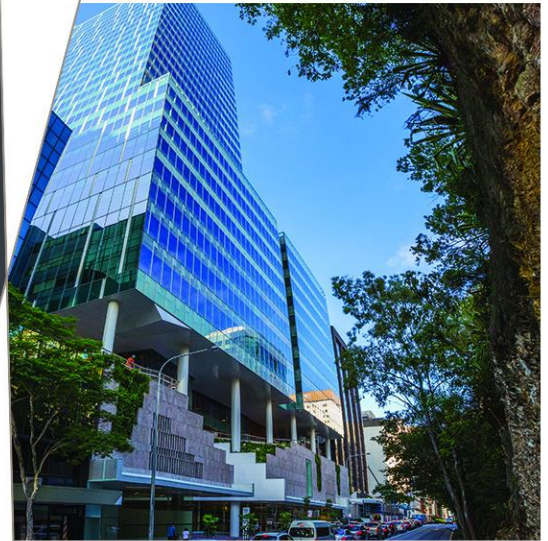


Traffic Impact Assessment

Stage 2C Caulfield Close

80219016



Prepared for
Wolin Investments and Landco Pty Ltd

26 March 2020

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1 Introduction

1.1 Background

Cardno has been commissioned by Wolin Investments and Landco Pty Ltd to produce a Traffic Impact Assessment (TIA) to accompany a planning proposal to amend the Minimum Lot Size Development Standard applying to land at Currans Hill.

The site was approved by Camden Council for the subdivision of 9 lots on the 26 November 2014, as contained in DA/2014/560/1, 8 lots of which are on the subject site. While this current planning proposal pertains to the use of the site only, an indicative layout suggests that it is possible to achieve a total of 17 lots, therefore in terms of traffic generation there is a potential net increase of 9 dwellings.

1.2 Scope of Works

The following scope of works has been undertaken as part of this study:

- > Review existing public transport facilities and future commitments to establish if any modifications to the public transport network is required to support the development.
- > Review traffic generation potential against the RMS Guide.
- > Assess the impact of the development on the existing road network.
- > Modelling of Currans Hill Drive / Spring Hill Circle and Glenfield Drive / Spring Hill Circle using the traffic modelling software SIDRA.
- > Identify potential impacts, if any, to residential amenity and road safety considerations.
- > Review potential access / driveway arrangements and provide assessment of any issues / mitigations.

1.3 Reference Documents

In preparing this report, reference has been made to a number of background documents, including:

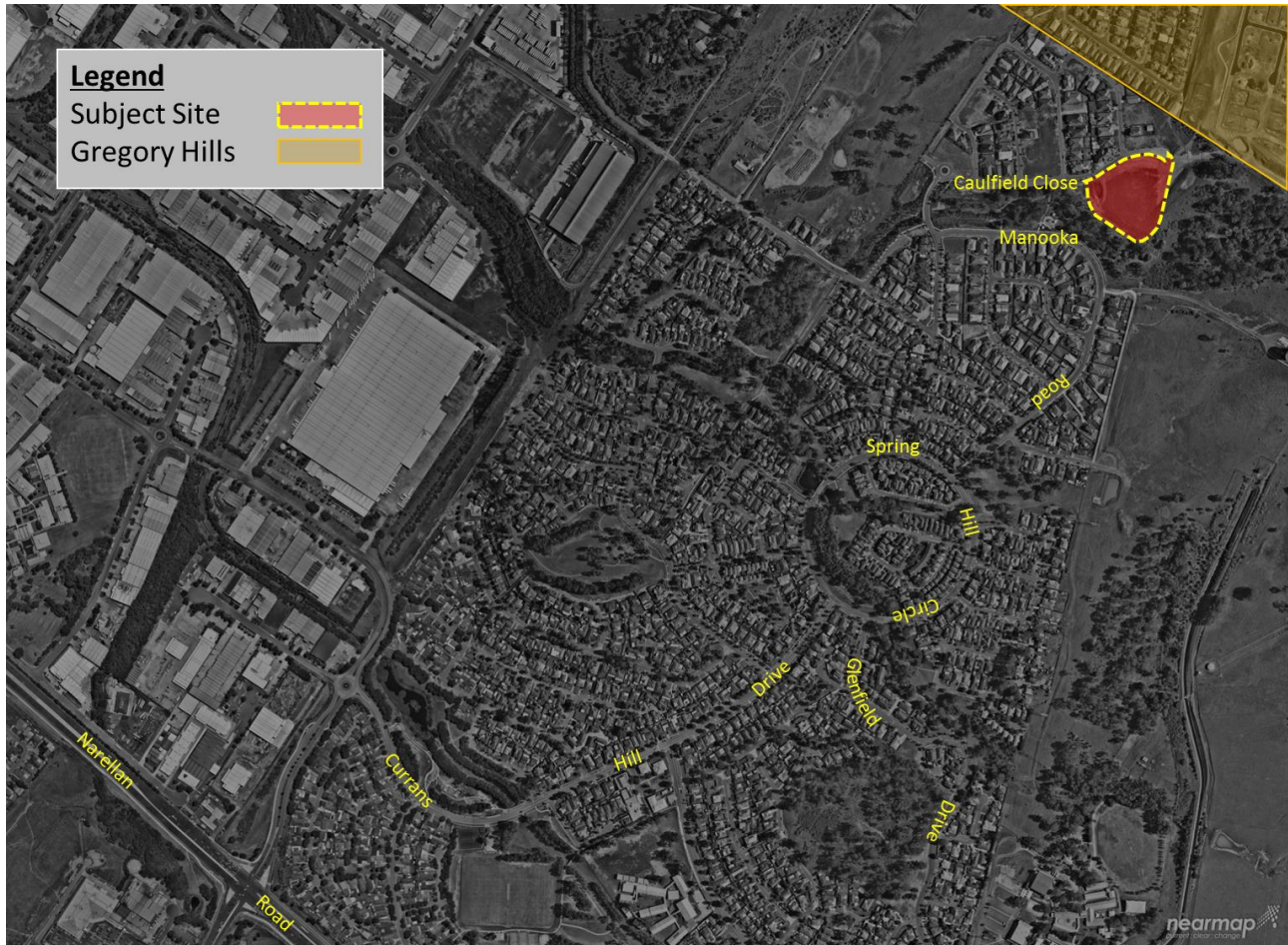
- > Schedule of Classified Roads and Unclassified Regional Roads (Roads and Maritime Services, 2014).
- > Development Control Plan (DCP) Part B: General Land Use Controls (Camden Council, 2011).
- > Camden Growth Centre Precincts DCP (Department of Planning and Environment, 2015).
- > Turner Road Precinct DCP (Department of Planning and Environment, 2018).
- > Guide to Traffic Generating Developments (Roads and Maritime Services, 2002).
- > Technical Direction (TDT 2013/04a) (Roads and Maritime Services, 2013).
- > Walking, Riding and Access to Public Transport (Department of Infrastructure and Transport, 2013).

2 Existing Conditions

2.1 Subject Site

The subject site is located to the south of Gregory Hills and north of Narellan Road as shown in **Figure 2-1**.

