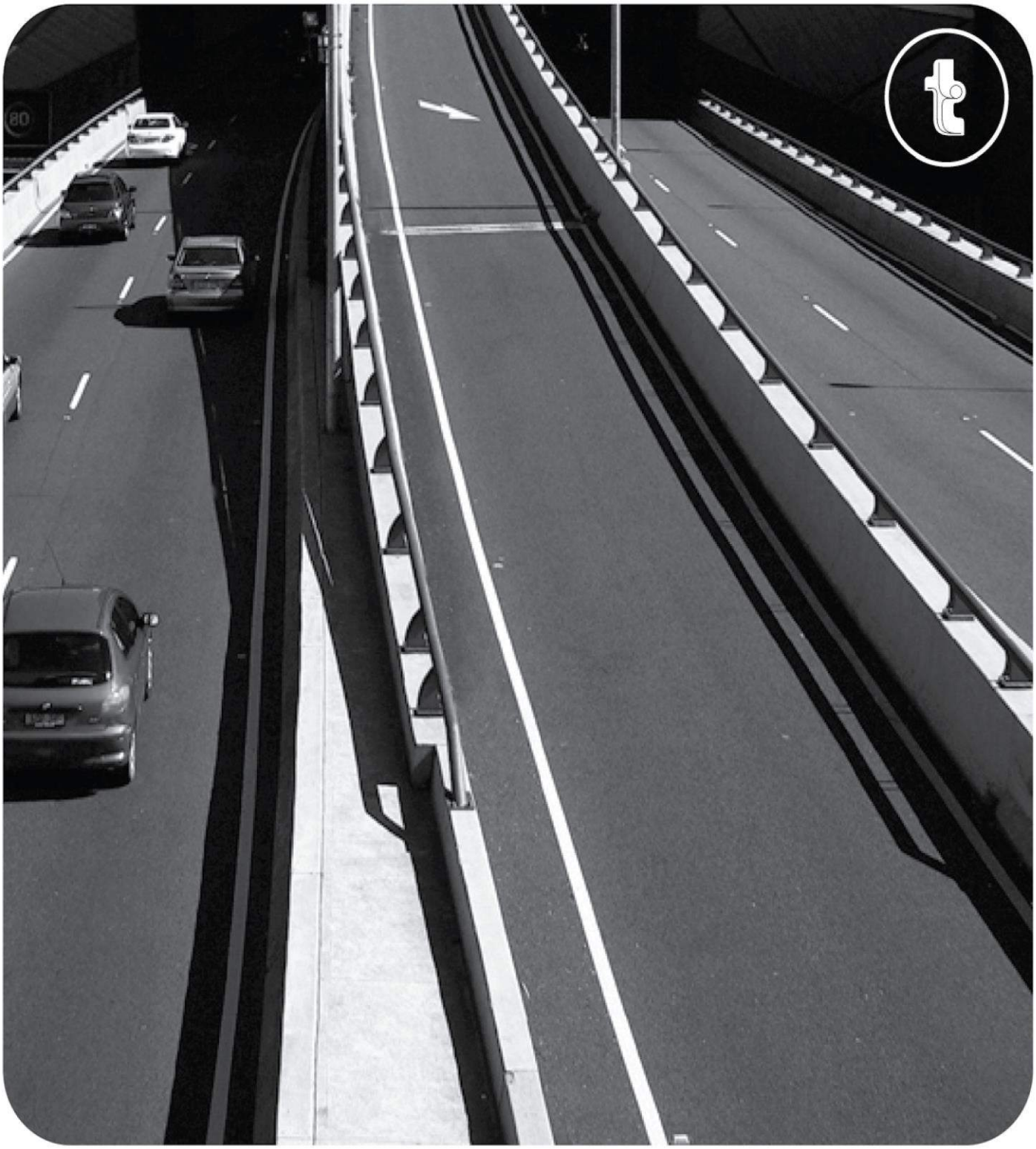
APPENDIX H TRAFFIC AND TRANSPORT REPORT



Traffic Impact Assessment

Proposed Cammeraygal Public School (Senior Campus)

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Reference: 16.355r01v03 TIA Report
Date: May 2017

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Document Verification

Job Number:	16.355			
Project:	Proposed Cammeraygal Public School Senior Campus			
Client:	Department of Education			
Revision	**Date**	**Prepared By**	**Checked By**	**Signed**
v01 - DRAFT	31/03/17	Alexandra Kavanagh	Thomas Yang	
v02	05/05/2017	Alexandra Kavanagh	Thomas Yang	
v03	22/05/2017	Alexandra Kavanagh	Thomas Yang	

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1. Introduction

TRAFFIX has been commissioned by the Department of Education to undertake a Traffic Impact Assessment (TIA) to accompany a Development Application (DA) relating to the conversion of an existing Tertiary Education Facility (Crows Nest TAFE) located at 149 West Street, Crows Nest into a Secondary Education Facility to meet the growing need of future schooling demand as a result of the population growth in Sydney's Northern suburbs.

The proposed Secondary Education Facility will be used as the Cammeraygal High School Senior Campus, accommodating up to 600 senior students and up to 60 staff which would be transient between the proposed Senior Campus and the existing Junior Campus located on the Pacific Highway in North Sydney. The site will also provide a multipurpose Hall for ancillary use during school hours and for Public use outside of school hours.

The proposed development is situated in the Northern Sydney Council's Local Government Area (LGA) and has been assessed under that Council's controls including the North Sydney Council's Development Control Plan (DCP) 2013. As the proposal is for a public school, assessment has also been undertaken with regard for the relevant policies of the Department of Education.

The purpose of this report is to assess the traffic and parking implications arising from the development proposal, and documents the findings of our investigations. The report should also be read in the context of the Statement of Environmental Effects (SEE) prepared separately.

The report is structured as follows:

- Section 2: Describes the site and its location.
- Section 3: Documents existing traffic conditions.
- Section 4: Describes the proposed development.
- Section 5: Assesses the parking implications.
- Section 6: Assesses the traffic implications.
- Section 7: Discusses access and internal design aspects.
- Section 8: Discusses a Sustainable travel plan.
- Section 9: Discusses Traffic Management during the construction phase.

2. Location and Site

The subject site is located at 149 West Street, Crows Nest and is currently occupied by the Crows Nest TAFE. The subject site is bounded by West Street to the west; residential properties and Ernest Street to the north; residential properties to the east; and residential properties, a child care centre and Rodborough Avenue to the south. The subject site is located within a SP2 Infrastructure zone and is bordered by R4 High Density Residential and R2 Low Density Residential zones. It is located approximately 1.3km south-east of St Leonards Station and 1.4km north-east of both Wollstonecraft and Waverton Station, and 5.5km north of Sydney CBD.

The subject site is irregular in configuration having a total site area of approximately 12,000m^2. The site has an eastern and western frontage of approximately 60 metres and a southern and northern frontage of approximately 178m.

The subject site is currently served by an at-grade car park with a provision of 88 car parking spaces including two (2) accessible parking spaces, and is accessed via a 7.0 metre wide driveway on West Street. The subject site is also currently configured with pedestrian access points from Ernest Street, West Street and Rodborough Avenue.

