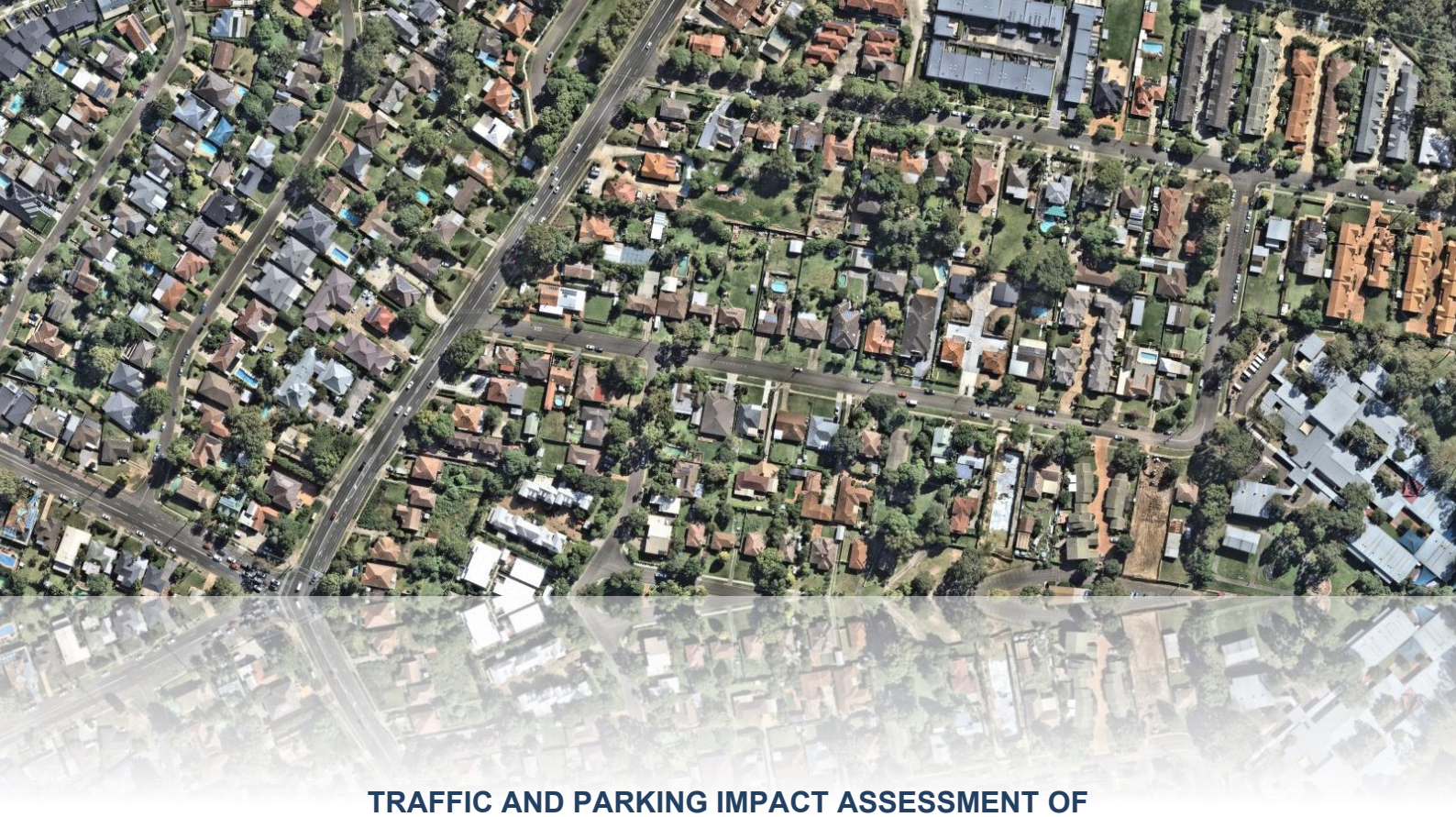

TRAFFIC AND PARKING IMPACT ASSESSMENT OF THE PROPOSED CHILD CARE CENTRE AT 5 MARY STREET, NORTHMEAD

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220918.01FA - 10 August 2023

Development Type: **Child Care Centre**

Site Address: **5 Mary Street, Northmead**

Prepared for: **Janssen Designs**

Document reference: **220918.01FA**

Status	Issue	Prepared By	Checked By	Approved By	Date
Draft	A	KL / MF	LS		1 August 2023
Final	A	MF	LS		10 August 2023

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1 INTRODUCTION

M^CLaren Traffic Engineering was commissioned by *Janssen Designs* to provide a traffic and parking impact assessment of the proposed Child Care Centre at 5 Mary Street, Northmead as depicted in **Annexure A**.

1.1 Description and Scale of Development

The proposed development has the following characteristics relevant to traffic and parking:

- Proposed child care centre accommodating 90 children and 14 staff with the following split:
  - 20 children between 0-2 years old (5 staff applied at a rate of 1 per 4 children);
  - 20 children between 2-3 years old (4 staff applied at a rate of 1 per 5 children);
  - 50 children between 3-6 years old (5 staff applied at a rate of 1 per 10 children);
- An at-grade parking area with vehicular access via a proposed two-way driveway from Mary Street, accommodating a total of 24 car parking spaces including:
  - 10 visitor car parking spaces including one (1) accessible car parking space;
  - 14 staff car parking spaces.

1.2 State Environmental Planning Policy (Transport and Infrastructure) 2021

The proposed development does not qualify as a traffic generating development with relevant size and/or capacity under *Clause 2.122* of the *SEPP (Transport and Infrastructure) 2021*. Accordingly, formal referral to Transport for NSW (TfNSW) is unnecessary and the application can be assessed by Parramatta City Council officers accordingly.

1.3 Site Description

The subject site is zoned *R2 – Low Density Residential* under the *Parramatta Local Environmental Plan 2023* and is currently occupied by a single dwelling. The site has a single frontage to Mary Street to the south.

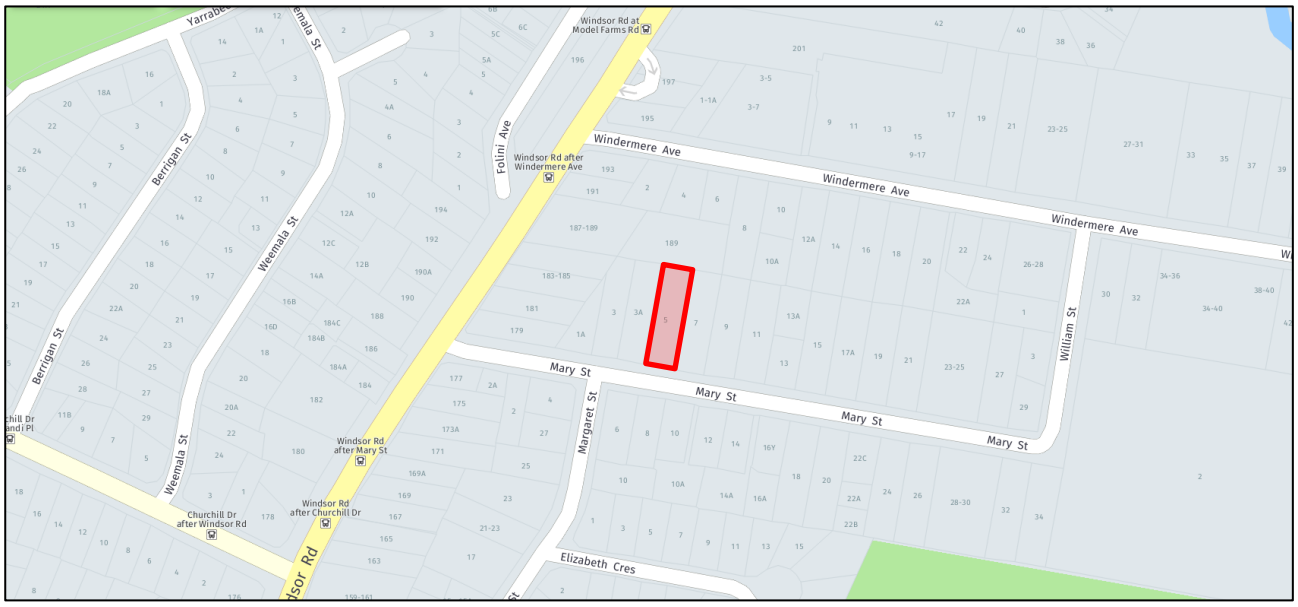
The site is generally surrounded by low to medium density residential developments with the Hills School is located approximately 300m to the east of the site.

1.4 Site Context

The location of the site is shown on an aerial photo and a street map in **Figure 1** and **Figure 2** respectively.

Site Location

FIGURE 1: SITE CONTEXT – AERIAL PHOTO



Site Location

FIGURE 2: SITE CONTEXT – STREET MAP

2 EXISTING TRAFFIC AND PARKING CONDITIONS

2.1 Road Hierarchy

The road network servicing the site has characteristics as described in the following sub-sections.

2.1.1 Mary Street

- Unclassified LOCAL Road;
- Approximately 10m wide carriageway facilitating one (1) traffic flow lane in each direction and kerbside parking on both sides of the road;
- Signposted 50km/h speed limit;
- 40km/h speed limit applies during school zone hours in front of and to the east of the site's frontage;
- Unrestricted kerbside parking permitted along both sides of the road.

2.1.2 Windsor Road

- TfNSW Classified STATE ARTERIAL Road (No. 184);
- Approximately 13m wide carriageway generally facilitating two (2) traffic flow lanes in each direction;
    - An AM / PM contraflow operates south of the signalised intersection of Churchill Drive / Windsor Road whereby one additional lane is provided in the southbound direction during the AM peak hour period, resulting in the loss of one northbound lane during the AM peak period;
- The kerbside lane in the southbound direction is linemarked as "BUS LANE AM" from approximately 120m south from the intersection of Churchill Drive / Windsor Road.
- Signposted 60km/h speed limit;
- Clearway restrictions apply on both sides of the road at all times.

2.1.3 Windermere Avenue

- Unclassified COLLECTOR Road;
- Approximately 10m wide carriageway facilitating one (1) traffic flow lane in each direction and kerbside parking on both sides of the road;
- Signposted 50km/h speed limit;
- Generally, unrestricted kerbside parking is permitted along both sides of the road.

2.1.4 Margaret Street

- Unclassified LOCAL Road;
- Approximately 8m wide carriageway facilitating two-way traffic flow and kerbside parking on both sides of the road;
- Default 50km/h speed limit;

- Generally unrestricted kerbside parking is permitted along both sides of the road;
    - Signposted *"No Parking During Sporting Fixtures"* restrictions apply along the eastern side of the carriageway.

2.2 Existing Traffic Management

- Priority controlled intersection of Mary Street / Margaret Street;
- Priority controlled intersection of Windsor Road / Mary Street;
- Priority controlled intersection of Windsor Road / Windermere Street;
    - Signposted restrictions to vehicles exceeding 3 tonnes from accessing Windermere Street from Windsor Road;
    - "*No Right Turn*" restrictions apply at the south Windsor Road approach between the hours of 6AM - 10AM & 3PM - 7PM Monday to Friday, buses excepted.
- Priority controlled intersection of Anderson Road / Margaret Street;
- Signalised intersection of Windsor Road / Anderson Road;
    - Signposted "*No Left Turn, Vehicles under 6m Excepted*" restriction applies at the south Windsor Road approach;
    - Signposted "*No Right Turn*" restrictions apply at the north Windsor Road approach;
    - Signposted "*Left Turn on Red Permitted After Stopping*" at the NBC Sports Club access driveway approach to the intersection;
    - Signposted restrictions to vehicles exceeding 3 tonnes from accessing Anderson Road.

2.3 Existing Traffic Environment

Turning movement count traffic surveys were conducted at the intersections of Windsor Road / Mary Street, Mary Street / Margaret Street, William Street / Windermere Avenue, Anderson Road / Margaret Street and Windsor Road / Anderson Road from 7:00am to 9:30am and 2:30pm to 6:00pm on Tuesday 6 June 2023 representing a typical operating weekday. The full survey results are shown in **Annexure B** for reference.

2.3.1 Existing Road Performance

The performance of the surrounding intersections under the existing traffic conditions has been assessed using SIDRA INTERSECTION 9.1. **Table 1** summarises the resultant intersection performance data, with full SIDRA results reproduced in **Annexure C**.

The following considerations have been undertaken to ensure a realistic calibrated model:

- Consideration to the TCS Plan for signalised intersection Windsor Road / Anderson Road (**Annexure D**);
- A review of the phase length and cycle times based upon video footage which is reproduced in **Annexure E** for reference:
    - Output cycle and phase lengths fall within observed cycle and phase lengths.
- Validation of the model using approach queue lengths for the southern approach of Windsor Road with consideration to the following input modifications:
    - Observed average queue lengths along Windsor Road and Anderson Street.

TABLE 1: EXISTING INTERSECTION PERFORMANCES (SIDRA INTERSECTION 9.1)

Intersection	Peak Hour	Degree of Saturation[1]	Average Delay[2] (sec/veh)	Level of Service[3][4]	Control Type	Worst Movement
EXISTING PERFORMANCE						
Windsor Rd / Mary St	AM	1.03	1.8 (Worst: >70)	**NA** (Worst: F)	Give Way	RT from Windsor Rd
	PM	1.03	0.8 (Worst: >70)	**NA** (Worst: F)		RT from Windsor Rd
Margaret St / Mary St	AM	0.05	3.9 (Worst: 4.9)	**NA** (Worst: A)	Give Way	RT from Mary St
	PM	0.05	3.5 (Worst: 4.9)	**NA** (Worst: A)		RT from Mary St
Windermere Ave / Mary St / William St	AM	0.05	2.5 (Worst: 5.1)	**NA** (Worst: A)	Give Way	RT from Mary St / William St
	PM	0.05	2.1 (Worst: 5.3)	**NA** (Worst: A)		RT from Mary St / William St
Anderson Rd / Margaret St	AM	0.06	2.9 (Worst: 5.1)	**NA** (Worst: A)	Give Way	RT from Margaret St
	PM	0.05	2.7 (Worst: 5.1)	**NA** (Worst: A)		RT from Anderson Rd
Anderson Rd / Windsor Rd	AM	0.78	9.6	**A**	Signals	RT from Windsor Rd
	PM	0.81	9.7	**A**		RT from Anderson Rd

Notes:

(1) The Degree of Saturation is the ratio of demand to capacity for the most disadvantaged movement.

(2) The average delay is the delay experienced on average by all vehicles. The value in brackets represents the delay to the most disadvantaged movement.

(3) The Level of Service is a qualitative measure of performance describing operational conditions. There are six levels of service, designated from A to F, with A representing the best operational condition and level of service F the worst. The LoS of the intersection is shown in bold, and the LoS of the most disadvantaged movement is shown in brackets.

(4) No overall Level of Service is provided for Give Way and Stop controlled intersections as the low delays associated with the dominant movements skew the average delay of the intersection. The Level of Service of the worst approach is an indicator of the operation of the intersection, with a worse Level of Service corresponding to long delays and reduced safety outcomes for that approach.

As shown, most of the relevant intersections are currently performing at a high level of efficiency, with an overall or worst movement Level of Service “A” condition in both the AM & PM peak hour periods. The Level of Service “A” performance is characterised by low approach delays and spare capacity. However, the intersection of Windsor Road / Mary Street is currently operating with a worst movement Level of Service “F” condition in both the AM & PM peak hour periods. The worst movement Level of Service “F” performance is indicative of high delays and low to nil capacity remaining.

It should be noted that in some circumstances, with intersections controlled by give way and stop signs, simply examining the highest individual average delay can be misleading. The size of the movement with the highest average delay per vehicle should also be taken into account. Thus, for example, an intersection where all movements are operating at a level of service “A”, except one which is at level of service “F”, may not necessarily define the intersection level of service as “F” if that movement is of a relatively small traffic volume. That is, longer delays to a small number of vehicles may not justify upgrading an intersection unless a safety issue were also involved.

The worst movement causing the “F” Level of Service is the right turn movement from Mary Street to Windsor Road northbound. In the AM and PM peak hour periods, the observed peak hour volumes of this movement where nil (0) and one (1) vehicle, respectively. The remaining movements in the intersection operate with a movement Level of Service of “A”.

In comparison to the above volumes, the left turn movement from Mary Street had higher volumes of eight (8) and 12 vehicles in the AM and PM peak hour periods, respectively. This suggests that the drivers at the intersection are aware of the high delays required to turn right at this intersection associated with the high two-way flows along Windsor Road and find alternative routes. Indeed, the signalised intersection of Windsor Road / Anderson Road is accessible by vehicles in Mary Street via Margaret Street and Anderson Road, where there are noted to be a high proportion of vehicles turning right from Anderson Road in both the AM and PM peak hour volumes. Accordingly, it is considered likely that drivers from the surrounding residential area travel via this intersection in order to travel northbound along Windsor Road.

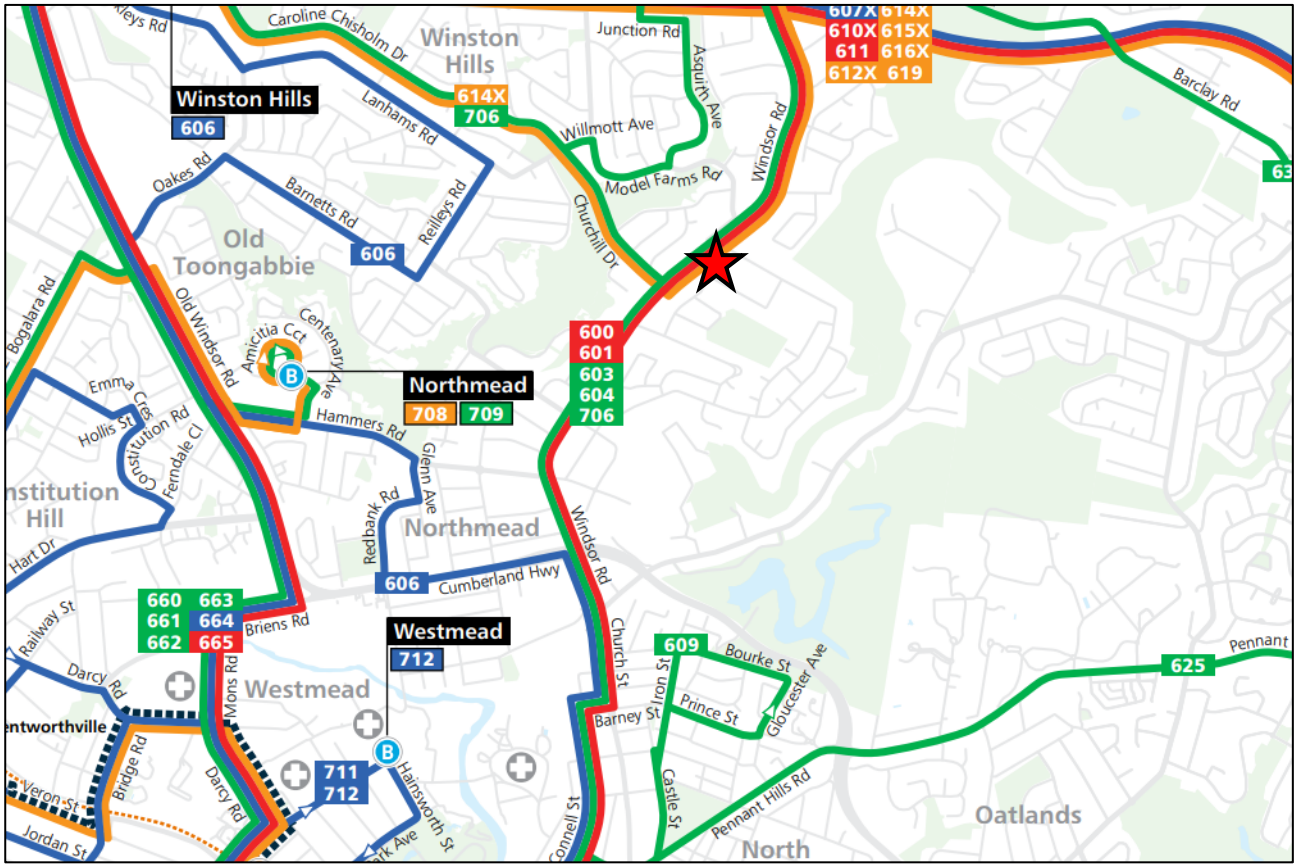
Based upon TfNSW crash data from their website, there are no existing cluster of accidents at the intersection of Windsor Road / Mary Street. Therefore, the low right turn volumes from Mary Street at this intersection should not define the operation of the intersection as unacceptable and consideration to intersection upgrades is not required.