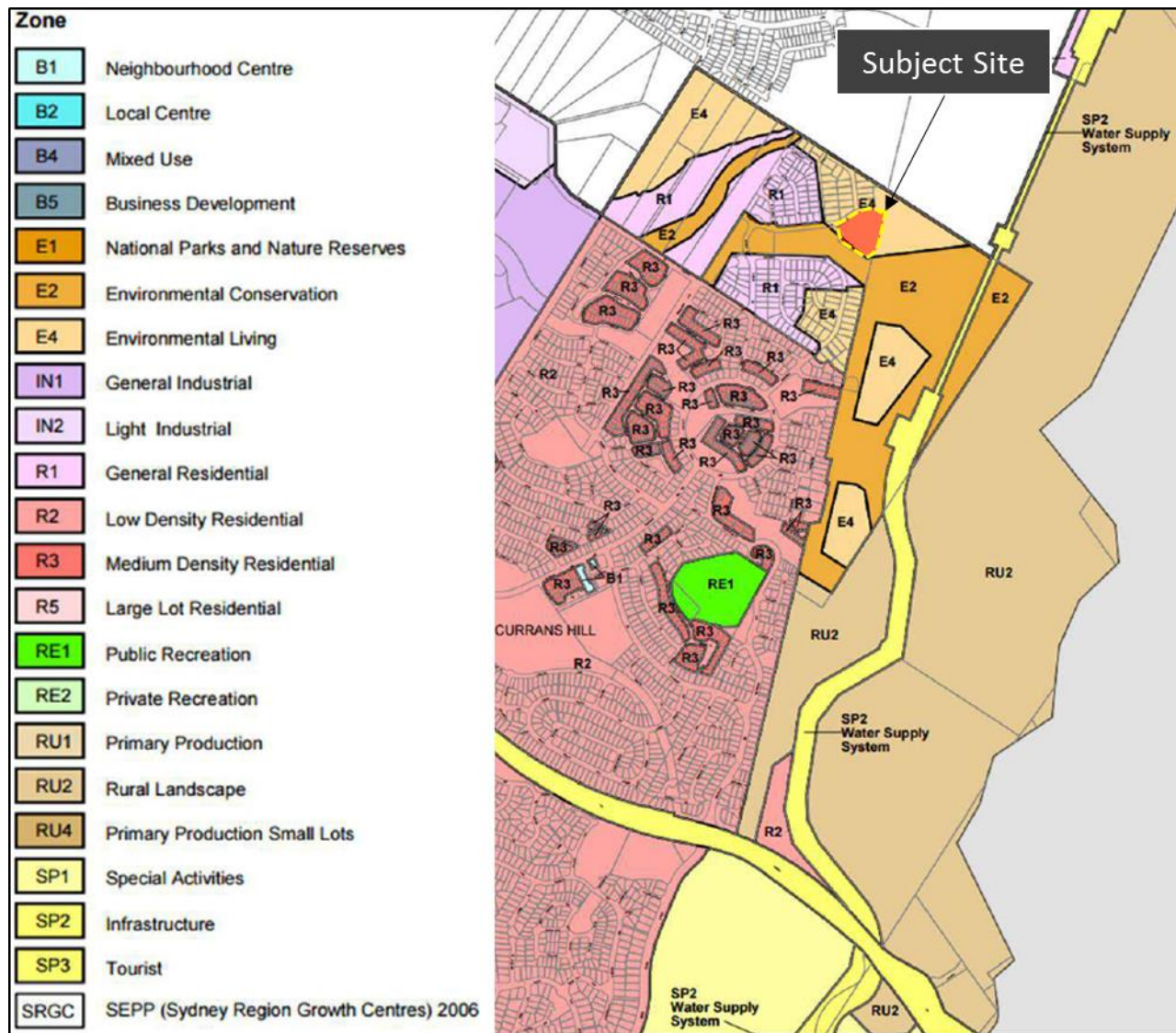
Figure 2-1 Subject Site Location



Source: Nearmap, 2019

The subject site is currently zoned as E4 – Environmental Living. A map of the existing zoning in the surrounding area is illustrated in **Figure 2-2**.

Figure 2-2 Existing Zoning Map



Source: Camden Local Environmental Plan 2010

2.2 Existing Road Network

2.2.1 Schedule of Road Classification

Roads and Maritime in partnership with local government established an administrative framework of State, Regional and Local Road categories to assist managing the extensive network of roads.

State roads are managed and financed by Roads and Maritime, and Regional / Local Roads are managed and financed by councils. Notwithstanding, Regional Roads perform an intermediate function between the main arterial network of State Roads and council controlled Local Roads and therefore received financial assistance from Roads and Maritime.

2.2.2 Narellan Road

Narellan Road is classified as a State Road under the care and maintenance of Roads and Maritime, connecting Campbelltown at Appin Road to Narellan at The Northern Road.

Narellan Road is a major arterial road signposted with a speed limit between 60km/h - 80km/h along various sections of the road.

2.2.3 Currans Hill Drive

Currans Hill Drive is a local road under the care and maintenance of Camden Council. The road is signposted with a speed limit of 50km/h. A 40km/h school zone exists between Hodges Place and William Mannix Avenue. Parking is generally allowed on both sides of Currans Hill Drive.

2.2.4 Spring Hill Circle

Spring Hill Circle is a local road under the care and maintenance of Camden Council. The road is signposted with a speed limit of 50km/h.

2.2.5 Glenfield Drive

Glenfield Drive is a local road under the care and maintenance of Camden Council. The road is signposted with a speed limit of 50km/h and parking is generally allowed on both sides of the road.

2.3 Current Road Upgrades

2.3.1 Narellan Road

Narellan Road has been upgraded between Camden Valley Way, Narellan and Blaxland Road, Campbelltown. The upgrade has been completed and opened to public April 2018. The upgrade has helped reduce congestion and improve safety and travel time within the vicinity of the subject site.

2.3.2 Camden Valley Way

Camden Valley Way has been upgrade to a four lane divided road with a wide vegetated median. Camden Valley Way now has an off-road shared pedestrian / cyclist path along the western carriageway and bus priority to the new South West Rail Lin Station at Leppington.

2.3.3 The Northern Road

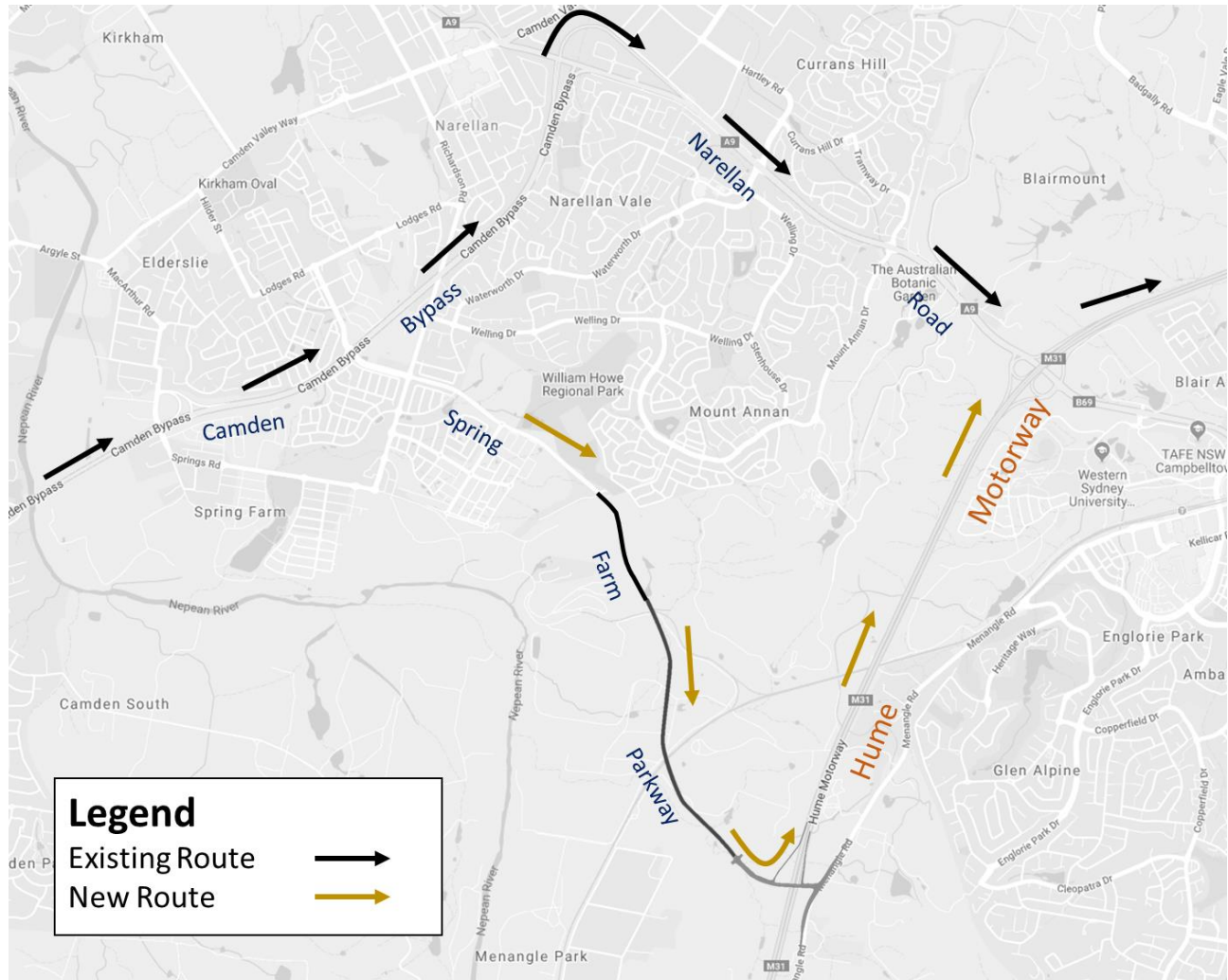
The Northern Road is currently undergoing upgrades between Richmond Road, Bligh Park and Camden Valley Way, Narellan. The upgrades aim to provide more reliable journeys through connections to motorways and new growth areas and provide additional capacity to the road network in anticipation of the significant growth in Western Sydney.

