. These road classes are:

- **Arterial Roads** – generally controlled by Roads and Maritime, typically no limit in flow and designed to carry vehicles long distance between regional centres.
- **Sub-Arterial Roads** – can be managed by either Roads and Maritime or local council. Typically, their operating capacity ranges between 10,000 and 20,000 vehicles per day, and their aim is to carry through traffic between specific areas in a sub region, or provide connectivity from arterial road routes (regional links).
- **Collector Roads** – provide connectivity between local roads and the-arterial road network and typically carry between 2,000 and 10,000 vehicles per day.
- **Local Roads** – provide direct access to properties and the collector road system and typically carry between 500 and 4,000 vehicles per day.

A summary of the key roads in proximity to the subject site is provided Figure 2-2.

Figure 2-2 – Key road network

2.2.2 Northcliffe Drive

Northcliffe Drive is an approximately 7.5 km sub-arterial road which links Unanderra in the west, to Port Kembla in the east. It passes through the suburbs of Berkeley, Lake Heights and Warrawong.

In the vicinity of the proposed Stage 1 site, Northcliffe Drive has the following characteristics:

- Two-way dual carriageway with two traffic lanes in each direction
- Parking lanes are provided on each side of the road.
- A footpath is provided on one side of the road (right side when walking westwards).
- Bus stops are located on each side of the road along the road corridor.
- Posted speed limit is 70 km/h.

Figure 2-3 – Northcliffe Drive, west of Nolan Street (viewed eastbound)
Source: Google Street View

Figure 2-4 – Northcliffe Drive, east of Nolan Street (viewed westbound)
Source: Google Street View

2.2.3 Nolan Street

Nolan Street functions as a collector road, which is approximately 2.3 km long and runs from Princes Highway to Northcliffe Drive.

Nolan Street has the following characteristics:

- A single traffic lane and parking lane provided in each direction.
- A footpath is provided on the west side of the road.
- Bus stops are located on each side of the road along the road corridor.

- Speed limit for local urban roads of 50 km/h applies, however, a limit of 40 km/h School Zone is observed in the vicinity of Berkeley West Public School.

Figure 2-5 – Nolan Street (viewed northbound)
Source: Google Street View

2.2.4 Warwick Street and Hopman Crescent

The proposed facility will be accessed through Warwick Street and / or Hopman Crescent.

These local roads have a width of nine metres, enabling a parking lane and travel lane in either direction. Bus stops are located on each side of these roads and an urban default speed limit of 50 km/h applies.

Figure 2-6 – Warwick Street (viewed eastbound)
Source: Google Street View

Figure 2-7 – Hopman Crescent (viewed southbound)
Source: Google Street View

2.3 Crash data review

Crash data was obtained from the Transport for NSW Centre for Road Safety website for roads within the vicinity of the site. The data has been analysed for the five year period between 2013 and 2017. The location of recorded crashes are shown in Figure 2-8.

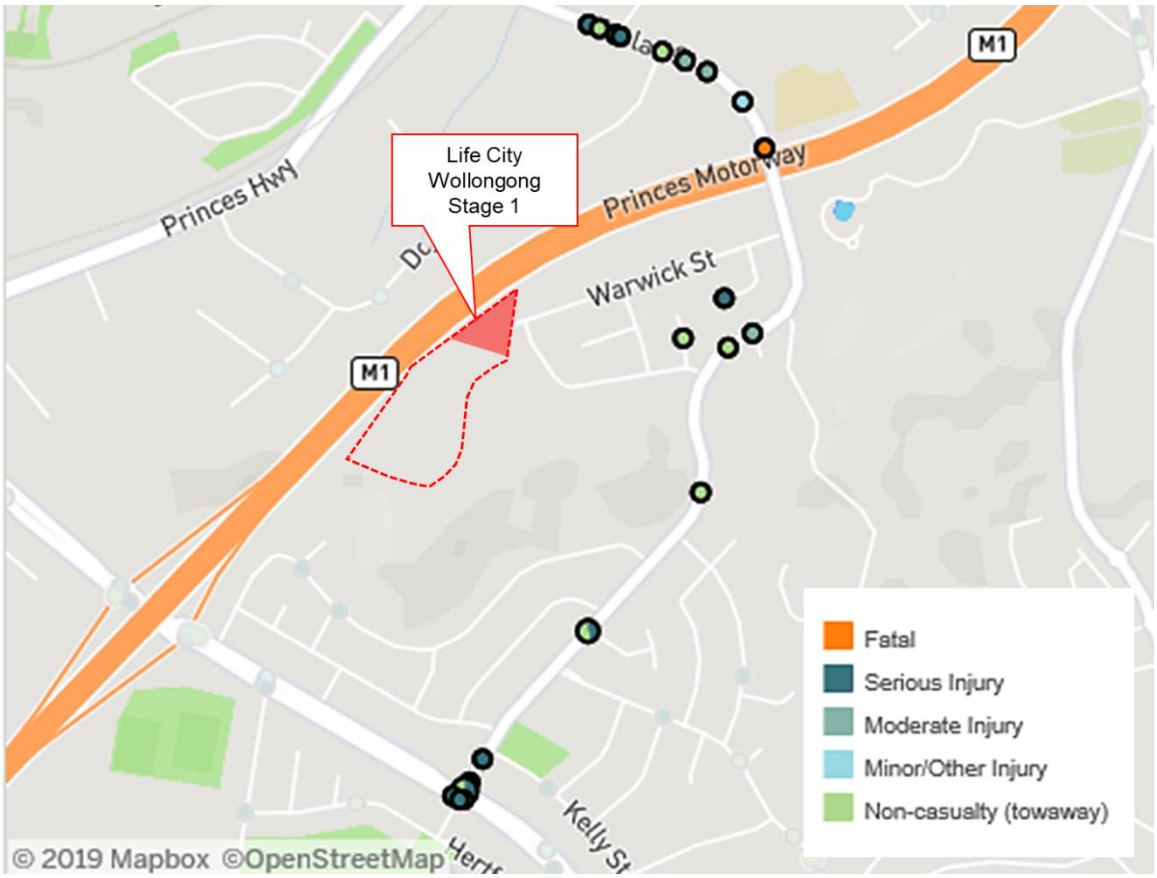


Figure 2-8 – Crash locations near the proposed Life City Wollongong Stage 1
Source: https://roadsafety.transport.nsw.gov.au/statistics/interactivecrashstats/lga_stats.html?tablga=4 modified by GHD

There were 25 crashes recorded between 2013 and 2017 on Nolan Street and on the local roads in the vicinity of the proposal site: A summary of the crash data is provided in Table 2-1.

Table 2-1 – Summary of crash data (2013-2017)

Location	Number of crashes	Number of injuries			
		Fatal	Serious	Moderate	Minor
Nolan Street	23	1	7	4	1
Hunt Place	1	0	1	0	0
Hoad Place	1	0	0	0	0
Total	25	1	8	4	1

The predominant crash types resulting in injuries recorded on these roads are as follows:

- Vehicle driving off the carriageway into an object/parked vehicle (6 injuries);
- Vehicle travelling on the same direction (2 injuries);
- Vehicles manoeuvring (1 injury); and
- Vehicles crashing into a pedestrian (1 injury).

2.4 Public transport

2.4.1 Train services

Unanderra Train Station is the closest station to Stage 1 Life City Wollongong and is served by the South Coast Line.

It is located approximately 2.5 km from Stage 1 which exceeds typical walking catchments.

Bus Route 34 operates between Stage 1 and Unanderra Station and will provide future utility to people seeking to access the facility via public transport.

2.4.2 Bus services

The nearest public bus stops from Stage 1 are located along Hopman Crescent, less than 100 metres from the proposed facility (refer to Figure 2-9).

Bus Route 34 operates from this bus stop. Bus Route 43, on the other hand, serves as a feeder route to Bus Route 34 and shares a common stop with the latter along Nolan Street. Their route and approximate frequencies are provided in Table 2-2.

Table 2-2 – Bus routes and frequencies

Bus Route	Origin – Destination	Frequency (minutes)	
		Peak	Off-peak
34	Wollongong to Warrawong	20-30	60
43	Port Kembla to Dapto District	50	60

Figure 2-9 – Bus services near the Stage 1 development site
Source: Google Maps modified by GHD

2.5 Active transport

2.5.1 Existing pedestrian and bicycle facilities

Pedestrian and cyclist safety is an important consideration in assessing the effectiveness of a transport system. An ideal road network is one wherein the safety and convenience of pedestrians and cyclists, through provisions such as walkways / cycleways, pedestrian signalisation, pavement markings, etc., is integrated with traffic controls that ensure smooth flow of both pedestrian, bicycle, and vehicle traffic.

There are currently no zebra crossing or signalised pedestrian crossings and other pedestrian and bicycle facilities within the vicinity of the site. An on-road cycle environment could be considered appropriate for low density residential areas (generally low speed environment), where cycle can utilise the kerbside parking lanes and the vehicle travel lanes when required.

Footpaths, approximately 1.5 m wide, are provided along Nolan Street and Northcliffe Drive.

The Wollongong Bike Plan (2014-2018) identifies Nolan Street as a proposed cycleway, as shown in Figure 2-10. However, there are no bicycle facilities currently provided within the vicinity of the proposed site.

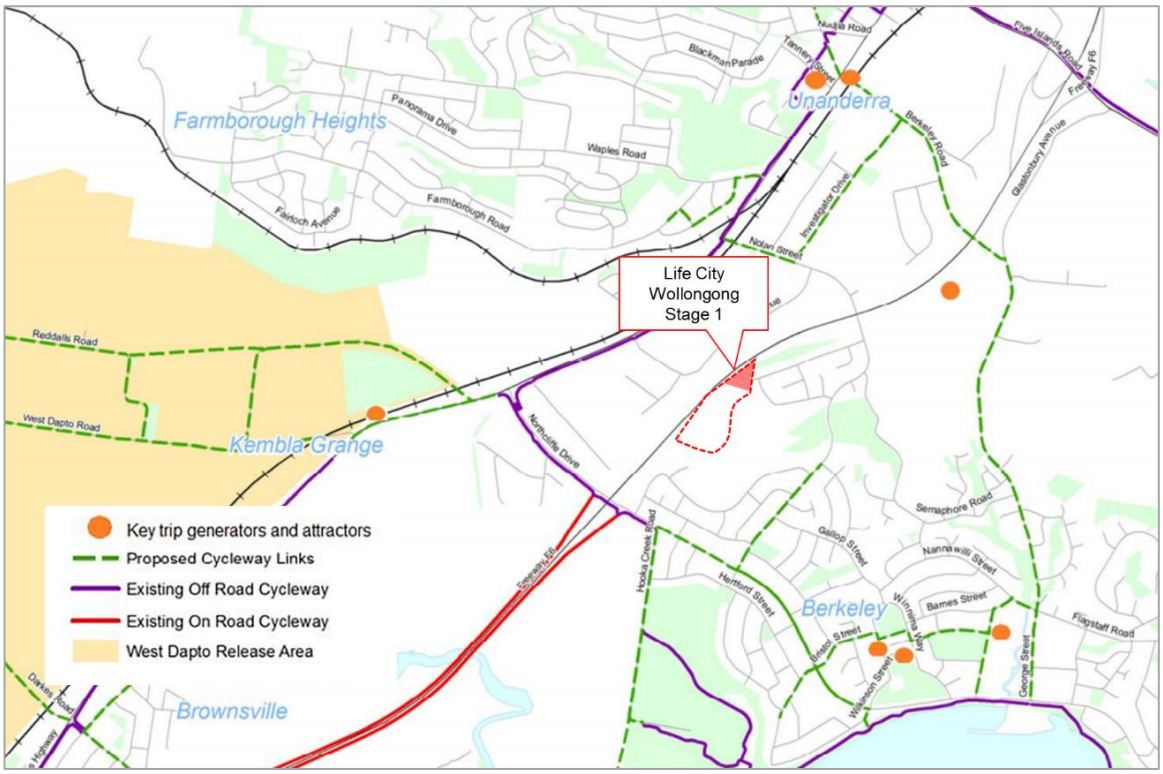


Figure 2-10 – Wollongong Bike Plan 2014-2018
Source: Wollongong Bike Plan 2014-2018, modified by GHD

2.6 Existing road network performance

2.6.1 Existing peak hour traffic

GHD engaged Matrix Traffic and Transport Data Pty Ltd to undertake traffic surveys at the locations shown previously in Figure 2-11 to determine the traffic volumes on the road network during weekday peak conditions.