2.4 Public Transport

The subject site has access to the existing bus stops (ID: 215235 & ID: 215236) which are located approximately 270m walking distance northwest and 220m walking distance to the southwest of the site respectively on Windsor Road. The bus stops collectively service existing bus routes 600 (Hornsby to Parramatta), 601 (Rouse Hill Station to Parramatta via Hills Showground), 603 (Rouse Hill Station to Parramatta via Glenhaven) and 614X (Crestwood to City QVB Express Service) provided by Hillsbus Bus Services.

There are no nearby train stations within an accessible walking distance of the site.

The location of the site subject to the surrounding public transport network is shown in **Figure 3**.



Site Location

FIGURE 3: PUBLIC TRANSPORT NETWORK MAP

2.5 Future Road and Infrastructure Upgrades

From Parramatta City Council Development Application tracker and website, it appears that there are no future planned road or public transport changes that will affect traffic conditions within the immediate vicinity of the subject site.

3 PARKING ASSESSMENT

3.1 Council Parking Requirement

Reference is made to *The Hills Development Control Plan 2012 Part C Section 1 Parking* (hereafter referred to as THDCP 2012) which designates the following parking rates applicable to the proposed development:

> ***2.1 General Parking Requirements***
>
> ***Table 1*** *Required Minimum Car Parking Provisions*
>
> | | |
> |---|---|
> | *Child Care Centres#* | *1 space per employee plus 1 space per 6 children enrolled for visitors and/or parent parking*

Also see 2.1.1. (e) |
>
> *# Set down areas are to be provided for these land uses – refer to section 2.6.*
>
> ***2.1.1. General***
>
> *(e) Car parking for child care centres must be situated in a convenient location, allowing for safe movement of children to and from the centre.*

Table 2 presents the parking requirements of the proposal according to THDCP 2012 parking requirements.

TABLE 2: THDCP 2012 PARKING REQUIREMENTS

Land Use	Scale	Rate	Spaces Required	Spaces Provided
Child Care Centre	90 Children	1 per 6 children	15	10
	14 Staff	1 per staff member	14	14
TOTAL	**-**	**-**	**29**	**24**

As shown, strict application of THDCP 2012 results in a required provision of **29** car parking spaces (with **15** for visitor use and **14** for staff use). The proposed plans detail the provision of **24** car parking spaces (including **10** for visitor use and **14** for staff use), resulting in a numerical shortfall of five (**5**) visitor spaces from THDCP 2012 requirements.

However, the City of Parramatta Council recently released a draft Parramatta Development Control Plan for public exhibition which is expected to prevail over The Hills DCP when it comes into effect. This DCP will consolidate five DCPs that currently apply across the City of Parramatta LGA, including The Hills DCP 2012. The relevant parking rates provided in the *Draft Parramatta Development Control Plan 2023* (DPDCP 2023) are reproduced below for reference:

6.2 Parking and Vehicular Access

Table 6.3.1 - Minimum car parking rates

Child care centres	*1 space for every 4 children in attendance*

Table 3 presents the parking requirements of the proposal according to the Draft Parramatta Development Control Plan 2023.

TABLE 3: DPDCP 2023 PARKING REQUIREMENTS

Land Use	Scale	Rate	Spaces Required	Spaces Provided
Child Care Centre	90 Children	1 per 4 children	23	24
TOTAL	**-**	**-**	**23**	**24**

As shown, the Draft Parramatta DCP requires a minimum provision of **23** car parking spaces when it comes into effect. This is a lower parking requirement than that currently required by THDCP 2012. The proposed plans detail the provision of **24** car parking spaces, exceeding DPDCP 2023 parking requirements by one (**1**) space. It is expected that the new DCP will come into effect imminently (September 2023 according to the Project Timeline on City of Parramatta Council's website) and accordingly, the shortfall from current THDCP 2012 requirements can be disregarded in this instance. In any case, an assessment of expected visitor parking demand is provided in **Section 3.1.1** below.

3.1.1 Car Parking Demand Analysis

In order to assess the peak demand of the child care centre parent car parking, conventional queuing theory has been employed. The results are reproduced within **Annexure F** with relevant details and assumptions provided below:

- An 8-minute 16-seconds service time for each parking space (i.e. a parent uses a parking space for approximately 8-minutes 16-seconds to drop off/ pickup their child);
    - This is sourced from *TfNSW – Roads and Maritime Services Validation Trip Generation Survey Child Care Centres* report (September 2015);
- Afternoon peak hour traffic generation of 63 trips (32 in, 31 out) is used as outlined within **Section 4.1**.

By applying conventional queuing theory, it has been determined that nine (**9**) car spaces can adequately accommodate the 98th percentile parent demand in the PM peak period. The proposed plans depict ten (**10**) spaces dedicated for child care centre visitor use, exceeding the peak demand for the proposed use and complying with AS2890.1:2004 requirements.

3.2 Parking for People with Disabilities

THDCP 2012 does not outline car parking rates for people with disabilities applicable to child care centre developments. However, the DPDCP 2023 states that *"The number of accessible car parking spaces to be provided as prescribed in Table D3.5 of the Building Code of Australia".* It is noted that the reference to Table D3.5 refers to the 2019 version of the Building Code of Australia (BCC) which has since been superceded by Section D4D6 within the 2022 update to the National Construction Code (NCC).

As such, reference is made to the *Section D4D6* of the *Building Code of Australia* (BCA) as part of the *National Construction Code 2022* (NCC) which categorises a child care centre as a Class 9b building and therefore requires the provision of car parking for people with disabilities at a rate of:

Class 9b *1 space for every 50 carparking spaces or part thereof.*

In accordance with the BCA requirements, one (**1**) car parking space for people with disabilities is to be provided. The proposed car parking layout details the provision of one (**1**) car parking space designed in accordance with *AS2890.6:2022*, complying with BCA requirements.

3.3 Bicycle & Motorcycle Parking Requirements

3.3.1 The Hills DCP 2012 Bicycle and Motorcycle Requirements

The Hills Council DCP 2012 does not require the provision of bicycle or motorcycle parking for a child care centre with a 24 space car park. Accordingly, no bicycle / motorcycle parking facilities have been provided, thus satisfying THDCP 2012 requirements.

3.3.2 Draft Parramatta DCP 2023 Bicycle and Motorcycle Requirements

Reference is made to the *Draft Parramatta Development Control Plan 2023* (DPDCP 2023), Part 6.3 Bicycle Parking which states the following bicycle parking requirements applicable to the proposed development:

> *"If a particular land use is not addressed in Table 6.4.1, bicycle parking is to be provided in accordance with one of the following, whichever is the greater:*
>
> - *in accordance with Austroads (2008) Guide to Traffic Management – Part 11: Parking (AGTM11-08), or*
> - *at a rate of 0.2 spaces per car parking space that would normally be required."*

It also states that:

> *"Unless otherwise specified, provision for motorcycle parking should be provided at a rate of 1 space per 50 car parking spaces, or part thereof."*

The referenced "*Austroads (2008) Guide to Traffic Management*" document from the DCP has been updated to *Austroads Guide to Traffic Management Part 11: Parking Management Techniques, Edition 3* published April 2020. Table 5.3 of this updated Guide includes an example of a bicycle parking provision for child care centres from Town of Cambridge, a Council in Western Australia. The requirement in Table 5.3 of this guide for a child care centre is one (**1**) long-stay bicycle space.

Using the other bicycle parking rate provided requires the provision of five (**5**) bicycle spaces (rounded from 4.6), based on the DPDCP 2023 car parking requirement of 23 spaces (23 x 0.2 = 4.6). The proposed development proposes four (**4**) bicycle parking spaces within the basement, which exceeds the Austroads parking requirement by three (**3**) spaces however represents a numerical shortfall of one (**1**) space from the DPDCP 2023 parking rate.

With consideration for the area surrounding the site, there are no dedicated on or off-road bicycle facilities which is likely to result in travelling via bicycle to/from the centre as being undesirable for users of the child care centre. It is considered that this would be particularly undesirable for parents to children, to whom maintaining the safety of children during travel would be of the utmost importance. It is similarly expected that demand for bicycle parking from staff members would be low. Therefore, it is considered unlikely that the site will have any significant demand for bicycle parking. With consideration for the above, the proposed shortfall of one (**1**) space from the DPDCP 2023 bicycle parking rate requirement is considered acceptable.

Reference is made to the *Draft Parramatta Development Control Plan 2023, 6.2 Parking and Vehicular Access* which states the following motorcycle parking requirements applicable to the proposed development:

> *C.53 Unless otherwise specified, provision for motorcycle parking should be provided at a rate of 1 space per 50 car parking spaces, or part thereof.*

In accordance with the above rate, the proposed development requires the provision of one (**1**) motorcycle parking space. The proposed development proposes nil (**0**) motorcycle parking spaces, representing a numerical shortfall of one (**1**) space from the DPDCP 2023 requirements. It should be noted that child care centre parents/carers would not drop-off/pick-up children using a motorcycle as it is unlawful for a child under the age of 8 to be a passenger on a motorcycle in NSW. If a staff member intended on using a motorcycle to travel to/from the child care centre, the motorcycle could be stored in a staff car parking space due to the provision of one (**1**) car parking space per staff member in accordance with the THDCP 2012 requirements. As such, there is no need for a dedicated motorcycle space at the subject child care centre and the proposed shortfall is considered acceptable.

3.4 Servicing & Loading

The THDCP 2012 and DPDCP 2023 do not outline any loading / servicing requirements applicable to a child care centre. It is expected that all deliveries will be undertaken within the proposed car parking area outside peak drop off / pick up times, under a plan of management if necessary. A van (standard B99 design vehicle) or similar can be accommodated within the car parking area, utilising vacant visitor spaces. This is common practice for child care centres and will not noticeably affect operation of the site. It is reiterated that deliveries and other arrivals of similar nature are low in frequency and can be easily managed.

It is expected that the site will be serviced by Council's waste collection services from the Mary Street frontage, similar to waste collection arrangements for the residential dwelling that currently exists onsite.

3.5 Car Park Design & Compliance

The car parking layout as depicted in **Annexure A**, has been assessed to achieve the relevant clauses and objectives of *AS2890.1:2004*, *AS2890.2:2018* and *AS2890.6:*2022. Swept path testing has been undertaken and the results are presented within **Annexure G** for reference.

The proposed car parking and vehicular access design achieves the following:

- Minimum 5.5m wide two-way driveway facilitating access to Mary Street;
- Minimum 5.8m wide parking aisles;
- Minimum 6.1m wall-to-wall width along ramp;
- Compliant ramp grades not exceeding 25% for private developments and no grade change greater than 12.5%;
- Minimum 5.4m long, 2.6m wide spaces for parents;
- Minimum 5.4m long, 2.4m wide accessible car parking space with adjacent associated 5.4m long, 2.4m wide shared space;
- Minimum headroom of 2.2m for general circulation and 2.5m headroom clearance provided over accessible parking areas;
- A 2.0m x 2.5m pedestrian sight triangle on the exit side of the driveway at the property boundary which is to be kept clear of obstructions exceeding 600mm in height for the life of the development.

Whilst the plans have been assessed to comply with the relevant standards, it is usual and expected that a design certificate be required at the Construction Certificate stage to account for any changes following the development application.

4 TRAFFIC ASSESSMENT

The impact of the expected traffic generation levels associated with the subject proposal is discussed in the following sub-sections.

4.1 Traffic Generation

Traffic generation rates for the relevant land uses are provided in the *RTA Guide to Traffic Generating Developments (2002)* and recent supplements as adopted by *Transport for NSW* (TfNSW) and are as follows:

> ***3.11.3 Child care centres***
>
> *Long-day care*
>
> *7.00-9.00am* *0.8 peak vehicle trips per child*
>
> *2.30-4.00pm* *0.3 peak vehicle trips per child*
>
> *4.00-6.00pm* *0.7 peak vehicle trips per child*

The resulting AM and PM peak hourly traffic generation is summarised in **Table 4**.

TABLE 4: ESTIMATED TRAFFIC GENERATION

Use	Scale	Peak	Generation Rate	Trips(1)
Long-day care	90 Children	AM	0.8 per child	72 (36 in, 36 out)
		PM	0.7 per child	63 (32 in, 31 out)

Notes:
(1) 50/50 inbound/outbound split.

As shown, the expected traffic generation associated with the proposed development is in the order of **72** vehicle trips in the AM peak period (36 in, 36 out) and **63** vehicle trips in the PM peak period (32 in, 31 out).

4.2 Traffic Assignment

The road network, traffic surveys and locations of residential areas surrounding the site have been assessed and the following traffic assignment has been assumed for all traffic to and from the site:

- 30% to/from the north via Windsor Road;
- 20% to/from the east via Windermere Avenue;
- 20% to/from the south via Anderson Road;
- 30% to/from the west via Windsor Road.

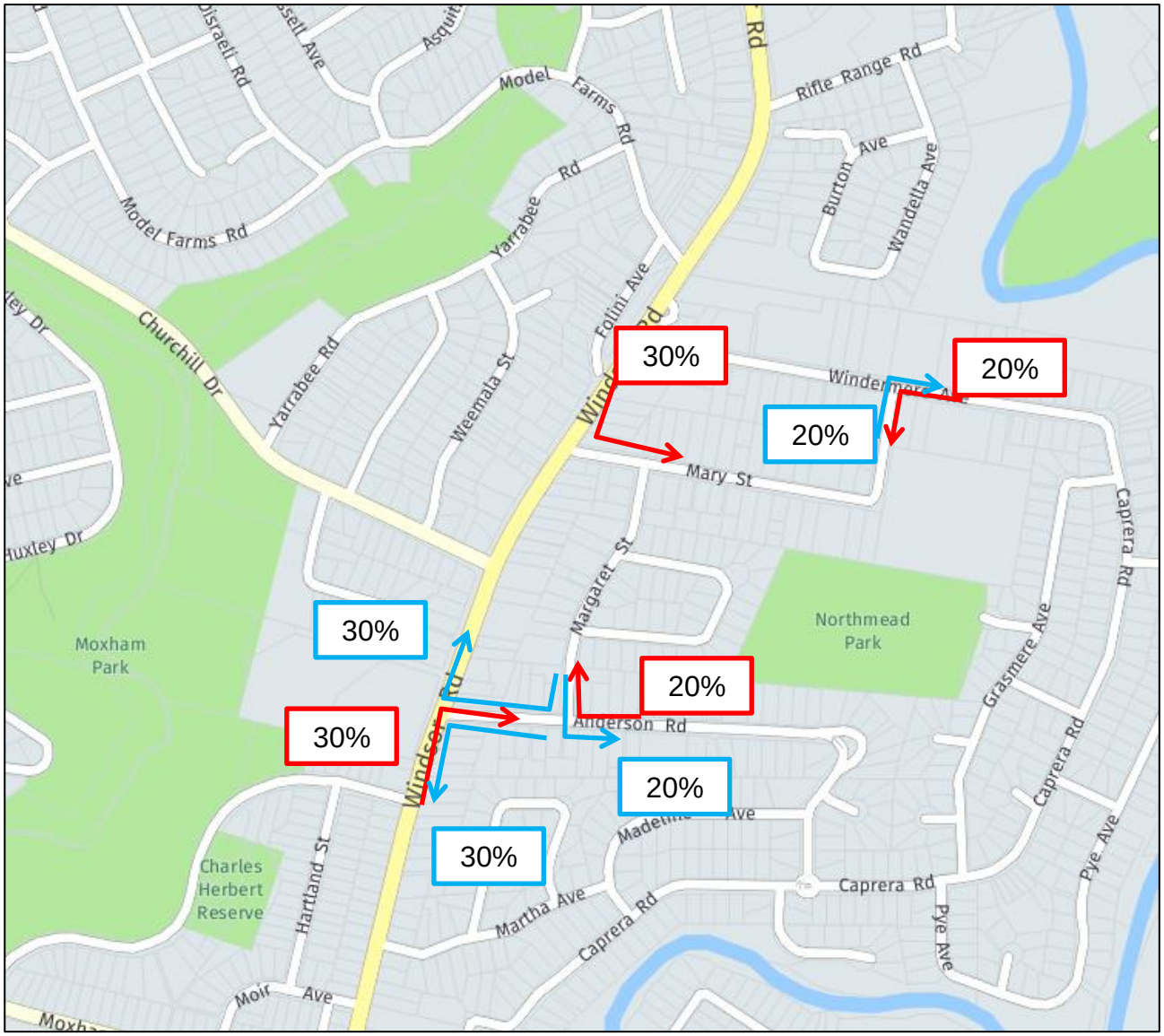


FIGURE 4: TRIP DISTRIBUTION

4.3 Traffic Impact

The traffic generation outlined in **Section 4.1** & **4.2** above has been added to the existing traffic volumes recorded. SIDRA INTERSECTION 9.1 was used to assess the intersections performance. The purpose of this assessment is to compare the existing intersection operations to the future scenario under the increased traffic load. The results of this assessment are shown in **Table 5**.

TABLE 5: INTERSECTION PERFORMANCE (SIDRA INTERSECTION 9.1)

Intersection	Peak Hour	Degree of Saturation[1]	Average Delay[2] (sec/veh)	Level of Service[3][4]	Control Type	Worst Movement
EXISTING PERFORMANCE						
Windsor Rd / Mary St	AM	1.03	1.8 (Worst: >70)	**NA** (Worst: F)	Give Way	RT from Windsor Rd
	PM	1.03	0.8 (Worst: >70)	**NA** (Worst: F)		RT from Windsor Rd
Margaret St / Mary St	AM	0.05	3.9 (Worst: 4.9)	**NA** (Worst: A)	Give Way	RT from Mary St
	PM	0.05	3.5 (Worst: 4.9)	**NA** (Worst: A)		RT from Mary St
Windermere Ave / Mary St / William St	AM	0.05	2.5 (Worst: 5.1)	**NA** (Worst: A)	Give Way	RT from Mary St / William St
	PM	0.05	2.1 (Worst: 5.3)	**NA** (Worst: A)		RT from Mary St / William St
Anderson Rd / Margaret St	AM	0.06	2.9 (Worst: 5.1)	**NA** (Worst: A)	Give Way	RT from Margaret St
	PM	0.05	2.7 (Worst: 5.1)	**NA** (Worst: A)		RT from Anderson Rd
Anderson Rd / Windsor Rd	AM	0.78	9.6	**A**	Signals	RT from Windsor Rd
	PM	0.81	9.7	**A**		RT from Anderson Rd
FUTURE (POST-DEVELOPMENT) PERFORMANCE						
Windsor Rd / Mary St	AM	1.03	1.8 (Worst: >70)	**NA** (Worst: F)	Give Way	RT from Windsor Rd
	PM	1.03	0.8 (Worst: >70)	**NA** (Worst: F)		RT from Windsor Rd

Margaret St / Mary St	AM	0.07	3.9 (Worst: 5.2)	**NA** (Worst: A)	Give Way	RT from Mary St
	PM	0.06	3.6 (Worst: 5.2)	**NA** (Worst: A)		RT from Mary St
Windermere Ave / Mary St / William St	AM	0.05	2.6 (Worst: 5.1)	**NA** (Worst: A)	Give Way	RT from Mary St / William St
	PM	0.05	2.3 (Worst: 5.2)	**NA** (Worst: A)		RT from Mary St / William St
Anderson Rd / Margaret St	AM	0.09	3.3 (Worst: 5.1)	**NA** (Worst: A)	Give Way	RT from Anderson Rd
	PM	0.07	3.1 (Worst: 5.1)	**NA** (Worst: A)		RT from Anderson Rd
Anderson Rd / Windsor Rd	AM	0.81	13.3	**A**	Signals	RT from Windsor Rd
	PM	0.92	10.6	**A**		RT from Anderson Rd

NOTES: Refer to **Table 1**.