2.3.4 Spring Farm Parkway Extension

The NSW Government is proposing to build a link road from the Menangle Park development area to Menangle Road to support future growth. This 2.5 kilometre road, including north facing motorway ramps, will form part of the future Spring Farm Parkway linking the Camden Bypass, the M31 Hume Motorway and Menangle Road, Menangle Park.

It is anticipated that Spring Farm Parkway will alleviate the traffic issues on Narellan Road. **Figure 2-3** illustrates the new route for those travelling from Camden Bypass to Hume Motorway bypassing Narellan Road.

Figure 2-3 Spring Farm Parkway Extension



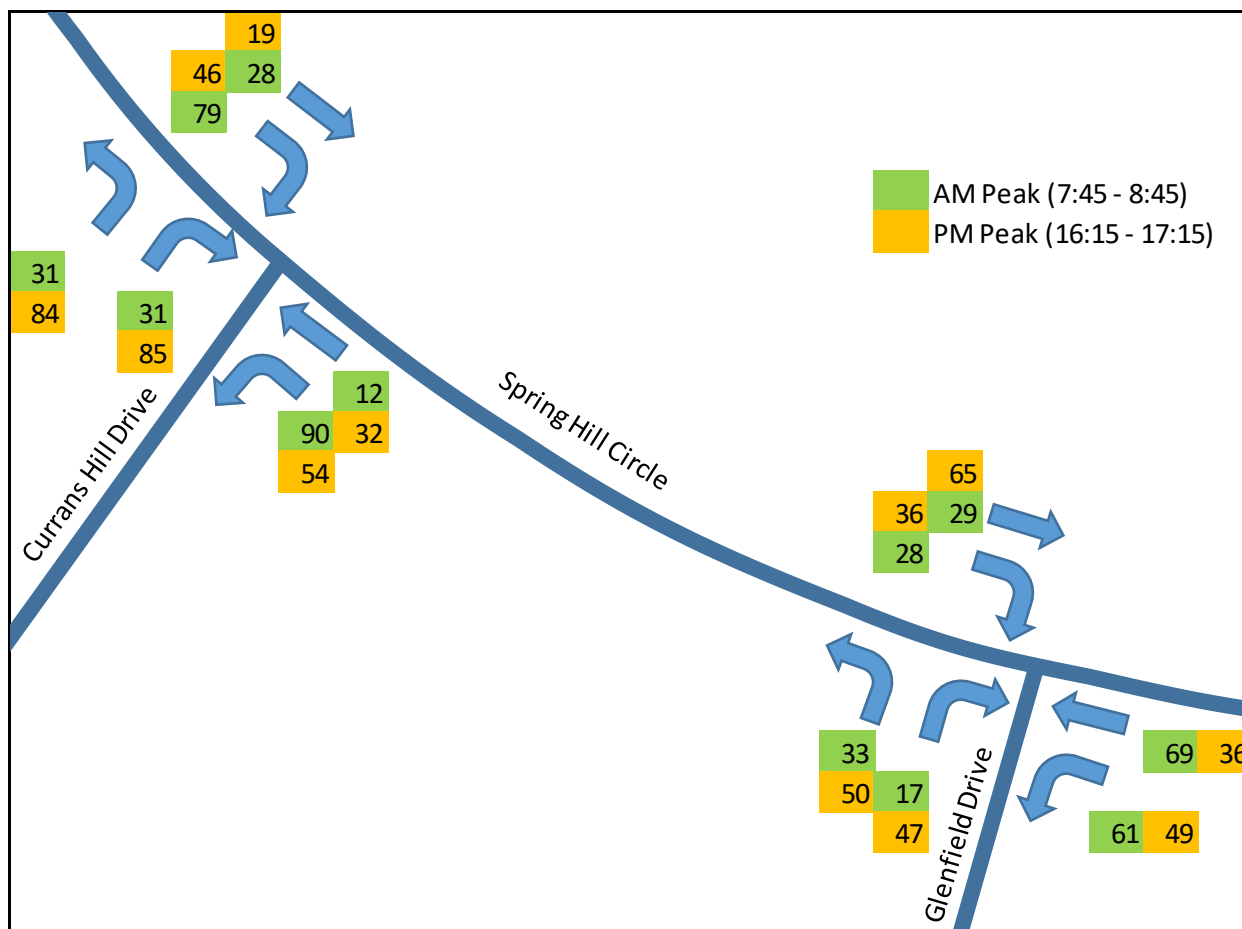
2.4 Existing Traffic Volumes

An indication of the existing traffic volumes in the vicinity of the subject site is provided by peak hour traffic surveys undertaken on 8 December 2016 between 7am-9am and 4pm-6pm at the following intersections:

- > Currans Hill Drive / Spring Hill Circle
- > Spring Hill Circle / Glenfield Drive

The survey data for Currans Hill Drive / Spring Hill Circle and Glenfield Drive / Spring Hill Circle is summarised in **Figure 2-4**.

Figure 2-4 Surveyed Turn Volumes at Spring Hill Circle / Manooka Road (2016)



2.5 Public Transport Service

"Most people are prepared to spend about 10 minutes walking or riding to a high-frequency, direct public transport service such as a train or express bus. This equates to 800 metres walking or two to three kilometres riding. For less frequent or indirect local services, people are generally prepared to walk for up to five minutes, about 400 metres." Department of Infrastructure and Transport (Walking, Riding and Access to Public Transport, 2013).

2.5.1 Existing Bus Services

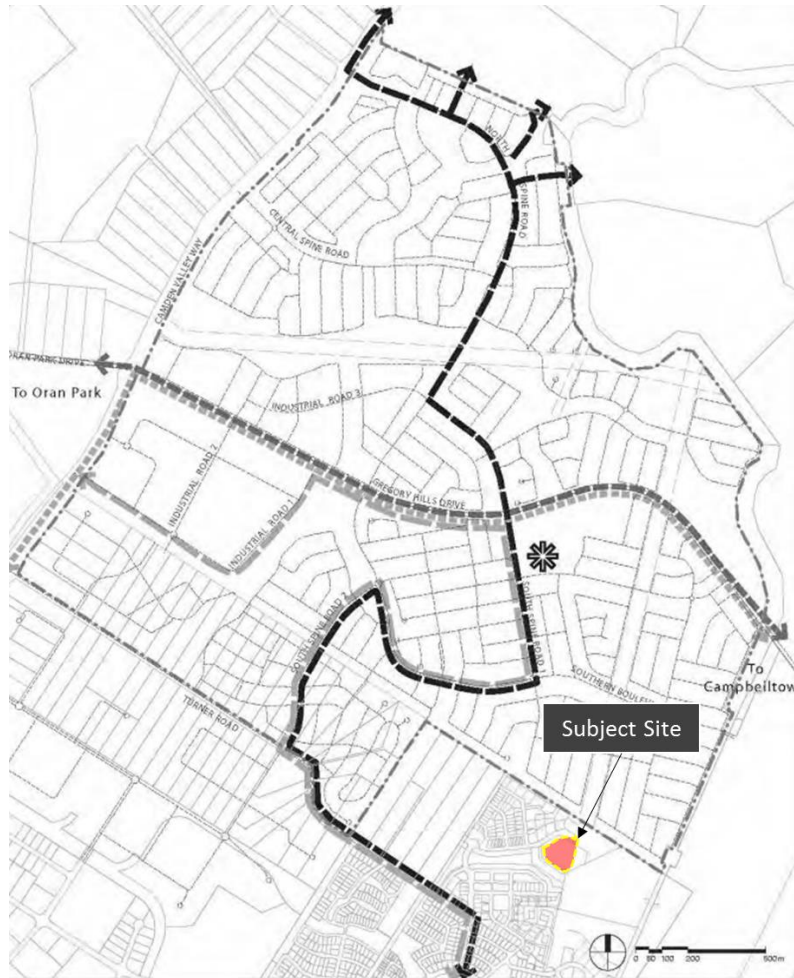
The closest operational bus stops are Glenfield Drive before Spring Hill Circle (2567139) providing services westbound and Glenfield Drive after Spring Hill Circle (2567145) providing services eastbound. According to Google Maps, these bus stops are a 1.3km walk (16 minutes) from the subject site. The following bus services operate from these bus stops:

- > 890 – One (1) service running eastbound to Campbelltown Station at 3:10pm on weekdays.
- > 891 – Runs approximately every 30 minutes and takes about 25 minutes to arrive at Campbelltown Station during morning peak hour.
- > 896 – One (1) service running westbound to Gregory Hills and Oran Park at 7:27 am on weekdays. One (1) service running eastbound to Campbelltown Station at 3:09 pm on weekdays.

2.5.2 Potential Bus Services

Turner Road Precinct DCP proposes a new bus route servicing the Turner Road Precinct travelling from Turner Road to Campbelltown (from Catherine Fields). **Figure 2-5** is sourced from the Turner Road Precinct DCP and illustrates the proposed route for the bus service. This bus route is approximately 500m from the subject site and, if implemented, will provide a service accessible to the subject site.

Figure 2-5 New Bus Route - Turner Road to Campbelltown (from Catherine Fields)



Source: Turner Road Precinct DCP

2.5.3 Train

The Subject site is located approximately 6 km from both Campbelltown Station and Macarthur Station by car. The currently connected rail networks include:

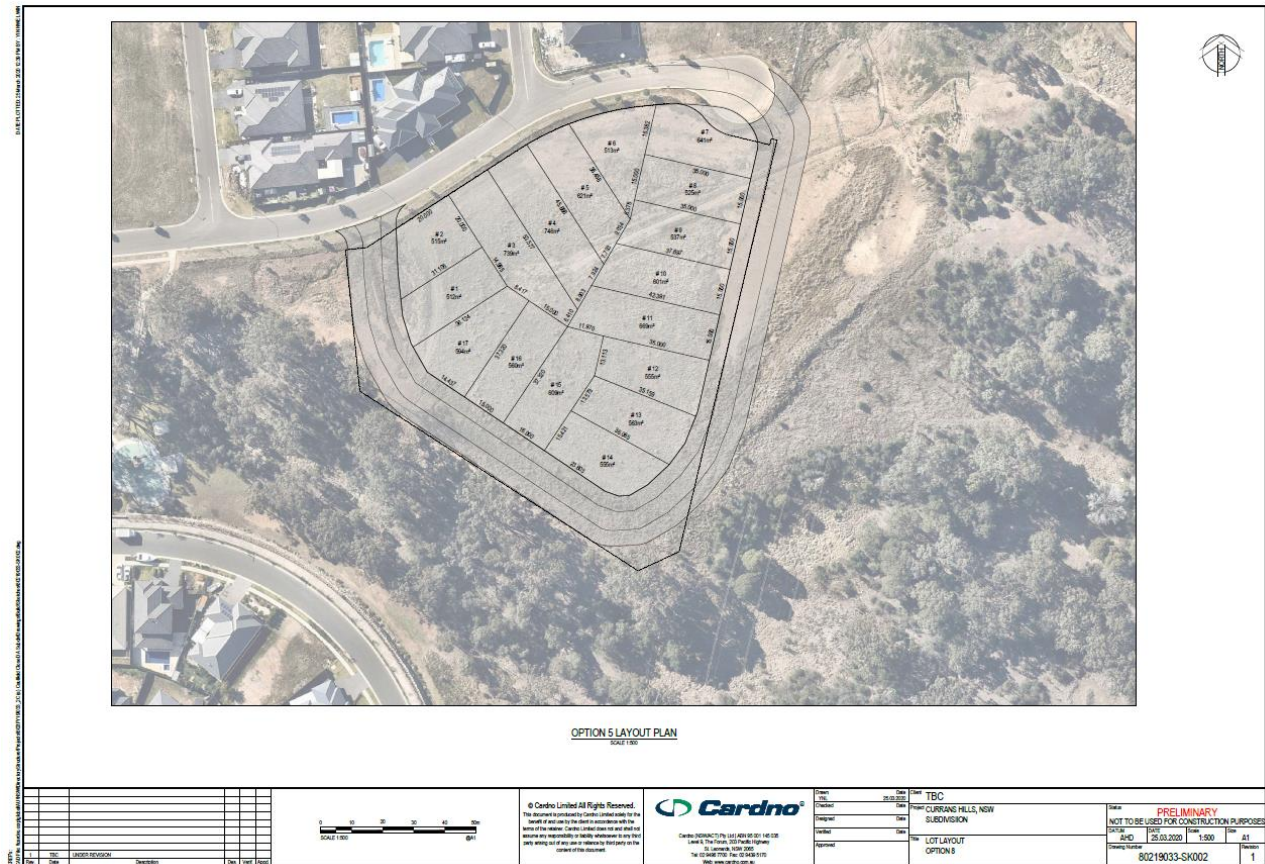
- T2 Airport, Inner West and South Line, comprising three varying routes connecting Sydney CBD to Macarthur, Edmondson Park and Leppington;
- T5 Cumberland Line connecting to Schofields through the Western Suburbs of Sydney, including Parramatta and Blacktown, and
- Southern Highland Line, connecting Campbelltown with rural regional centres such as Bowral and Goulburn.

The future South West Rail Link Extension is proposed to run from the existing Leppington Station to a new station at Narellan, approximately 5 km from the site. This new line will have the potential to connect with the future Western Sydney Airport at Badgerys Creek. This will attract trips to the west of the site for commuters linking with heavy rail transport.

3 Proposed Development

The Planning Proposal would facilitate a potential subdivision of the land into approximately 17 lots for low density dwellings. The built design of houses and driveways is subject to individual development applications and construction certificates.