The survey conducted for the traffic network indicates that the morning traffic volume peak occurs between 8:00 am to 9:00 pm, while the afternoon traffic volume peak occurs between 3:15 pm to 4:15 pm.

The traffic survey data is provided in Appendix A, with a summary of the AM and PM peak hour traffic movements shown in Figure 2-11.

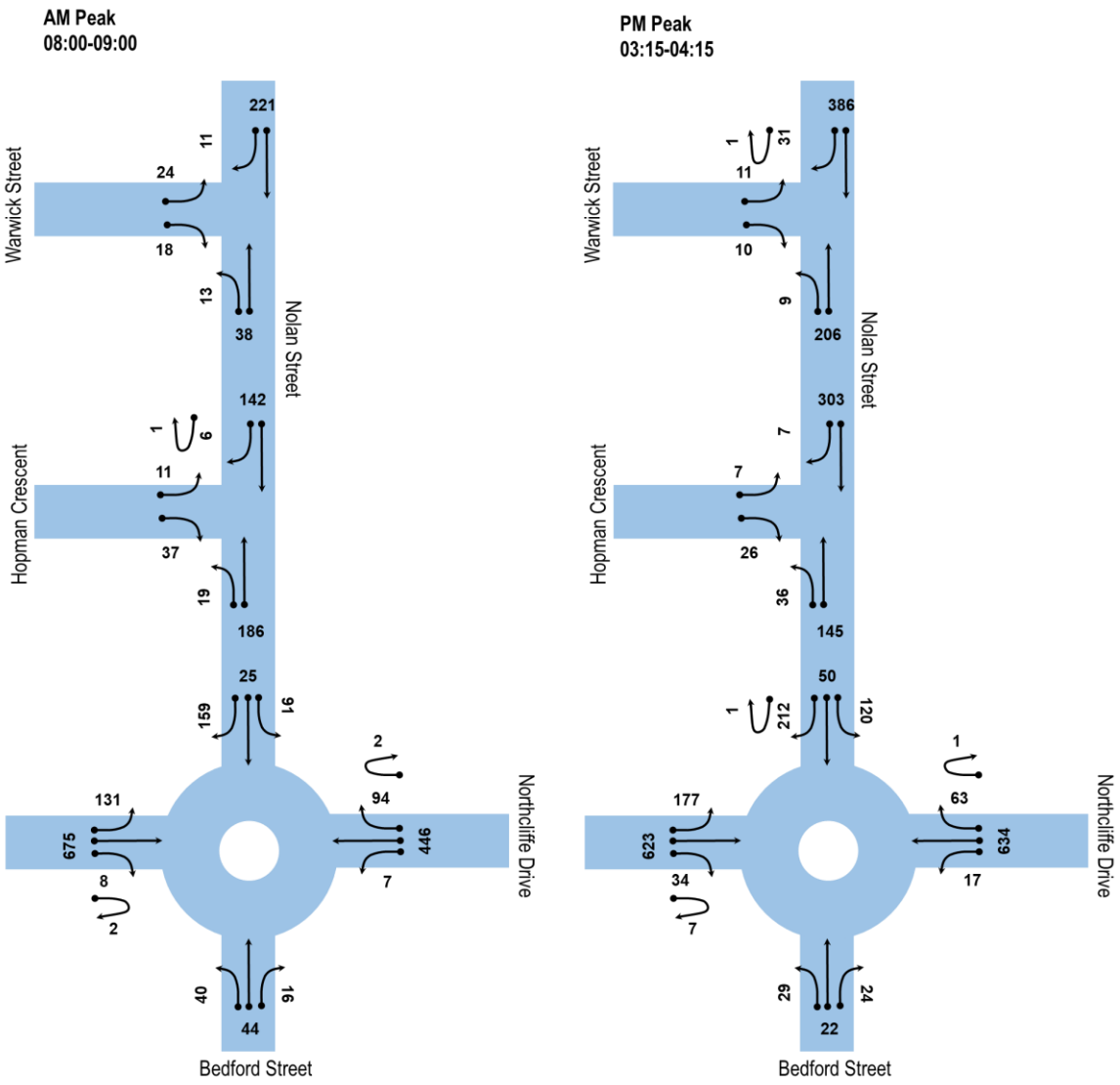


Figure 2-11 – Peak hour traffic volumes

Traffic volumes during the AM and PM peak hour periods are considered to be low along Warwick Street, Hopman Crescent and Nolan Street, which provide access to the site. Northcliffe Drive has moderate traffic flows during peak hour periods.

2.6.2 Heavy and light vehicle ratio

Based on the traffic survey data, the average heavy vehicle percentage for each road within the vicinity of the site is outlined in Table 2-3. It should be noted that the higher percentage of heavy vehicle traffic at Warwick Street is reflective of the overall low traffic volumes along this street.

Table 2-3 – Peak hour heavy vehicle ratio

Location	% Heavy Vehicles	
	AM	PM
Northcliffe Drive	5%	4%
Nolan Street	6%	6%
Bedford Street	0%	5%
Warwick Street	5%	14%
Hopman Crescent	2%	3%

2.6.3 Mid-block analysis

Table 2-4 (from the *Roads and Maritime Guide to Traffic Generating Developments*) indicates the Level of Service mid-block capacities for urban roads.

Table 2-4 – Urban road mid-block capacities

Level of Service	One Lane veh/h	Two Lanes veh/h
A	200	900
B	380	1,400
C	600	1,800
D	900	2,200
E	1,400	2,800

In accordance with the above, the roads within the vicinity of Stage 1 Life City Wollongong have the following mid-block capacities:

Table 2-5 – Mid-block review of roads within the vicinity of Stage 1 LCW

Road	Number of Lanes	Mid-block volume (AM Peak) *	Mid-block volume (PM Peak)*	LOS^
Warwick Street (E)	1	42	21	A
Warwick Street (W)	1	24	40	A
Hopman Crescent (E)	1	48	33	A
Hopman Crescent (W)	1	25	43	A
Nolan Street (N)*	1	243	206	B
Nolan Street (S)*	1	215	368	B
Northcliffe Drive (E)*	2	800	805	A
Northcliffe Drive (W)*	2	598	799	A

**average vehicles per hour*

^ LoS = Level of Service

The traffic survey outputs and data indicate that the roads in the vicinity of the facility currently operate within the acceptable limits of their mid-block capacities with Level of service not greater than LoS D (desirable maximum).

2.7 Existing intersection performance

The performance of the existing road network is largely dependent on the operating performance of key intersections, which are critical capacity control points on the road network. SIDRA 8 Intersection modelling software was used to assess the proposed peak hour operating performance of intersections on the surrounding road network.

The criteria for evaluating the operational performance of intersections is provided by the Guide to Traffic Generating Developments (Roads and Maritime Services, 2002) and reproduced in

Table 2-6. The criteria for evaluating the operational performance of intersections is based on a qualitative measure (i.e. Level of Service), which is applied to each band of average vehicle delay.

Table 2-6 – Level of service criteria for intersections

Level of Service	Average Delay per Vehicle (seconds/veh)	Traffic Signals, Roundabouts	Give Way & Stop Signs
A	< 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays & spare capacity	Acceptable delays & spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity & accident study required
E	57 to 70	At capacity; at signals, incidents will cause excessive delays Roundabouts require other control modes	At capacity, requires another control mode
F	> 70	Over Capacity Unstable operation	Over Capacity Unstable operation

Source: Guide to Traffic Generating Developments (Roads and Maritime Services 2002)

The base 2019 traffic models were developed using the AM and PM peak hour survey data results. Existing traffic flows at key intersections were analysed using SIDRA 8 to obtain the current operation of the key intersections. The results of the SIDRA analysis are shown in Table 2-7. A summary of the results is outlined in and detailed in Appendix B.

Table 2-7 – 2019 Weekday intersection operations

Intersection	AM Peak				PM Peak			
	Ave. Delay (s)	LoS	95% Queue (m)	Degree of Saturation	Ave. Delay (s)	LoS	95% Queue (m)	Degree of Saturation
Nolan Street / Warwick Street	5.6	A	0.5	0.079	5.9	A	0.9	0.126
Nolan Street / Hopman Crescent	5.3	A	0.5	0.060	5.6	A	0.4	0.092
Nolan Street / Northcliffe Drive (roundabout)	10.1	A	7.2	0.178	10.5	A	7.0	0.237

Notes:

- *The average delay for priority-controlled intersections is selected from the movement on the approach with the highest average delay.*
- *The level of service for priority-controlled intersections is based on the highest average delay per vehicle for the most critical movement.*
- *The degree of saturation is defined as the ratio of the arrival flow (demand) to the capacity of each approach.*
- *Average delay is given in seconds per vehicle.*

Table 2-7 indicates that each of the analysed intersections currently have an acceptable Level of Service (i.e. better than Level of Service E) with spare capacity in both the weekday morning and evening and weekend peak periods. This indicates that the road network in the vicinity of the site is currently operating satisfactorily with minimal delays to traffic at intersections.

3. Proposed development

3.1 Life City Wollongong Stage 1

The proposed Stage 1 of the development will consist of a Medical Centre and child care centre, with day surgery, respite care centre, and specialist rooms. This stage also includes construction of access roads and associated car parking.

3.2 Car parking

Wollongong City Council has produced a Development Control Plan and associated parking rates for land use developments. The proposed parking provision for the Stage 1 development has been reviewed based on the Wollongong City Council *Development Control Plan* 2009 (WDCP) Chapter E3 - Car Parking, Access, Servicing/Loading Facilities and Traffic Management, Chapter C5 – Child Care Centres and Chapter C9 – Health Consulting Rooms.

3.2.1 Proposed parking layout

The proposed site layout of the proposed parking area is shown in Figure 3-1.