A Location Plan is presented in **Figure 1**, with a Site Plan presented in **Figure 2**. Reference should be made to the Photographic Record presented in **Appendix A**, visual amenity of the existing site and surrounding road network.

Figure 1: Location Plan

Figure 2: Site Plan

3. Existing & Future Traffic Conditions

3.1 Road Network

The existing road hierarchy in the vicinity of the site is shown in **Figure 3** and the proposed road hierarchy, with the following of particular interest:

- Miller Street: a Roads and Maritime Services (herein referred to as 'RMS') Main Road (MR599) which traverses in a north-south direction between Blues Point Road in the south and The Boulevard in the north (a regional road status is assigned south of the Pacific Highway). Miller Street is subject to a 50km/h speed zoning, however a "40km/h 8:00am-9:30am, 2:30pm – 4:00pm, School Days" restriction applies. Miller Street accommodates two northbound lanes and three southbound lanes within a median divided carriageway. A clearway is operational on the eastern kerbside lane between 6:00am – 10:00am and on the western kerbside between 3:00pm to 7:00pm with time restricted parking otherwise generally permitted.

- Falcon Street: a RMS Main Road (MR164) that traverses in an east-west direction between Military Road in the East and the Pacific Highway in the west (a highway status (HW10) is assigned east of the Warringah Freeway). Falcon Street is subject to a 60 km/h zoning however a "40km/h 8:00am-9:30am, 2:30pm – 4:00pm, School Days" restriction applies.

- Ernest Street: a RMS Secondary Road (SR 2036) which traverse in an east-west direction between Willoughby Lane in the west and Ben Boyd Road in the west. It has a posted speed limit of 50km/h and generally accommodates two lanes of traffic in each direction, with No Stopping restrictions operating during peak times.

- West Street: a local road which traverses in a north-south direction between the Pacific Highway in the south and Palmer Street in the north. West Street is subject to a 50 km/h speed zoning and carries two traffic lanes, one in each directions. Time restricted parallel parking is permissible along both sides of the street.

- Rodborough Avenue: a local road which traverses in a north-south direction. Rodborough intersects Falcon Street in the south and ends in a cul-de-sac configuration in the north at a pedestrian access for the existing Crows Nest TAFE site.

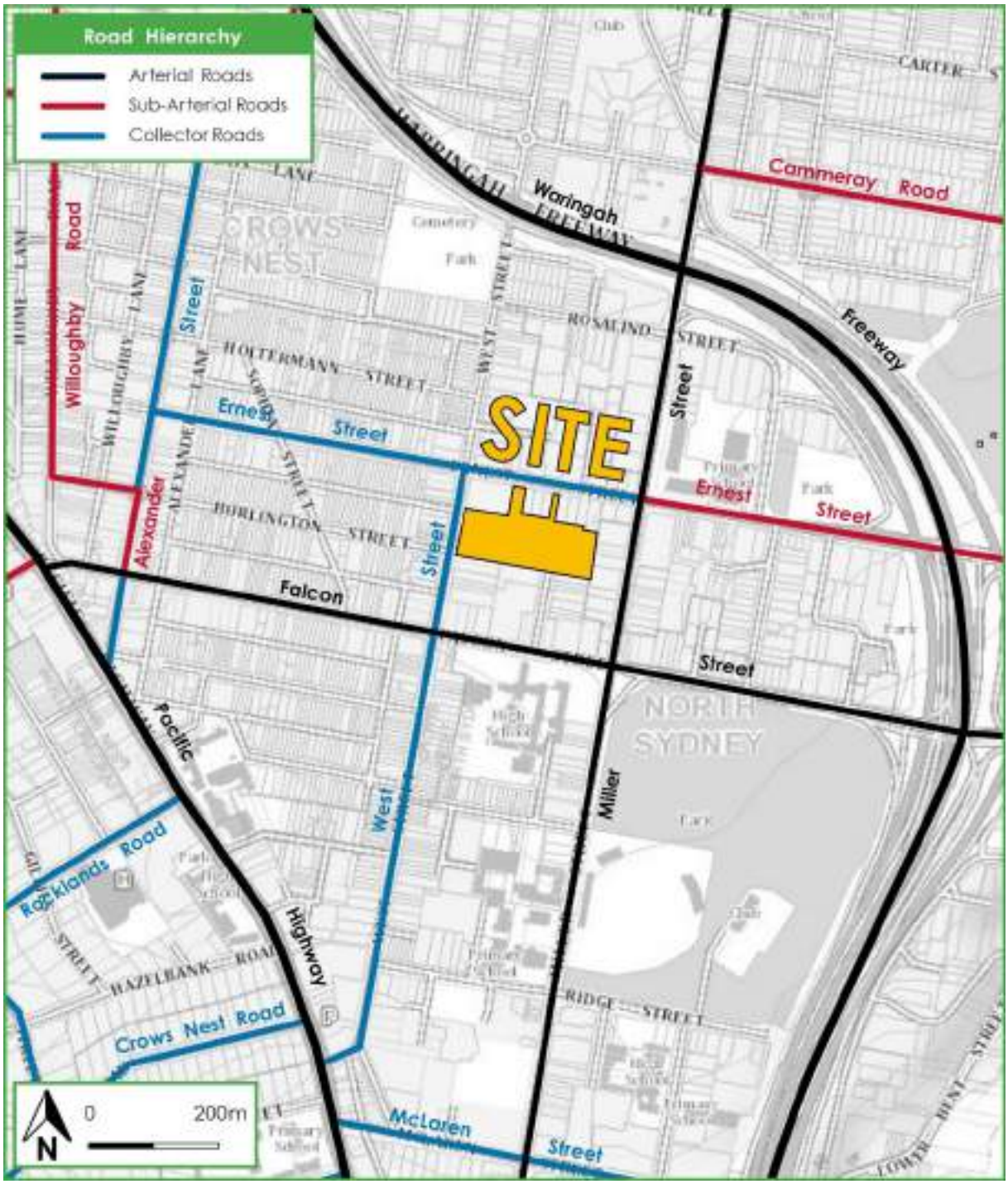


Figure 3: Existing Road Hierarchy

3.2 Key Intersections

Key intersections in the vicinity of the subject site consists of:

- Ernest Street with West Street (Traffic Signals).
- Ernest Street with Miller Street (Traffic Signals).
- Falcon Street with Miller Street (Traffic Signals).

Descriptions of the abovementioned intersections are provided below, noting that all the intersections are signal controlled. A Keep Clear restriction is painted on Falcon Street at Rodborough Avenue to allow unimpeded access and egress from Rodborough Avenue.

The intersection of Ernest Street and West Street is controlled by signals and two traffic lanes are available in all directions. **Figure 6** provides an aerial image of the subject intersection.

The intersection of Earnest Street and Miller Street is controlled by signals and two traffic lanes are available in all directions. A dedicated short right turn bay is provided on the eastern and northern approaches to the intersection. **Figure 7** provide an aerial image of the subject intersection.