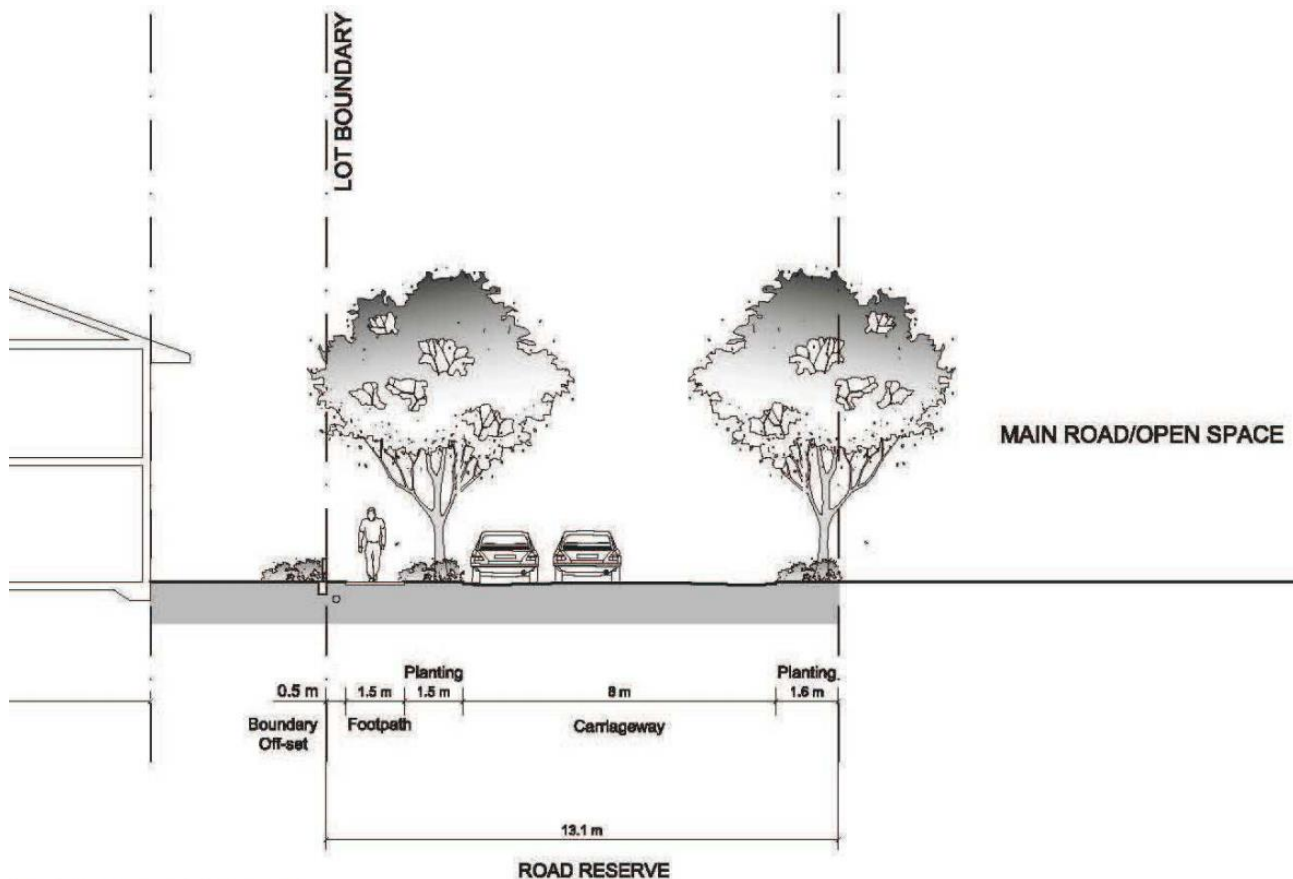
The diagram below illustrates an indicative layout for the subject site.



3.1 Road Layout

Due to the low traffic volumes utilising the road infrastructure, a loop access street is deemed suitable to provide access to the dwellings. **Figure 3-1** illustrates a typical access street cross section.

Figure 3-1 Typical Access Road Cross Section



Source: Camden Growth Centre Precincts Development Control Plan

According to the DCP, the carriageway is to be a minimum width of 8m, however, it can be reduced to a minimum of 6.5m subject to consideration of traffic volumes and road safety issues.

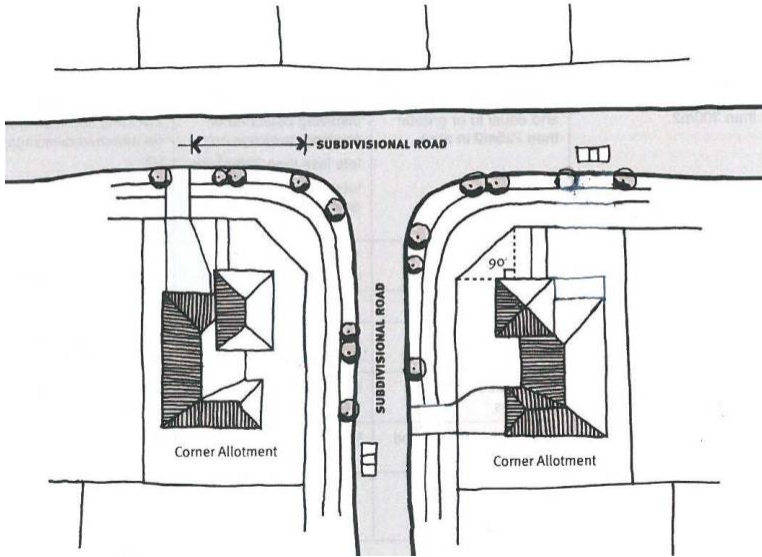
3.2 Driveways

The driveway design and location are to adhere to Council specification and are subject to individual development applications and construction certification.

3.2.1 Corner Lots

Corner lots are to be designed in accordance with AS 2890 and Council's Engineering Specifications. An example of a corner lot driveway layout can be found in Camden Growth Centre DCP and is provided in **Figure 3-2**.

Figure 3-2 Corner Lots Driveway Layout



4 Traffic Impact Assessment

4.1 Traffic Generation

An indication of the traffic generation potential of the proposed development is sourced from the Roads and Maritime's Technical Direction (TDT 2013/04a), which nominates the following traffic generation rates applicable to the proposed development:

Low Density Residential Dwellings (Sydney)

- > AM Peak: 0.95 peak hour vehicle trips per dwelling.
- > PM Peak: 0.99 peak hour vehicle trips per dwelling.

Table 4-1 below summarises the estimated traffic generation of the proposed 17 residential lots.

Table 4-1 Traffic Generation Summary

Land Use	RMS Guide Definition	Quantum	Traffic Generation	
			AM	PM
Residential	Low-Density	17 lots	17 trips	17 trips

Improved public transport infrastructure (such as an extension to the existing bus services to service dwellings in the vicinity of the proposed development) and improved walking and cycling facilities would help reduce reliance on private vehicle usage and will therefore reduce the traffic generation of the development.

When considering the existing approval of 8 dwellings, the site is forecast to **generate an additional 9 peak hour vehicle trips**. This is relatively low, being 1 vehicle movement every 5 minutes which would have a negligible impact on the surrounding local road network and not be of a noticeable difference to the existing neighbourhood. This volume would not adversely impact residential amenity considerations or road safety performance of the local road network. There is no nexus between the application, and increase of 1 vehicle every 5 minutes, with road safety or crash types in the area of Currans Hill.

Furthermore, concerning the consideration of traffic volumes in the determination of carriageway width of an access street, the proposed development can be reduced to a minimum carriageway width of 6.5m.

4.2 Trip Distribution and Assignment

4.2.1 Directional Distribution

The directional distribution and assignment of traffic generated by the proposed development would be influenced by a number of factors:

- > Configuration of the adjoining local road network in the vicinity of the site.
- > Accessibility and suitability of the local road network to cater for additional traffic.
- > Existing operation of intersections providing access around the adjoining road network.
- > Development of a residential lots layout within the subject area.
- > Surroundings employment centres, retail centres and schools in relation to the site.
- > Likely distribution of employee's residences in relation to the site.
- > Configuration of the access arrangement to the site.

Having considered all the above and Census Journey to Work (JTW) data, the directional distribution of development generated traffic is established in **Figure 4-1**.

Figure 4-1 Directional Traffic Distribution



The above figure indicates 70% of generated trips will head east towards Campbelltown and Sydney CBD and 30 % of generated trips will head west towards Camden.

4.2.2 Inbound / Outbound Distribution

The ratio of the inbound and outbound traffic movements is assumed to be 20:80 in the AM peak hour (i.e. 20% inbound and 80% outbound) and 80:20 in the PM peak hour (i.e. 80% inbound and 20% outbound).