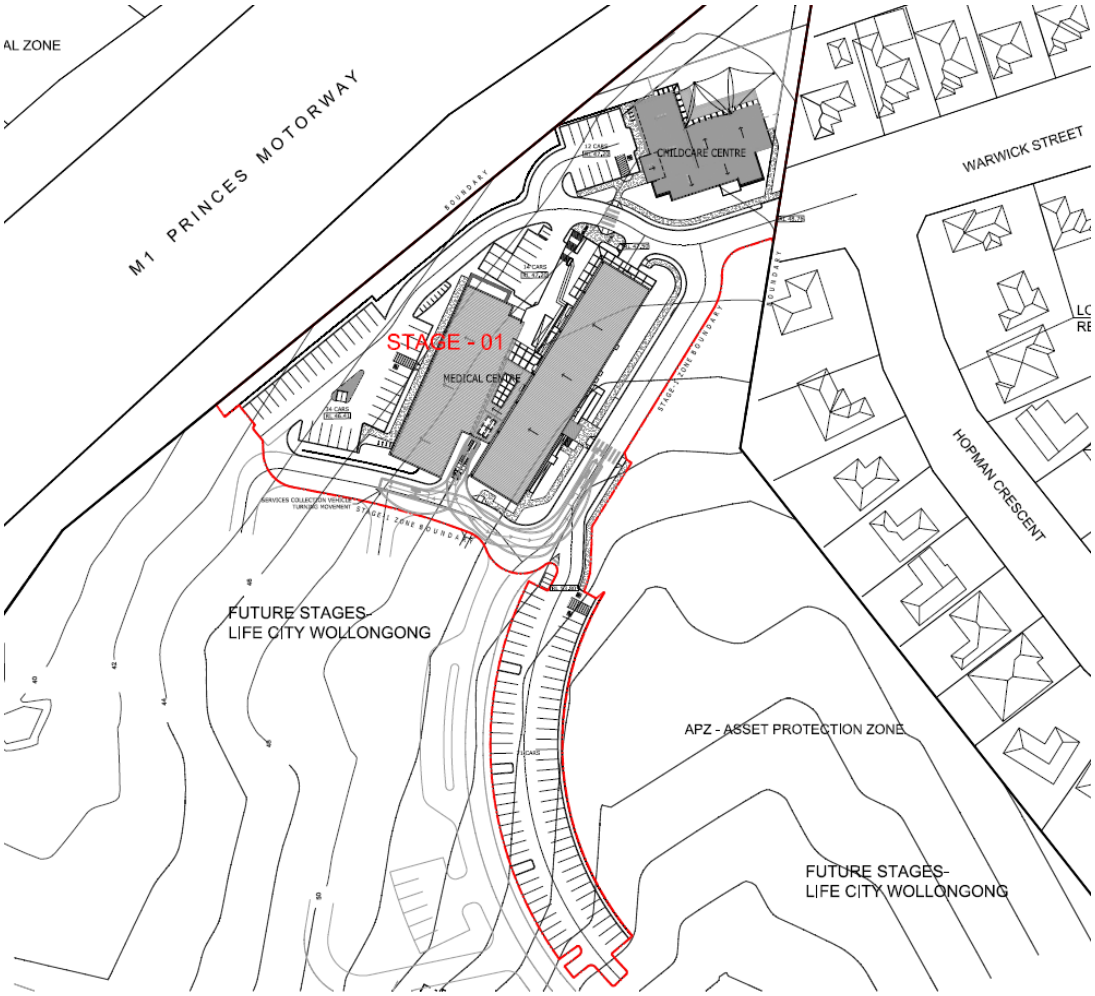


Figure 3-1 – Proposed parking site plan

The plans indicate that there is a total of 161 car parking spaces provided. The breakdown of the parking provided is outlined in Table 3-1.

Table 3-1 – Proposed parking supply breakdown

Parking relative location	Number of spaces
West of Childcare Centre	12
West of Medical Centre – 1	14
West of Medical Centre – 2	34
Medical Centre – Lower Ground Floor	30
South of Medical Centre	71
TOTAL	**161**

3.2.2 Wollongong DCP parking requirement

The minimum WDCP parking requirements for the proposed Stage 1 land uses are summarised in Table 3-2.

A preliminary estimate of the potential number of employees, specialists and children have been provided by TCG Planning for each respective land use. These are summarised in Table 3-2 and include the corresponding overall WDCP parking requirements.

Based on Wollongong City Council's parking rates, a total of 144 parking spaces are required. The proposed 161 spaces is therefore in accordance with the Council's DCP requirements.

Table 3-2 – Wollongong City Council DCP parking requirement summary

Land Use	WDCP Rate	Estimated number of people / rooms	WDCP 2009 Parking Requirement
Medical Centre	4 spaces per consulting room and 1 space per 3 employees	27 rooms for 19 specialists and 8 General Practitioners 27 employees including nurses, receptionists, and other support staff	117
Child care centres	1 space for each member of staff present at any one time *plus* 1 per 6 children *plus* 1 space as per Off Street Parking for People with Disabilities *plus* 2 large spaces (3.2 m x 5.5 m for parents requiring the use of strollers)	12 staff 70 students (children)	27
Total			**144**

3.3 Accessible parking

Reference is made to the Building Code Australia (BCA) which outlines accessible parking rates for 'Clinics / day surgery not forming part of a hospital' and the Wollongong DCP which outlines accessible parking rates for child care centres. The accessible parking rates provision outlines in these reference documents are outlined in Table 3-3.

Table 3-3 – Accessible parking requirement

Component	Land Use	Reference resource	Parking rate
Stage 1 Medical Centre, Day surgery, Child Care Centre & Respite Care Centre	Medical Centre	BCA	1 space for every 50 car parking spaces or part thereof
	Child care centres	WDCP	1 accessible space

Based on the proposed developments and the WDCP and BCA, three (3) accessible space should be provided for the medical centre and one (1) accessible spaces for the child care centre. This is a total of four (4) accessible spaces required for the Stage 1 development.

The proposed development is proposing eight (8) accessible spaces, which meet the BCA accessible parking requirements.

3.4 Bicycle parking facilities

The WDCP provides bicycle parking rates for medical centres and child care centres. The bicycle parking rates provision are outlined in Table 3-4.

Table 3-4 – Wollongong City Council DCP Bicycle parking requirement

Component	Land Use	WDCP 2009 Bicycle Parking Rate Requirements
Stage 1 Medical Centre, Day surgery, Child Care Centre & Respite Care Centre	Medical Centre	1 bicycle space per medical centre
	Child care centres	1 bicycle space per 200 m^2 GFA

Based on the proposed developments and the WDCP, one (1) bicycle space should be provided for the medical centre and three (3) bicycle spaces for the child care centre. This is a total of four (4) bicycle spaces required for the Stage 1 development.

The proposed development is proposing 22 bicycle spaces which meet the WDCP bicycle parking requirements. A covered bike storage will also be provided at the Medical Centre's lower ground floor. Shower and changing rooms are also proposed to be provided at the ground floor.

3.5 Motorcycle parking

The WDCP provides motorcycle parking rates for medical centres and child care centres. The motorcycle parking rates provision are outlined in Table 3-5.

Table 3-5 – Wollongong City Council DCP Motorcycle parking requirement

Component	Land Use	WDCP 2009 Bicycle Parking Rate Requirements
Stage 1 Medical Centre, Day surgery, Child Care Centre & Respite Care Centre	Medical Centre	1 motorcycle space per 25 car parking spaces
	Child care centres	1 motorcycle space per 25 car parking spaces

Based on the proposed developments and the WDCP, six (6) motorcycle spaces should be provided for the medical centre and one (1) motorcycle spaces for the child care centre. This is a total of seven (7) motorcycle spaces required for the Stage 1 development.

The proposed development is proposing seven (7) motorcycle spaces which meet the WDCP motorcycle parking requirements.

3.6 Pick-up and Drop-off

It is noted that the majority of car parking spaces for the whole development is located around and under the Medical Centre. Only 12 spaces have been provided at grade level in front of the Child care Centre.

This area should be identified as short term parking for drop off and pick up purposes. Otherwise, there is the risk of long term parking undertaken here which will impact on the pick-up and drop-off to the Child care centre.

3.7 Service Vehicles

A bin collection area for loading and unloading activities is provided at the ground floor between the rehab and waste storage areas. On-site manoeuvring is satisfactory and the bin collection area / loading bay is in accordance with the Australian Standard AS 2890.2, with the vehicle

swept path for a 12.5 metre heavy vehicle (provided by Boss Design, drawing reference number ST1_A_01/A September 2019), as shown in Figure 3-2.

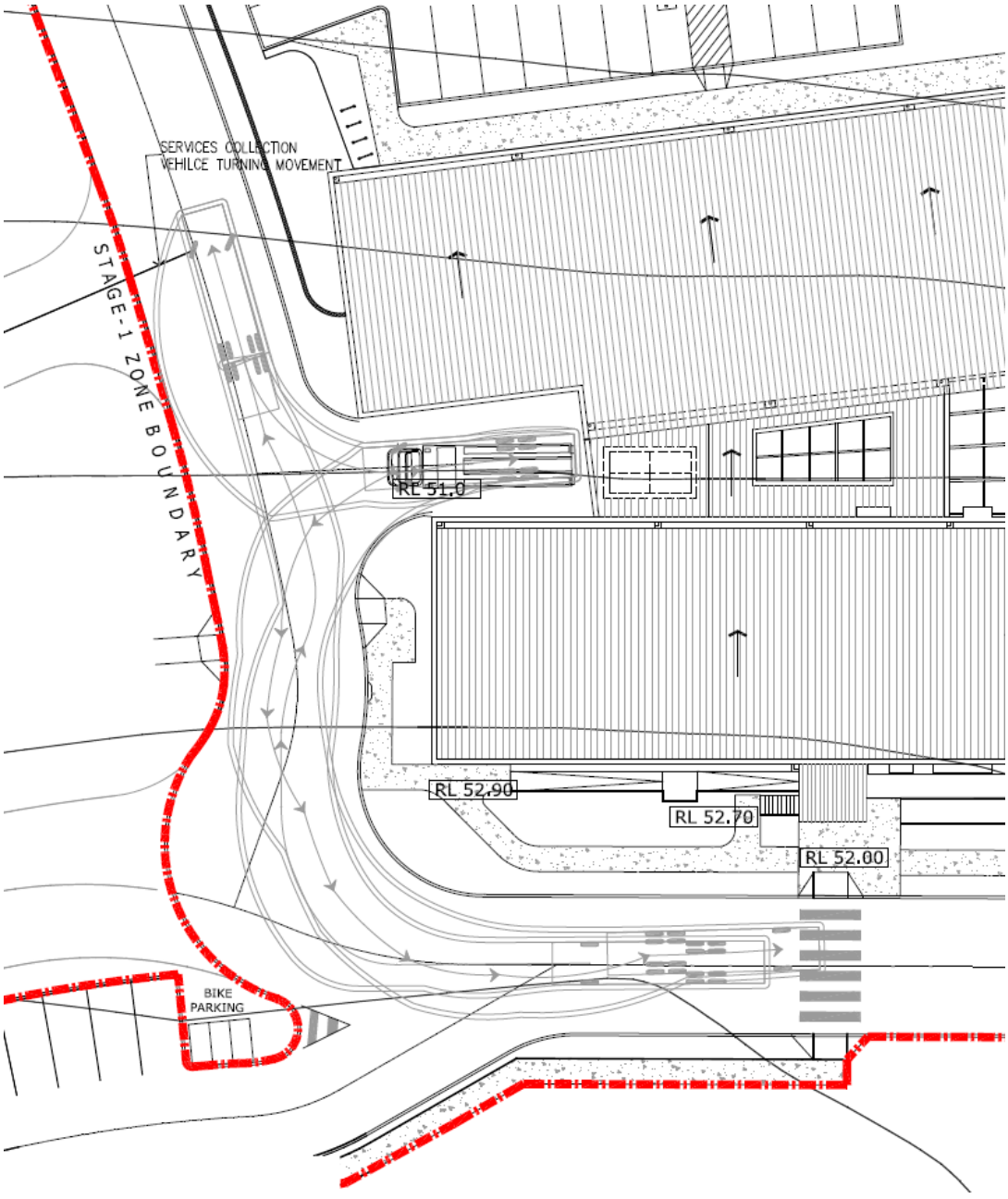


Figure 3-2 - Turning Movement

Source: Boss Design, drawing reference number ST1_A_01/A September 2019

3.8 Parking layout configuration

In the design development stage, the parking layout configuration should be developed in accordance with the following Australian Standards:

- AS2890.1: Parking Facilities: Off-street parking.
- AS2890.3: Parking Facilities: Bicycle Parking Facilities.
- AS2890.6: Parking Facilities: Off-street parking for people with disabilities.