The intersection of Falcon Street and Miller Street is controlled by signals and two traffic lanes are available in all directions. A dedicated short right turn bay is provided on the eastern and southern approaches to the intersection. Left-turn slip lanes are provided for the eastern and southern approach to the intersection. A dedicated bus through lane is also provided on the eastern approach to the intersection. It is worthwhile to mention that the southern departure leg is configured with a dedicated bus lane that services an existing bus stop at that location, and is controlled by a separate set of signals primarily to stop traffic from the eastern slip lane to assist a bus departing the bus stop from its stopped position. **Figure 8** provides an aerial image of the subject intersection.

Figure 6: Aerial of Existing Intersection of Ernest Street with West Street.

Figure 7: Aerial of Existing Intersection of Ernest Street with Miller Street.

Figure 8: Aerial of Existing Intersection of Falcon Street and Miller Street.

3.3 Existing Traffic Conditions

An indication of the existing traffic conditions is provided by peak hour vehicle turning movement counts undertaken on Wednesday 8th March 2017 between 7:00am-9:00am and 3:00pm-6:00pm at the above nominated key intersections, with the full results of the traffic surveys reproduced in **Appendix C**.

These survey results are then subsequently analysed using SIDRA INTERSECTION 7.0 to determine the performance characteristics of the key intersections under existing traffic conditions, which is discussed further in **Section 6**.

3.4 Sustainable Transport Facilities

The subject site is conveniently located within close proximity to several bus services with bus stops on Ernest Street, Falcon Street and Miller Street accessible within a 400 metres radius. These services attributes to site accessibility and are provided in **Table 1** below. **Figure 5** shows the location of the Bus Stops overleaf.

Table 1: Public Transport Services- Accessibility to Other Urban Centres and Service Attributes

Bus Route	Starting Destination	Accessible Urban Centres	Attributes
140	Manly Wharf to Epping	Fairlight, Balgowlah, The Spit, Cremorne, Neutral Bay, Crows Nest, St Leonards, Gore Hill, Artarmon, Lane Cove, North Ryde, Macquarie Centre, Macquarie University and Epping.	Monday to Friday peak hour limited stops.
143	Manly to Chatswood	Balgowlah, Neutral Bay, Crows Nest and St Leonards	Service operates daily
144	Manly to Chatswood	Balgowlah, Neutral Bay and Crows Nest	Service operates daily
201	Cremorne to City	Bridge Street via Freeway	Service operates daily
202	Northbridge to City	Via Cammeray and North Sydney	Service operates daily
203	Castlecrag to City	Via Cammeray	Service operates daily
206	East Lindfield to City	Via Eastern Valley Way, Cammeray and Freeway	Service operates daily
207	East Lindfield to City	Via Eastern Valley Way, Cammeray and North Sydney	Service operates daily
208	East Lindfield to City	Via Eastern Valley Way, Northbridge, Cammeray and North Sydney	Service operates early morning and evenings daily
209	East Lindfield to City	Via Eastern Valley Wat, Cammeray and North Sydney	Service operates Monday to Friday peak hours
257	Chatswood to Balmoral	North Willoughby, Naremburn, Crows Nest, Neutral Bay Cremorne and Balmoral	Daily daytime service
263	Crows Nest to City	Vie Neutral Bay	Service operates daily
267	Crows Nest to Chatswood	Crows Nest, Cammeray, Northbridge and Willoughby	Monday to Saturday daytime service
343	Kingsford to Chatswood	Via Eastlakes, Rosebery, Zetland, Waterloo, Redfern, City, North Sydney, Crows Nest, Naremburn, Willoughby and North Willoughby.	Service operates daily

It is also pertinent to mention that the subject site will benefit from the future Sydney Metro currently under construction that is envisaged to deliver a new generation of world-class fast, safe and reliable trains with 31 stations connecting between Cudgegong and Bankstown. It is said that customers won't need to rely on timetables with the train service operating at four (4) minute intervals. The future Crows Nest Station will be located on the western fringe of the Crows Nest village, between the Pacific Highway and Clarke Lane (eastern side of the Pacific Highway) and Oxley Street, south of Hume Street which will be accessible within an approximate 10 minute walking distance to / from the subject site.

Further to the above, the proposed Cammeraygal High School Senior Campus will make provision for School Bus services during sporting and special events. In addition to the Public Transport services, **Figure 5** also shows the existing and proposed cycle routes as provided in the North Sydney City Bicycle Map within close proximity to the site. The Bicycle Map has been included in **Appendix C** for reference.

On the above basis, it is evident that the subject site benefits from existing and future planned sustainable transport facilities, and is therefore in an ideal location to encourage the greater use of alternate sustainable modes of transport to reduce private vehicle dependency.