As shown, the above intersections all retain the same overall and worst movement level service under future conditions with minimal delays and additional capacity, indicating that there will be no adverse impact on the existing road network as a result of the proposed development. Whilst the Windsor Road / Mary Street intersection has a worst movement Level of Service “F”, the worst movements come from turning from Mary Street onto Windsor Road and the right turn from Windsor Road into Mary Street. Realistically, parents and staff will take the fastest routes to and from the site through the intersection of Windsor Road / Anderson Road. This will not affect the intersection of Windsor Road / Mary Street.

5 CONCLUSION

In view of the foregoing, the subject Child Care Centre proposal at 5 Mary Street, Northmead (as depicted in **Annexure A**) is fully supportable in terms of its traffic and parking impacts. The following outcomes of this traffic and parking impact assessment are relevant to note:

a) The proposal includes the provision of **24** car parking spaces within a proposed carpark, comprised of **14** for staff use and **10** for visitor use, resulting in a shortfall of five (**5**) visitor car parking spaces from the requirements of The Hills Development Control Plan 2012 (THDCP 2012).

b) The shortfall of five (**5**) visitor car parking spaces from THDCP 2012 requirements is supported by queuing analysis which shows that nine (**9**) visitor spaces can adequately accommodate the 98th percentile parent demand in the PM peak period. As such, the provision of ten (**10**) visitor car parking spaces exceeds the peak demand for the proposed use. Furthermore, it is noted that the proposed provision of **24** parking spaces satisfies the requirements of the Draft Parramatta Development Control Plan 2023 (DPDCP 2023) which is expected to come into effect during September 2023, according to the Project Timeline on the City of Parramatta Council's website.

c) THDCP 2012 does not require the provision of bicycle and motorcycle parking facilities for a child care centre. As such, nil (**0**) motorcycle parking spaces have been provided in plans. Four (**4**) bicycle parking spaces have been detailed in plans.

d) The parking areas of the site have been assessed against the relevant sections of *AS2890.1:2004*, *AS2890.2:2018* and *AS2890.6:2022* and has been found to satisfy the objectives of each standard. Swept path testing has been undertaken and the results are reproduced within **Annexure G**.

e) The traffic generation of the proposed development has been estimated to be some **72** trips in the AM peak period (36 in, 36 out) and **63** trips in the PM peak period (32 in, 31 out). The impacts of the traffic generation have been modelled using SIDRA INTERSECTION 9.1, indicating that there will be no adverse impact to the performance of the intersections as a result of the generated traffic.

ANNEXURE A: PROPOSED PLANS
(4 SHEETS)

NOTE: ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH BCA, SAA & COUNCILS CONDITIONS **COPYRIGHT:** DO NOT SCALE OFF ARCHITECTURAL DRAWINGS. THESE NOTES MUST BE READ IN CONJUNCTION WITH COLOURS SELECTION FOR ADDITIONAL DETAILS ON APPLIANCES, PC ITEMS & SHOWER SEES SHOWN ON PLAN ARE INSIDE HOB DIMENSIONS SHOWER SCREENS TO BE FITTED ON INSIDE OF HOB BULKHEADS MAY BE REQUIRED TO ACCOMMODATE DRAINAGE LINES & STEEL BEAMS POSITION TO BE DETERMINED ON SITE. **USE FIGURED DIMENSIONS ONLY. DO NOT SCALE.** FINISHED GROUND LEVELS ON PLANS ARE SUBJECT TO SITE CONDITIONS. ALL CALCULATED DIMENSIONS ARE SUBJECT TO SITE MEASURE DURING CONSTRUCTION & NO ALLOWANCE HAS BEEN MADE FOR SHRINKAGE OR MELLING POSITION OF ELECTRICAL METER TO BE DETERMINED ON SITE IN ACCORDANCE TO THE TURRET POSITION FRONT GARDEN TAP ON METER **ENERGY SMART DESIGN:** AAA RATED WATER CONSERVATION DEVICES INCLUDE RAINWATER TANKS SHOWER HEADS, WATER TAP FLOW REGULATORS, DUAL FLUSH TOILETS CISTERNS & COMPLIANT HOT WATER SYSTEMS WITH MINIMUM GREEN HOUSE SCORE OF 3.5TARS ARE TO BE USED IN THIS DEVELOPMENT. OCCUPANTS ARE ENCOURAGED TO USE AAA RATED DISH WASHING MACHINES WITH FRONT LOADING WHERE POSSIBLE. OWNDER/BUILDER MUST READ ALL PLANS IN CONJUNCTION WITH THE ABSA & BASIX REPORT

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C
DP 415985

44
DP 8884

LOWER GROUND FLOOR PLAN -
1:100 @ A1

JANSSEN DESIGNS
info@janssendesigns.com.au | PO Box 41, Kenthurst 2156 | m: 0423 216 636
Nominated Architect: Jake Janssen NSW ARB 11575

AMENDMENTS

ISSUE:	DESCRIPTION	DATE:

Project Title:
Proposed Child Care Centre

DRAWING TITLE:
Lower Ground Floor Plan

ADDRESS:
5 Mary Street, Northmead

CLIENT DETAILS:
Kirribilli Capital

LOCAL GOVERNMENT AREA:
Parramatta Council

Issue For:	Issue:	
DA	A	

Date:	Scale:	Drawing #:	Project #:
15.7.2023	1:100	A005	10198

NOTE: ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH BCA, SAA & COUNCILS CONDITIONS **COPYRIGHT:**, DO NOT SCALE OFF ARCHITECTURAL DRAWINGS. THESE NOTES MUST BE READ IN CONJUNCTION WITH COLOURS SELECTION FOR ADDITIONAL DETAILS ON APPLIANCES, PC ITEMS & SHOWER SEES SHOWN ON PLAN ARE INSIDE HOB DIMENSIONS SHOWER SCREENS TO BE FITTED ON INSIDE OF HOB BULKHEADS MAY BE REQUIRED TO ACCOMMODATE DRAINAGE LINES & STEEL BEAMS POSITION TO BE DETERMINED ON SITE. **USE FIGURED DIMENSIONS ONLY, DO NOT SCALE.** FINISHED GROUND LEVELS ON PLANS ARE SUBJECT TO SITE CONDITIONS. ALL CALCULATED DIMENSIONS ARE SUBJECT TO SITE MEASURE DURING CONSTRUCTION & NO ALLOWANCE HAS BEEN MADE FOR SHRINKAGE OR MELLING POSITION OF ELECTRICAL METER TO BE DETERMINED ON SITE IN ACCORDANCE TO THE TURRET POSITION FRONT GARDEN TAP ON METER **ENERGY SMART DESIGN:** AAA RATED WATER CONSERVATION DEVICES INCLUDE RAINWATER TANKS SHOWER HEADS, WATER TAP FLOW REGULATORS, DUAL FLUSH TOILETS CISTERNS & COMPLIANT HOT WATER SYSTEMS WITH MINIMUM GREEN HOUSE SCORE OF 3.5TARS ARE TO BE USED IN THIS DEVELOPMENT. OCCUPANTS ARE ENCOURAGED TO USE AAA RATED DISH WASHING MACHINES WITH FRONT LOADING WHERE POSSIBLE. OWNNDER/BUILDER MUST READ ALL PLANS IN CONJUNCTION WITH THE ABSA & BASIX REPORT

DO NOT SCALE OFF ARCHITECTURAL DRAWINGS

C
DP 415985

44
DP 8884

UPPER GROUND FLOOR PLAN -
1:100 @ A1

JANSSEN DESIGNS

info@janssendesigns.com.au | PO Box 41, Kenthurst 2156 | m: 0423 216 636
Nominated Architect: Jake Janssen NSW ARB 11575

AMENDMENTS		
ISSUE:	DESCRIPTION	DATE:

Project Title:
Proposed Child Care Centre

DRAWING TITLE:
Upper Ground Floor Plan

ADDRESS:
5 Mary Street, Northmead

CLIENT DETAILS:
Kirribilli Capital

LOCAL GOVERNMENT AREA:
Parramatta Council

Issue For:	Issue:		
DA	A		
Date:	Scale:	Drawing #:	Project #:
5.10.2022	1:100	A000	10198

NOTE: ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH BCA, SAA & COUNCILS CONDITIONS **COPYRIGHT:** DO NOT SCALE OFF ARCHITECTURAL DRAWINGS. THESE NOTES MUST BE READ IN CONJUNCTION WITH COLOURS SELECTION FOR ADDITIONAL DETAILS ON APPLIANCES, PC ITEMS & SHOWER SEES SHOWN ON PLAN ARE INSIDE HOB DIMENSIONS SHOWER SCREENS TO BE FITTED ON INSIDE OF HOB BULKHEADS MAY BE REQUIRED TO ACCOMMODATE DRAINAGE LINES & STEEL BEAMS POSITION TO BE DETERMINED ON SITE. **USE FIGURED DIMENSIONS ONLY, DO NOT SCALE.** FINISHED GROUND LEVELS ON PLANS ARE SUBJECT TO SITE CONDITIONS. ALL CALCULATED DIMENSIONS ARE SUBJECT TO SITE MEASURE DURING CONSTRUCTION & NO ALLOWANCE HAS BEEN MADE FOR SHRINKAGE OR MELLING POSITION OF ELECTRICAL METER TO BE DETERMINED ON SITE IN ACCORDANCE TO THE TURRET POSITION FRONT GARDEN TAP ON METER **ENERGY SMART DESIGN:** AAA RATED WATER CONSERVATION DEVICES INCLUDE RAINWATER TANKS SHOWER HEADS, WATER TAP FLOW REGULATORS, DUAL FLUSH TOILETS CISTERNS & COMPLIANT HOT WATER SYSTEMS WITH MINIMUM GREEN HOUSE SCORE OF 3.5TARS ARE TO BE USED IN THIS DEVELOPMENT. OCCUPANTS ARE ENCOURAGED TO USE AAA RATED DISH WASHING MACHINES WITH FRONT LOADING WHERE POSSIBLE. OWNNDER/BUILDER MUST READ ALL PLANS IN CONJUNCTION WITH THE ABSA & BASIX REPORT

DO NOT SCALE OFF ARCHITECTURAL DRAWINGS

C
DP 415985

44
DP 8884

FIRST GROUND FLOOR PLAN -
1:100 @ A1

JANSSEN DESIGNS
info@janssendesigns.com.au | PO Box 41, Kenthurst 2156 | m: 0423 216 636
Nominated Architect: Jake Janssen NSW ARB 11575

AMENDMENTS		
ISSUE:	DESCRIPTION	DATE:

Project Title:
Proposed Child Care Centre

DRAWING TITLE:
First Floor Plan

ADDRESS:
5 Mary Street, Northmead

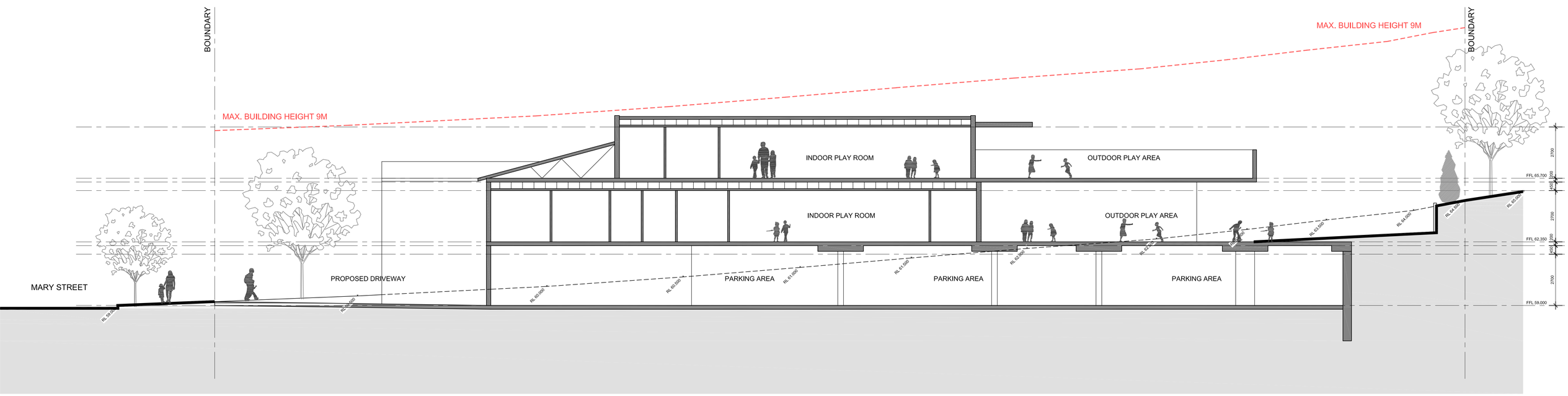
CLIENT DETAILS:
Kirribilli Capital

LOCAL GOVERNMENT AREA:
Parramatta Council

Issue For:	Issue:		
DA	A		
Date:	Scale:	Drawing #:	Project #:
5.10.2022	1:100	A000	10198

NOTE: ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH BCA, SAA & COUNCILS CONDITIONS **COPYRIGHT:** DO NOT SCALE OFF ARCHITECTURAL DRAWINGS. THESE NOTES MUST BE READ IN CONJUNCTION WITH COLOURS SELECTION FOR ADDITIONAL DETAILS ON APPLIANCES, PC ITEMS & SHOWER SEES SHOWN ON PLAN ARE INSIDE HOB DIMENSIONS SHOWER SCREENS TO BE FITTED ON INSIDE OF HOB BULKHEADS MAY BE REQUIRED TO ACCOMMODATE DRAINAGE LINES & STEEL BEAMS POSITION TO BE DETERMINED ON SITE. **USE FIGURED DIMENSIONS ONLY. DO NOT SCALE.** FINISHED GROUND LEVELS ON PLANS ARE SUBJECT TO SITE CONDITIONS. ALL CALCULATED DIMENSIONS ARE SUBJECT TO SITE MEASURE DURING CONSTRUCTION & NO ALLOWANCE HAS BEEN MADE FOR SHRINKAGE OR MELLING POSITION OF ELECTRICAL METER TO BE DETERMINED ON SITE IN ACCORDANCE TO THE TURRET POSITION FRONT GARDEN TAP ON METER **ENERGY SMART DESIGN:** AAA RATED WATER CONSERVATION DEVICES INCLUDE RAINWATER TANKS SHOWER HEADS, WATER TAP FLOW REGULATORS, DUAL FLUSH TOILETS CISTERNS & COMPLIANT HOT WATER SYSTEMS WITH MINIMUM GREEN HOUSE SCORE OF 3.5STARS ARE TO BE USED IN THIS DEVELOPMENT. OCCUPANTS ARE ENCOURAGED TO USE AAA RATED DISH WASHING MACHINES WITH FRONT LOADING WHERE POSSIBLE. OWNDER/BUILDER MUST READ ALL PLANS IN CONJUNCTION WITH THE ABSA & BASIX REPORT

DO NOT SCALE OFF ARCHITECTURAL DRAWINGS



SECTION A -
1:100 @ A1

JANSSEN DESIGNS
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Nominated Architect: Jake Janssen NSW ARB 11575

AMENDMENTS		
ISSUE:	DESCRIPTION	DATE:

Project Title:
Proposed Child Care Centre

DRAWING TITLE:
First Floor Plan

ADDRESS:
5 Mary Street, Northmead

CLIENT DETAILS:
Kirribilli Capital

LOCAL GOVERNMENT AREA:
Parramatta Council

Issue For:	Issue:	
DA	A	

Date:	Scale:	Drawing #:	Project #:
5.10.2022	1:100	A000	10198

ANNEXURE B: TRAFFIC SURVEY DATA
(5 SHEETS)

TRANS TRAFFIC SURVEY

trafficsurvey.com.au

TURNING MOVEMENT SURVEY

Intersection of Windsor Rd and Mary St, Northmead

GPS *-33.778954, 150.998531*

Date:	Tue 06/06/23
Weather:	Fine
Suburban:	Northmead
Customer:	McLaren

North:	Windsor Rd
East:	Mary St
South:	Windsor Rd
West:	N/A

Survey Period	AM:	7:00 AM-9:30 AM
	PM:	2:30 PM-6:00 PM
Traffic Peak	AM:	7:00 AM-8:00 AM
	PM:	4:00 PM-5:00 PM

All Vehicles

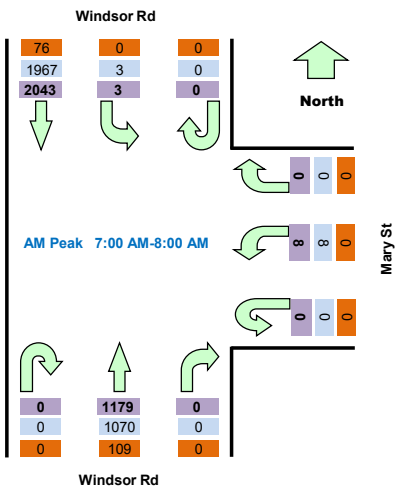
Time		North Approach Windsor R			East Approach Mary St			South Approach Windsor R			Hourly Total	
Period Start	Period End	U	SB	L	U	R	L	U	R	NB	Hour	Peak
7:00	7:15	0	490	0	0	0	2	0	0	279	3233	Peak
7:15	7:30	0	524	2	0	0	2	0	0	284	3231	
7:30	7:45	0	526	1	0	0	2	0	0	317	3226	
7:45	8:00	0	503	0	0	0	2	0	0	299	3156	
8:00	8:15	0	444	2	0	0	1	0	0	322	3166	
8:15	8:30	0	493	2	0	0	6	0	0	306	3182	
8:30	8:45	0	471	4	0	2	9	0	0	290	3174	
8:45	9:00	0	495	4	0	0	16	0	0	299		
9:00	9:15	0	493	3	0	1	4	0	0	284		
9:15	9:30	0	521	2	0	0	5	0	0	271		
14:30	14:45	0	344	2	0	0	1	0	0	403	3420	
14:45	15:00	0	393	2	0	2	4	0	0	444	3594	
15:00	15:15	0	406	2	0	0	15	0	0	459	3637	
15:15	15:30	0	416	3	0	1	8	0	0	515	3674	
15:30	15:45	1	443	2	0	0	5	0	0	473	3683	
15:45	16:00	0	400	6	0	1	5	0	0	476	3689	
16:00	16:15	0	416	3	0	0	5	0	0	495	3756	Peak
16:15	16:30	0	442	4	0	0	0	0	0	506	3726	
16:30	16:45	0	407	5	0	1	2	1	0	514	3741	
16:45	17:00	0	432	4	0	0	4	0	0	515	3704	
17:00	17:15	0	409	8	0	0	4	0	0	468	3655	
17:15	17:30	0	475	3	0	0	1	0	0	488		
17:30	17:45	1	413	7	0	0	3	0	0	469		
17:45	18:00	0	459	3	0	0	2	0	0	442		

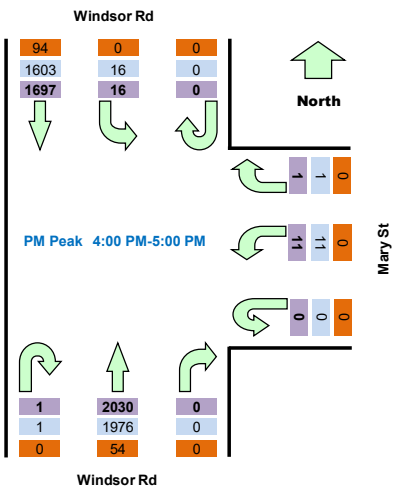
Peak Time		North Approach Windsor R			East Approach Mary St			South Approach Windsor R			Peak
Period Start	Period End	U	SB	L	U	R	L	U	R	NB	total
7:00	8:00	0	2043	3	0	0	8	0	0	1179	3233
16:00	17:00	0	1697	16	0	1	11	1	0	2030	3756

Note: Site sketch is for illustrating traffic flows. Direction is indicative only, drawing is not to scale and not an exact streets configuration.