4. Traffic assessment

4.1 Traffic generation

The potential traffic generation from the Stage 1 of the development has been referenced from the previous Traffic and Transport Assessment for 'Life City' prepared by GHD on behalf of Delbest Pty Ltd in 2013, as well as the Roads and Maritime's *Guide to Traffic Generating Developments* (2002).

4.1.1 Medical centre

The TCG Planning has advised that specialists would only be in attendance at the proposed development for one (1) day per month, as the specialists are predominately based in Sydney. General Practitioners, on the other hand, will be at the centre on a daily basis.

However, for a conservative assessment of the trip generation rate it has been assumed that all of the specialists will be there at any given time. Therefore, the traffic generation rate of four trips per specialist, as indicated in the previous Traffic and Transport Assessment report (GHD 2013), has been adopted to calculate the peak hour trip generation.

Additionally, the trip generation rate of one (1) trip per bed which was also based on the previous TTA was also adopted.

4.1.2 Childcare centre

The suggested rate for a child care centre has been specified as 0.7 trips per child, based on the Roads and Maritime's *Guide to Traffic Generating Developments* (2002).

4.1.3 Stage 1 trip generation summary

The peak traffic generation for the Stage 1 development component is summarised in Table 4-1.

Table 4-1 – Stage 1 Traffic generation

Component	Land Use	Beds / Rooms / Persons	Peak hour traffic generation	Peak hour trips
Stage 1 Medical Centre, Day surgery, Child Care Centre & Respite Care Centre	Medical Centre	27 consulting rooms (19 specialists & 8 general practitioners)	4 trips per specialist	108
		10 beds	10 x 1	10
	Child care centre	70 children	0.7 trips per child	49
	Total			**167**

4.2 Future intersection performance

The assessment of traffic generated by the proposed Life City Wollongong Stage 1 and its potential effect on the existing road network were carried out using SIDRA 8 Intersection program. Intersection site layout parameters were developed using Google Earth and Google Maps. Future year traffic volume was estimated by projecting existing background traffic to grow based on a two per cent annual average growth rate, which is considered a conservative approach for this assessment.

The traffic performance of the existing intersections was tested in the following three (3) scenarios:

1. 2019 with Stage 1 Life City Wollongong.
2. 2029 without Stage 1 Life City Wollongong.
3. 2029 with Stage 1 Life City Wollongong.

4.2.1 2019 Post Stage 1 Life City Wollongong development scenario

A summary of the SIDRA results for the 2019 intersection performance with the Stage 1 Life City Wollongong for the weekday AM and PM Peak hour periods is shown in Table 4-2.

Table 4-2 – 2019 weekday intersection operations with Stage 1

Intersection	AM Peak				PM Peak			
	Ave. Delay (s)	LoS	95% Queue (m)	Degree of Saturation	Ave. Delay (s)	LoS	95% Queue (m)	Degree of Saturation
Nolan Street / Warwick Street	5.8	A	1.0	0.039	6.1	A	0.6	0.022
Nolan Street / Hopman Crescent	5.3	A	1.0	0.043	5.7	A	1.0	0.046
Nolan Street / Northcliffe Drive (roundabout)	6.4	A	7.6	0.204	6.5	A	7.5	0.278

Notes:

- *The average delay for priority-controlled intersections is selected from the movement on the approach with the highest average delay.*
- *The level of service for priority-controlled intersections is based on the highest average delay per vehicle for the most critical movement.*
- *The degree of saturation is defined as the ratio of the arrival flow (demand) to the capacity of each approach.*
- *Average delay is given in seconds per vehicle.*

The results shown in Table 4-2 indicate that with the traffic generated by the proposed development, all of the intersections are expected to operate with an acceptable Level of Service (i.e. better than Level of Service E).

4.2.2 2029 without development scenario

A summary of the SIDRA results for the 2029 (10 year horizon) intersection performance without the Stage 1 Life City Wollongong for the weekday AM and PM Peak hour periods is shown in Table 4-3.

Table 4-3 – 2029 weekday intersection operations pre Stage 1 LCW

Intersection	AM Peak				PM Peak			
	Ave. Delay (s)	LoS	95% Queue (m)	Degree of Saturation	Ave. Delay (s)	LoS	95% Queue (m)	Degree of Saturation
Nolan Street / Warwick Street	5.9	A	0.6	0.023	6.3	A	0.3	0.155
Nolan Street / Hopman Crescent	5.5	A	0.7	0.029	5.8	A	0.5	0.022
Nolan Street / Northcliffe Drive (roundabout)	6.5	A	9.3	0.226	6.6	A	8.9	0.303

The results shown in Table 4-3 indicate that in the future base case scenario (i.e. 2029 without Stage 1 development), all of the tested intersections operate with an acceptable Level of Service (i.e. better than Level of Service E).

4.2.3 2029 post Stage 1 Life City Wollongong development scenario

A summary of the SIDRA results for the 2029 (10 year horizon) intersection performance post the Stage 1 Life City Wollongong for the weekday AM and PM peak hour periods is shown in Table 4-4.

Table 4-4 – 2029 weekday intersection operations post Stage 1

Intersection	AM Peak				PM Peak			
	Ave. Delay (s)	LoS	95% Queue (m)	Degree of Saturation	Ave. Delay (s)	LoS	95% Queue (m)	Degree of Saturation
Nolan Street / Warwick Street	6.1	A	1.2	0.045	6.5	A	0.7	0.026
Nolan Street / Hopman Crescent	5.5	A	1.1	0.048	5.9	A	1.2	0.052
Nolan Street / Northcliffe Drive (roundabout)	6.6	A	9.7	0.255	6.7	A	9.5	0.343

The results shown in Table 4-4 indicate that with the traffic generated by the proposal, all of the tested intersections are expected to operate with an acceptable Level of Service (i.e. better than Level of Service E) in 2029.

4.2.4 Future intersection performance summary

The results shown in Table 4-3 and Table 4-4 indicate that the intersections analysed are expected to continue to have an acceptable Level of Service (i.e. better than Level of Service E) following the development of the site in 2029. There is expected to be spare capacity in both the weekday morning and evening peak periods in 2029 following the proposed development of the site.

The SIDRA intersection modelling indicates the proposed Stage 1 proposed development is expected to have minimal traffic impacts on the performance of these intersections.

The detailed SIDRA results for the AM and PM weekday are shown in Appendix B.

5. Summary and conclusion

5.1 Overview

GHD has been engaged by TCG Planning to prepare a Traffic and Transport Assessment to support the Development Application (DA) for Stage 1 of the Life City Wollongong development in Berkeley, NSW. The purpose of this report is to:

- Review the existing road and transport conditions, adjacent developments, traffic volumes and crash data;
- Review the access arrangements of the proposed facility;
- Assess the trip generation characteristics of the proposed facility and the performance of the intersections following its development; and
- Assess potential parking demand and review the facility's parking arrangements.

5.2 Key findings

5.2.1 Existing conditions

- The site is accessed via Warwick Street and Hopman Crescent.
- The site has direct access to public transport by bus services operating between Wollongong and Warrawong, which is also connected to the nearest train station (Unanderra Station).
- There are footpaths and on-road cycle routes which providing active travel access to the site. Cycleway links are also proposed along Nolan Street and Northcliffe Drive.
- A review of five year crash statistics identified that the majority of the crashes in the vicinity of the site involved vehicles driving off the carriageway and hitting other objects. One of the crashes involved a pedestrian, which resulted in serious injuries.
- Analysis of traffic count surveys identified the morning traffic peak hour occurs between 8:00 am to 9:00 am, with the afternoon traffic hour occurring between 3:15 pm to 4:15 pm.
- The roads in the vicinity of the facility currently operate within the acceptable limits of their mid-block capacities and can still absorb additional traffic.
- SIDRA intersection analysis indicates that intersections within the study area currently perform with spare capacity, at an acceptable level of service (LoS) A.

5.2.2 Future conditions

- The proposed development is estimated to generate approximately 135 additional vehicle trips in the peak hour.
- The facility will provide 161 parking spaces, with eight (8) accessible car spaces. This is in accordance with Wollongong City Council's DCP (WDCP) parking requirements.
- The facility will also provide 22 bicycle parking spaces, which is in accordance with the WDCP bicycle parking requirements. End of trip facilities such as bike storage and shower and changing rooms will also be provided to encourage and support active transport access to the site.
- The on-site service vehicle manoeuvring, including to the proposed bin collection area, is satisfactory and is in accordance with the Australian Standard AS 2890.2.

- The SIDRA intersection modelling indicates the proposed Stage 1 proposed development is expected to have minimal traffic impacts on the performance intersections in the vicinity of the site.

5.3 Conclusion

Based on the assumptions and findings outlined in this report, it is considered that the proposed Wollongong Life City Stage 1 development satisfies the planning requirements on traffic engineering grounds and is not anticipated to have adverse traffic impacts on the surrounding road network.

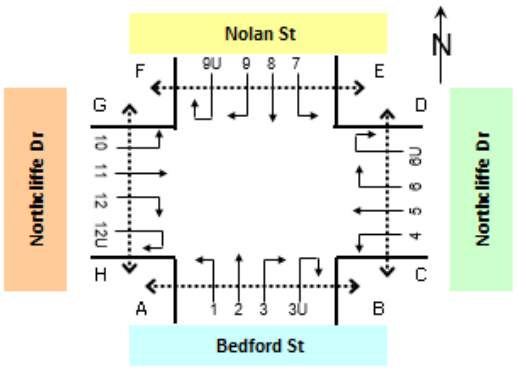
Appendices

Appendix A – Traffic Survey Results

MATRIX
Traffic and Transport Data

Job No. : N5272
Client : GHD
Suburb : Berkeley
Location : 1. Northcliffe Dr / Nolan St / Bedford St

Day/Date : Tue, 3rd September 2019
Weather : Fine
Description : Classified Intersection Count
: Peak Hour Summary



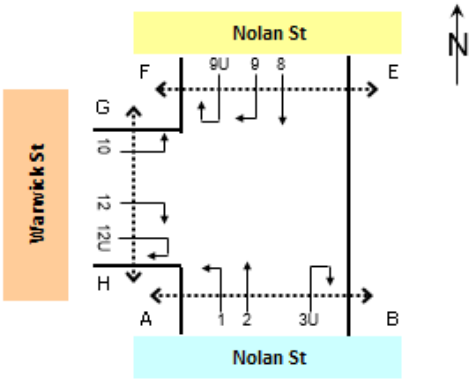
	Approach	Bedford St			Northcliffe Dr			Nolan St			Northcliffe Dr			Grand Total
	Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
AM	7:45 to 8:45	105	0	**105**	515	25	**540**	266	22	**288**	807	43	**850**	**1,783**
PM	15:15 to 16:15	71	4	**75**	684	31	**715**	368	15	**383**	806	35	**841**	**2,014**