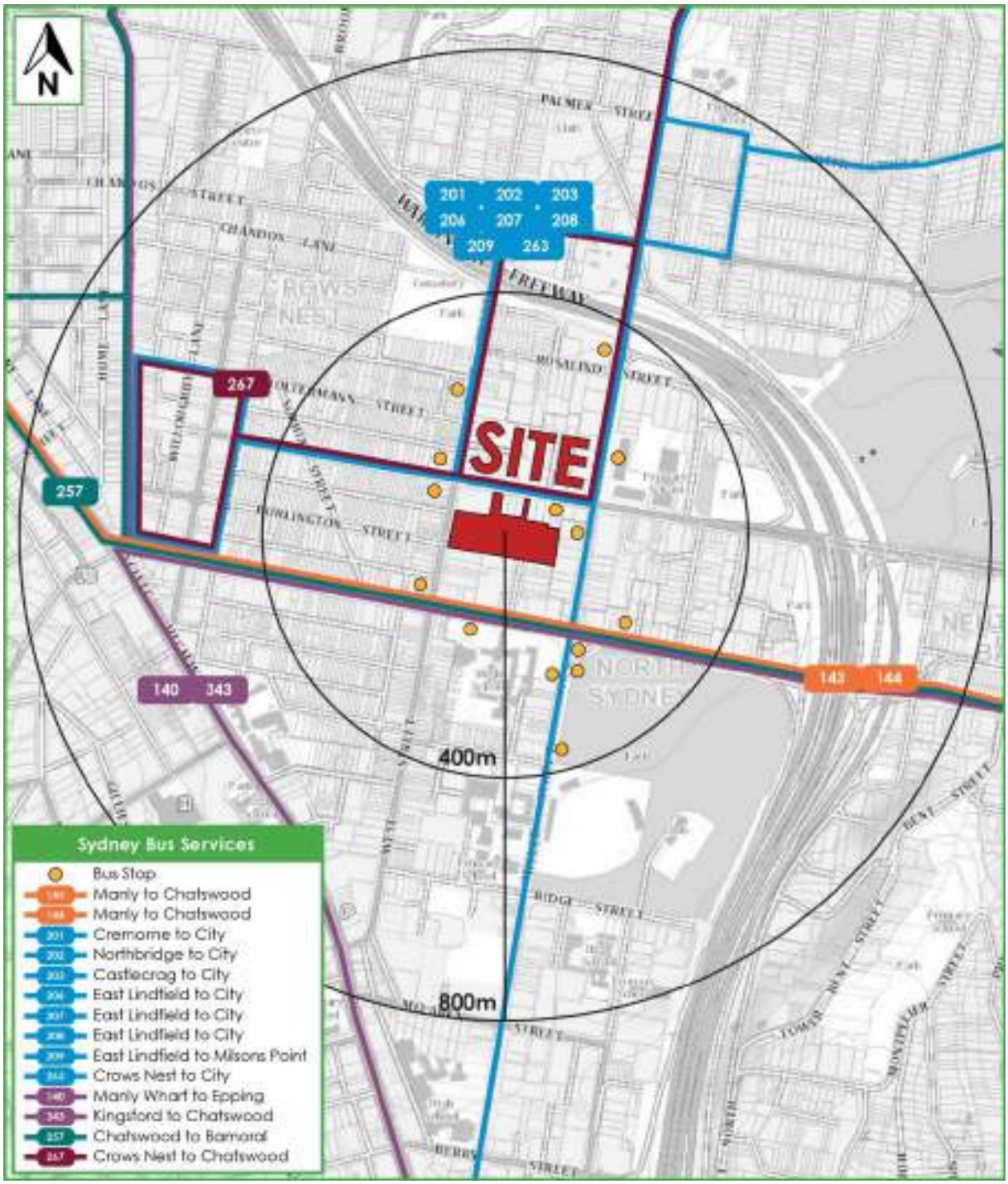


Figure 5: Existing Bus and Rail Network

3.5 Existing Travel Modes & Site Traffic Generation

As a means of assessing the travel modes and traffic generation of the proposed Cammeraygal High School Senior Campus, online travel mode questionnaire surveys were prepared by TRAFFIX and distributed by the school to all staff and parents / carers of the existing Cammeraygal High School Junior Campus which is located on the Pacific Highway in Crows Nest. This is considered suitable on the basis that these students will ultimately transition into the Senior Campus where the school catchment areas and modes of transport is expected to remain largely similar.

The online survey was open for responses for ten day period from 24 March 2017 to 3 April 2017. A sample rate of approximately 56% of students and 100% of staff was collected and completed. The survey included a range of questions which were primarily aimed to gain an understanding of average car occupancies and travel modes in the morning and afternoon peak periods in order to understand the existing development characteristics and inform the future impacts of the development. The key results of these surveys are discussed in the following sections.

Table 3 below shows the existing travel modes of both staff and students during the AM and PM school peak periods.

Table 3: Existing Travel Modes – AM and PM School Peak Periods

Travel Mode	AM Peak		PM Peak	
	Staff	Student	Staff	Student
Car Driver	47%	-	44%	-
Car Passenger	-	13%	-	4%
Public Transport	46%	34%	40%	39%
Other	7%	53%	16%	57%

Based on the above survey results, 44%-47% of staff utilise private vehicle to travel to / from the school with the remaining staff utilising other modes of transport (including public transport, walking and cycling).

The results also show that 13% of students are dropped-off by private car to the school in the morning, with 3% of students being picked-up by private car in the afternoon. A significant proportion of students, 34%, utilise public transport in the morning, increasing to 39% in the afternoons. The majority (53%-58%) of students also travel to and from the school using other modes of transport such as walking or

cycling. **Section 3.4.1** and **3.4.2** provide more insight into the travel modes for staff and students, respectively.

3.5.1 Staff

The results of the travel questionnaires completed by the staff at Cammeraygal Public High School 's Junior Campus are outlined in the tables below. **Table 4** to **Table 7** present the surveyed travel mode shares, arrival and departure times of the existing staff.

Table 4: Surveyed Mode Share-of Surveyed Sample of Staff at Cammeraygal High Public School (Junior Campus)

Travel Mode	Number of Staff (Average- To/From School)	Proportion of Staff
Car Driver	14	47%
Car Share	14	47%
Walk	0	0
Public Transport	0	0
Other	2	6%
TOTAL	30	100%

Table 5: Surveyed Car Share of Existing Staff at Cammeraygal High Public School (Junior Campus)

Private Vehicle Occupancy	Number of Staff (Arrivals)	Proportion
1	21	95%
2	1	5%
3	0	0
TOTAL	22	100%

*Indicates a number of staff who are car sharing but did not themselves answer the survey

Table 6: Arrival Time-of Existing Staff at Cammeraygal High Public School (Junior Campus)

Arrival Time	Number of Staff (Arrivals)	Proportion
Before 7:00am	3	10%
7:00am – 8:00am	21	70%
8:00am – 9:00am	6	20%
9:00am – 10:00am	0	0
TOTAL	30	100%

Table 7 Departure Time of Existing Staff at Cammeraygal High Public School (Junior Campus)

Arrival Time	Number of Staff (Arrivals)	Proportion
Before 3:00pm	0	0%
3:00pm – 4:00pm	9	30%
4:00pm – 5:00pm	16	54%
5:00pm – 6:00pm	5	17%
TOTAL	30	100%

The key findings from the staff travel mode surveys are summarised below:

- 47% and 44% of staff at the school drive a car in the AM and PM periods respectively.
- There is one (1) recorded case of carpooling, demonstrating that this is not common practice.
- For the purpose of reviewing trip arrival patterns, 20% of staff arrived at the school between the hours of 8:00am - 9:00am and 54% of staff leave the school between the hours of 3:00pm and 4:00pm.

3.5.2 Students

The result of the travel questionnaires completed by a sample of the students at Cammeraygal Public High School Junior Campus are outlined in the tables below. **Table 8** to **Table 12** present the surveyed travel mode shares, arrival and departure times of the existing students.

Table 8: Surveyed AM Mode Share of Existing Students at the Cammeraygal High School (Junior Campus)

Travel Mode	Number of Students (Average- To School- AM)	Proportion of Students
Car Passenger	**27**	13%
School Bus	5	2%
Public Transport	65	32%
Cycle	4	2%
Walk	81	39%
Other	24	12%
TOTAL:	**206**	100%

Table 9: Surveyed PM Mode Share of Existing Students at the Cammeraygal High School (Junior Campus)

Travel Mode	Number of Students (Average- From School- PM)	Proportion of Students
Car Passenger	**8**	4%
School Bus	6	3%
Public Transport	73	36%
Cycle	4	2%
Walk	96	47%
Other	19	9%
TOTAL	**206**	100%

Table 10: Private Vehicle Occupancy of Existing Students at the Cammeraygal High School (Junior Campus)

Private Vehicle Occupancy	AM			PM		
	Number of Students (Arrivals)	Proportion	No of Vehicles	Number of Students (Departures)	Proportion	No of Vehicles
0	128	74%	33 vehicles	147	85%	22 vehicles
1	32	18%		21	12%	
2	10	6%		5	3%	
3	3	2%		0	-	
TOTAL	**45 student passengers**	**26% car sharing**		**26 student passengers**	**15% car sharing**	

Table 11: Arrival Time- of Existing Students at the Cammeraygal High School (Junior Campus)

Arrival Time	Number of Students (Arrivals)	Proportion
Prior to 8:00am	4	2%
8:00am - 8:19am	33	16%
8:20am - 8:39am	133	64%
8:40am – 9:00am	32	16%
After 9:00am	5	2%
TOTAL	207	100%

Table 12: Departure Time- of Existing Students at the Cammeraygal High School (Junior Campus)

Arrival Time	Number of Students(Departures)	Proportion
Prior to 3:00pm	10	5%
3:00pm – 3:19pm	159	77%
3:20pm – 3:39pm	17	8%
3:40pm – 3:59pm	7	3%
4:00pm – 5:00pm	5	3%
After 5:00 pm	9	4%
TOTAL	207	100%

The key findings of the student travel mode survey are as follows:

- 13% of students get dropped off in the morning with 26% of these students arrive in the same vehicle in groups of 2 or 3, and 4% of students gets picked up in the afternoon with 15% of these students depart in the same vehicle in groups of 2 or 3.
- 32% and 36% students utilise public transport in the morning and afternoon respectively.
- 41% of students walk or cycle to school in the morning, and 49% students walk or cycle home in the afternoon.
- 2% and 3% students utilise school bus services in the morning and afternoon respectively.
- The remaining 12% and 9% is recorded to use other modes of transport, that is, a combination of the above mentioned modes of transport in the morning and afternoon respectively.