Graphic

Total
Light
Heavy





TRANS TRAFFIC SURVEY

trafficsurvey.com.au

TURNING MOVEMENT SURVEY

Intersection of Mary St and Margaret St, Northmead

GPS *-33.779130, 150.999659*

Date:	Tue 06/06/23
Weather:	Fine
Suburban:	Northmead
Customer:	McLaren

North:	N/A
East:	Mary St
South:	Margaret St
West:	Mary St

Survey Period	AM:	7:00 AM-9:30 AM
	PM:	2:30 PM-6:00 PM
Traffic Peak	AM:	8:15 AM-9:15 AM
	PM:	2:45 PM-3:45 PM

All Vehicles

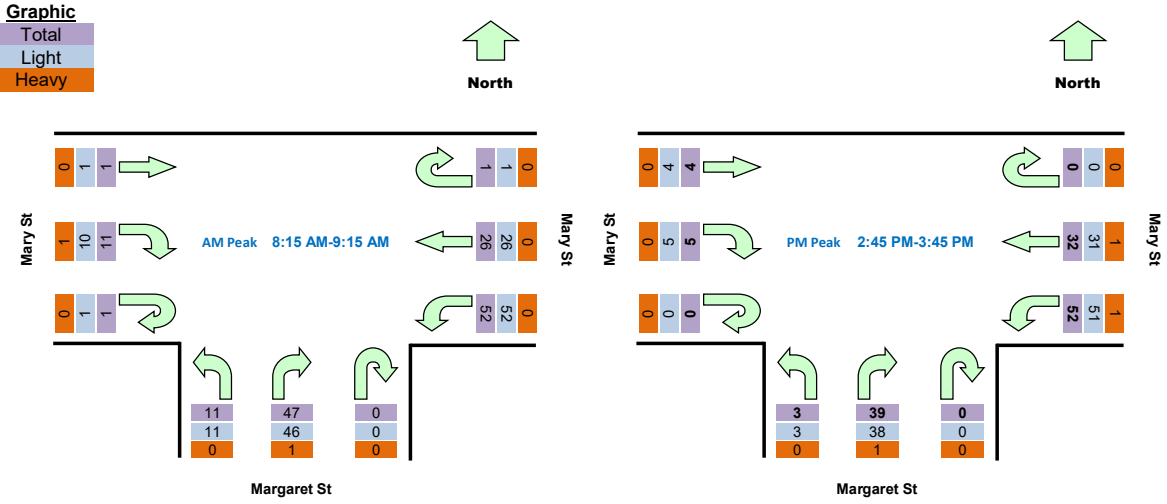
Time		East Approach Mary St			South Approach Margaret S			West Approach Mary St			Hourly Total	
Period Start	Period End	U	WB	L	U	R	L	U	R	EB	Hour	Peak
7:00	7:15	0	2	6	0	5	0	0	0	0	55	
7:15	7:30	0	2	5	0	3	0	0	1	1	67	
7:30	7:45	0	2	8	0	7	0	0	0	1	99	
7:45	8:00	0	2	5	0	5	0	0	0	0	111	
8:00	8:15	0	0	14	0	8	1	0	0	2	146	
8:15	8:30	1	5	17	0	18	1	0	2	0	150	Peak
8:30	8:45	0	5	5	0	11	5	1	3	0	125	
8:45	9:00	0	13	16	0	11	3	0	4	0		
9:00	9:15	0	3	14	0	7	2	0	2	1		
9:15	9:30	0	3	7	0	6	1	1	1	0		
14:30	14:45	0	0	5	0	11	1	0	0	2	125	
14:45	15:00	0	6	7	0	10	0	0	0	2	135	Peak
15:00	15:15	0	14	18	0	6	1	0	2	0	134	
15:15	15:30	0	9	16	0	12	0	0	2	1	121	
15:30	15:45	0	3	11	0	11	2	0	1	1	103	
15:45	16:00	0	4	6	0	6	2	0	3	3	95	
16:00	16:15	1	5	8	0	11	0	0	1	2	101	
16:15	16:30	0	0	12	0	6	0	0	3	1	89	
16:30	16:45	0	1	10	0	3	2	0	4	1	90	
16:45	17:00	0	3	10	0	12	1	0	2	2	94	
17:00	17:15	0	2	2	0	2	2	0	6	2	85	
17:15	17:30	0	0	7	0	12	1	0	3	0		
17:30	17:45	0	3	6	0	9	0	0	5	2		
17:45	18:00	0	2	2	1	13	0	0	0	3		

Peak Time		East Approach Mary St			South Approach Margaret S			West Approach Mary St			Peak
Period Start	Period End	U	WB	L	U	R	L	U	R	EB	total
8:15	9:15	1	26	52	0	47	11	1	11	1	150
14:45	15:45	0	32	52	0	39	3	0	5	4	135

Note: Site sketch is for illustrating traffic flows. Direction is indicative only, drawing is not to scale and not an exact streets configuration.

Graphic

Total
Light
Heavy



TRANS TRAFFIC SURVEY

trafficsurvey.com.au

TURNING MOVEMENT SURVEY

Intersection of Windermere Ave and William St, Northme

GPS *-33.778237, 151.003137*

Date:	Tue 06/06/23
Weather:	Fine
Suburban:	Northmead
Customer:	McLaren

North:	N/A
East:	Windermere Ave
South:	William St
West:	Windermere Ave

Survey Period	AM:	7:00 AM-9:30 AM
	PM:	2:30 PM-6:00 PM
Traffic Peak	AM:	8:00 AM-9:00 AM
	PM:	3:15 PM-4:15 PM

All Vehicles

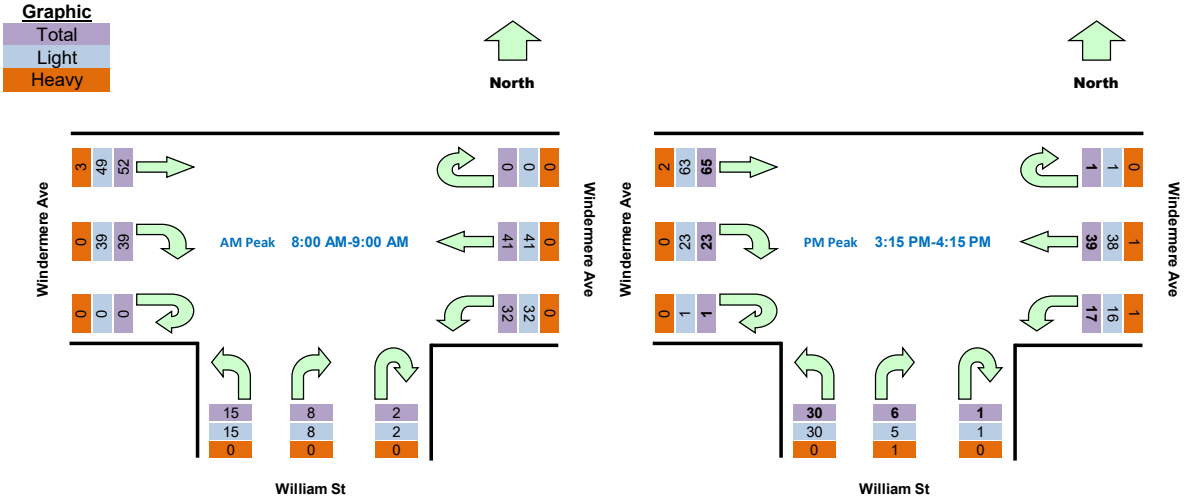
Time		st Approach Windermere A			South Approach William St			st Approach Windermere A			Hourly Total	
Period Start	Period End	U	WB	L	U	R	L	U	R	EB	Hour	Peak
7:00	7:15	1	6	5	0	1	3	0	3	7	110	
7:15	7:30	1	2	6	0	1	0	1	2	12	130	
7:30	7:45	0	9	3	1	1	3	0	3	11	159	
7:45	8:00	0	10	2	0	0	3	1	3	9	171	
8:00	8:15	0	11	5	1	1	1	0	12	15	189	Peak
8:15	8:30	0	8	11	0	3	8	0	8	16	176	
8:30	8:45	0	14	7	1	2	3	0	7	9	149	
8:45	9:00	0	8	9	0	2	3	0	12	12		
9:00	9:15	0	2	5	0	1	4	0	3	18		
9:15	9:30	0	9	1	0	0	4	1	5	7		
14:30	14:45	0	4	2	0	2	2	0	2	7	124	
14:45	15:00	0	7	7	0	1	4	0	5	7	147	
15:00	15:15	0	6	1	0	2	4	0	0	5	148	
15:15	15:30	0	13	1	0	0	11	1	13	17	183	Peak
15:30	15:45	0	5	4	1	3	8	0	2	19	176	
15:45	16:00	1	9	2	0	2	6	0	4	8	168	
16:00	16:15	0	12	10	0	1	5	0	4	21	178	
16:15	16:30	0	13	2	0	1	5	0	8	20	167	
16:30	16:45	0	5	1	0	1	7	0	4	16	157	
16:45	17:00	0	12	0	0	1	6	0	6	17	160	
17:00	17:15	0	7	2	0	4	2	0	7	20	174	
17:15	17:30	0	9	1	0	1	8	0	0	20		
17:30	17:45	0	9	0	0	4	5	0	5	14		
17:45	18:00	0	24	2	0	4	8	0	6	12		

Peak Time		st Approach Windermere A			South Approach William St			st Approach Windermere A			Peak
Period Start	Period End	U	WB	L	U	R	L	U	R	EB	total
8:00	9:00	0	41	32	2	8	15	0	39	52	189
15:15	16:15	1	39	17	1	6	30	1	23	65	183

Note: Site sketch is for illustrating traffic flows. Direction is indicative only, drawing is not to scale and not an exact streets configuration.

Graphic

Total
Light
Heavy



TRANS TRAFFIC SURVEY

trafficsurvey.com.au

TURNING MOVEMENT SURVEY

Intersection of Anderson Rd and Margaret St, Northmea

GPS -33.782086, 150.998581

Date:	Tue 06/06/23
Weather:	Fine
Suburban:	Northmead
Customer:	McLaren

North:	Margaret St
East:	Anderson Rd
South:	N/A
West:	Anderson Rd

Survey Period	AM:	7:00 AM-9:30 AM
	PM:	2:30 PM-6:00 PM
Traffic Peak	AM:	8:00 AM-9:00 AM
	PM:	4:00 PM-5:00 PM

All Vehicles

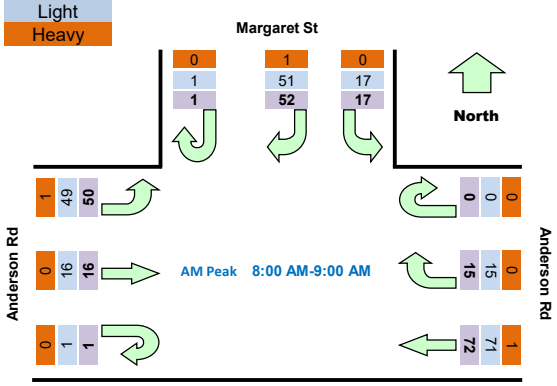
Time		North Approach Margaret S			East Approach Anderson R			West Approach Anderson R			Hourly Total	
Period Start	Period End	U	R	L	U	R	WB	U	EB	L	Hour	Peak
7:00	7:15	0	6	0	0	0	5	0	0	6	142	
7:15	7:30	1	9	1	0	2	18	0	2	4	174	
7:30	7:45	0	6	3	0	1	26	0	6	7	203	
7:45	8:00	0	7	3	0	2	18	0	4	5	212	
8:00	8:15	0	15	1	0	3	17	0	3	10	224	Peak
8:15	8:30	0	17	4	0	4	21	0	2	18	220	
8:30	8:45	1	8	4	0	6	22	1	5	11	183	
8:45	9:00	0	12	8	0	2	12	0	6	11		
9:00	9:15	1	13	5	0	4	8	0	8	6		
9:15	9:30	0	9	1	0	2	8	0	2	7		
14:30	14:45	0	4	2	0	2	7	0	8	13	173	
14:45	15:00	0	10	2	1	1	15	0	4	10	176	
15:00	15:15	0	19	2	0	1	12	0	4	5	170	
15:15	15:30	0	16	4	0	1	8	0	9	13	184	
15:30	15:45	0	8	2	0	3	8	1	5	12	176	
15:45	16:00	0	10	2	0	0	9	2	4	10	183	
16:00	16:15	0	13	3	0	3	14	1	11	12	193	Peak
16:15	16:30	0	12	3	0	3	11	0	6	8	173	
16:30	16:45	0	13	2	0	1	11	0	12	7	174	
16:45	17:00	0	10	3	0	2	10	0	11	11	174	
17:00	17:15	0	7	2	0	2	16	0	2	8	156	
17:15	17:30	0	7	2	0	0	12	0	9	14		
17:30	17:45	0	8	1	0	2	10	1	12	12		
17:45	18:00	0	3	1	0	2	3	1	7	12		

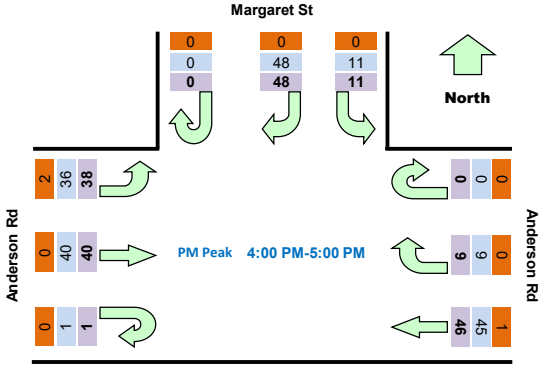
Peak Time		North Approach Margaret S			East Approach Anderson R			West Approach Anderson R			Peak
Period Start	Period End	U	R	L	U	R	WB	U	EB	L	total
8:00	9:00	1	52	17	0	15	72	1	16	50	224
16:00	17:00	0	48	11	0	9	46	1	40	38	193

Note: Site sketch is for illustrating traffic flows. Direction is indicative only, drawing is not to scale and not an exact streets configuration.

Graphic

Total
Light
Heavy





TRANS TRAFFIC SURVEY

trafficsurvey.com.au

TURNING MOVEMENT SURVEY

Intersection of Anderson Rd and Windsor Rd, Northmead

GPS -33.781983, 150.996831

Date:	Tue 06/06/23
Weather:	Fine
Suburban:	Northmead
Customer:	McLaren

North:	Windsor Rd
East:	Anderson Rd
South:	Windsor Rd
West:	Club Access

Survey Period	AM:	7:00 AM-9:30 AM
	PM:	2:30 PM-6:00 PM
Traffic Peak	AM:	7:15 AM-8:15 AM
	PM:	4:00 PM-5:00 PM

All Vehicles

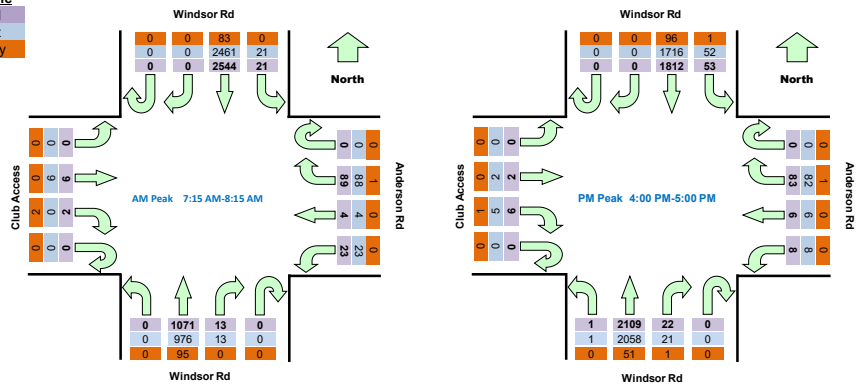
Time		North Approach Windsor Rd				East Approach Anderson Rd				South Approach Windsor Rd				West Approach Club Access				Hourly Total	
Period Start	**Period End**	**U**	**R**	**SB**	**L**	**U**	**R**	**WB**	**L**	**U**	**R**	**NB**	**L**	**U**	**R**	**EB**	**L**	**Hour**	**Peak**
7:00	7:15	0	0	609	4	0	10	0	2	0	3	266	0	0	0	0	0	3755	
7:15	7:30	0	0	635	4	0	21	2	6	0	1	266	0	0	0	2	0	3773	Peak
7:30	7:45	0	0	663	5	0	25	2	7	0	2	267	0	0	0	4	0	3749	
7:45	8:00	0	0	647	7	0	18	0	5	0	2	268	0	0	2	0	0	3620	
8:00	8:15	0	0	599	5	0	25	0	5	0	8	270	0	0	0	0	0	3559	
8:15	8:30	0	0	600	13	0	23	1	8	0	8	260	0	0	0	0	0	3489	
8:30	8:45	0	0	586	7	0	25	2	4	0	8	214	0	0	0	0	0	3433	
8:45	9:00	0	0	595	8	0	19	0	4	0	7	255	0	0	0	0	0		
9:00	9:15	0	0	560	12	0	20	2	8	0	4	236	0	0	0	0	0		
9:15	9:30	0	0	580	6	0	15	0	4	0	4	248	0	0	0	0	0		
14:30	14:45	0	0	356	6	0	10	0	3	0	13	438	0	0	0	0	0	3658	
14:45	15:00	0	0	411	9	0	19	0	7	0	4	463	0	0	0	0	0	3870	
15:00	15:15	0	0	443	9	0	22	0	5	0	1	465	0	0	1	0	0	3902	
15:15	15:30	0	0	406	14	0	22	1	5	1	10	510	0	0	4	0	0	3974	
15:30	15:45	0	0	506	8	0	13	0	2	0	9	500	0	0	0	0	0	4040	
15:45	16:00	0	0	388	8	0	21	2	4	0	8	512	0	0	2	0	0	3985	
16:00	16:15	0	0	460	16	0	22	2	3	0	5	506	0	0	3	1	0	4102	Peak
16:15	16:30	0	0	471	9	0	18	3	1	0	4	533	0	0	0	0	0	4046	
16:30	16:45	0	0	408	12	0	22	1	3	0	4	530	0	0	2	1	0	4079	
16:45	17:00	0	0	473	16	0	21	0	1	0	9	540	1	0	1	0	0	4051	
17:00	17:15	0	0	425	7	0	17	1	2	0	5	504	0	0	1	0	0	4051	
17:15	17:30	0	0	527	17	0	14	1	1	0	5	507	0	0	0	0	0		
17:30	17:45	0	0	412	17	0	16	2	4	0	10	494	0	0	0	0	0		
17:45	18:00	0	0	532	16	0	10	0	2	0	4	498	0	0	0	0	0		

Peak Time		North Approach Windsor Rd				East Approach Anderson Rd				South Approach Windsor Rd				West Approach Club Access				Peak
Period Start	**Period End**	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	**total**
7:15	8:15	0	0	2544	21	0	89	4	23	0	13	1071	0	0	2	6	0	3773
16:00	17:00	0	0	1812	53	0	83	6	8	0	22	2109	1	0	6	2	0	4102

Note: Site sketch is for illustrating traffic flows. Direction is indicative only, drawing is not to scale and not an exact streets configuration.