Approach	Bedford St			Northcliffe Dr			Nolan St			Northcliffe Dr			Grand Total
Time Period	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	Lights	Heavies	Total	
6:00 to 7:00	66	0	**66**	324	16	**340**	196	19	**215**	529	27	**556**	**1,177**
6:15 to 7:15	73	0	**73**	333	17	**350**	187	21	**208**	581	35	**616**	**1,247**
6:30 to 7:30	61	1	**62**	335	25	**360**	198	21	**219**	586	39	**625**	**1,266**
6:45 to 7:45	55	1	**56**	323	29	**352**	194	19	**213**	605	40	**645**	**1,266**
7:00 to 8:00	72	1	**73**	359	28	**387**	215	22	**237**	630	45	**675**	**1,372**
7:15 to 8:15	76	1	**77**	405	29	**434**	241	17	**258**	743	45	**788**	**1,557**
7:30 to 8:30	96	0	**96**	462	20	**482**	271	17	**288**	795	43	**838**	**1,704**
7:45 to 8:45	105	0	**105**	515	25	**540**	266	22	**288**	807	43	**850**	**1,783**
8:00 to 9:00	100	0	**100**	524	25	**549**	257	18	**275**	784	32	**816**	**1,740**
AM Totals	**238**	**1**	**239**	**1,207**	**69**	**1,276**	**668**	**59**	**727**	**1,943**	**104**	**2,047**	**4,289**
15:00 to 16:00	79	4	**83**	684	27	**711**	375	16	**391**	791	32	**823**	**2,008**
15:15 to 16:15	71	4	**75**	684	31	**715**	368	15	**383**	806	35	**841**	**2,014**
15:30 to 16:30	71	3	**74**	699	30	**729**	355	10	**365**	801	36	**837**	**2,005**
15:45 to 16:45	74	1	**75**	686	31	**717**	320	9	**329**	780	34	**814**	**1,935**
16:00 to 17:00	71	1	**72**	672	23	**695**	309	7	**316**	774	32	**806**	**1,889**
16:15 to 17:15	68	0	**68**	658	21	**679**	286	6	**292**	737	30	**767**	**1,806**
16:30 to 17:30	74	0	**74**	632	14	**646**	267	6	**273**	711	30	**741**	**1,734**
16:45 to 17:45	87	0	**87**	622	12	**634**	249	6	**255**	673	25	**698**	**1,674**
17:00 to 18:00	88	0	**88**	622	11	**633**	240	5	**245**	651	22	**673**	**1,639**
PM Totals	**238**	**5**	**243**	**1,978**	**61**	**2,039**	**924**	**28**	**952**	**2,216**	**86**	**2,302**	**5,536**

MATRIX
Traffic and Transport Data

Job No. : N5272
Client : GHD
Suburb : Berkeley
Location : 2. Nolan St / Warwick St

Day/Date : Tue, 3rd September 2019
Weather : Fine
Description : Classified Intersection Count
: Peak Hour Summary



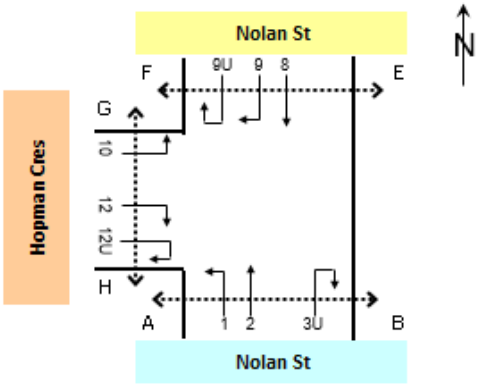
	Approach	Nolan St				Nolan St			Warwick St			Grand Total
	Time Period	Lights	Heavies	Total		Lights	Heavies	Total	Lights	Heavies	Total	
AM	8:00 to 9:00	254	12	**266**		218	14	**232**	40	2	**42**	**540**
PM	15:15 to 16:15	200	15	**215**		403	15	**418**	18	3	**21**	**654**

Approach	Nolan St				Nolan St			Warwick St			Grand Total
Time Period	Lights	Heavies	Total		Lights	Heavies	Total	Lights	Heavies	Total	
6:00 to 7:00	239	10	**249**		65	25	**90**	13	0	**13**	**352**
6:15 to 7:15	247	10	**257**		72	21	**93**	13	1	**14**	**364**
6:30 to 7:30	249	11	**260**		75	23	**98**	17	1	**18**	**376**
6:45 to 7:45	227	14	**241**		91	14	**105**	19	1	**20**	**366**
7:00 to 8:00	221	8	**229**		120	17	**137**	18	1	**19**	**385**
7:15 to 8:15	220	10	**230**		153	13	**166**	20	1	**21**	**417**
7:30 to 8:30	231	10	**241**		193	12	**205**	30	1	**31**	**477**
7:45 to 8:45	261	10	**271**		206	18	**224**	37	1	**38**	**533**
8:00 to 9:00	254	12	**266**		218	14	**232**	40	2	**42**	**540**
AM Totals	**714**	**30**	**744**		**403**	**56**	**459**	**71**	**3**	**74**	**1,277**
15:00 to 16:00	209	15	**224**		348	15	**363**	20	4	**24**	**611**
15:15 to 16:15	200	15	**215**		403	15	**418**	18	3	**21**	**654**
15:30 to 16:30	181	16	**197**		395	13	**408**	20	2	**22**	**627**
15:45 to 16:45	177	13	**190**		358	8	**366**	18	1	**19**	**575**
16:00 to 17:00	167	13	**180**		345	8	**353**	20	0	**20**	**553**
16:15 to 17:15	161	13	**174**		311	7	**318**	19	0	**19**	**511**
16:30 to 17:30	151	11	**162**		305	5	**310**	21	0	**21**	**493**
16:45 to 17:45	160	10	**170**		287	6	**293**	22	0	**22**	**485**
17:00 to 18:00	144	9	**153**		274	4	**278**	20	0	**20**	**451**
PM Totals	**520**	**37**	**557**		**967**	**27**	**994**	**60**	**4**	**64**	**1,615**

MATRIX
Traffic and Transport Data

Job No. : N5272
Client : GHD
Suburb : Berkeley
Location : 3. Nolan St / Hopman Cres

Day/Date : Tue, 3rd September 2019
Weather : Fine
Description : Classified Intersection Count
: Peak Hour Summary



	Approach	Nolan St				Nolan St			Hopman Cres			Grand Total
	Time Period	Lights	Heavies	Total		Lights	Heavies	Total	Lights	Heavies	Total	
AM	8:00 to 9:00	193	12	**205**		136	13	**149**	47	1	**48**	**402**
PM	15:15 to 16:15	165	16	**181**		298	12	**310**	32	1	**33**	**524**

Approach	Nolan St				Nolan St			Hopman Cres			Grand Total
Time Period	Lights	Heavies	Total		Lights	Heavies	Total	Lights	Heavies	Total	
6:00 to 7:00	210	9	**219**		50	23	**73**	26	0	**26**	**318**
6:15 to 7:15	219	10	**229**		50	22	**72**	23	0	**23**	**324**
6:30 to 7:30	204	14	**218**		54	22	**76**	27	0	**27**	**321**
6:45 to 7:45	187	16	**203**		68	15	**83**	25	0	**25**	**311**
7:00 to 8:00	171	11	**182**		83	16	**99**	21	0	**21**	**302**
7:15 to 8:15	164	13	**177**		99	11	**110**	32	0	**32**	**319**
7:30 to 8:30	182	11	**193**		126	10	**136**	35	0	**35**	**364**
7:45 to 8:45	195	10	**205**		135	15	**150**	43	0	**43**	**398**
8:00 to 9:00	193	12	**205**		136	13	**149**	47	1	**48**	**402**
AM Totals	**574**	**32**	**606**		**269**	**52**	**321**	**94**	**1**	**95**	**1,022**
15:00 to 16:00	185	14	**199**		268	8	**276**	29	1	**30**	**505**
15:15 to 16:15	165	16	**181**		298	12	**310**	32	1	**33**	**524**
15:30 to 16:30	156	15	**171**		290	12	**302**	25	1	**26**	**499**
15:45 to 16:45	150	11	**161**		266	9	**275**	27	1	**28**	**464**
16:00 to 17:00	141	12	**153**		252	10	**262**	24	0	**24**	**439**
16:15 to 17:15	119	12	**131**		216	6	**222**	19	0	**19**	**372**
16:30 to 17:30	114	12	**126**		199	4	**203**	19	0	**19**	**348**
16:45 to 17:45	115	13	**128**		174	5	**179**	18	0	**18**	**325**
17:00 to 18:00	108	11	**119**		175	3	**178**	26	0	**26**	**323**
PM Totals	**434**	**37**	**471**		**695**	**21**	**716**	**79**	**1**	**80**	**1,267**

Appendix B – SIDRA Results

MOVEMENT SUMMARY

Site: 1A [2019_ AM_Nolan Street | Warwick Street]

Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Nolan Street												
1	L2	7	0.0	0.079	4.6	LOS A	0.0	0.0	0.00	0.03	0.00	24.8
2	T1	142	1.5	0.079	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	49.5
Approach		149	1.4	0.079	0.2	NA	0.0	0.0	0.00	0.03	0.00	48.0
North: Nolan Street												
8	T1	123	2.6	0.069	0.0	LOS A	0.0	0.3	0.03	0.03	0.03	49.3
9	R2	6	0.0	0.069	5.1	LOS A	0.0	0.3	0.03	0.03	0.03	30.3
Approach		129	2.4	0.069	0.3	NA	0.0	0.3	0.03	0.03	0.03	48.1
West: Warwick Street												
10	L2	14	0.0	0.019	5.0	LOS A	0.1	0.5	0.24	0.53	0.24	38.3
12	R2	9	0.0	0.019	5.6	LOS A	0.1	0.5	0.24	0.53	0.24	34.9
Approach		23	0.0	0.019	5.2	LOS A	0.1	0.5	0.24	0.53	0.24	37.0
All Vehicles		302	1.7	0.079	0.6	NA	0.1	0.5	0.03	0.07	0.03	47.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
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: 1B [2019_AM_Nolan Street | Hopman Crescent]

Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Nolan Street												
1	L2	11	0.0	0.060	4.6	LOS A	0.0	0.0	0.00	0.05	0.00	47.6
2	T1	103	2.0	0.060	0.0	LOS A	0.0	0.0	0.00	0.05	0.00	49.1
Approach		114	1.9	0.060	0.4	NA	0.0	0.0	0.00	0.05	0.00	49.0
North: Nolan Street												
8	T1	78	4.1	0.044	0.0	LOS A	0.0	0.1	0.02	0.02	0.02	49.4
9	R2	3	0.0	0.044	5.0	LOS A	0.0	0.1	0.02	0.02	0.02	45.2
Approach		81	3.9	0.044	0.2	NA	0.0	0.1	0.02	0.02	0.02	49.3
West: Hopman Crescent												
10	L2	6	0.0	0.023	4.9	LOS A	0.1	0.5	0.22	0.54	0.22	36.9
12	R2	21	0.0	0.023	5.3	LOS A	0.1	0.5	0.22	0.54	0.22	38.4
Approach		27	0.0	0.023	5.2	LOS A	0.1	0.5	0.22	0.54	0.22	38.1
All Vehicles		222	2.4	0.060	0.9	NA	0.1	0.5	0.03	0.10	0.03	47.5

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

MOVEMENT SUMMARY

Site: 1C [2019_AM_Nolan Street | Northcliffe Drive]

Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Bedford Street												
10	L2	26	0.0	0.085	6.2	LOS A	0.4	2.7	0.53	0.63	0.53	46.2
11	T1	24	0.0	0.085	6.0	LOS A	0.4	2.7	0.53	0.63	0.53	35.3
12	R2	11	0.0	0.085	9.9	LOS A	0.4	2.7	0.53	0.63	0.53	50.8
Approach		61	0.0	0.085	6.7	LOS A	0.4	2.7	0.53	0.63	0.53	44.3
East: Northcliffe Drive												
1	L2	3	0.0	0.114	5.5	LOS A	0.6	4.5	0.28	0.49	0.28	52.5
2	T1	251	1.7	0.114	6.0	LOS A	0.6	4.5	0.29	0.51	0.29	57.6
3	R2	48	2.2	0.114	10.1	LOS A	0.6	4.4	0.29	0.55	0.29	49.4
Approach		302	1.7	0.114	6.7	LOS A	0.6	4.5	0.29	0.52	0.29	56.4
North: Nolan Street												
4	L2	49	4.3	0.178	4.6	LOS A	0.5	3.6	0.33	0.67	0.33	47.7
5	T1	13	0.0	0.178	4.3	LOS A	0.5	3.6	0.33	0.67	0.33	35.3
6	R2	97	2.2	0.178	8.2	LOS A	0.5	3.6	0.33	0.67	0.33	46.7
Approach		159	2.6	0.178	6.9	LOS A	0.5	3.6	0.33	0.67	0.33	46.6
West: Northcliffe Drive												
7	L2	73	2.9	0.172	5.4	LOS A	1.0	7.2	0.25	0.49	0.25	49.9
8	T1	396	1.6	0.172	5.9	LOS A	1.0	7.2	0.26	0.49	0.26	58.2
9	R2	6	0.0	0.172	10.0	LOS A	1.0	7.2	0.26	0.49	0.26	47.7
Approach		475	1.8	0.172	5.9	LOS A	1.0	7.2	0.26	0.49	0.26	57.2
All Vehicles		997	1.8	0.178	6.3	LOS A	1.0	7.2	0.30	0.54	0.30	55.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
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: 1A [2019_ PM_Nolan Street | Warwick Street]

Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Nolan Street												
1	L2	5	0.0	0.063	4.6	LOS A	0.0	0.0	0.00	0.02	0.00	24.8
2	T1	114	2.8	0.063	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	49.6
Approach		119	2.7	0.063	0.2	NA	0.0	0.0	0.00	0.02	0.00	48.2
North: Nolan Street												
8	T1	219	1.0	0.126	0.0	LOS A	0.1	0.9	0.04	0.04	0.04	49.1
9	R2	17	6.3	0.126	5.1	LOS A	0.1	0.9	0.04	0.04	0.04	30.1
Approach		236	1.3	0.126	0.4	NA	0.1	0.9	0.04	0.04	0.04	47.4
West: Warwick Street												
10	L2	5	0.0	0.009	4.9	LOS A	0.0	0.2	0.23	0.53	0.23	38.3
12	R2	5	0.0	0.009	5.9	LOS A	0.0	0.2	0.23	0.53	0.23	35.0
Approach		11	0.0	0.009	5.4	LOS A	0.0	0.2	0.23	0.53	0.23	36.8
All Vehicles		365	1.7	0.126	0.5	NA	0.1	0.9	0.03	0.05	0.03	47.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
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: 1B [2019_PM_Nolan Street | Hopman Crescent]

Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Nolan Street												
1	L2	20	0.0	0.053	4.6	LOS A	0.0	0.0	0.00	0.11	0.00	46.6
2	T1	79	2.7	0.053	0.0	LOS A	0.0	0.0	0.00	0.11	0.00	48.1
Approach		99	2.1	0.053	0.9	NA	0.0	0.0	0.00	0.11	0.00	47.8
North: Nolan Street												
8	T1	171	1.2	0.092	0.0	LOS A	0.0	0.2	0.01	0.01	0.01	49.7
9	R2	4	0.0	0.092	4.9	LOS A	0.0	0.2	0.01	0.01	0.01	45.5
Approach		175	1.2	0.092	0.1	NA	0.0	0.2	0.01	0.01	0.01	49.6
West: Hopman Crescent												
10	L2	4	0.0	0.017	4.8	LOS A	0.1	0.4	0.23	0.55	0.23	36.9
12	R2	15	0.0	0.017	5.6	LOS A	0.1	0.4	0.23	0.55	0.23	38.4
Approach		19	0.0	0.017	5.4	LOS A	0.1	0.4	0.23	0.55	0.23	38.1
All Vehicles		293	1.4	0.092	0.7	NA	0.1	0.4	0.02	0.08	0.02	48.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
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: 1C [2019_PM_Nolan Street | Northcliffe Drive]

Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Bedford Street												
10	L2	16	6.7	0.066	7.1	LOS A	0.3	2.1	0.58	0.69	0.58	42.9
11	T1	13	0.0	0.066	6.6	LOS A	0.3	2.1	0.58	0.69	0.58	33.2
12	R2	14	0.0	0.066	10.5	LOS A	0.3	2.1	0.58	0.69	0.58	49.1
Approach		42	2.5	0.066	8.1	LOS A	0.3	2.1	0.58	0.69	0.58	43.5
East: Northcliffe Drive												
1	L2	9	0.0	0.158	5.8	LOS A	0.9	6.4	0.36	0.52	0.36	52.0
2	T1	359	1.5	0.158	6.3	LOS A	0.9	6.4	0.36	0.53	0.36	57.4
3	R2	34	3.1	0.158	10.5	LOS A	0.9	6.4	0.37	0.55	0.37	49.5
Approach		402	1.6	0.158	6.6	LOS A	0.9	6.4	0.36	0.53	0.36	56.7
North: Nolan Street												
4	L2	66	1.6	0.237	4.8	LOS A	0.7	4.9	0.33	0.66	0.33	48.8
5	T1	29	0.0	0.237	4.3	LOS A	0.7	4.9	0.33	0.66	0.33	35.6
6	R2	120	1.8	0.237	8.2	LOS A	0.7	4.9	0.33	0.66	0.33	47.1
Approach		216	1.5	0.237	6.6	LOS A	0.7	4.9	0.33	0.66	0.33	46.8
West: Northcliffe Drive												
7	L2	98	3.2	0.165	5.3	LOS A	1.0	7.0	0.21	0.49	0.21	50.3
8	T1	355	1.2	0.165	5.8	LOS A	1.0	7.0	0.22	0.49	0.22	58.5
9	R2	19	0.0	0.165	9.9	LOS A	1.0	6.9	0.22	0.49	0.22	47.8
Approach		472	1.6	0.165	5.9	LOS A	1.0	7.0	0.22	0.49	0.22	57.0
All Vehicles		1132	1.6	0.237	6.4	LOS A	1.0	7.0	0.30	0.55	0.30	55.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
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: 1A [2019_ AM_Nolan Street | Warwick Street_with LCW Stage 1]

Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Nolan Street												
1	L2	7	0.0	0.079	4.6	LOS A	0.0	0.0	0.00	0.03	0.00	24.8
2	T1	142	1.5	0.079	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	49.5
Approach		149	1.4	0.079	0.2	NA	0.0	0.0	0.00	0.03	0.00	48.0
North: Nolan Street												
8	T1	123	2.6	0.088	0.2	LOS A	0.2	1.6	0.13	0.13	0.13	47.1
9	R2	35	0.0	0.088	5.1	LOS A	0.2	1.6	0.13	0.13	0.13	29.3
Approach		158	2.0	0.088	1.2	NA	0.2	1.6	0.13	0.13	0.13	42.4
West: Warwick Street												
10	L2	42	0.0	0.039	5.0	LOS A	0.1	1.0	0.24	0.52	0.24	38.3
12	R2	9	0.0	0.039	5.8	LOS A	0.1	1.0	0.24	0.52	0.24	35.0
Approach		52	0.0	0.039	5.1	LOS A	0.1	1.0	0.24	0.52	0.24	37.8
All Vehicles		359	1.5	0.088	1.4	NA	0.2	1.6	0.09	0.14	0.09	44.0

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

MOVEMENT SUMMARY

Site: 1B [2019_AM_Nolan Street | Hopman Crescent _with LCW Stage 1]

Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Nolan Street												
1	L2	29	0.0	0.071	4.6	LOS A	0.0	0.0	0.00	0.12	0.00	46.5
2	T1	103	3.1	0.071	0.0	LOS A	0.0	0.0	0.00	0.12	0.00	47.9
Approach		133	2.4	0.071	1.0	NA	0.0	0.0	0.00	0.12	0.00	47.6
North: Nolan Street												
8	T1	78	4.1	0.044	0.0	LOS A	0.0	0.2	0.02	0.02	0.02	49.4
9	R2	3	0.0	0.044	5.0	LOS A	0.0	0.2	0.02	0.02	0.02	45.2
Approach		81	3.9	0.044	0.2	NA	0.0	0.2	0.02	0.02	0.02	49.3
West: Hopman Crescent												
10	L2	7	0.0	0.043	4.9	LOS A	0.1	1.0	0.24	0.56	0.24	36.8
12	R2	41	0.0	0.043	5.3	LOS A	0.1	1.0	0.24	0.56	0.24	38.3
Approach		48	0.0	0.043	5.3	LOS A	0.1	1.0	0.24	0.56	0.24	38.1
All Vehicles		262	2.4	0.071	1.6	NA	0.1	1.0	0.05	0.17	0.05	46.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
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: 1C [2019_AM_Nolan Street | Northcliffe Drive_with LCW Stage 1]

Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Bedford Street												
10	L2	26	0.0	0.086	6.3	LOS A	0.4	2.8	0.54	0.65	0.54	46.1
11	T1	24	0.0	0.086	6.1	LOS A	0.4	2.8	0.54	0.65	0.54	35.1
12	R2	11	0.0	0.086	10.0	LOS A	0.4	2.8	0.54	0.65	0.54	50.6
Approach		61	0.0	0.086	6.9	LOS A	0.4	2.8	0.54	0.65	0.54	44.2
East: Northcliffe Drive												
1	L2	3	0.0	0.118	5.6	LOS A	0.7	4.6	0.31	0.50	0.31	52.3
2	T1	251	1.7	0.118	6.1	LOS A	0.7	4.6	0.31	0.52	0.31	57.4
3	R2	53	2.0	0.118	10.2	LOS A	0.6	4.6	0.32	0.57	0.32	49.2
Approach		306	1.7	0.118	6.8	LOS A	0.7	4.6	0.32	0.53	0.32	56.2
North: Nolan Street												
4	L2	54	3.9	0.204	4.8	LOS A	0.6	4.2	0.34	0.68	0.34	47.7
5	T1	13	0.0	0.204	4.3	LOS A	0.6	4.2	0.34	0.68	0.34	35.1
6	R2	116	1.8	0.204	8.3	LOS A	0.6	4.2	0.34	0.68	0.34	46.6
Approach		182	2.3	0.204	7.0	LOS A	0.6	4.2	0.34	0.68	0.34	46.5
West: Northcliffe Drive												
7	L2	92	2.3	0.179	5.5	LOS A	1.1	7.6	0.26	0.50	0.26	50.0
8	T1	396	1.6	0.179	5.9	LOS A	1.1	7.6	0.27	0.49	0.27	58.2
9	R2	6	0.0	0.179	10.0	LOS A	1.1	7.5	0.27	0.49	0.27	47.6
Approach		494	1.7	0.179	5.9	LOS A	1.1	7.6	0.27	0.49	0.27	57.0
All Vehicles		1043	1.7	0.204	6.4	LOS A	1.1	7.6	0.31	0.55	0.31	54.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
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: 1A [2019_ PM_Nolan Street | Warwick Street _with LCW Stage 1]

Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Nolan Street												
1	L2	5	0.0	0.063	4.6	LOS A	0.0	0.0	0.00	0.02	0.00	24.8
2	T1	114	2.8	0.063	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	49.6
Approach		119	2.7	0.063	0.2	NA	0.0	0.0	0.00	0.02	0.00	48.2
North: Nolan Street												
8	T1	219	1.0	0.139	0.1	LOS A	0.3	1.8	0.08	0.08	0.08	48.1
9	R2	37	2.9	0.139	5.1	LOS A	0.3	1.8	0.08	0.08	0.08	29.7
Approach		256	1.2	0.139	0.8	NA	0.3	1.8	0.08	0.08	0.08	44.9
West: Warwick Street												
10	L2	24	0.0	0.022	4.9	LOS A	0.1	0.6	0.20	0.52	0.20	38.5
12	R2	5	0.0	0.022	6.1	LOS A	0.1	0.6	0.20	0.52	0.20	35.2
Approach		29	0.0	0.022	5.1	LOS A	0.1	0.6	0.20	0.52	0.20	38.0
All Vehicles		404	1.6	0.139	0.9	NA	0.3	1.8	0.07	0.10	0.07	45.3