The above trip rates are therefore utilised in assessing the traffic generation of the proposed development, which is discussed in further detail in **Section 6**.

4. Description of Proposed Development

A detailed description of the proposed development is provided in the Statement of Environmental Effects prepared separately. In summary, the development for which approval is now sought comprises the following components:

- Conversion of an existing Tertiary Education Facility into a Secondary Education Facility which will involve the alterations to the existing four-storey building to include the following:
    - Classrooms and homebases.
    - Outdoor play areas.
    - Construction of open space including assembly court, pedestrian circulation, gardens and open play area.
    - Retention of one (1) commercial kitchen for teaching purposes.
- Provision of a new 537m^2 multipurpose hall on the eastern side of the site including:
    - A stage
    - One (1) basketball court
    - One (1) volley ball court; and
    - Three (3) badminton courts
- Landscaping including modifications to pedestrian access points.
- The retention of twenty-eight existing off-street parking spaces, including two (2) accessible space and one (1) loading area for service vehicles and bus pick-up and drop-off.
- Provision of an egress only driveway at the cul-de-sac of Rodborough Street for school buses only.

The proposed Secondary Education Facility will be used as the Cammeraygal High School's Senior Campus, accommodating up to 600 senior students and up to 60 staff which would be transient between the proposed Senior Campus and the existing Junior Campus located on the Pacific Highway in Crows Nest. During school hours the proposed multipurpose hall will be an ancillary use for the Cammeraygal High School, exclusively. Outside of school hours the proposed use of the hall is for sports competitions

and performances with audiences. It is considered that parking for these events will be allocated to ticket holders.

The parking requirements and traffic impacts arising from the development are discussed in **Sections 5** and **6** respectively. Reference should be made to the plans submitted separately to Council which are presented at reduced scale in **Appendix F**.

5. Parking Assessment

5.1 Statutory Car Parking Requirements

The North Sydney Development Control Plan (DCP) 2002 stipulates a maximum parking rate applicable for Educational Establishments. Accordingly, the relevant car parking rates and the maximum permissible car parking provision applicable to the development proposal has been set out in **Table 14**.

Table 14: Council Parking Rates and Provision

Type	Number	Council Parking Rates[1]	Maximum Spaces	No. Spaces Retained
Staff	60	1 space / 6 staff member	10	28
		Totals	**10**	**28**

Based on the results in the above table, the retention of 28 off-street car parking spaces for staff will exceed the maximum permissible car parking provision by 18 spaces when assessed under Council's DCP requirements. Notwithstanding, this is a significant reduction from 88 car spaces that are currently provided on site and therefore considered acceptable in these circumstances.

Notwithstanding the over provision of off-street car parking, it is not necessary for the car park to be fully utilised and that car sharing schemes are recommended to be implemented to encouraged staff carpooling to alleviate congestion during AM and PM peak periods.

5.2 Parent Drop-Off and Pick-Up

5.2.1 Sustainable Transport Initiatives

It was previously established only 13% of students are dropped off in the morning and 4% students are picked-up in the afternoon at the existing Cammeraygal High School Junior Campus. This shows that there is an excellent opportunity to completely negate the dependence on private vehicle trips where students attending the Senior Campus can be expected to be much more independent where it is quite reasonable to expect them to travel to school by themselves or with friends. To further assist, the following initiatives can be put in place to attract the small percentage of students that may be hesitant to shift towards sustainable modes of transport:

- Bicycle user group and promotion of bicycle initiatives

Cycle routes should be designed to link schools to other facilities within the area. To support the installed routes bicycle facilities should be provided for at the destination. Local Bicycle User Groups (BUGs) should be supported and Cammeraygal High School should support government initiatives such as bicycle week and cycle to work day.

- Walking school bus program and school travel plans

The walking bus is a concept where a group of children walk to school with one or more adults. The walking school bus alleviates safety concerns of parents. These programs can change mind-sets and encourage active travel in life for both adults and children.

Workplace Travel Plans can be issued to teachers before the first day of work and Travel Access Guides can be provided to students and parents on the first day of school. Early issue of these documents enable alternate modes of travel to be considered before habits are established.

5.2.2 Recommended Changes to On-Street Parking Arrangement

Notwithstanding the small percentage of parent pick-up and drop-off, when this is applied to the envisaged enrolment of up to 600 students results in a peak of approximately 54 vehicle arrivals / departures that will need to be accommodated between 8:00am-9:00am. In this regard, it is recommended that a "30m No Parking zone between 7:30am-9:30am, 2:30pm-4:00pm, School Days" is installed along the West Street site frontage to facilitate parent pick-up and drop-off.

5.3 Public Use of Multipurpose Hall.

The North Sydney Development Control Plan (DCP) 2002 stipulates a maximum parking rate applicable for Entertainment Facilities. It is considered that the Multipurpose Hall will be in operation between 7:00am and 10:00pm. During school hours, the use will be ancillary and outside of these hours the hall may be utilised by the public. Accordingly, the relevant car parking rates and the maximum permissible car parking provision applicable to the development proposal has been set out in **Table 15**.

Table 15: Council Parking Rates and Provision

Type	Area	Council Parking Rates[1]	Maximum Spaces	No. Spaces Retained
Entertainment Facility	537m^2	1 space / 100m^2	6	28
		Totals	**6**	**28**

As indicated in Table 15 the parking requirement of the hall outside of school hours can be readily accommodated on-site. Additionally, it is considered that during larger events, the parking will be allocated to ticket holders.

5.4 Disabled Parking

The North Sydney Council DCP does not provide a rate for the provision of disabled car parking. Accordingly, this has been assessed having regard for the Building Code of Australia (BCA) which recommends that educational establishments (Class 9b Structures) provide disabled parking at a rate of 1 space per 100 parking spaces or part thereof.

The development is proposing to maintain 28 parking spaces and provides two (2) accessible parking spaces, therefore meeting the minimum requirements of the BCA.