Graphic

Total
Light
Heavy



ANNEXURE C: SIDRA RESULTS
(20 SHEETS)

MOVEMENT SUMMARY

Site: 1 [(ExAM) Windsor Rd / Mary St (Site Folder: Existing)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Windsor Rd / Mary St
Existing AM Peak
Job No 220918
Site Category: Existing AM
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Windsor Rd (S)															
2	T1	All MCs	1241	9.2	1241	9.2	0.354	0.0	LOS A	2.1	16.2	0.02	0.02	0.02	56.9
3	R2	All MCs	1	0.0	1	0.0	0.354	3153.6	LOS F	2.1	16.2	0.05	0.05	0.05	47.5
Approach			1242	9.2	1242	9.2	0.354	2.7	NA	2.1	16.2	0.02	0.02	0.02	56.9
East: Mary St (E)															
4	L2	All MCs	8	0.0	8	0.0	1.032	233.3	LOS F	2.3	15.9	1.00	1.04	1.15	11.1
6	R2	All MCs	1	0.0	1	0.0	1.032	84.1	LOS F	2.3	15.9	1.00	1.04	1.15	12.5
Approach			9	0.0	9	0.0	1.032	216.7	LOS F	2.3	15.9	1.00	1.04	1.15	11.3
North: Windsor Rd (N)															
7	L2	All MCs	3	0.0	3	0.0	0.566	5.8	LOS A	0.0	0.0	0.00	0.00	0.00	57.0
8	T1	All MCs	2151	3.7	2151	3.7	0.566	0.3	LOS A	0.0	0.0	0.00	0.00	0.00	59.5
Approach			2154	3.7	2154	3.7	0.566	0.3	NA	0.0	0.0	0.00	0.00	0.00	59.5
All Vehicles			3405	5.7	3405	5.7	1.032	1.8	NA	2.3	16.2	0.01	0.01	0.01	57.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 4 [(ExAM) Anderson Rd / Margaret St (Site Folder: Existing)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Anderson Rd / Margaret St
Existing AM Peak
Job No 220918
Site Category: Existing AM
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Anderson Rd (E)															
5	T1	All MCs	76	1.4	76	1.4	0.049	0.0	LOS A	0.1	0.7	0.06	0.11	0.06	48.9
6	R2	All MCs	16	0.0	16	0.0	0.049	5.0	LOS A	0.1	0.7	0.06	0.11	0.06	47.9
Approach			92	1.1	92	1.1	0.049	0.9	NA	0.1	0.7	0.06	0.11	0.06	48.7
North: Margaret St (N)															
7	L2	All MCs	18	0.0	18	0.0	0.060	4.6	LOS A	0.2	1.5	0.13	0.52	0.13	45.7
9	R2	All MCs	56	1.9	56	1.9	0.060	5.1	LOS A	0.2	1.5	0.13	0.52	0.13	43.5
Approach			74	1.4	74	1.4	0.060	5.0	LOS A	0.2	1.5	0.13	0.52	0.13	44.2
West: Anderson Rd (W)															
10	L2	All MCs	54	2.0	54	2.0	0.038	4.6	LOS A	0.0	0.0	0.00	0.41	0.00	45.0
11	T1	All MCs	17	0.0	17	0.0	0.038	0.0	LOS A	0.0	0.0	0.00	0.41	0.00	46.7
Approach			71	1.5	71	1.5	0.038	3.5	NA	0.0	0.0	0.00	0.41	0.00	45.4
All Vehicles			236	1.3	236	1.3	0.060	2.9	NA	0.2	1.5	0.06	0.33	0.06	46.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 1 [(ExPM) Windsor Rd / Mary St (Site Folder: Existing)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Windsor Rd / Mary St
Existing PM Peak
Job No 220918
Site Category: Existing PM
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Windsor Rd (S)															
2	T1	All MCs	2137	2.7	2137	2.7	0.564	0.1	LOS A	0.4	2.7	0.01	0.01	0.01	59.5
3	R2	All MCs	1	0.0	1	0.0	0.564	352.9	LOS F	0.4	2.7	0.01	0.01	0.01	51.6
Approach			2138	2.7	2138	2.7	0.564	0.3	NA	0.4	2.7	0.01	0.01	0.01	59.5
East: Mary St (E)															
4	L2	All MCs	12	0.0	12	0.0	1.029	169.1	LOS F	2.2	15.7	1.00	1.02	1.19	14.3
6	R2	All MCs	1	0.0	1	0.0	1.029	65.4	LOS E	2.2	15.7	1.00	1.02	1.19	15.9
Approach			13	0.0	13	0.0	1.029	160.5	LOS F	2.2	15.7	1.00	1.02	1.19	14.4
North: Windsor Rd (N)															
7	L2	All MCs	17	0.0	17	0.0	0.479	5.7	LOS A	0.0	0.0	0.00	0.01	0.00	57.1
8	T1	All MCs	1786	5.5	1786	5.5	0.479	0.2	LOS A	0.0	0.0	0.00	0.01	0.00	59.6
Approach			1803	5.5	1803	5.5	0.479	0.2	NA	0.0	0.0	0.00	0.01	0.00	59.5
All Vehicles			3954	3.9	3954	3.9	1.029	0.8	NA	2.2	15.7	0.01	0.01	0.01	58.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 2 [(ExAM) Mary St / Margaret St (Site Folder: Existing)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Mary St / Margaret St
Existing AM Peak
Job No 220918
Site Category: Existing AM
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Margaret St (S)															
1	L2	All MCs	13	0.0	13	0.0	0.049	4.6	LOS A	0.2	1.2	0.12	0.53	0.12	45.7
3	R2	All MCs	49	2.1	49	2.1	0.049	4.8	LOS A	0.2	1.2	0.12	0.53	0.12	45.5
Approach			62	1.7	62	1.7	0.049	4.8	LOS A	0.2	1.2	0.12	0.53	0.12	45.5
East: Mary St (E)															
4	L2	All MCs	55	0.0	55	0.0	0.044	4.6	LOS A	0.0	0.0	0.00	0.36	0.00	46.8
5	T1	All MCs	27	0.0	27	0.0	0.044	0.0	LOS A	0.0	0.0	0.00	0.36	0.00	48.0
Approach			82	0.0	82	0.0	0.044	3.1	NA	0.0	0.0	0.00	0.36	0.00	47.2
West: Mary St (W)															
11	T1	All MCs	1	0.0	1	0.0	0.008	0.0	LOS A	0.0	0.3	0.18	0.48	0.18	46.9
12	R2	All MCs	13	8.3	13	8.3	0.008	4.9	LOS A	0.0	0.3	0.18	0.48	0.18	45.5
Approach			14	7.7	14	7.7	0.008	4.5	NA	0.0	0.3	0.18	0.48	0.18	45.6
All Vehicles			158	1.3	158	1.3	0.049	3.9	NA	0.2	1.2	0.06	0.43	0.06	46.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 2 [(ExPM) Mary St / Margaret St (Site Folder: Existing)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Mary St / Margaret St
Existing PM Peak
Job No 220918
Site Category: Existing PM
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Margaret St (S)															
1	L2	All MCs	3	0.0	3	0.0	0.036	4.7	LOS A	0.1	0.8	0.14	0.53	0.14	45.7
3	R2	All MCs	41	2.6	41	2.6	0.036	4.8	LOS A	0.1	0.8	0.14	0.53	0.14	45.4
Approach			44	2.4	44	2.4	0.036	4.8	LOS A	0.1	0.8	0.14	0.53	0.14	45.4
East: Mary St (E)															
4	L2	All MCs	55	1.9	55	1.9	0.048	4.6	LOS A	0.0	0.0	0.00	0.33	0.00	46.9
5	T1	All MCs	34	3.1	34	3.1	0.048	0.0	LOS A	0.0	0.0	0.00	0.33	0.00	48.1
Approach			88	2.4	88	2.4	0.048	2.8	NA	0.0	0.0	0.00	0.33	0.00	47.4
West: Mary St (W)															
11	T1	All MCs	4	0.0	4	0.0	0.005	0.0	LOS A	0.0	0.2	0.17	0.31	0.17	47.9
12	R2	All MCs	5	0.0	5	0.0	0.005	4.9	LOS A	0.0	0.2	0.17	0.31	0.17	46.6
Approach			9	0.0	9	0.0	0.005	2.7	NA	0.0	0.2	0.17	0.31	0.17	47.1
All Vehicles			142	2.2	142	2.2	0.048	3.5	NA	0.1	0.8	0.05	0.39	0.05	46.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 3 [(ExAM) William St / Windermere Ave (Site Folder: Existing)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

William St / Windermere Ave
Existing AM Peak
Job No 220918
Site Category: Existing AM
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Mary St / William St (S)															
1	L2	All MCs	16	0.0	16	0.0	0.019	4.7	LOS A	0.1	0.5	0.14	0.51	0.14	45.7
3	R2	All MCs	11	0.0	11	0.0	0.019	5.1	LOS A	0.1	0.5	0.14	0.51	0.14	45.5
Approach			26	0.0	26	0.0	0.019	4.8	LOS A	0.1	0.5	0.14	0.51	0.14	45.6
East: Windermere Ave (E)															
4	L2	All MCs	36	0.0	36	0.0	0.041	4.6	LOS A	0.0	0.0	0.00	0.25	0.00	47.4
5	T1	All MCs	43	0.0	43	0.0	0.041	0.0	LOS A	0.0	0.0	0.00	0.25	0.00	48.6
Approach			79	0.0	79	0.0	0.041	2.1	NA	0.0	0.0	0.00	0.25	0.00	48.1
West: Windermere Ave (W)															
11	T1	All MCs	55	5.8	55	5.8	0.054	0.0	LOS A	0.2	1.5	0.14	0.25	0.14	48.3
12	R2	All MCs	41	0.0	41	0.0	0.054	5.0	LOS A	0.2	1.5	0.14	0.25	0.14	46.9
Approach			96	3.3	96	3.3	0.054	2.1	NA	0.2	1.5	0.14	0.25	0.14	47.7
All Vehicles			201	1.6	201	1.6	0.054	2.5	NA	0.2	1.5	0.09	0.28	0.09	47.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 3 [(ExPM) William St / Windermere Ave (Site Folder: Existing)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

William St / Windermere Ave
Existing PM Peak
Job No 220918
Site Category: Existing PM
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Mary St / William St (S)															
1	L2	All MCs	33	0.0	33	0.0	0.028	4.7	LOS A	0.1	0.8	0.12	0.50	0.12	45.7
3	R2	All MCs	7	14.3	7	14.3	0.028	5.3	LOS A	0.1	0.8	0.12	0.50	0.12	45.3
Approach			40	2.6	40	2.6	0.028	4.8	LOS A	0.1	0.8	0.12	0.50	0.12	45.6
East: Windermere Ave (E)															
4	L2	All MCs	18	5.9	18	5.9	0.031	4.6	LOS A	0.0	0.0	0.00	0.16	0.00	47.8
5	T1	All MCs	41	2.6	41	2.6	0.031	0.0	LOS A	0.0	0.0	0.00	0.16	0.00	49.1
Approach			59	3.6	59	3.6	0.031	1.4	NA	0.0	0.0	0.00	0.16	0.00	48.7
West: Windermere Ave (W)															
11	T1	All MCs	68	3.1	68	3.1	0.051	0.0	LOS A	0.1	1.0	0.09	0.16	0.09	48.9
12	R2	All MCs	25	0.0	25	0.0	0.051	4.9	LOS A	0.1	1.0	0.09	0.16	0.09	47.5
Approach			94	2.2	94	2.2	0.051	1.3	NA	0.1	1.0	0.09	0.16	0.09	48.5
All Vehicles			193	2.7	193	2.7	0.051	2.1	NA	0.1	1.0	0.07	0.23	0.07	47.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 4 [(ExAM) Anderson Rd / Margaret St (Site Folder: Existing)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Anderson Rd / Margaret St
Existing AM Peak
Job No 220918
Site Category: Existing AM
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Anderson Rd (E)															
5	T1	All MCs	76	1.4	76	1.4	0.049	0.0	LOS A	0.1	0.7	0.06	0.11	0.06	48.9
6	R2	All MCs	16	0.0	16	0.0	0.049	5.0	LOS A	0.1	0.7	0.06	0.11	0.06	47.9
Approach			92	1.1	92	1.1	0.049	0.9	NA	0.1	0.7	0.06	0.11	0.06	48.7
North: Margaret St (N)															
7	L2	All MCs	18	0.0	18	0.0	0.060	4.6	LOS A	0.2	1.5	0.13	0.52	0.13	45.7
9	R2	All MCs	56	1.9	56	1.9	0.060	5.1	LOS A	0.2	1.5	0.13	0.52	0.13	43.5
Approach			74	1.4	74	1.4	0.060	5.0	LOS A	0.2	1.5	0.13	0.52	0.13	44.2
West: Anderson Rd (W)															
10	L2	All MCs	54	2.0	54	2.0	0.038	4.6	LOS A	0.0	0.0	0.00	0.41	0.00	45.0
11	T1	All MCs	17	0.0	17	0.0	0.038	0.0	LOS A	0.0	0.0	0.00	0.41	0.00	46.7
Approach			71	1.5	71	1.5	0.038	3.5	NA	0.0	0.0	0.00	0.41	0.00	45.4
All Vehicles			236	1.3	236	1.3	0.060	2.9	NA	0.2	1.5	0.06	0.33	0.06	46.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 4 [(ExPM) Anderson Rd / Margaret St (Site Folder: Existing)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Anderson Rd / Margaret St
Existing PM Peak
Job No 220918
Site Category: Existing PM
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Anderson Rd (E)															
5	T1	All MCs	48	2.2	48	2.2	0.031	0.0	LOS A	0.1	0.4	0.07	0.11	0.07	49.0
6	R2	All MCs	9	0.0	9	0.0	0.031	5.1	LOS A	0.1	0.4	0.07	0.11	0.07	47.9
Approach			58	1.8	58	1.8	0.031	0.8	NA	0.1	0.4	0.07	0.11	0.07	48.7
North: Margaret St (N)															
7	L2	All MCs	12	0.0	12	0.0	0.051	4.7	LOS A	0.2	1.2	0.17	0.53	0.17	45.6
9	R2	All MCs	51	0.0	51	0.0	0.051	5.0	LOS A	0.2	1.2	0.17	0.53	0.17	43.4
Approach			62	0.0	62	0.0	0.051	4.9	LOS A	0.2	1.2	0.17	0.53	0.17	43.9
West: Anderson Rd (W)															
10	L2	All MCs	40	5.3	40	5.3	0.044	4.6	LOS A	0.0	0.0	0.00	0.26	0.00	46.1
11	T1	All MCs	42	0.0	42	0.0	0.044	0.0	LOS A	0.0	0.0	0.00	0.26	0.00	47.9
Approach			82	2.6	82	2.6	0.044	2.2	NA	0.0	0.0	0.00	0.26	0.00	47.0
All Vehicles			202	1.6	202	1.6	0.051	2.7	NA	0.2	1.2	0.07	0.30	0.07	46.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 5 [(ExAM) Windsor Rd / Anderson Rd (Site Folder: Existing)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Windsor Rd / Anderson Rd
Existing AM Peak
Job No 220918
Site Category: Existing AM
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 277 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Windsor Rd (S)															
1	L2	All MCs	1	0.0	1	0.0	0.719	12.7	LOS A	17.1	128.7	0.41	0.38	0.41	32.9
2	T1	All MCs	1127	8.9	1127	8.9	* 0.719	7.1	LOS A	17.1	128.7	0.41	0.38	0.41	55.8
3	R2	All MCs	14	0.0	14	0.0	0.292	156.8	LOS F	1.2	8.2	1.00	0.70	1.00	12.2
Approach			1142	8.8	1142	8.8	0.719	8.9	LOS A	17.1	128.7	0.42	0.38	0.42	53.9
East: Anderson Rd (E)															
4	L2	All MCs	24	0.0	24	0.0	0.103	92.2	LOS F	1.0	6.8	0.92	0.71	0.92	22.4
5	T1	All MCs	4	0.0	4	0.0	* 0.775	103.0	LOS F	4.4	30.7	1.00	0.83	1.09	7.5
6	R2	All MCs	94	1.1	94	1.1	0.775	107.6	LOS F	4.4	30.7	1.00	0.83	1.09	16.5
Approach			122	0.9	122	0.9	0.775	104.4	LOS F	4.4	30.7	0.98	0.80	1.06	17.4
North: Windsor Rd (N)															
7	L2	All MCs	22	0.0	22	0.0	0.583	10.9	LOS A	16.3	117.4	0.39	0.37	0.39	46.4
8	T1	All MCs	2678	3.3	2678	3.3	0.583	5.3	LOS A	16.3	117.6	0.39	0.36	0.39	54.4
Approach			2700	3.2	2700	3.2	0.583	5.4	LOS A	16.3	117.6	0.39	0.36	0.39	54.3
West: Club Access (W)															
10	L2	All MCs	1	0.0	1	0.0	0.074	67.6	LOS E	0.4	3.1	0.95	0.66	0.95	15.0
11	T1	All MCs	6	0.0	6	0.0	0.074	65.3	LOS E	0.4	3.1	0.95	0.66	0.95	8.7
12	R2	All MCs	2	100.0	2	100.0	0.074	68.1	LOS E	0.4	3.1	0.95	0.66	0.95	17.9
Approach			9	22.2	9	22.2	0.074	66.2	LOS E	0.4	3.1	0.95	0.66	0.95	11.9
All Vehicles			3974	4.8	3974	4.8	0.775	9.6	LOS A	17.1	128.7	0.42	0.38	0.42	51.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

MOVEMENT SUMMARY

Site: 5 [(ExPM) Windsor Rd / Anderson Rd (Site Folder: Existing)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Windsor Rd / Anderson Rd
Existing PM Peak
Job No 220918
Site Category: Existing PM
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 147 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Windsor Rd (S)															
1	L2	All MCs	1	0.0	1	0.0	0.666	8.6	LOS A	14.7	104.7	0.34	0.31	0.34	33.4
2	T1	All MCs	2220	2.4	2220	2.4	0.666	3.5	LOS A	14.7	104.7	0.34	0.31	0.34	56.7
3	R2	All MCs	23	4.5	23	4.5	* 0.146	74.6	LOS F	1.0	7.0	0.96	0.71	0.96	20.6
Approach			2244	2.4	2244	2.4	0.666	4.2	LOS A	14.7	104.7	0.34	0.31	0.34	55.8
East: Anderson Rd (E)															
4	L2	All MCs	8	0.0	8	0.0	0.023	71.8	LOS F	0.3	2.1	0.83	0.66	0.83	24.3
5	T1	All MCs	6	0.0	6	0.0	* 0.811	97.7	LOS F	4.5	31.5	1.00	0.92	1.24	6.6
6	R2	All MCs	87	1.2	87	1.2	0.811	102.3	LOS F	4.5	31.5	1.00	0.92	1.24	15.5
Approach			102	1.0	102	1.0	0.811	99.5	LOS F	4.5	31.5	0.99	0.89	1.20	15.7
North: Windsor Rd (N)															
7	L2	All MCs	56	1.9	56	1.9	0.703	16.3	LOS B	22.7	165.8	0.59	0.55	0.59	40.7
8	T1	All MCs	1907	5.3	1907	5.3	* 0.703	10.8	LOS A	22.7	166.3	0.59	0.55	0.59	49.6
Approach			1963	5.2	1963	5.2	0.703	10.9	LOS A	22.7	166.3	0.59	0.55	0.59	49.4
West: Club Access (W)															
10	L2	All MCs	1	0.0	1	0.0	0.084	2.7	LOS A	0.4	3.0	0.96	0.67	0.96	14.5
11	T1	All MCs	2	0.0	2	0.0	0.084	75.8	LOS F	0.4	3.0	0.96	0.67	0.96	8.6
12	R2	All MCs	6	16.7	6	16.7	0.084	78.3	LOS F	0.4	3.0	0.96	0.67	0.96	18.3
Approach			9	11.1	9	11.1	0.084	69.3	LOS E	0.4	3.0	0.96	0.67	0.96	16.1
All Vehicles			4319	3.7	4319	3.7	0.811	9.7	LOS A	22.7	166.3	0.47	0.43	0.48	50.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