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.
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: 1B [2019_PM_Nolan Street | Hopman Crescent _with LCW Stage 1]

Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Nolan Street												
1	L2	48	0.0	0.069	4.6	LOS A	0.0	0.0	0.00	0.21	0.00	45.1
2	T1	79	4.0	0.069	0.0	LOS A	0.0	0.0	0.00	0.21	0.00	46.5
Approach		127	2.5	0.069	1.7	NA	0.0	0.0	0.00	0.21	0.00	46.0
North: Nolan Street												
8	T1	171	1.2	0.092	0.0	LOS A	0.0	0.2	0.01	0.01	0.01	49.6
9	R2	4	0.0	0.092	5.0	LOS A	0.0	0.2	0.01	0.01	0.01	45.5
Approach		175	1.2	0.092	0.1	NA	0.0	0.2	0.01	0.01	0.01	49.6
West: Hopman Crescent												
10	L2	4	0.0	0.046	4.8	LOS A	0.1	1.0	0.28	0.58	0.28	36.6
12	R2	43	0.0	0.046	5.7	LOS A	0.1	1.0	0.28	0.58	0.28	38.2
Approach		47	0.0	0.046	5.6	LOS A	0.1	1.0	0.28	0.58	0.28	38.0
All Vehicles		349	1.5	0.092	1.5	NA	0.1	1.0	0.04	0.16	0.04	46.4

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.
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: 1C [2019_PM_Nolan Street | Northcliffe Drive_with LCW Stage 1]

Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Bedford Street												
10	L2	16	6.7	0.068	7.4	LOS A	0.3	2.2	0.59	0.70	0.59	42.6
11	T1	13	0.0	0.068	6.9	LOS A	0.3	2.2	0.59	0.70	0.59	32.9
12	R2	14	0.0	0.068	10.8	LOS A	0.3	2.2	0.59	0.70	0.59	48.8
Approach		42	2.5	0.068	8.3	LOS A	0.3	2.2	0.59	0.70	0.59	43.2
East: Northcliffe Drive												
1	L2	9	0.0	0.166	5.9	LOS A	1.0	6.8	0.39	0.53	0.39	51.7
2	T1	359	1.5	0.166	6.4	LOS A	1.0	6.8	0.39	0.55	0.39	57.1
3	R2	41	2.6	0.166	10.6	LOS A	0.9	6.7	0.40	0.57	0.40	49.2
Approach		409	1.5	0.166	6.8	LOS A	1.0	6.8	0.40	0.55	0.40	56.4
North: Nolan Street												
4	L2	74	1.4	0.278	4.8	LOS A	0.8	6.0	0.35	0.67	0.35	48.6
5	T1	29	0.0	0.278	4.4	LOS A	0.8	6.0	0.35	0.67	0.35	35.3
6	R2	148	1.4	0.278	8.3	LOS A	0.8	6.0	0.35	0.67	0.35	47.0
Approach		252	1.3	0.278	6.8	LOS A	0.8	6.0	0.35	0.67	0.35	46.7
West: Northcliffe Drive												
7	L2	125	2.5	0.177	5.4	LOS A	1.1	7.5	0.23	0.50	0.23	50.3
8	T1	355	1.2	0.177	5.8	LOS A	1.1	7.5	0.23	0.50	0.23	58.4
9	R2	19	0.0	0.177	9.9	LOS A	1.1	7.4	0.24	0.49	0.24	47.7
Approach		499	1.5	0.177	5.9	LOS A	1.1	7.5	0.23	0.50	0.23	56.6
All Vehicles		1202	1.5	0.278	6.5	LOS A	1.1	7.5	0.32	0.56	0.32	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: 1A [2029_ AM_Nolan Street | Warwick Street_without LCW Stage 1]

Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Nolan Street												
1	L2	9	0.0	0.097	4.6	LOS A	0.0	0.0	0.00	0.03	0.00	24.8
2	T1	174	1.8	0.097	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	49.5
Approach		183	1.7	0.097	0.2	NA	0.0	0.0	0.00	0.03	0.00	47.9
North: Nolan Street												
8	T1	149	2.1	0.084	0.0	LOS A	0.1	0.4	0.03	0.03	0.03	49.3
9	R2	7	0.0	0.084	5.2	LOS A	0.1	0.4	0.03	0.03	0.03	30.3
Approach		157	2.0	0.084	0.3	NA	0.1	0.4	0.03	0.03	0.03	48.2
West: Warwick Street												
10	L2	16	0.0	0.023	5.1	LOS A	0.1	0.6	0.28	0.54	0.28	38.1
12	R2	12	0.0	0.023	5.9	LOS A	0.1	0.6	0.28	0.54	0.28	34.8
Approach		27	0.0	0.023	5.4	LOS A	0.1	0.6	0.28	0.54	0.28	36.8
All Vehicles		367	1.7	0.097	0.6	NA	0.1	0.6	0.03	0.07	0.03	47.2

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

MOVEMENT SUMMARY

Site: 1B [2029_AM_Nolan Street | Hopman Crescent _without LCW Stage 1]

Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Nolan Street												
1	L2	13	0.0	0.074	4.6	LOS A	0.0	0.0	0.00	0.05	0.00	47.6
2	T1	126	2.5	0.074	0.0	LOS A	0.0	0.0	0.00	0.05	0.00	49.1
Approach		139	2.3	0.074	0.4	NA	0.0	0.0	0.00	0.05	0.00	49.0
North: Nolan Street												
8	T1	94	3.4	0.053	0.0	LOS A	0.0	0.2	0.03	0.03	0.03	49.4
9	R2	4	0.0	0.053	5.1	LOS A	0.0	0.2	0.03	0.03	0.03	45.1
Approach		98	3.2	0.053	0.2	NA	0.0	0.2	0.03	0.03	0.03	49.2
West: Hopman Crescent												
10	L2	7	0.0	0.029	4.9	LOS A	0.1	0.7	0.26	0.56	0.26	36.7
12	R2	25	0.0	0.029	5.5	LOS A	0.1	0.7	0.26	0.56	0.26	38.3
Approach		33	0.0	0.029	5.3	LOS A	0.1	0.7	0.26	0.56	0.26	38.0
All Vehicles		269	2.3	0.074	0.9	NA	0.1	0.7	0.04	0.10	0.04	47.5

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

MOVEMENT SUMMARY

Site: 1C [2029_AM_Nolan Street | Northcliffe Drive_without LCW Stage 1]

Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Bedford Street												
10	L2	33	0.0	0.110	6.8	LOS A	0.5	3.5	0.57	0.69	0.57	45.5
11	T1	28	0.0	0.110	6.6	LOS A	0.5	3.5	0.57	0.69	0.57	34.3
12	R2	13	0.0	0.110	10.5	LOS A	0.5	3.5	0.57	0.69	0.57	50.0
Approach		74	0.0	0.110	7.4	LOS A	0.5	3.5	0.57	0.69	0.57	43.6
East: Northcliffe Drive												
1	L2	4	0.0	0.142	5.6	LOS A	0.8	5.8	0.33	0.50	0.33	52.2
2	T1	304	1.4	0.142	6.1	LOS A	0.8	5.8	0.33	0.53	0.33	57.4
3	R2	59	3.6	0.142	10.3	LOS A	0.8	5.7	0.34	0.57	0.34	49.1
Approach		367	1.7	0.142	6.8	LOS A	0.8	5.8	0.33	0.53	0.33	56.2
North: Nolan Street												
4	L2	59	3.6	0.226	5.1	LOS A	0.7	4.9	0.39	0.71	0.39	47.7
5	T1	15	0.0	0.226	4.6	LOS A	0.7	4.9	0.39	0.71	0.39	34.9
6	R2	119	2.7	0.226	8.6	LOS A	0.7	4.9	0.39	0.71	0.39	46.2
Approach		193	2.7	0.226	7.2	LOS A	0.7	4.9	0.39	0.71	0.39	46.2
West: Northcliffe Drive												
7	L2	87	2.4	0.212	5.5	LOS A	1.3	9.3	0.29	0.50	0.29	49.7
8	T1	482	1.5	0.212	6.0	LOS A	1.3	9.3	0.30	0.50	0.30	58.0
9	R2	7	0.0	0.212	10.1	LOS A	1.3	9.2	0.30	0.50	0.30	47.4
Approach		577	1.6	0.212	6.0	LOS A	1.3	9.3	0.30	0.50	0.30	57.0
All Vehicles		1211	1.7	0.226	6.5	LOS A	1.3	9.3	0.34	0.56	0.34	54.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
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: 1A [2029_ PM_Nolan Street | Warwick Street _without LCW Stage 1]

Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Nolan Street												
1	L2	6	0.0	0.077	4.6	LOS A	0.0	0.0	0.00	0.02	0.00	24.8
2	T1	139	3.0	0.077	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	49.6
Approach		145	2.9	0.077	0.2	NA	0.0	0.0	0.00	0.02	0.00	48.2
North: Nolan Street												
8	T1	267	1.2	0.155	0.1	LOS A	0.2	1.1	0.05	0.04	0.05	49.0
9	R2	21	5.0	0.155	5.2	LOS A	0.2	1.1	0.05	0.04	0.05	30.1
Approach		288	1.5	0.155	0.4	NA	0.2	1.1	0.05	0.04	0.05	47.3
West: Warwick Street												
10	L2	6	0.0	0.012	4.9	LOS A	0.0	0.3	0.26	0.54	0.26	38.1
12	R2	6	0.0	0.012	6.3	LOS A	0.0	0.3	0.26	0.54	0.26	34.7
Approach		13	0.0	0.012	5.6	LOS A	0.0	0.3	0.26	0.54	0.26	36.5
All Vehicles		446	1.9	0.155	0.5	NA	0.2	1.1	0.04	0.05	0.04	47.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
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: 1B [2029_PM_Nolan Street | Hopman Crescent_without LCW Stage 1]

Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Nolan Street												
1	L2	24	0.0	0.064	4.6	LOS A	0.0	0.0	0.00	0.11	0.00	46.6
2	T1	96	3.3	0.064	0.0	LOS A	0.0	0.0	0.00	0.11	0.00	48.1
Approach		120	2.6	0.064	0.9	NA	0.0	0.0	0.00	0.11	0.00	47.8
North: Nolan Street												
8	T1	208	1.5	0.113	0.0	LOS A	0.0	0.3	0.01	0.01	0.01	49.6
9	R2	5	0.0	0.113	5.0	LOS A	0.0	0.3	0.01	0.01	0.01	45.5
Approach		214	1.5	0.113	0.1	NA	0.0	0.3	0.01	0.01	0.01	49.6
West: Hopman Crescent												
10	L2	5	0.0	0.022	4.8	LOS A	0.1	0.5	0.26	0.56	0.26	36.6
12	R2	18	0.0	0.022	5.8	LOS A	0.1	0.5	0.26	0.56	0.26	38.2
Approach		23	0.0	0.022	5.6	LOS A	0.1	0.5	0.26	0.56	0.26	37.9
All Vehicles		357	1.8	0.113	0.8	NA	0.1	0.5	0.02	0.08	0.02	48.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
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: 1C [2029_PM_Nolan Street | Northcliffe Drive_without LCW Stage 1]

Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Bedford Street												
10	L2	19	5.6	0.087	7.8	LOS A	0.4	2.7	0.62	0.75	0.62	42.3
11	T1	15	0.0	0.087	7.4	LOS A	0.4	2.7	0.62	0.75	0.62	32.1
12	R2	17	0.0	0.087	11.3	LOS A	0.4	2.7	0.62	0.75	0.62	48.1
Approach		51	2.1	0.087	8.8	LOS A	0.4	2.7	0.62	0.75	0.62	42.7
East: Northcliffe Drive												
1	L2	12	0.0	0.200	6.0	LOS A	1.2	8.5	0.41	0.54	0.41	51.6
2	T1	437	1.4	0.200	6.5	LOS A	1.2	8.5	0.42	0.56	0.42	57.0
3	R2	41	2.6	0.200	10.7	LOS A	1.2	8.4	0.42	0.58	0.42	49.2
Approach		489	1.5	0.200	6.8	LOS A	1.2	8.5	0.42	0.56	0.42	56.4
North: Nolan Street												
4	L2	82	1.3	0.303	5.1	LOS A	1.0	6.8	0.40	0.70	0.40	48.6
5	T1	36	8.8	0.303	4.8	LOS A	1.0	6.8	0.40	0.70	0.40	34.6
6	R2	145	0.7	0.303	8.6	LOS A	1.0	6.8	0.40	0.70	0.40	47.0
Approach		263	2.0	0.303	7.0	LOS A	1.0	6.8	0.40	0.70	0.40	46.6
West: Northcliffe Drive												
7	L2	118	2.7	0.202	5.4	LOS A	1.3	8.9	0.24	0.50	0.24	50.1
8	T1	432	0.2	0.202	5.8	LOS A	1.3	8.9	0.25	0.50	0.25	58.6
9	R2	22	0.0	0.202	9.9	LOS A	1.2	8.7	0.25	0.50	0.25	47.5
Approach		572	0.7	0.202	5.9	LOS A	1.3	8.9	0.25	0.50	0.25	57.0
All Vehicles		1375	1.3	0.303	6.6	LOS A	1.3	8.9	0.35	0.57	0.35	54.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
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: 1A [2029_ AM_Nolan Street | Warwick Street_with LCW Stage 1]

Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Nolan Street												
1	L2	9	0.0	0.097	4.6	LOS A	0.0	0.0	0.00	0.03	0.00	24.8
2	T1	174	1.8	0.097	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	49.5
Approach		183	1.7	0.097	0.2	NA	0.0	0.0	0.00	0.03	0.00	47.9
North: Nolan Street												
8	T1	149	2.1	0.103	0.2	LOS A	0.2	1.7	0.13	0.11	0.13	47.3
9	R2	36	0.0	0.103	5.3	LOS A	0.2	1.7	0.13	0.11	0.13	29.4
Approach		185	1.7	0.103	1.2	NA	0.2	1.7	0.13	0.11	0.13	43.2
West: Warwick Street												
10	L2	45	0.0	0.045	5.1	LOS A	0.2	1.2	0.27	0.54	0.27	38.1
12	R2	12	0.0	0.045	6.1	LOS A	0.2	1.2	0.27	0.54	0.27	34.8
Approach		57	0.0	0.045	5.3	LOS A	0.2	1.2	0.27	0.54	0.27	37.5
All Vehicles		425	1.5	0.103	1.3	NA	0.2	1.7	0.09	0.13	0.09	44.4

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.
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: 1B [2029_AM_Nolan Street | Hopman Crescent_with LCW Stage 1]

Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Nolan Street												
1	L2	13	0.0	0.074	4.6	LOS A	0.0	0.0	0.00	0.05	0.00	47.6
2	T1	126	2.5	0.074	0.0	LOS A	0.0	0.0	0.00	0.05	0.00	49.1
Approach		139	2.3	0.074	0.4	NA	0.0	0.0	0.00	0.05	0.00	49.0
North: Nolan Street												
8	T1	94	3.4	0.053	0.0	LOS A	0.0	0.2	0.03	0.03	0.03	49.4
9	R2	4	0.0	0.053	5.1	LOS A	0.0	0.2	0.03	0.03	0.03	45.1
Approach		98	3.2	0.053	0.2	NA	0.0	0.2	0.03	0.03	0.03	49.2
West: Hopman Crescent												
10	L2	7	0.0	0.029	4.9	LOS A	0.1	0.7	0.26	0.56	0.26	36.7
12	R2	25	0.0	0.029	5.5	LOS A	0.1	0.7	0.26	0.56	0.26	38.3
Approach		33	0.0	0.029	5.3	LOS A	0.1	0.7	0.26	0.56	0.26	38.0
All Vehicles		269	2.3	0.074	0.9	NA	0.1	0.7	0.04	0.10	0.04	47.5

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

MOVEMENT SUMMARY

Site: 1C [2029_AM_Nolan Street | Northcliffe Drive_with LCW Stage 1]

Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Bedford Street												
10	L2	33	0.0	0.112	7.0	LOS A	0.5	3.6	0.58	0.70	0.58	45.3
11	T1	28	0.0	0.112	6.8	LOS A	0.5	3.6	0.58	0.70	0.58	34.0
12	R2	13	0.0	0.112	10.7	LOS A	0.5	3.6	0.58	0.70	0.58	49.8
Approach		74	0.0	0.112	7.5	LOS A	0.5	3.6	0.58	0.70	0.58	43.3
East: Northcliffe Drive												
1	L2	4	0.0	0.146	5.7	LOS A	0.8	6.0	0.35	0.51	0.35	52.0
2	T1	304	1.4	0.146	6.2	LOS A	0.8	6.0	0.36	0.54	0.36	57.2
3	R2	64	3.3	0.146	10.4	LOS A	0.8	6.0	0.36	0.58	0.36	48.9
Approach		373	1.7	0.146	6.9	LOS A	0.8	6.0	0.36	0.54	0.36	55.9
North: Nolan Street												
4	L2	64	3.3	0.255	5.2	LOS A	0.8	5.7	0.40	0.72	0.40	47.6
5	T1	15	0.0	0.255	4.7	LOS A	0.8	5.7	0.40	0.72	0.40	34.7
6	R2	138	2.3	0.255	8.6	LOS A	0.8	5.7	0.40	0.72	0.40	46.2
Approach		217	2.4	0.255	7.3	LOS A	0.8	5.7	0.40	0.72	0.40	46.2
West: Northcliffe Drive												
7	L2	107	2.0	0.221	5.6	LOS A	1.4	9.7	0.30	0.51	0.30	49.7
8	T1	482	1.5	0.221	6.1	LOS A	1.4	9.7	0.31	0.50	0.31	57.9
9	R2	7	0.0	0.221	10.1	LOS A	1.4	9.6	0.31	0.50	0.31	47.3
Approach		597	1.6	0.221	6.0	LOS A	1.4	9.7	0.31	0.50	0.31	56.8
All Vehicles		1260	1.7	0.255	6.6	LOS A	1.4	9.7	0.35	0.56	0.35	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: 1A [2029_ PM_Nolan Street | Warwick Street _with LCW Stage 1]

Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Nolan Street												
1	L2	6	0.0	0.077	4.6	LOS A	0.0	0.0	0.00	0.02	0.00	24.8
2	T1	139	3.0	0.077	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	49.6
Approach		145	2.9	0.077	0.2	NA	0.0	0.0	0.00	0.02	0.00	48.2
North: Nolan Street												
8	T1	267	1.2	0.167	0.1	LOS A	0.3	2.1	0.08	0.08	0.08	48.2
9	R2	40	2.6	0.167	5.2	LOS A	0.3	2.1	0.08	0.08	0.08	29.8
Approach		307	1.4	0.167	0.8	NA	0.3	2.1	0.08	0.08	0.08	45.3
West: Warwick Street												
10	L2	26	0.0	0.026	5.0	LOS A	0.1	0.7	0.23	0.53	0.23	38.4
12	R2	6	0.0	0.026	6.5	LOS A	0.1	0.7	0.23	0.53	0.23	35.1
Approach		33	0.0	0.026	5.3	LOS A	0.1	0.7	0.23	0.53	0.23	37.8
All Vehicles		485	1.7	0.167	0.9	NA	0.3	2.1	0.07	0.09	0.07	45.6

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

MOVEMENT SUMMARY

Site: 1B [2029_PM_Nolan Street | Hopman Crescent _with LCW Stage 1]

Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Nolan Street												
1	L2	54	0.0	0.080	4.6	LOS A	0.0	0.0	0.00	0.19	0.00	45.3
2	T1	96	3.3	0.080	0.0	LOS A	0.0	0.0	0.00	0.19	0.00	46.7
Approach		149	2.1	0.080	1.6	NA	0.0	0.0	0.00	0.19	0.00	46.2
North: Nolan Street												
8	T1	208	1.5	0.113	0.0	LOS A	0.0	0.3	0.02	0.01	0.02	49.6
9	R2	5	0.0	0.113	5.1	LOS A	0.0	0.3	0.02	0.01	0.02	45.4
Approach		214	1.5	0.113	0.1	NA	0.0	0.3	0.02	0.01	0.02	49.5
West: Hopman Crescent												
10	L2	5	0.0	0.052	4.8	LOS A	0.2	1.2	0.31	0.60	0.31	36.3
12	R2	46	0.0	0.052	5.9	LOS A	0.2	1.2	0.31	0.60	0.31	37.9
Approach		52	0.0	0.052	5.8	LOS A	0.2	1.2	0.31	0.60	0.31	37.7
All Vehicles		415	1.5	0.113	1.4	NA	0.2	1.2	0.05	0.15	0.05	46.6

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

MOVEMENT SUMMARY

Site: 1C [2029_PM_Nolan Street | Northcliffe Drive_with LCW Stage 1]

Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Bedford Street												
10	L2	19	5.6	0.089	8.1	LOS A	0.4	2.8	0.63	0.76	0.63	42.0
11	T1	15	0.0	0.089	7.6	LOS A	0.4	2.8	0.63	0.76	0.63	31.7
12	R2	17	0.0	0.089	11.5	LOS A	0.4	2.8	0.63	0.76	0.63	47.8
Approach		51	2.1	0.089	9.1	LOS A	0.4	2.8	0.63	0.76	0.63	42.4
East: Northcliffe Drive												
1	L2	12	0.0	0.208	6.1	LOS A	1.3	8.9	0.44	0.56	0.44	51.3
2	T1	437	1.4	0.208	6.7	LOS A	1.3	8.9	0.45	0.57	0.45	56.8
3	R2	48	2.2	0.208	10.9	LOS A	1.2	8.8	0.45	0.60	0.45	48.9
Approach		497	1.5	0.208	7.1	LOS A	1.3	8.9	0.45	0.58	0.45	56.1
North: Nolan Street												
4	L2	88	2.4	0.343	5.2	LOS A	1.1	8.1	0.41	0.72	0.41	48.0
5	T1	36	0.0	0.343	4.7	LOS A	1.1	8.1	0.41	0.72	0.41	34.8
6	R2	174	1.2	0.343	8.7	LOS A	1.1	8.1	0.41	0.72	0.41	46.6
Approach		298	1.4	0.343	7.2	LOS A	1.1	8.1	0.41	0.72	0.41	46.3
West: Northcliffe Drive												
7	L2	146	2.2	0.215	5.4	LOS A	1.3	9.5	0.26	0.50	0.26	50.1
8	T1	432	1.0	0.215	5.9	LOS A	1.3	9.5	0.27	0.50	0.27	58.3
9	R2	22	0.0	0.215	10.0	LOS A	1.3	9.4	0.27	0.50	0.27	47.4
Approach		600	1.2	0.215	5.9	LOS A	1.3	9.5	0.26	0.50	0.26	56.5
All Vehicles		1445	1.4	0.343	6.7	LOS A	1.3	9.5	0.37	0.58	0.37	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.

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