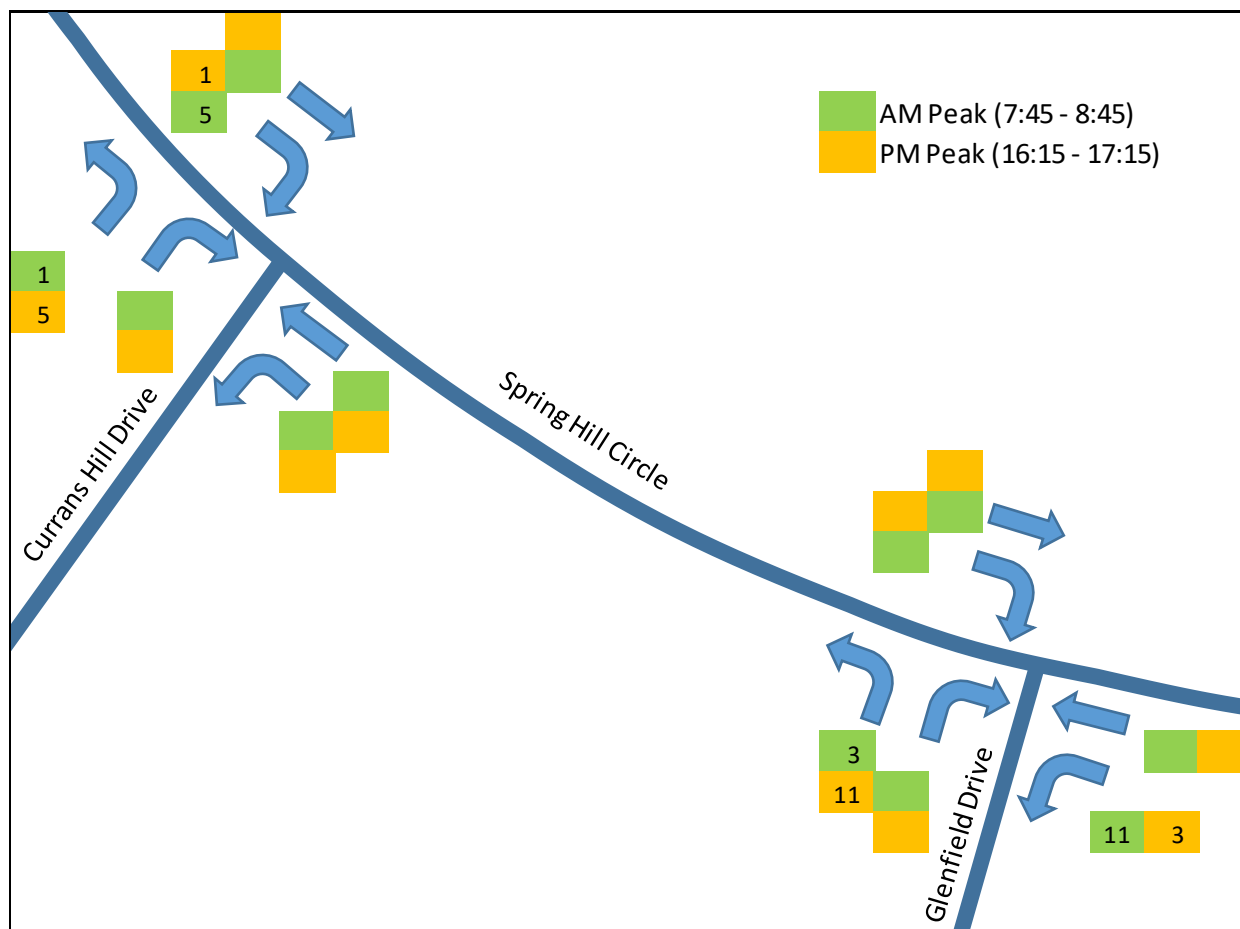
4.2.3 Trip Assignment

For the purposes of this report, the following two (2) intersections will be assessed:

- > Currans Hills Drive / Spring Hill Circle
- > Glenfield Drive / Spring Hill Circle

Figure 4-2 incorporates the aforementioned trip generation and directional split of the proposed development.

Figure 4-2 Traffic Assignment of Stage 2C Caulfield Close



4.3 Level of Service Criteria for intersections

In an urban area, the capacity of a road network can be largely determined by the capacity of the controlling intersections. The existing intersection operating performance was assessed using the SIDRA software package to determine the Degree of Saturation (DOS), Average Delay (AVD in seconds) and Level of Service (LOS) at each intersection. The key indicator of intersection performance is Level of Service, where results are placed on a continuum from 'A' to 'F', as shown in **Table 4-2**.

Table 4-2 Intersection Level of Service

LOS	Traffic Signal / Roundabout	Give Way / Stop Sign / T-Junction Control
A	Good operation	Good operation
B	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	Satisfactory	Satisfactory, but crash study required
D	Operating near capacity	Near capacity and crash study required
E	At capacity at signals, incidents will cause excessive delays	At capacity and requires alternative control model
F	Unsatisfactory and requires additional capacity Roundabout requires alternative control mode	Exceeds capacity and requires alternative control mode

The Average Vehicle Delay (AVD) provides a measure of the operational performance of an intersection as indicated in **Table 4-3** which relates AVD to LOS. The AVDs should be taken as a guide only as longer delays could be tolerated in some locations (i.e. inner city conditions) and on some roads (i.e. minor side street intersection with major arterial route). For traffic signals, the average delay over all movements should be taken. For roundabouts and priority control intersections (sign control) the critical movement for level of service assessment should be that movement with the highest average delay.

Table 4-3 Intersection Average Vehicle Delay

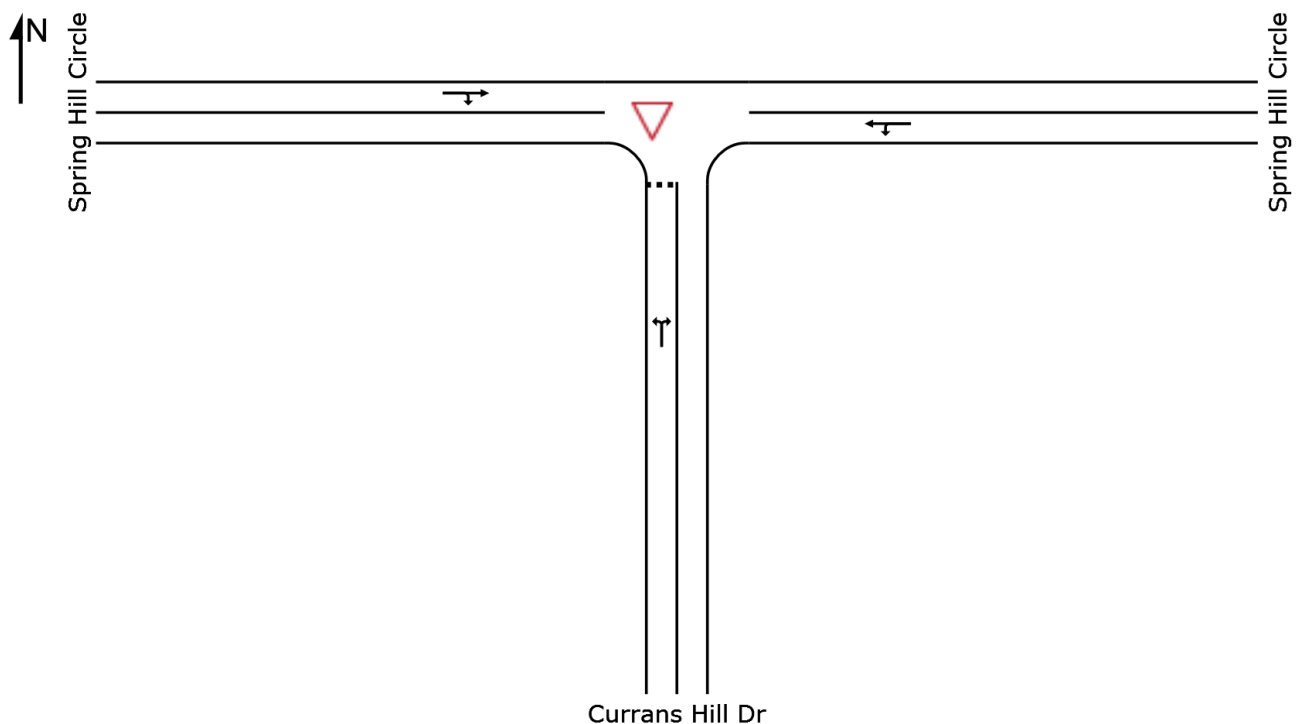
LoS	Average Delay per Vehicle (seconds)
A	Less than 14
B	15 to 28
C	29 to 42
D	43 to 56
E	57 to 70
F	More than 70

The degree of saturation (DOS) is another measure of the operational performance of individual intersections. For intersections controlled by traffic signals both queue length and delay increase rapidly as DOS approaches 1.000. It is usual to attempt to keep DOS to less than 0.9. DOS in the order of 0.7 generally represent satisfactory intersection operation, when DOS exceed 0.9 vehicle queues can be expected.

4.3.2 Currans Hill Drive / Spring Hill Circle

The layout of Currans Hill Drive / Spring Hill Circle is illustrated in **Figure 4-3**.

Figure 4-3 Currans Hill Drive / Spring Hill Circle Intersection Layout



The SIDRA assessment of Currans Hill Drive / Spring Hill Circle intersection is summarised in **Table 4-4**.