MOVEMENT SUMMARY

Site: 1 [(FutAM) Windsor Rd / Mary St (Site Folder: Future)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Windsor Rd / Mary St
Future AM Peak
Job No 220918
Site Category: Future AM
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Windsor Rd (S)															
2	T1	All MCs	1252	9.2	1252	9.2	0.358	0.0	LOS A	2.3	17.3	0.02	0.02	0.02	56.8
3	R2	All MCs	1	0.0	1	0.0	0.358	3374.9	LOS F	2.3	17.3	0.05	0.05	0.05	47.2
Approach			1253	9.2	1253	9.2	0.358	2.9	NA	2.3	17.3	0.02	0.02	0.02	56.8
East: Mary St (E)															
4	L2	All MCs	8	0.0	8	0.0	1.031	232.0	LOS F	2.3	15.9	1.00	1.04	1.15	11.3
6	R2	All MCs	1	0.0	1	0.0	1.031	83.2	LOS F	2.3	15.9	1.00	1.04	1.15	12.8
Approach			9	0.0	9	0.0	1.031	215.4	LOS F	2.3	15.9	1.00	1.04	1.15	11.5
North: Windsor Rd (N)															
7	L2	All MCs	15	0.0	15	0.0	0.569	5.8	LOS A	0.0	0.0	0.00	0.01	0.00	57.0
8	T1	All MCs	2151	3.7	2151	3.7	0.569	0.3	LOS A	0.0	0.0	0.00	0.00	0.00	59.4
Approach			2165	3.7	2165	3.7	0.569	0.3	NA	0.0	0.0	0.00	0.00	0.00	59.4
All Vehicles			3428	5.7	3428	5.7	1.031	1.8	NA	2.3	17.3	0.01	0.01	0.01	57.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 1 [(FutPM) Windsor Rd / Mary St (Site Folder: Future)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Windsor Rd / Mary St
Future PM Peak
Job No 220918
Site Category: Future PM
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Windsor Rd (S)															
2	T1	All MCs	2147	2.6	2147	2.6	0.566	0.1	LOS A	0.4	2.9	0.01	0.01	0.01	59.5
3	R2	All MCs	1	0.0	1	0.0	0.566	374.6	LOS F	0.4	2.9	0.01	0.01	0.01	56.5
Approach			2148	2.6	2148	2.6	0.566	0.3	NA	0.4	2.9	0.01	0.01	0.01	59.5
East: Mary St (E)															
4	L2	All MCs	12	0.0	12	0.0	1.029	167.4	LOS F	2.2	15.7	1.00	1.03	1.19	14.2
6	R2	All MCs	1	0.0	1	0.0	1.029	63.9	LOS E	2.2	15.7	1.00	1.03	1.19	16.0
Approach			13	0.0	13	0.0	1.029	158.7	LOS F	2.2	15.7	1.00	1.03	1.19	14.4
North: Windsor Rd (N)															
7	L2	All MCs	27	0.0	27	0.0	0.482	5.7	LOS A	0.0	0.0	0.00	0.02	0.00	57.0
8	T1	All MCs	1786	5.5	1786	5.5	0.482	0.2	LOS A	0.0	0.0	0.00	0.01	0.00	59.5
Approach			1813	5.5	1813	5.5	0.482	0.3	NA	0.0	0.0	0.00	0.01	0.00	59.5
All Vehicles			3974	3.9	3974	3.9	1.029	0.8	NA	2.2	15.7	0.01	0.01	0.01	58.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 2 [(FutAM) Mary St / Margaret St (Site Folder: Future)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Mary St / Margaret St
Future AM Peak
Job No 220918
Site Category: Future AM
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Margaret St (S)															
1	L2	All MCs	13	0.0	13	0.0	0.066	4.6	LOS A	0.2	1.6	0.15	0.53	0.15	45.6
3	R2	All MCs	68	1.5	68	1.5	0.066	4.9	LOS A	0.2	1.6	0.15	0.53	0.15	45.4
Approach			81	1.3	81	1.3	0.066	4.9	LOS A	0.2	1.6	0.15	0.53	0.15	45.5
East: Mary St (E)															
4	L2	All MCs	85	0.0	85	0.0	0.060	4.6	LOS A	0.0	0.0	0.00	0.40	0.00	46.6
5	T1	All MCs	27	0.0	27	0.0	0.060	0.0	LOS A	0.0	0.0	0.00	0.40	0.00	47.7
Approach			112	0.0	112	0.0	0.060	3.5	NA	0.0	0.0	0.00	0.40	0.00	46.9
West: Mary St (W)															
11	T1	All MCs	12	0.0	12	0.0	0.015	0.0	LOS A	0.1	0.5	0.19	0.30	0.19	48.1
12	R2	All MCs	13	8.3	13	8.3	0.015	5.2	LOS A	0.1	0.5	0.19	0.30	0.19	46.6
Approach			25	4.2	25	4.2	0.015	2.6	NA	0.1	0.5	0.19	0.30	0.19	47.3
All Vehicles			219	1.0	219	1.0	0.066	3.9	NA	0.2	1.6	0.08	0.44	0.08	46.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 2 [(FutPM) Mary St / Margaret St (Site Folder: Future)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Mary St / Margaret St
Future PM Peak
Job No 220918
Site Category: Future PM
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Margaret St (S)															
1	L2	All MCs	3	0.0	3	0.0	0.051	4.7	LOS A	0.2	1.2	0.16	0.53	0.16	45.6
3	R2	All MCs	58	1.8	58	1.8	0.051	4.9	LOS A	0.2	1.2	0.16	0.53	0.16	45.4
Approach			61	1.7	61	1.7	0.051	4.9	LOS A	0.2	1.2	0.16	0.53	0.16	45.4
East: Mary St (E)															
4	L2	All MCs	81	1.3	81	1.3	0.062	4.6	LOS A	0.0	0.0	0.00	0.38	0.00	46.7
5	T1	All MCs	34	3.1	34	3.1	0.062	0.0	LOS A	0.0	0.0	0.00	0.38	0.00	47.9
Approach			115	1.8	115	1.8	0.062	3.2	NA	0.0	0.0	0.00	0.38	0.00	47.0
West: Mary St (W)															
11	T1	All MCs	14	0.0	14	0.0	0.011	0.0	LOS A	0.0	0.2	0.12	0.18	0.12	48.8
12	R2	All MCs	5	0.0	5	0.0	0.011	5.2	LOS A	0.0	0.2	0.12	0.18	0.12	47.4
Approach			20	0.0	20	0.0	0.011	1.4	NA	0.0	0.2	0.12	0.18	0.12	48.5
All Vehicles			195	1.6	195	1.6	0.062	3.6	NA	0.2	1.2	0.06	0.41	0.06	46.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 3 [(FutAM) William St / Windermere Ave (Site Folder: Future)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

William St / Windermere Ave
Future AM Peak
Job No 220918
Site Category: Future AM
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Mary St / William St (S)															
1	L2	All MCs	16	0.0	16	0.0	0.026	4.7	LOS A	0.1	0.6	0.15	0.51	0.15	45.6
3	R2	All MCs	18	0.0	18	0.0	0.026	5.1	LOS A	0.1	0.6	0.15	0.51	0.15	45.4
Approach			34	0.0	34	0.0	0.026	4.9	LOS A	0.1	0.6	0.15	0.51	0.15	45.5
East: Windermere Ave (E)															
4	L2	All MCs	43	0.0	43	0.0	0.045	4.6	LOS A	0.0	0.0	0.00	0.27	0.00	47.3
5	T1	All MCs	43	0.0	43	0.0	0.045	0.0	LOS A	0.0	0.0	0.00	0.27	0.00	48.5
Approach			87	0.0	87	0.0	0.045	2.3	NA	0.0	0.0	0.00	0.27	0.00	47.9
West: Windermere Ave (W)															
11	T1	All MCs	55	5.8	55	5.8	0.054	0.0	LOS A	0.2	1.5	0.15	0.26	0.15	48.3
12	R2	All MCs	41	0.0	41	0.0	0.054	5.0	LOS A	0.2	1.5	0.15	0.26	0.15	46.9
Approach			96	3.3	96	3.3	0.054	2.2	NA	0.2	1.5	0.15	0.26	0.15	47.7
All Vehicles			216	1.5	216	1.5	0.054	2.6	NA	0.2	1.5	0.09	0.30	0.09	47.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 3 [(FutPM) William St / Windermere Ave (Site Folder: Future)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

William St / Windermere Ave
Future PM Peak
Job No 220918
Site Category: Future PM
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Mary St / William St (S)															
1	L2	All MCs	33	0.0	33	0.0	0.033	4.7	LOS A	0.1	0.9	0.13	0.51	0.13	45.7
3	R2	All MCs	14	7.6	14	7.6	0.033	5.2	LOS A	0.1	0.9	0.13	0.51	0.13	45.4
Approach			47	2.3	47	2.3	0.033	4.8	LOS A	0.1	0.9	0.13	0.51	0.13	45.6
East: Windermere Ave (E)															
4	L2	All MCs	26	4.1	26	4.1	0.036	4.6	LOS A	0.0	0.0	0.00	0.21	0.00	47.6
5	T1	All MCs	41	2.6	41	2.6	0.036	0.0	LOS A	0.0	0.0	0.00	0.21	0.00	48.8
Approach			67	3.2	67	3.2	0.036	1.8	NA	0.0	0.0	0.00	0.21	0.00	48.3
West: Windermere Ave (W)															
11	T1	All MCs	68	3.1	68	3.1	0.051	0.0	LOS A	0.1	1.0	0.09	0.17	0.09	48.9
12	R2	All MCs	25	0.0	25	0.0	0.051	5.0	LOS A	0.1	1.0	0.09	0.17	0.09	47.5
Approach			94	2.2	94	2.2	0.051	1.3	NA	0.1	1.0	0.09	0.17	0.09	48.5
All Vehicles			207	2.5	207	2.5	0.051	2.3	NA	0.1	1.0	0.07	0.26	0.07	47.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 4 [(FutAM) Anderson Rd / Margaret St (Site Folder: Future)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Anderson Rd / Margaret St
Future AM Peak
Job No 220918
Site Category: Future AM
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Anderson Rd (E)															
5	T1	All MCs	76	1.4	76	1.4	0.054	0.0	LOS A	0.1	1.0	0.09	0.15	0.09	48.5
6	R2	All MCs	23	0.0	23	0.0	0.054	5.1	LOS A	0.1	1.0	0.09	0.15	0.09	47.6
Approach			99	1.1	99	1.1	0.054	1.2	NA	0.1	1.0	0.09	0.15	0.09	48.2
North: Margaret St (N)															
7	L2	All MCs	25	0.0	25	0.0	0.086	4.6	LOS A	0.3	2.1	0.13	0.52	0.13	45.7
9	R2	All MCs	79	1.3	79	1.3	0.086	5.1	LOS A	0.3	2.1	0.13	0.52	0.13	43.5
Approach			104	1.0	104	1.0	0.086	5.0	LOS A	0.3	2.1	0.13	0.52	0.13	44.2
West: Anderson Rd (W)															
10	L2	All MCs	65	1.6	65	1.6	0.044	4.6	LOS A	0.0	0.0	0.00	0.42	0.00	44.9
11	T1	All MCs	17	0.0	17	0.0	0.044	0.0	LOS A	0.0	0.0	0.00	0.42	0.00	46.5
Approach			82	1.3	82	1.3	0.044	3.6	NA	0.0	0.0	0.00	0.42	0.00	45.2
All Vehicles			285	1.1	285	1.1	0.086	3.3	NA	0.3	2.1	0.08	0.37	0.08	45.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 4 [(FutPM) Anderson Rd / Margaret St (Site Folder: Future)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Anderson Rd / Margaret St
Future PM Peak
Job No 220918
Site Category: Future PM
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Anderson Rd (E)															
5	T1	All MCs	48	2.2	48	2.2	0.035	0.0	LOS A	0.1	0.7	0.10	0.16	0.10	48.4
6	R2	All MCs	16	0.0	16	0.0	0.035	5.1	LOS A	0.1	0.7	0.10	0.16	0.10	47.5
Approach			65	1.6	65	1.6	0.035	1.3	NA	0.1	0.7	0.10	0.16	0.10	48.1
North: Margaret St (N)															
7	L2	All MCs	18	0.0	18	0.0	0.072	4.7	LOS A	0.2	1.7	0.18	0.53	0.18	45.6
9	R2	All MCs	70	0.0	70	0.0	0.072	5.0	LOS A	0.2	1.7	0.18	0.53	0.18	43.4
Approach			88	0.0	88	0.0	0.072	5.0	LOS A	0.2	1.7	0.18	0.53	0.18	44.0
West: Anderson Rd (W)															
10	L2	All MCs	50	4.2	50	4.2	0.049	4.6	LOS A	0.0	0.0	0.00	0.29	0.00	45.8
11	T1	All MCs	42	0.0	42	0.0	0.049	0.0	LOS A	0.0	0.0	0.00	0.29	0.00	47.6
Approach			92	2.3	92	2.3	0.049	2.5	NA	0.0	0.0	0.00	0.29	0.00	46.6
All Vehicles			245	1.3	245	1.3	0.072	3.1	NA	0.2	1.7	0.09	0.34	0.09	46.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 5 [(FutAM) Windsor Rd / Anderson Rd (Site Folder: Future)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Windsor Rd / Anderson Rd
Future AM Peak
Job No 220918
Site Category: Future AM
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 271 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Windsor Rd (S)															
1	L2	All MCs	1	0.0	1	0.0	0.752	17.3	LOS B	21.6	163.0	0.51	0.47	0.51	31.8
2	T1	All MCs	1127	8.9	1127	8.9	* 0.752	11.7	LOS A	21.6	163.0	0.51	0.47	0.51	53.9
3	R2	All MCs	25	0.0	25	0.0	* 0.522	157.1	LOS F	2.1	14.8	1.00	0.73	1.00	12.3
Approach			1153	8.7	1153	8.7	0.752	14.9	LOS B	21.6	163.0	0.52	0.47	0.52	50.9
East: Anderson Rd (E)															
4	L2	All MCs	36	0.0	36	0.0	0.140	96.6	LOS F	1.3	9.3	0.92	0.72	0.92	22.9
5	T1	All MCs	4	0.0	4	0.0	* 0.812	109.5	LOS F	5.0	35.3	1.00	0.85	1.12	7.5
6	R2	All MCs	105	1.0	105	1.0	0.812	114.1	LOS F	5.0	35.3	1.00	0.85	1.12	16.5
Approach			145	0.7	145	0.7	0.812	109.7	LOS F	5.0	35.3	0.98	0.82	1.07	17.8
North: Windsor Rd (N)															
7	L2	All MCs	22	0.0	22	0.0	0.608	12.8	LOS A	18.8	135.5	0.46	0.43	0.46	44.3
8	T1	All MCs	2678	3.3	2678	3.3	* 0.608	7.2	LOS A	18.9	135.7	0.46	0.43	0.46	52.6
Approach			2700	3.2	2700	3.2	0.608	7.3	LOS A	18.9	135.7	0.46	0.43	0.46	52.6
West: Club Access (W)															
10	L2	All MCs	1	0.0	1	0.0	0.067	64.7	LOS E	0.4	3.1	0.94	0.65	0.94	15.4
11	T1	All MCs	6	0.0	6	0.0	0.067	62.4	LOS E	0.4	3.1	0.94	0.65	0.94	9.0
12	R2	All MCs	2	100.0	2	100.0	0.067	65.6	LOS E	0.4	3.1	0.94	0.65	0.94	18.4
Approach			9	22.2	9	22.2	0.067	63.3	LOS E	0.4	3.1	0.94	0.65	0.94	12.3
All Vehicles			4008	4.8	4008	4.8	0.812	13.3	LOS A	21.6	163.0	0.50	0.46	0.50	49.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

MOVEMENT SUMMARY

Site: 5 [(FutPM) Windsor Rd / Anderson Rd (Site Folder: Future)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Windsor Rd / Anderson Rd
Future PM Peak
Job No 220918
Site Category: Future PM
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 147 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Windsor Rd (S)															
1	L2	All MCs	1	0.0	1	0.0	0.667	8.6	LOS A	14.7	105.0	0.34	0.31	0.34	33.4
2	T1	All MCs	2220	2.4	2220	2.4	0.667	3.5	LOS A	14.7	105.0	0.34	0.31	0.34	56.6
3	R2	All MCs	33	3.2	33	3.2	* 0.207	75.1	LOS F	1.4	10.0	0.96	0.73	0.96	20.5
Approach			2254	2.4	2254	2.4	0.667	4.5	LOS A	14.7	105.0	0.35	0.31	0.35	55.5
East: Anderson Rd (E)															
4	L2	All MCs	18	0.0	18	0.0	0.050	77.5	LOS F	0.6	4.5	0.84	0.69	0.84	24.1
5	T1	All MCs	6	0.0	6	0.0	* 0.924	113.5	LOS F	5.3	37.4	1.00	1.03	1.45	6.2
6	R2	All MCs	97	1.1	97	1.1	0.924	118.1	LOS F	5.3	37.4	1.00	1.03	1.45	14.3
Approach			122	0.9	122	0.9	0.924	111.8	LOS F	5.3	37.4	0.98	0.98	1.36	15.1
North: Windsor Rd (N)															
7	L2	All MCs	56	1.9	56	1.9	0.703	16.3	LOS B	22.7	165.8	0.59	0.55	0.59	40.7
8	T1	All MCs	1907	5.3	1907	5.3	* 0.703	10.8	LOS A	22.7	166.3	0.59	0.55	0.59	49.6
Approach			1963	5.2	1963	5.2	0.703	10.9	LOS A	22.7	166.3	0.59	0.55	0.59	49.4
West: Club Access (W)															
10	L2	All MCs	1	0.0	1	0.0	0.084	2.5	LOS A	0.4	3.0	0.96	0.67	0.96	14.5
11	T1	All MCs	2	0.0	2	0.0	0.084	75.8	LOS F	0.4	3.0	0.96	0.67	0.96	8.3
12	R2	All MCs	6	16.7	6	16.7	0.084	78.2	LOS F	0.4	3.0	0.96	0.67	0.96	18.2
Approach			9	11.1	9	11.1	0.084	69.2	LOS E	0.4	3.0	0.96	0.67	0.96	16.0
All Vehicles			4349	3.7	4349	3.7	0.924	10.6	LOS A	22.7	166.3	0.48	0.44	0.49	50.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

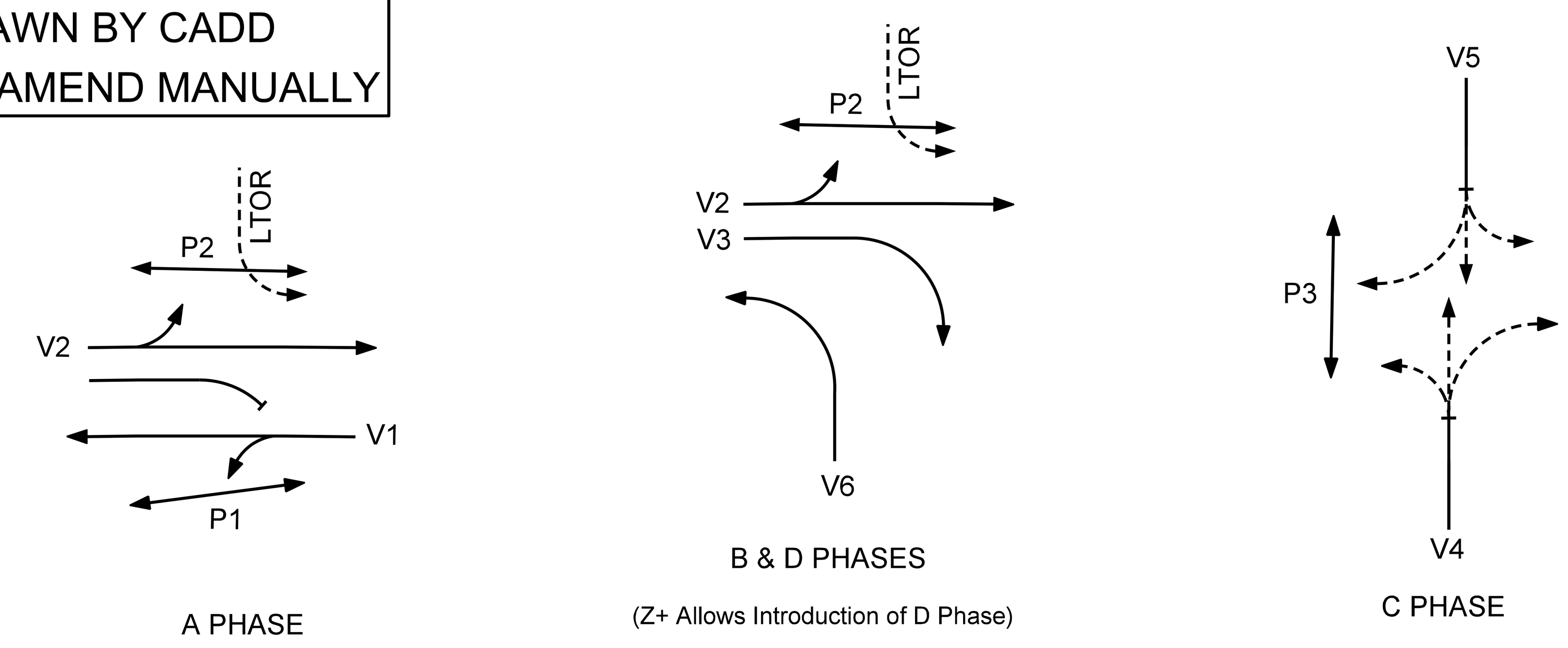
ANNEXURE D: TCS PLANS
(1 SHEET)