5.5 Bicycle Parking

The North Sydney Council's DCP does not provide a rate for the provision of bicycle parking. In this regard, we have assessed with consideration of the *Planning guidelines for walking and cycling 2004* which require:

- Long Term Use: 3-5% Staff (2-3 space)
- Short Term Use: 5-10% Staff (3-6 spaces)

With regard for the above, it is recommended that the proposed development provide between five (5) to nine (9) bicycle parking spaces taking into account the total 60 transient staff between the existing Cammeraygal High School Junior Campus and the proposed Senior Campus.

All bicycle spaces provided within the site are required to be designed to satisfy the relevant requirements of AS 2890.3 (2015).

5.6 Servicing

The North Sydney Council DCP does not provide a specific rate for the loading requirements for the Educational Establishment. The DCP requires loading facilities to be provided as per the requirements of the intended use of the premises.

As mentioned previously, the proposed development will make provision for a pick-up and drop off area within the site for school buses to safely set down and pick up students for sporting events and special events. Details of the School Bus requirements are provided in **Table 2**.

Table 2: School Bus Service Requirements

School Service	Frequency	Bus Size
School Sports	1 occasion / week	12.5m long rigid bus
Sporting Carnivals	2 occasions / year	14.5m coach
Student Camp	1 occasion / term	14.5m coach

Further to the above, it is envisaged that the school will be serviced by a range of commercial vehicles up to and including 8.8 metre long Medium Rigid Vehicles (MRV).

Accordingly, swept path analysis of a 14.5m bus and an 8.8m MRV design vehicle accessing and egressing the respective loading areas has been provided in **Appendix G** demonstrating that:

- There is sufficient manoeuvring area for an 8.8 metre MRV vehicle to allow forward entry and exit from the West Street vehicular access.
- There is sufficient manoeuvring area for a 14.5m bus to allow forward entry via West Street and forward egress through a new proposed egress driveway at the cul-de-sac of Rodborough Street.

Furthermore, the existing site contains two (2) commercial kitchens. The proposal seeks to retain one (1) of the commercial kitchens for teaching purposes. The existing sites grease arrestor is located at the north western corner of the site. Currently, the arrester is serviced by an 8.8m MRV. It is proposed that the grease arrester will continue to be serviced by the same truck when the school is operational. Accordingly swept path analysis of an 8.8m MRV turning at this section of the site has also be included in **Appendix G**. The analysis demonstrates a MRV can complete a three-point turn at this section of the site.

On the above basis, the proposed loading and servicing arrangements will operate satisfactorily and all commercial vehicles will be able to enter and exit the site whilst travelling in a forward direction at all times.

6. Traffic Assessment

6.1 Existing Traffic Generation

The existing site is historically occupied and operated by the Crows Nest TAFE. Whilst there may be some TAFE related vehicle trips captured in the traffic surveys undertaken as part of this study, it is understood that lectures are currently limited and enrolment has dwindled since the transfer of the land over to the Department of Education. Therefore, all trips generated by the proposed Cammeraygal High School Senior Campus is assumed to be new, or additional on the road network to provide a robust and conservative assessment.

6.2 Trip Generation Estimate

An indication of trip generation potential of developments is typically provided by reference to the RMS Guide to Traffic Generating Developments. Notwithstanding, the RMS Guide to Traffic Generating Developments does not nominate a specific generation rate for schools, with traffic generation to be assessed using surveys of comparable developments. As discussed in **Section 3.5,** the **proposed** development is expected to generate vehicle trips in the AM peak associated with student drop-off and staff arrivals, and vice versa during the PM peak. It should also be acknowledged that the proposed volumes occur over the school peaks which range from 7:30am-9:30am and 2:30pm-4:30pm.

Accordingly, TRAFFIX has reviewed the survey data collected from staff and students, and has applied a 13% and 4% private vehicle occupancy for students in the AM and PM peak periods respectively, as well as a 47% vehicle occupancy for staff.

Furthermore, it is conservatively assumed that 96% of parent drop-off vehicles and 20% of staff vehicles will arrive at the school during the AM Peak hour between 8:00am - 9:00am, and 88% of parent pick-up vehicles and 30% of staff vehicles will depart during the PM Peak hour between 3:00pm - 4:00pm.

Application of the above assumptions to the envisaged enrolment of up to 600 students and 60 staff results in the following traffic generation numbers, with detailed breakdown presented in **Table 16** and **17** overleaf:

- 114 vehicle trips (60 in, 54 out) during the AM peak period.
- 38 vehicle trips (15 in, 23 out) during the PM peak period.

Table 16: Expected Travel Mode Breakdown for proposed Staff and Students at Cammeraygal High School (Senior Campus) AM Peak Period.

Morning Departure	No.	Car			Public Transport		Active Transport	
		%	No. People	Peak Hour Vehicle Trips	%	No. People	%	No. People
Students	600	13%	78	**108***	34%	204	53%	318
Staff	60	47%	28	**6****	46%	28	7%	4

Vehicle Trip Calculation			
Number of students picked-up:	78	Number of staff departures:	28
Student Car Occupancy*:	1.4	Staff Car Occupancy**:	1
% of students arriving between 8:00am-9:00am:	96%	% of staff arriving between 8:00am-9:00am:	20%
# drop-off vehicles arriving during AM Peak:	54	# staff vehicles arriving during AM Peak:	6
# pick-up vehicles departing during AM Peak:	54	# staff vehicles departing during AM Peak:	0
TOTAL Student Vehicle Trips (two-way):	**108**	**TOTAL Staff Vehicle Trips:**	**6**

Table 17: Expected Travel Mode Breakdown for proposed Staff and Students at Cammeraygal High School (Senior Campus) PM Peak Period.

Afternoon Departure	No.	Car			Public Transport		Active Transport	
		%	No. People	Peak Hour Vehicle Trips	%	No. People	%	No. People
Proposed								
Students	600	4%	24	**30***	39%	234	58%	348
Staff	60	44%	27	**8****	40%	24	17%	10

Vehicle Trip Calculation			
Number of students picked-up:	24	Number of staff departures:	27
Student Car Occupancy*:	1.4	Staff Car Occupancy**:	1.0
% of students departing between 3:00pm-4:00pm:	88%	% of staff departing between 3:00pm-4:00pm:	30%
# drop-off vehicles arriving during AM Peak:	15	# Staff vehicles arriving during PM Peak:	0
# pick-up vehicles departing during AM Peak:	15	# Staff vehicles departing during PM Peak:	8
TOTAL Student Vehicle Trips (two-way):	**30**	**TOTAL Staff Trips:**	**8**

6.3 Traffic Distribution

To estimate the distribution of the additional vehicle trips associated with the proposed development, reference is again made to the online surveys that were completed by existing students and staff to establish the directional split of traffic when arriving / departing the school. Furthermore, it is assumed all pick-up / drop-off will occur on West Street. In this regard, the traffic generation associated with the proposed development has been adopted as follows:

Traffic distribution during the Peak Periods:

- 100% of development traffic to arrive from the north at West Street during the AM peak period with
  - 50% arriving from the south along Miller Street and Ernest Street
  - 10% arriving from the east along Ernest Street
  - 40% arriving from the north along Miller Street and Ernest Street

Traffic distribution during the Peak Period periods:

- 100% of development traffic to depart towards the south along West Street during the AM peak period with
  - 34% departing towards the west along Falcon Street towards Pacific Highway and western suburbs.
  - 66% departing towards the east along Falcon Street towards Warringah Freeway or continue onto Military Road towards eastern suburbs.