Table 4-4 Currans Hills Drive / Spring Hill Circle Intersection

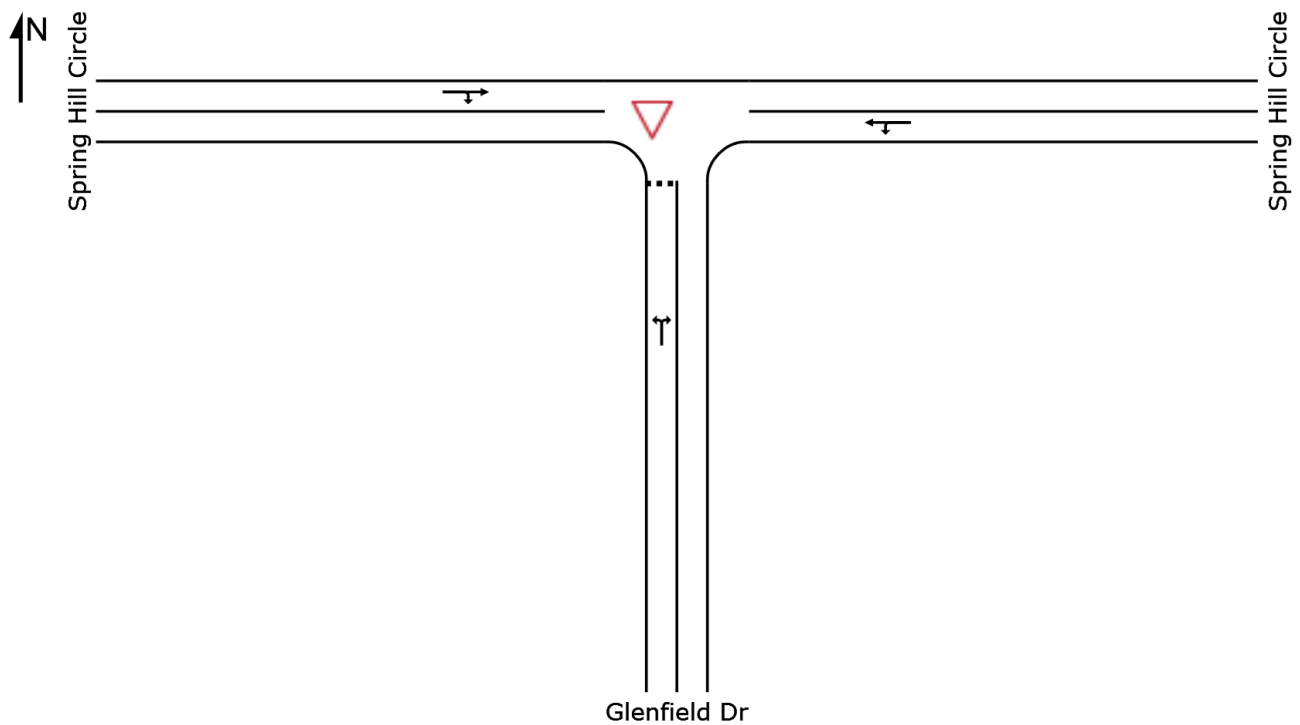
Scenario	AM			PM		
	DOS	Delay (s)	LOS	DOS	Delay (s)	LOS
2021 Base	0.054	5.5	A	0.133	5.1	A
2021 Base + Development	0.055	5.5	A	0.137	5.1	A

The above SIDRA results indicate that the intersection is expected to operate satisfactorily in both the AM and PM peak hour for both assessment scenarios with LOS A. The SIDRA movement summaries are provided in **Appendix A**.

4.3.3 Glenfield Drive / Spring Hill Circle

The layout of Glenfield Drive / Spring Hill Circle is illustrated in **Figure 4-4**.

Figure 4-4 Glenfield Drive / Spring Hill Circle Intersection Layout



The SIDRA assessment of Glenfield Drive / Spring Hill Circle intersection is summarised in **Table 4-5**.

Table 4-5 Glenfield Drive / Spring Hill Circle Intersection

Scenario	AM			PM		
	DOS	Delay (s)	LOS	DOS	Delay (s)	LOS
2021 Base	0.042	5.4	A	0.078	5.2	A
2021 Base + Development	0.044	5.4	A	0.086	5.2	A

The above SIDRA results indicate that the intersection is expected to operate satisfactorily in both the AM and PM peak hour for all assessment scenarios with LOS A. The SIDRA movement summarised are found in **Appendix A**.

5 Conclusions

Cardno has been commissioned by Wolin Investments and Landco Pty Ltd to produce a Traffic Impact Assessment (TIA) to accompany a planning proposal to amend the Minimum Lot Size development Standard applying to a single parcel of land on Caulfield Close at Currans Hill. The site is currently approved for 8 dwellings seeking approval for an increase of 9 additional dwellings.

The following conclusion outlines the analysis and discussions presented within this report:

- > It is anticipated that Spring Farm Parkway Extension will alleviate the traffic issues on Narellan Road.
- > Nearest bus stop is approximately 1km from the subject site with a bus service to Campbelltown running every 30 minutes during peak hours.
- > The proposed increase of 9 dwellings would equate to 1 vehicle movement every 5 minutes which would have a negligible impact on the surrounding local road network and not be of a noticeable difference to the existing neighbourhood.
- > Assessment done on Currans Hill Drive / Spring Hill Circle indicate that no significant impact on the road network will be caused by the proposed development.
- > Assessment done on Glenfield Drive / Spring Hill Circle indicate that no significant impact on the road network will be caused by the proposed development.

APPENDIX

A

SIDRA MOVEMENT SUMMARIES

MOVEMENT SUMMARY

▽ Site: [2021 Base AM Currans Hill Dr x Spring Hill Circle]

Opening Year Base 2021
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Currans Hill Dr											
1	L2	33	9.7	0.054	4.7	LOS A	0.2	1.5	0.05	0.53	45.8
3	R2	33	19.4	0.054	5.5	LOS A	0.2	1.5	0.05	0.53	45.1
Approach		65	14.5	0.054	5.1	LOS A	0.2	1.5	0.05	0.53	45.5
East: Spring Hill Circle											
4	L2	95	6.7	0.060	4.6	LOS A	0.0	0.0	0.00	0.47	46.5
5	T1	13	0.0	0.060	0.0	LOS A	0.0	0.0	0.00	0.47	47.4
Approach		107	5.9	0.060	4.1	NA	0.0	0.0	0.00	0.47	46.6
West: Spring Hill Circle											
11	T1	29	3.6	0.067	0.3	LOS A	0.3	2.3	0.22	0.39	47.3
12	R2	83	1.3	0.067	4.9	LOS A	0.3	2.3	0.22	0.39	45.9
Approach		113	1.9	0.067	3.7	NA	0.3	2.3	0.22	0.39	46.3
All Vehicles		285	6.3	0.067	4.2	NA	0.3	2.3	0.10	0.45	46.2

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.

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MOVEMENT SUMMARY

▽ Site: [2021 Base + Development AM Currans Hill Dr x Spring Hill Circle]

Opening Year Base + Development 2021
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Currans Hill Dr											
1	L2	34	9.4	0.055	4.7	LOS A	0.2	1.5	0.05	0.53	45.8
3	R2	33	19.4	0.055	5.5	LOS A	0.2	1.5	0.05	0.53	45.1
Approach		66	14.3	0.055	5.1	LOS A	0.2	1.5	0.05	0.53	45.5
East: Spring Hill Circle											
4	L2	95	6.7	0.060	4.6	LOS A	0.0	0.0	0.00	0.47	46.5
5	T1	13	0.0	0.060	0.0	LOS A	0.0	0.0	0.00	0.47	47.4
Approach		107	5.9	0.060	4.1	NA	0.0	0.0	0.00	0.47	46.6
West: Spring Hill Circle											
11	T1	29	3.6	0.070	0.3	LOS A	0.3	2.4	0.22	0.40	47.2
12	R2	88	1.2	0.070	4.9	LOS A	0.3	2.4	0.22	0.40	45.9
Approach		118	1.8	0.070	3.8	NA	0.3	2.4	0.22	0.40	46.3
All Vehicles		292	6.1	0.070	4.2	NA	0.3	2.4	0.10	0.45	46.2

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.