DRAWN BY CADD
DO NOT AMEND MANUALLY

TCS No. 4472

DATE IN SERVICE : 31/07/14

NSW GOVERNMENT Transport Roads & Maritime Services

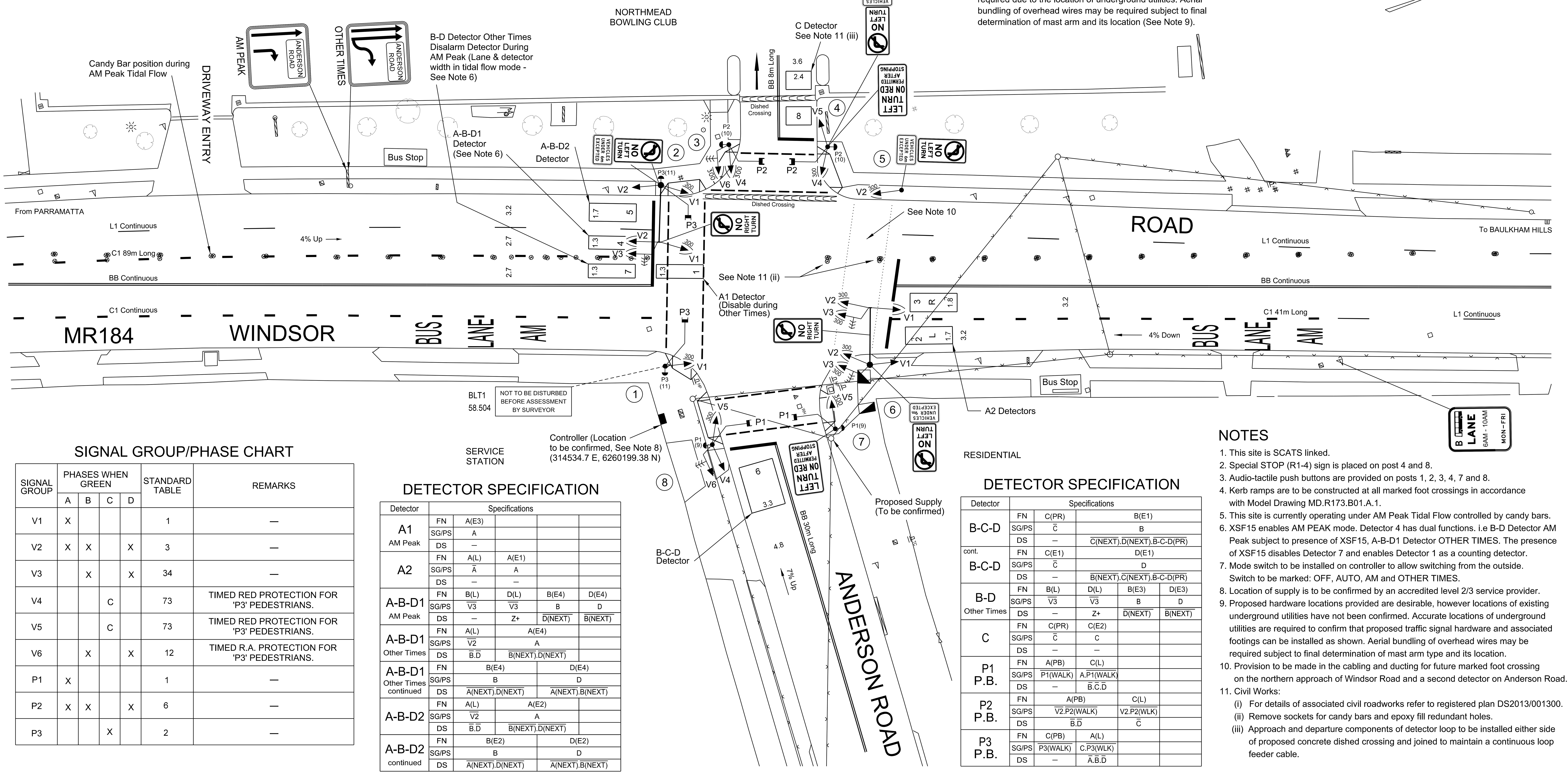


MOVEMENTS

POSTS

POSTS	TYPE	LENGTH	OFFSET	REMARKS	CO-ORDINATES (MGA Zone 56) EASTING	NORTHING
1	2	4.1	1.2	New	314529.99	6260201.20
2	5XL	-	1.0	New	314513.43	6260206.25
3	2	4.1	1.0	New	314511.80	6260213.63
4	2	4.1	1.0	New	314514.96	6260222.53
5	2	4.1	1.0	New	314521.08	6260227.95
6	5XL	-	1.0	New #	314536.00	6260219.82
7	2	4.1	1.0	New	314540.78	6260214.77
8	2	4.1	1.0	New	314538.52	6260203.13

An adjustment to the post offset or a special footing may be required due to the location of underground utilities. Aerial bundling of overhead wires may be required subject to final determination of mast arm and its location (See Note 9).



SIGNAL GROUP/PHASE CHART

SIGNAL GROUP	PHASES WHEN GREEN A	B	C	D	STANDARD TABLE	REMARKS
V1	X				1	—
V2	X	X		X	3	—
V3		X		X	34	—
V4			C		73	TIMED RED PROTECTION FOR 'P3' PEDESTRIANS.
V5			C		73	TIMED RED PROTECTION FOR 'P3' PEDESTRIANS.
V6		X		X	12	TIMED R.A. PROTECTION FOR 'P3' PEDESTRIANS.
P1	X				1	—
P2	X	X		X	6	—
P3			X		2	—

DETECTOR SPECIFICATION

Detector	Specifications				
A1 AM Peak	FN	A(E3)			
	SG/PS	A			
	DS	—			
A2	FN	A(L)	A(E1)		
	SG/PS	$\overline{A}$	A		
	DS	—	—		
A-B-D1 AM Peak	FN	B(L)	D(L)	B(E4)	D(E4)
	SG/PS	$\overline{V3}$	$\overline{V3}$	B	D
	DS	—	Z+	$\overline{D(NEXT)}$	$\overline{B(NEXT)}$
A-B-D1 Other Times	FN	A(L)	A(E4)		
	SG/PS	$\overline{V2}$	A		
	DS	$\overline{B}.\overline{D}$	$\overline{B(NEXT)}.\overline{D(NEXT)}$		
A-B-D1 Other Times continued	FN	B(E4)		D(E4)	
	SG/PS	B		D	
	DS	$\overline{A(NEXT)}.\overline{D(NEXT)}$		$\overline{A(NEXT)}.\overline{B(NEXT)}$	
A-B-D2	FN	A(L)	A(E2)		
	SG/PS	$\overline{V2}$	A		
	DS	$\overline{B}.\overline{D}$	$\overline{B(NEXT)}.\overline{D(NEXT)}$		
A-B-D2 continued	FN	B(E2)		D(E2)	
	SG/PS	B		D	
	DS	$\overline{A(NEXT)}.\overline{D(NEXT)}$		$\overline{A(NEXT)}.\overline{B(NEXT)}$	

DETECTOR SPECIFICATION

Detector	Specifications				
B-C-D	FN	C(PR)	B(E1)		
	SG/PS	$\overline{C}$	B		
	DS	—	$\overline{C(NEXT)}.\overline{D(NEXT)}.\overline{B\text{-}C\text{-}D(PR)}$		
cont. B-C-D	FN	C(E1)	D(E1)		
	SG/PS	$\overline{C}$	D		
	DS	—	$\overline{B(NEXT)}.\overline{C(NEXT)}.\overline{B\text{-}C\text{-}D(PR)}$		
B-D Other Times	FN	B(L)	D(L)	B(E3)	D(E3)
	SG/PS	$\overline{V3}$	$\overline{V3}$	B	D
	DS	—	Z+	$\overline{D(NEXT)}$	$\overline{B(NEXT)}$
C	FN	C(PR)	C(E2)		
	SG/PS	$\overline{C}$	C		
	DS	—	—		
P1 P.B.	FN	A(PB)	C(L)		
	SG/PS	$\overline{P1(WALK)}$	$A.\overline{P1(WALK)}$		
	DS	—	$\overline{B}.\overline{C}.\overline{D}$		
P2 P.B.	FN	A(PB)		C(L)	
	SG/PS	$\overline{V2}.\overline{P2(WALK)}$		$V2.\overline{P2(WLK)}$	
	DS	$\overline{B}.\overline{D}$		$\overline{C}$	
P3 P.B.	FN	C(PB)	A(L)		
	SG/PS	$\overline{P3(WALK)}$	$C.\overline{P3(WLK)}$		
	DS	—	$\overline{A}.\overline{B}.\overline{D}$		

NOTES

1. This site is SCATS linked.
2. Special STOP (R1-4) sign is placed on post 4 and 8.
3. Audio-tactile push buttons are provided on posts 1, 2, 3, 4, 7 and 8.
4. Kerb ramps are to be constructed at all marked foot crossings in accordance with Model Drawing MD.R173.B01.A.1.
5. This site is currently operating under AM Peak Tidal Flow controlled by candy bars.
6. XSF15 enables AM PEAK mode. Detector 4 has dual functions. i.e B-D Detector AM Peak subject to presence of XSF15, A-B-D1 Detector OTHER TIMES. The presence of XSF15 disables Detector 7 and enables Detector 1 as a counting detector.
7. Mode switch to be installed on controller to allow switching from the outside. Switch to be marked: OFF, AUTO, AM and OTHER TIMES.
8. Location of supply is to be confirmed by an accredited level 2/3 service provider.
9. Proposed hardware locations provided are desirable, however locations of existing underground utilities have not been confirmed. Accurate locations of underground utilities are required to confirm that proposed traffic signal hardware and associated footings can be installed as shown. Aerial bundling of overhead wires may be required subject to final determination of mast arm type and its location.
10. Provision to be made in the cabling and ducting for future marked foot crossing on the northern approach of Windsor Road and a second detector on Anderson Road.
11. Civil Works:
    (i) For details of associated civil roadworks refer to registered plan DS2013/001300.
    (ii) Remove sockets for candy bars and epoxy fill redundant holes.
    (iii) Approach and departure components of detector loop to be installed either side of proposed concrete dished crossing and joined to maintain a continuous loop feeder cable.

A ORIGINAL ISSUE

B ISSUE OFFICE INSTRUCTION BY TRAFFIC ENGINEERING SERVICES ADDED: NO LEFT TURN SIGNS WITH SUPP. PLATE POSTS 4 & 6. J.B 04/02/14

C ISSUE OFFICE INSTRUCTION WORKS AS EXECUTED ADDED: V1 LANTERN TO POST 2. AMENDED: NOTE 6. AW / JB 13/11/14

D ISSUE JI SM915 11/11/14 ADDED: "STRAIGHT THROUGH" PAVEMENT ARROW TO BOWLING CLUB ENTRANCE. AW / JB 13/11/14

PUBLIC UTILITY LEGEND		REFERENCE PLANS	
HYDRANT	□	SYMBOLS/ABBS.	VD003-6
STOP VALVE	⚠	STD POSIT	VD001-5
GAS VALVE	#	PRES. DETECT	VC005-17
SEWER MANHOLE	⊗	VEH. GROUP OP	TS-TN-019
TELECOM PIT	◪	DET. LOGIC OP	TS-TN-020
ELECT LIGHT POLE	○	PED. MOVEMNT OP	TS-TN-021
POWER POLE	○		
STAY POLE	⊘		
TELEPHONE BOX	T	SURVEYOR : A. DEGIORGIO	
TELECOM PILLAR	⊘	DATE : 24/10/2011	

U.B.D. Ref. Map 190 Q4
I.S.G. CO-ORDS E: 299 590 N: 1 260 560
DESIGNED S. HAWLEY
CHECKED T. BLADES
T. BLADES / K. IRONSIDE
SITE CHECKED K. Ironside K. IRONSIDE 18/12/13
RECOMMENDED

DESIGN APPROVAL
APPROVED J. Sales-Luis
POSITION Senior Designer
DATE 18/12/2013
DESIGN PREPARED BY ROAD DESIGN ENGINEERING ENGINEERING TECHNOLOGY ASSET MAINTENANCE

RMS ACCEPTANCE
RECOMMENDED F. Cavaleri
POSITION A / NETWORK OPERATIONS LEADER
DATE 19/12/13
ACCEPTED K. Lysaught
POSITION RNMgr
DATE 19/12/13

ROADS AND MARITIME SERVICES

THE HILLS COUNCIL AREA
TRAFFIC SIGNALS AT
MR184 WINDSOR ROAD AND
ANDERSON ROAD
NORTHMEAD

DESIGN LAYOUT TCS No 4472

EXISTING ☐ PROPOSED ☒
CADD FILE: K:\Signals\TCS\...\VV4472_1D.dgn
SCALE 5 0 (1:200) 5 10
ISSUE D
FILE SF2013/175723
SUPERSEDES SHEET/ISSUE 1/C
REG No. DS2013/001981
TCS No. 4472
SHEET 1

13/11/2014 10:18:19 AM K:\Signals\TCS\vv4400-vv4499\vv4472\Drawings\VV4472_1D.dgn

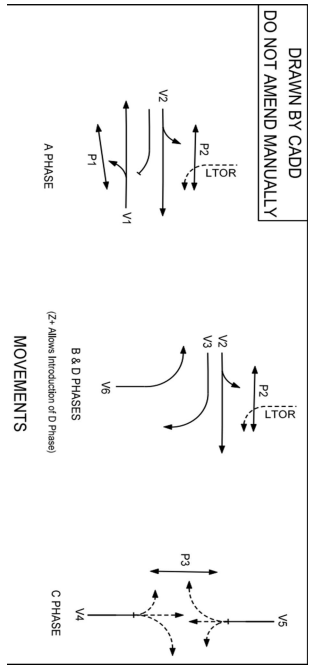
ANNEXURE E: PHASE TIME REVIEW
(2 SHEETS)

Intersection	Windsor Rd / Anderson Rd
Period Start	**Period Finish**
7:30AM	7:45AM

No. of Cycle Recorded	Mod
6	1

Phase	Min	Max	Average	Occurences
A	109	132	118	100%
B	13	13	13	43%
C	11	21	14	100%
Cycle Time	133	145	138	

Cycle 1	TIME START			TIME END			Phase Duration (s)	Cycle Time (s)			
Phase	**HR**	**MIN**	**SEC**	**HR**	**MIN**	**SEC**					
C	7	31	44	7	32	5	21			7:31:44 AM	7:32:05 AM
A	7	32	5	7	34	11	126	142		7:32:05 AM	7:34:11 AM
C	7	34	11	7	34	27	16			7:34:11 AM	7:34:27 AM
A	7	34	27	7	36	28	121	133		7:34:27 AM	7:36:28 AM
C	7	36	28	7	36	40	12			7:36:28 AM	7:36:40 AM
A	7	36	40	7	38	52	132	145		7:36:40 AM	7:38:52 AM
C	7	38	52	7	39	5	13			7:38:52 AM	7:39:05 AM
A	7	39	5	7	40	54	109	136		7:39:05 AM	7:40:54 AM
B	7	40	54	7	41	7	13			7:40:54 AM	7:41:07 AM
C	7	41	7	7	41	21	14			7:41:07 AM	7:41:21 AM
A	7	41	21	7	43	12	111	135		7:41:21 AM	7:43:12 AM
B	7	43	12	7	43	25	13			7:43:12 AM	7:43:25 AM
C	7	43	25	7	43	36	11			7:43:25 AM	7:43:36 AM
A	7	43	36	7	45	27	111	137		7:43:36 AM	7:45:27 AM
B	7	45	27	7	45	40	13			7:45:27 AM	7:45:40 AM
C	7	45	40	7	45	53	13			7:45:40 AM	7:45:53 AM



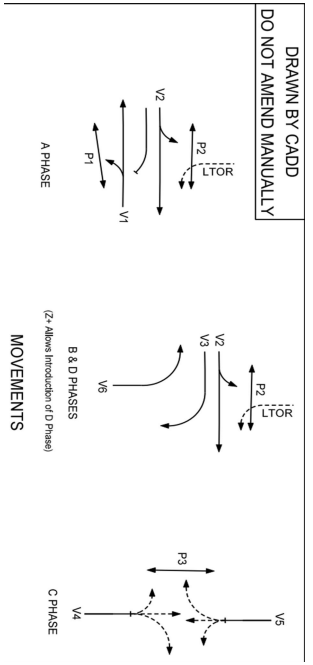
Intersection	Windsor Rd / Anderson Rd
Period Start	Period Finish
4:45PM	5:00:00 PM

No. of Cycle Recorded	Mod
6	1

Phase	Min	Max	Average	Occurences
A	110	126	115	100%
B	15	24	19	71%
C	11	14	13	100%

Cycle Time	131	148	141

Cycle 1	TIME START			TIME END			Phase Duration (s)	Cycle Time (s)			
Phase	HR	MIN	SEC	HR	MIN	SEC					
B	16	45	55	16	46	12	17			4:45:55 PM	4:46:12 PM
C	16	46	12	16	46	25	13			4:46:12 PM	4:46:25 PM
A	16	46	25	16	48	15	110	147		4:46:25 PM	4:48:15 PM
B	16	48	15	16	48	39	24			4:48:15 PM	4:48:39 PM
C	16	48	39	16	48	52	13			4:48:39 PM	4:48:52 PM
A	16	48	52	16	50	50	118	131		4:48:52 PM	4:50:50 PM
C	16	50	50	16	51	3	13			4:50:50 PM	4:51:03 PM
A	16	51	3	16	52	55	112	141		4:51:03 PM	4:52:55 PM
B	16	52	55	16	53	13	18			4:52:55 PM	4:53:13 PM
C	16	53	13	16	53	24	11			4:53:13 PM	4:53:24 PM
A	16	53	24	16	55	30	126	140		4:53:24 PM	4:55:30 PM
C	16	55	30	16	55	44	14			4:55:30 PM	4:55:44 PM
A	16	55	44	16	57	37	113	140		4:55:44 PM	4:57:37 PM
B	16	57	37	16	57	52	15			4:57:37 PM	4:57:52 PM
C	16	57	52	16	58	4	12			4:57:52 PM	4:58:04 PM
A	16	58	4	16	59	55	111	148		4:58:04 PM	4:59:55 PM
B	16	59	55	17	0	18	23			4:59:55 PM	5:00:18 PM
C	17	0	18	17	0	32	14			5:00:18 PM	5:00:32 PM



ANNEXURE F: QUEUING ANALYSIS
(1 SHEET)

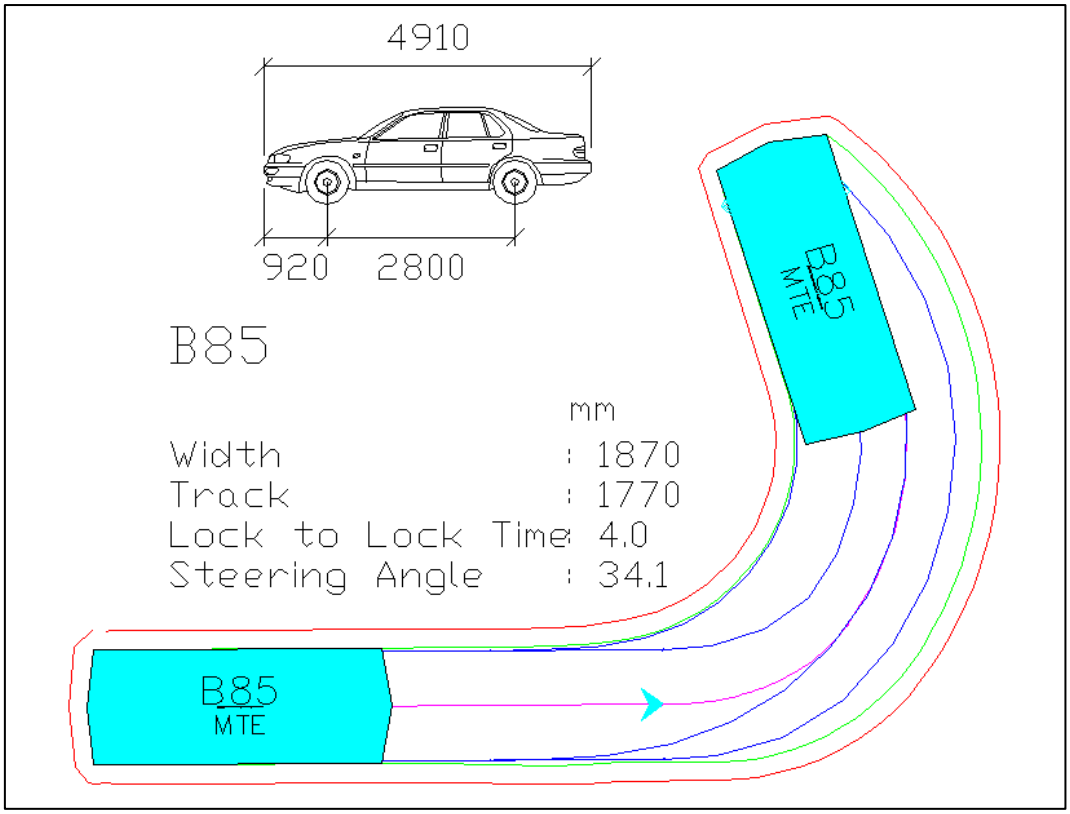
Multi-Server Queue Worksheet

Service Bays	24	Arrival Rate (vehicles/hour)	32	Wait Time in Each Bay (seconds)	496
Vehicles/Second IN	0.008888889	Vehicles/Second OUT (per bay)	0.002016129		
P0	0.012168692	rho	4.408888889	rho (single bay system assumed)	0.1837