On the above basis, the increase in vehicle turning movements in the vicinity of the site during the AM and PM peak hour are summarised in **Figure 9 and Figure 10,** respectively.

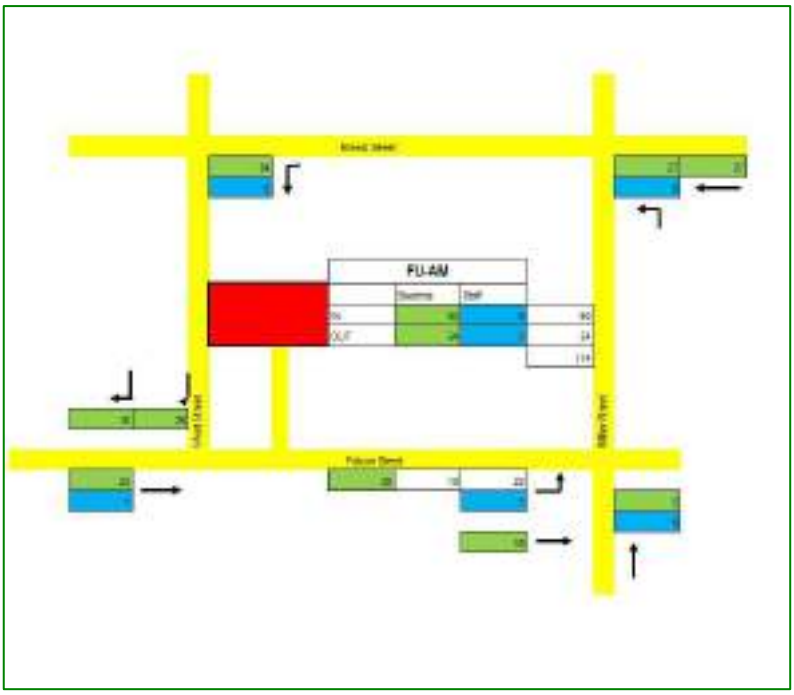


Figure 9: Proposed Traffic Increase Distribution AM Peak Period

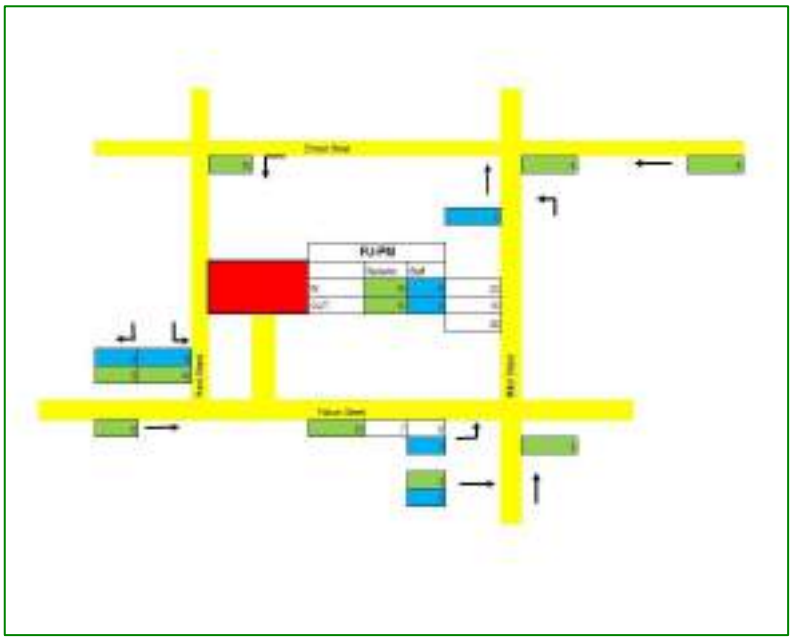


Figure 10: Proposed Traffic Increase Distribution PM Peak Period

Peak Period Intersection Performances

The traffic impacts of the development proposal is expected to primarily impact on the Earnest Street / West Street intersection, Earnest Street / Miller Street intersection and Miller Street / Falcon Street intersection.

Accordingly, these intersections were then subsequently analysed using SIDRA INTERSECTION 7.0 to determine the performance characteristics under existing and future traffic conditions.

The SIDRA model produces a range of outputs, the most useful of which are the Degree of Saturation (DOS) and Average Vehicle Delay per vehicle (AVD). The AVD is in turn related to a level of service (LOS) criteria. These performance measures can be interpreted using the following explanations:

DOS - the DOS is a measure of the operational performance of individual intersections. As both queue length and delay increase rapidly as DOS approaches 1, it is usual to attempt to keep DOS to less than 0.9. When DOS exceeds 0.9 residual queues can be anticipated, as occurs at many major intersections throughout the metropolitan area during peak periods. For intersections controlled by roundabout or give way/stop control, satisfactory intersection operation is generally indicated by a DOS of 0.8 or less.

AVD - the AVD for individual intersections provides a measure of the operational performance of an intersection. In general, levels of acceptability of AVD for individual intersections depend on the time of day (motorists generally accept higher delays during peak commuter periods) and the road system being modelled (motorists are more likely to accept longer delays on side streets than on the main road system).

LOS - this is a comparative measure which provides an indication of the operating performance of an intersection as shown overleaf:

Level of Service	Average Delay per Vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way and Stop Signs
A	less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory but accident study required
D	43 to 56	Operating near capacity	Near capacity and accident study required
E	57 to 70	At capacity; at signals incidents will cause excessive delays. Roundabouts require other control mode	At capacity and requires other control mode
F	More than 70	Unsatisfactory and requires additional capacity.	Unsatisfactory and requires other control mode or major treatment.

A summary of the modelling results are provided in **Table 18** below, noting that the critical PM peak period for schools is between 3:00pm-4:00pm which does not coincide with the commuter PM peak hour.

Table 13: AM & PM Peak Hour Intersection Performances

Intersection Description	Control Type	Model	Period	Level of Service	Degree of Saturation	Intersection Delay (sec)
Ernest Street with West Street	Signals	Existing	AM	B	0.596	29.5
			PM	B	0.766	32.5
		Existing + Development	AM	B	0.599	29.4
			PM	B	0.800	33.9
Ernest Street with Miller Street	Signals	Existing	AM	C	0.539	15.7
			PM	C	0.445	15.2
		Existing + Development	AM	C	0.567	15.7
			PM	C	0.455	15.2
Falcon Street with Miller Street	Signalised	Existing	AM	E	0.934	58.6
			PM	D	0.842	44.0
		Existing + Development	AM	E	0.949	60.2
			PM	D	0.844	42.6

* Note: All SIDRA results reported for priority controlled intersections relate to the movement with the highest delay, in accordance with the RMS Guide to Traffic Generating Developments.

It can be seen from Table 13 that all intersections will continue to operate at satisfactory LoS as per existing with minimal changes to DOS and AVD.

On the above basis, that project increase in traffic movements as a result of the proposal will clearly not have any negative traffic implications in terms of road network capacity.