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MOVEMENT SUMMARY

▽ Site: [2021 Base PM Currans Hill Dr x Spring Hill Circle]

Opening Year Base 2021
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Currans Hill Dr											
1	L2	88	1.2	0.133	4.7	LOS A	0.5	3.7	0.11	0.53	45.9
3	R2	87	3.6	0.133	5.1	LOS A	0.5	3.7	0.11	0.53	45.4
Approach		176	2.4	0.133	4.9	LOS A	0.5	3.7	0.11	0.53	45.6
East: Spring Hill Circle											
4	L2	57	5.6	0.049	4.6	LOS A	0.0	0.0	0.00	0.34	47.3
5	T1	34	0.0	0.049	0.0	LOS A	0.0	0.0	0.00	0.34	48.1
Approach		91	3.5	0.049	2.9	NA	0.0	0.0	0.00	0.34	47.6
West: Spring Hill Circle											
11	T1	20	0.0	0.040	0.2	LOS A	0.2	1.3	0.19	0.37	47.4
12	R2	48	2.2	0.040	4.8	LOS A	0.2	1.3	0.19	0.37	46.1
Approach		68	1.5	0.040	3.5	NA	0.2	1.3	0.19	0.37	46.5
All Vehicles		335	2.5	0.133	4.1	NA	0.5	3.7	0.10	0.44	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.

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MOVEMENT SUMMARY

 **Site: [2021 Base + Development PM Currans Hill Dr x Spring Hill Circle]**

Opening Year Base + Development 2021
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	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 per veh	Average Speed km/h
South: Currans Hill Dr											
1	L2	94	1.1	0.137	4.7	LOS A	0.5	3.8	0.11	0.53	45.9
3	R2	87	3.6	0.137	5.1	LOS A	0.5	3.8	0.11	0.53	45.4
Approach		181	2.3	0.137	4.9	LOS A	0.5	3.8	0.11	0.53	45.6
East: Spring Hill Circle											
4	L2	57	5.6	0.049	4.6	LOS A	0.0	0.0	0.00	0.34	47.3
5	T1	34	0.0	0.049	0.0	LOS A	0.0	0.0	0.00	0.34	48.1
Approach		91	3.5	0.049	2.9	NA	0.0	0.0	0.00	0.34	47.6
West: Spring Hill Circle											
11	T1	20	0.0	0.041	0.2	LOS A	0.2	1.3	0.19	0.37	47.4
12	R2	49	2.1	0.041	4.8	LOS A	0.2	1.3	0.19	0.37	46.1
Approach		69	1.5	0.041	3.5	NA	0.2	1.3	0.19	0.37	46.5
All Vehicles		341	2.5	0.137	4.1	NA	0.5	3.8	0.10	0.45	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.

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MOVEMENT SUMMARY

▽ Site: [2021 Base AM Glenfield Dr x Spring Hill Circle]

Opening Year Base 2021
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
		Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m		per veh	km/h
South: Glenfield Dr											
1	L2	35	15.2	0.042	4.9	LOS A	0.2	1.2	0.17	0.52	46.0
3	R2	18	17.6	0.042	5.4	LOS A	0.2	1.2	0.17	0.52	45.5
Approach		53	16.0	0.042	5.1	LOS A	0.2	1.2	0.17	0.52	45.8
East: Spring Hill Circle											
4	L2	64	1.6	0.073	4.6	LOS A	0.0	0.0	0.00	0.25	48.1
5	T1	73	1.4	0.073	0.0	LOS A	0.0	0.0	0.00	0.25	48.6
Approach		137	1.5	0.073	2.2	NA	0.0	0.0	0.00	0.25	48.3
West: Spring Hill Circle											
11	T1	31	0.0	0.037	0.4	LOS A	0.2	1.2	0.22	0.26	48.1
12	R2	29	17.9	0.037	5.2	LOS A	0.2	1.2	0.22	0.26	46.9
Approach		60	8.8	0.037	2.7	NA	0.2	1.2	0.22	0.26	47.5
All Vehicles		249	6.3	0.073	2.9	NA	0.2	1.2	0.09	0.31	47.6

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.

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MOVEMENT SUMMARY

▽ Site: [2021 Base + Development AM Glenfield Dr x Spring Hill Circle]

Opening Year Base + Development 2021
Giveway / Yield (Two-Way)

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
South: Glenfield Dr											
1	L2	38	13.9	0.044	4.9	LOS A	0.2	1.3	0.17	0.52	46.0
3	R2	18	17.6	0.044	5.4	LOS A	0.2	1.3	0.17	0.52	45.5
Approach		56	15.1	0.044	5.1	LOS A	0.2	1.3	0.17	0.52	45.9
East: Spring Hill Circle											
4	L2	76	1.4	0.079	4.6	LOS A	0.0	0.0	0.00	0.28	48.0
5	T1	73	1.4	0.079	0.0	LOS A	0.0	0.0	0.00	0.28	48.4
Approach		148	1.4	0.079	2.3	NA	0.0	0.0	0.00	0.28	48.2
West: Spring Hill Circle											
11	T1	31	0.0	0.038	0.4	LOS A	0.2	1.2	0.23	0.26	48.1
12	R2	29	17.9	0.038	5.3	LOS A	0.2	1.2	0.23	0.26	46.9
Approach		60	8.8	0.038	2.8	NA	0.2	1.2	0.23	0.26	47.5
All Vehicles		264	6.0	0.079	3.0	NA	0.2	1.3	0.09	0.32	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.

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MOVEMENT SUMMARY

▽ Site: [2021 Base PM Glenfield Dr x Spring Hill Circle]

Opening Year Base 2021
Giveway / Yield (Two-Way)

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
South: Glenfield Dr											
1	L2	53	4.0	0.078	4.7	LOS A	0.3	2.1	0.12	0.53	46.3
3	R2	49	0.0	0.078	5.2	LOS A	0.3	2.1	0.12	0.53	45.9
Approach		102	2.1	0.078	4.9	LOS A	0.3	2.1	0.12	0.53	46.1
East: Spring Hill Circle											
4	L2	52	2.0	0.048	4.6	LOS A	0.0	0.0	0.00	0.31	47.8
5	T1	38	2.8	0.048	0.0	LOS A	0.0	0.0	0.00	0.31	48.2
Approach		89	2.4	0.048	2.6	NA	0.0	0.0	0.00	0.31	48.0
West: Spring Hill Circle											
11	T1	68	0.0	0.060	0.2	LOS A	0.2	1.5	0.14	0.19	48.6
12	R2	38	5.6	0.060	4.9	LOS A	0.2	1.5	0.14	0.19	47.6
Approach		106	2.0	0.060	1.8	NA	0.2	1.5	0.14	0.19	48.2
All Vehicles		298	2.1	0.078	3.1	NA	0.3	2.1	0.09	0.34	47.4

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.

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MOVEMENT SUMMARY

 **Site: [2021 Base + Development PM Glenfield Dr x Spring Hill Circle]**

Opening Year Base + Development 2021
Giveway / Yield (Two-Way)

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
South: Glenfield Dr											
1	L2	64	3.3	0.086	4.7	LOS A	0.3	2.3	0.11	0.53	46.3
3	R2	49	0.0	0.086	5.2	LOS A	0.3	2.3	0.11	0.53	45.9
Approach		114	1.9	0.086	4.9	LOS A	0.3	2.3	0.11	0.53	46.2
East: Spring Hill Circle											
4	L2	55	1.9	0.050	4.6	LOS A	0.0	0.0	0.00	0.32	47.7
5	T1	38	2.8	0.050	0.0	LOS A	0.0	0.0	0.00	0.32	48.2
Approach		93	2.3	0.050	2.7	NA	0.0	0.0	0.00	0.32	47.9
West: Spring Hill Circle											
11	T1	68	0.0	0.060	0.2	LOS A	0.2	1.5	0.14	0.19	48.6
12	R2	38	5.6	0.060	4.9	LOS A	0.2	1.5	0.14	0.19	47.6
Approach		106	2.0	0.060	1.8	NA	0.2	1.5	0.14	0.19	48.2
All Vehicles		313	2.0	0.086	3.2	NA	0.3	2.3	0.09	0.35	47.4

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.

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