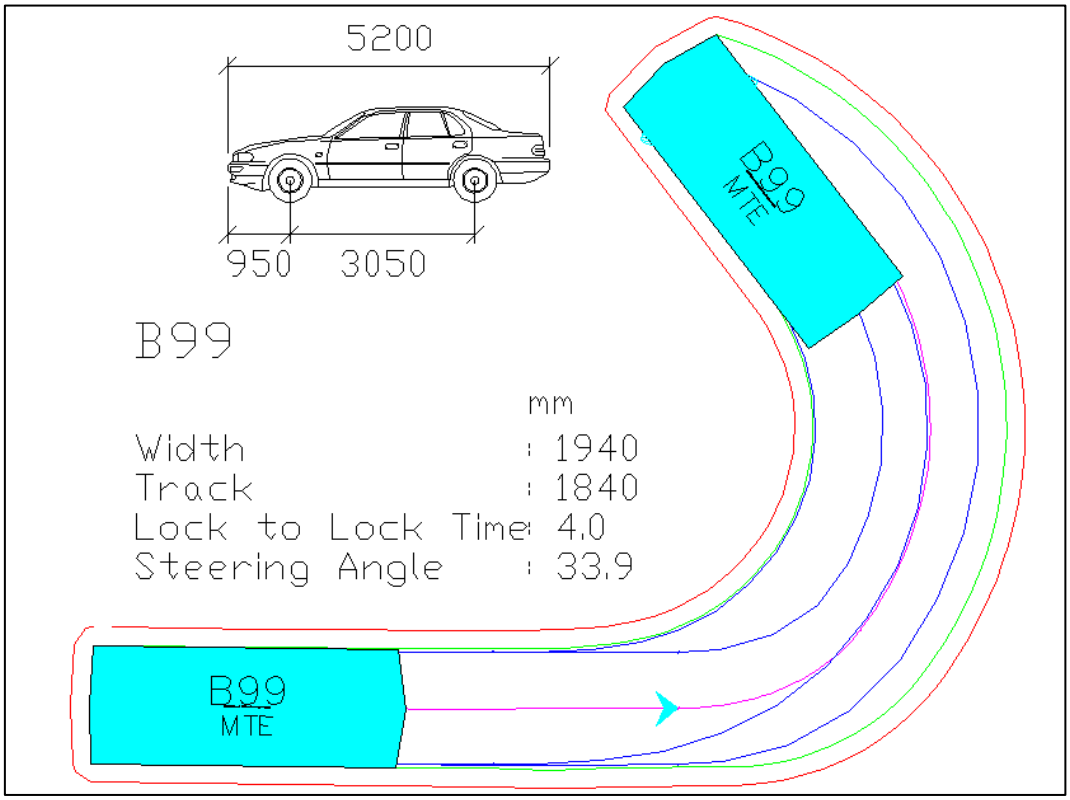
n	1st Term	Pn	P(>=n)
0	1	1.22%	98.78%
1	4.40889	5.37%	93.42%
2	9.71915	11.83%	81.59%
3	14.2836	17.38%	64.21%
4	15.7436	19.16%	45.05%
5	13.8824	16.89%	28.16%
6	10.201	12.41%	15.75%
7	6.42501	7.82%	7.93%
8	3.54089	4.31%	3.62%
9	1.7346	2.11%	1.51%
10	0.76477	0.93%	0.58%
11	0.30652	0.37%	0.20%
12	0.11262	0.14%	0.07%
13	0.03819	0.05%	0.02%
14	0.01203	0.01%	0.01%

Percentile	Number of Vehicles in System	Number of Vehicles Queued
50%	4	0
60%	5	0
70%	5	0
80%	6	0
85%	7	0
90%	7	0
95%	8	0
98%	9	0

ANNEXURE G: SWEPT PATH TESTING
(5 SHEETS)



AUSTRALIAN STANDARD 85TH PERCENTILE SIZE VEHICLE (B85)



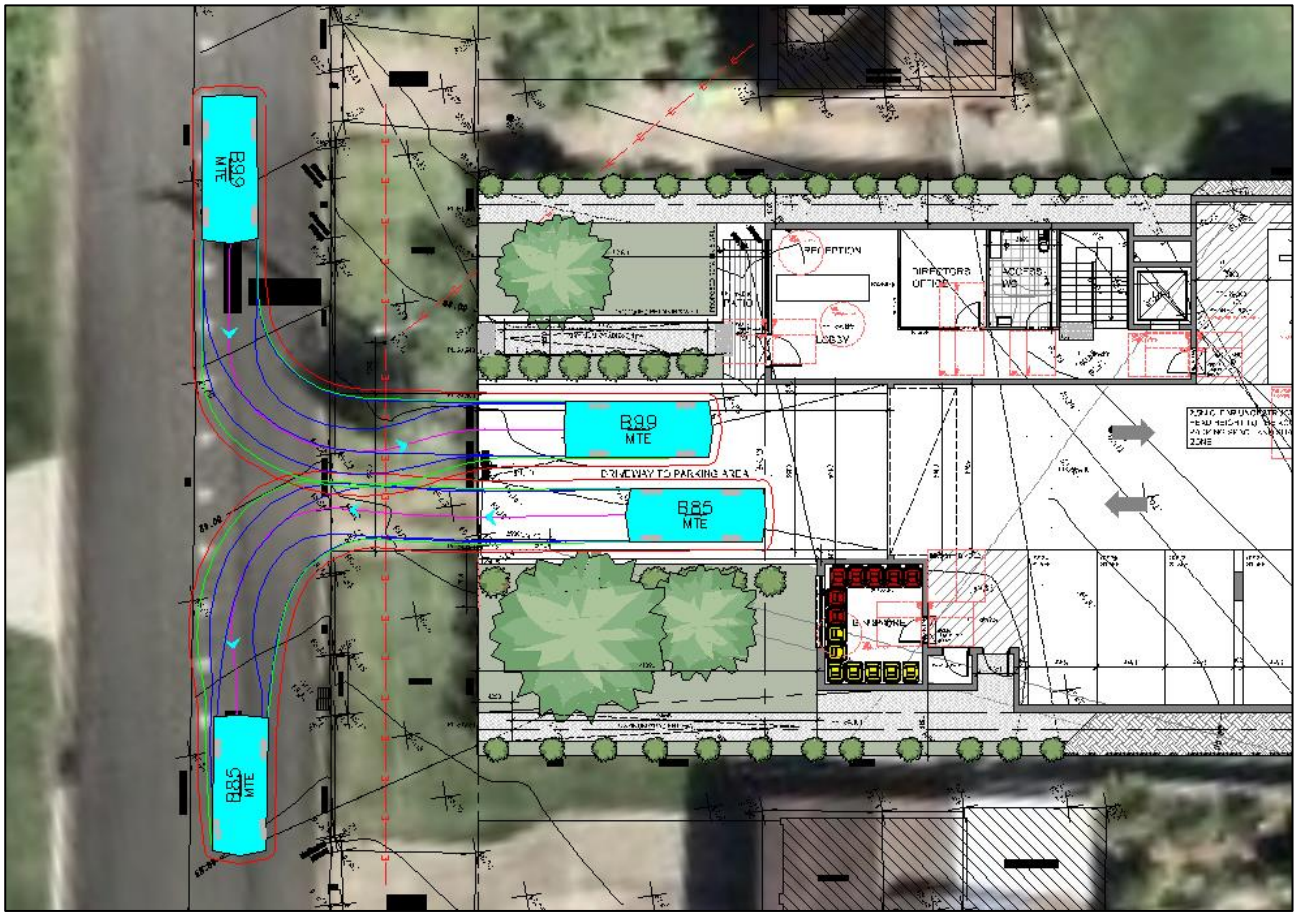
AUSTRALIAN STANDARD 99.8TH PERCENTILE SIZE VEHICLE (B99)

Blue – Tyre Path

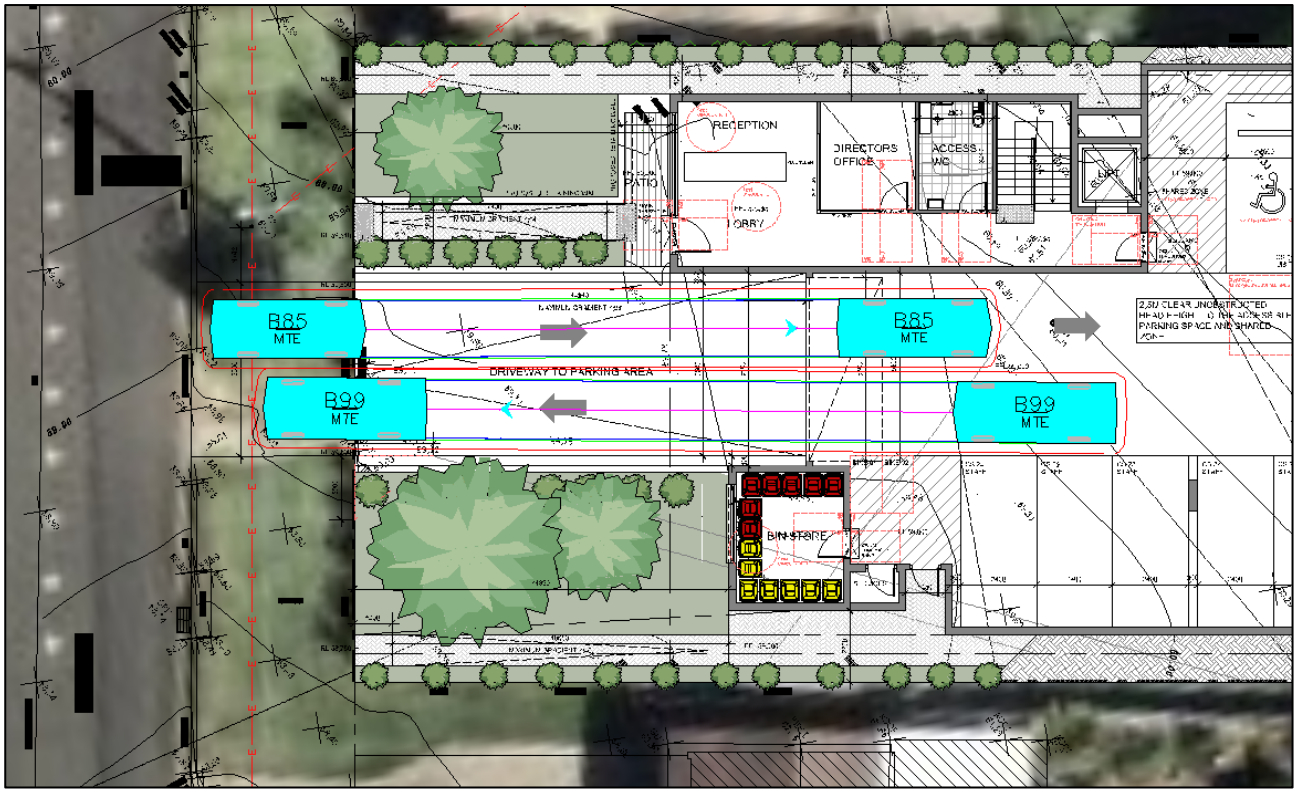
Green – Vehicle Body

Red – 300mm Clearance

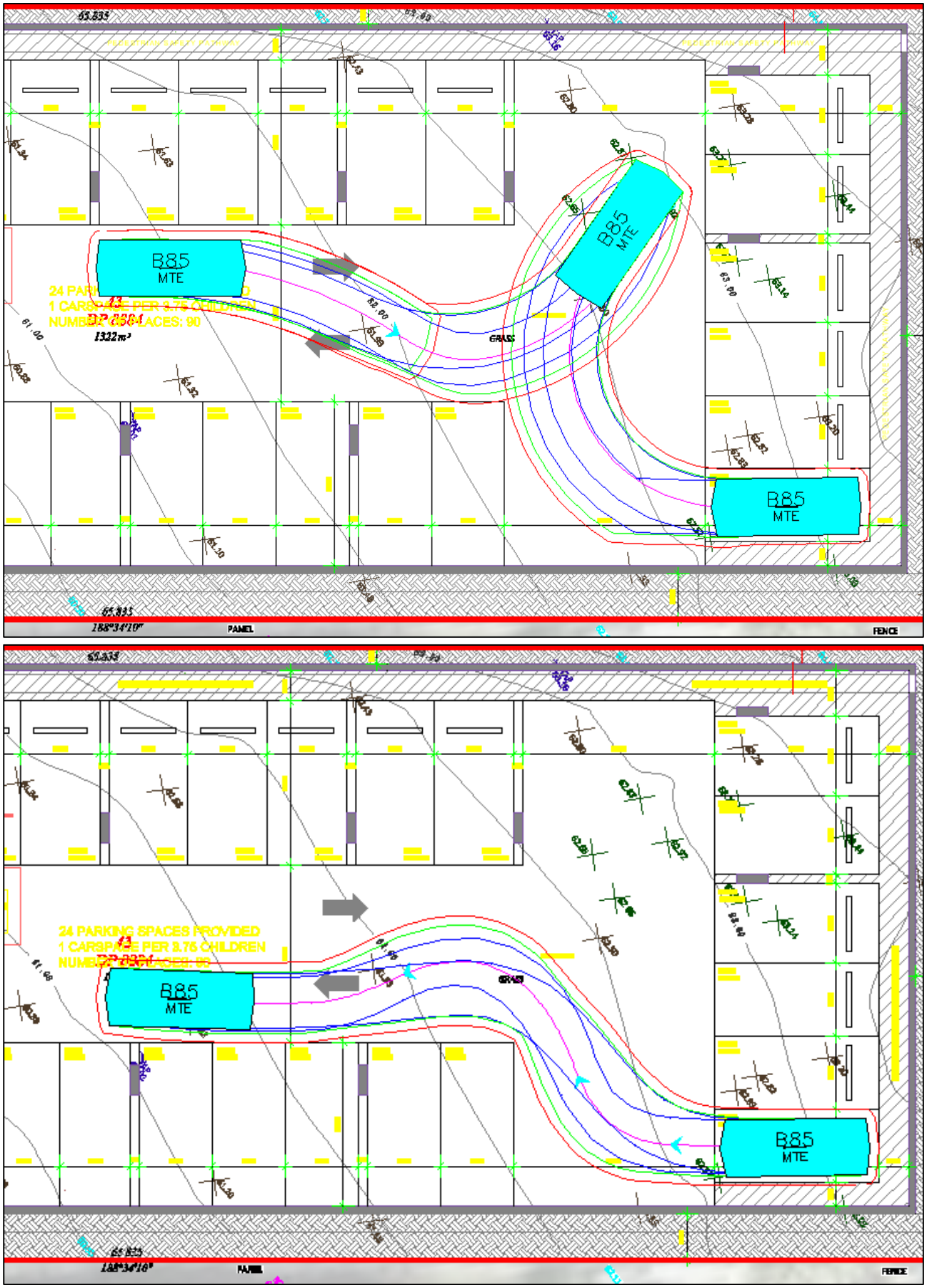
Tested @ 5-km/h internally; 10-km/h on public roads.



B85 / B99 TWO-WAY PASSING AT THE VEHICLE CROSSOVER
Successful

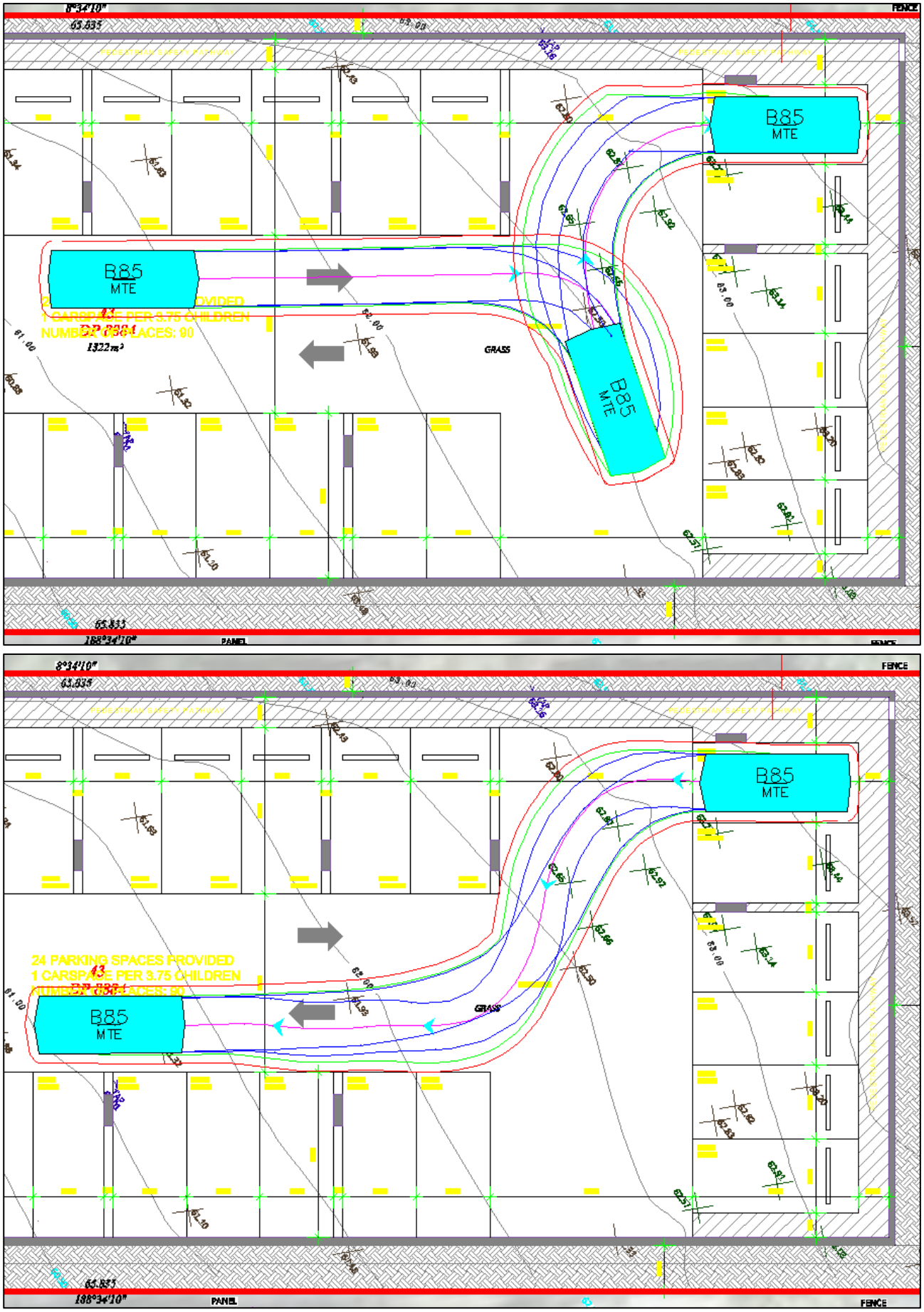


B85 / B99 TWO-WAY PASSING ALONG BASEMENT RAMP
Successful



B85 ENTRY / EXIT FROM SPACE 13

Successful – 2 manoeuvres REVERSE IN / 1 manoeuvre FORWARD OUT



B85 ENTRY / EXIT FROM SPACE 8

Successful – 2 manoeuvres REVERSE IN / 1 manoeuvre FORWARD OUT