7. Access & Internal Design Aspects

7.1 Access

All vehicular access will continue to be provided via the existing driveway on West Street which will be retained in its existing configuration.

In addition, the proposed development makes provision for a new vehicular egress (only) driveway at the cul-de-sac of Rodborough Avenue for service vehicles and buses preventing the need for these large vehicles to turnaround on site. This will completely negate any risks associated with limited visibility when large vehicles are undertaking reversing manoeuvres, where it should be strongly discouraged on school grounds with students about. Swept path analysis of these vehicle movements are provided in **Appendix G** demonstrating the proposed 7.5m wide egress driveway is satisfactory.

7.2 Internal Design

The development proposes no changes to the existing car park. Notwithstanding, the following design features are considered noteworthy.

7.2.1 Parking Modules

- All staff parking spaces shall be designed in accordance with a Class 1A User and provided with a minimum space length of 5.4m, a minimum width of 2.4m and a minimum aisle width of 5.8m.
- All disabled parking spaces are designed in accordance with AS 2890.6 (2009). The space is provided with a clear width of 2.4m and located adjacent to a minimum shared area of 2.4m.
- All spaces located adjacent to obstructions of greater than 150mm in height are provided with an additional width of 300mm.

7.2.2 Other Considerations

- Appropriate visual splays are to be provided on the driveway onto West Street and Rodborough Avenue in accordance with the requirements of Figure 3.3 of AS 2890.1 (2004).

In summary, the existing internal parking arrangements comply with relevant sections of AS 2890.1 (2004), AS 2890.2 (2002) and AS 2890.6 (2009). It is however envisaged that a condition of consent

would be imposed requiring compliance with these standards and as such any minor amendments considered necessary (if any) can be dealt with prior to the release of a Construction Certificate.

8. Sustainable Travel Plan

8.1 Staff

A sustainable Workplace Travel Plan (WTP) is a work place plan developed to make it easier for employees to get to and from work and reduce reliance on private vehicle and parking spaces. Such a plan typically includes support for walking, cycling, carpooling and public transport use. It is an important part of managing the transport demand generated by a development.

A comprehensive WTP is considered to be the most effective travel planning measure to encourage employees and visitors to travel by alternative means other than by private car. The WTP provides relevant transport and access information that would be relayed to school employees. In addition, the school proposes bicycle parking within the car park in order to encourage additional cycle trips with employees safe in the knowledge that secure bike parking is available. This WTP information that would be provided to staff includes:

- Local bus facilities and network maps;
- Local cycle route maps; and
- Information on car-pooling schemes

The development of a WTP is encouraged to promote alternative modes of transport however it is highly noteworthy that such a document is generally more effective for new developments. Whilst Council's objective to reduce private vehicle usage is acknowledged, it is clear that as no additional parking is provided on site, then staff will continue to utilise the on-street parking in the area. Therefore, the travel targets in this case must be uniquely tailored to encourage alternative modes of transport. In this regard, it is recommended that formal carpool scheme be considered by the school. Carpooling can be an effective method reducing the impact of private vehicle usage and as noted from the travel surveys there is potential for carpooling to significantly reduce private vehicle usage as no staff are currently carpooling. As an additional incentive off-street staff parking can be allocated to vehicles transporting two (2) or more staff members to and from work only. Travel Mode data gathered indicates that there is a current staff car occupancy of 1.2 people. By developing such a scheme, the school will actively attempt to reduce vehicular reliance.

8.2 Travel Access Guide

A comprehensive Travel Access Guide (TAG) is considered to be the most effective travel planning measure to educate parents and encourage students to travel by alternative means other than private car to the school campus. A TAG can be developed by schools to distribute to staff, students, parents and visitors. The TAG provides relevant transport and access information. In addition, the school proposes bicycle parking within the site for visitors in order to encourage additional cycle trips and to provide safe storage and comfort in the knowledge that secure bike parking is available. This TAG information that would be provided to students, parents and visitors includes:

- Local bus facilities and network maps;
- Local cycle route maps
- Information regarding a walking school bus
- Information regarding staggered pick up and drop off times; and
- Cycle initiatives and events

The development of a TAG is encouraged to promote alternative modes of transport however it is highly noteworthy that such a document is generally more effective for new developments. Whilst Council's objective to reduce private vehicle usage is acknowledged, it is clear that if no pick-up and drop-off locations were provided on site, then parents would continue to utilise the on-street parking in the area. Therefore, the travel targets in this case must be uniquely tailored to encourage alternative modes of transport. A draft TAG has been included in **Appendix H.**

9. Construction Traffic Management

A detailed construction Traffic Management Plan (CTMP) will be prepared and submitted to Council separate to this Development Application. The below commentary addresses the overall management principles for the site during the construction process. It is noted that the preparation of a detailed CTMP report would require significant input from the appointed builder and would heavily rely upon the construction methodology which at this point cannot be confirmed. The proposed development would however adhere to the general CTMP principle that are provided for information purposes:

- Truck Routes

The truck routes utilised for the construction of the development would utilise the arterial road network where possible. A copy of those routes would be provided to all drivers prior to attending the site and all trucks serving the site will do so via the proposed route only. The proposed truck routes are recommended so that all vehicles could access the site in a forward direction and likewise the vehicle could also exit the site in a forward direction. The route is therefore recommended to ensure that no reverse manoeuvres on the public roadway.

With regard to the access locations that are nominated for the site, a swept path analysis assessment should be undertaken demonstrating forward entry and forward exit manoeuvres with all reverse manoeuvres to occur on site.

- Truck Size and Volumes

The maximum size of vehicles and frequency of construction delivery vehicles will be documented in the detailed CTMP report however it is anticipated that a maximum vehicle size of 12.5m HRV is generally feasible and should be included in the aforementioned swept paths. The anticipated truck volumes should be estimated and discussed in the Preliminary Construction Management Plan.

- Contractor Parking

Contractors will be encouraged to either use public transport or ride share to/ from the site nothing that the current layout of the school would allow for some off-street parking until future buildings are erected. This parking would of course be restricted for construction employees who car pool to reduce the impact and this can be further detailed subject to the detailed CTMP which will be undertaken at CC stage.

- Traffic Plans (if necessary)

Traffic Control Plans will be designed in accordance with the RMS Traffic Control at Worksites Manual and AS 1742.3. The TCP's would primarily relate pedestrian control to ensure appropriate safety measures are implemented.

- Swept Path Analysis

Swept Path Analysis should be undertaken for each construction stage demonstrating forward entry and exit during all construction stages. All entry and exit movements will be monitored by certified traffic controllers.

Accordingly, it is anticipated that a standard condition of consent would be imposed requiring a site specific CTMP be provided for this development application. The CTMP will be designed in accordance with the above principles and the draft CTMP would be issued to Council at a later stage for consideration and review.

10. Conclusions

In summary:

- The proposed development is expected, in the worst case, to generate a total of 114 vehicle trips (60 in, 54 out) during the 8:00-9:00am peak hour and 38 vehicle trips (15 in, 23 out) during the 3:00-4:00pm peak hour if travel modes are maintained as documented in survey data.
- The traffic distribution and SIDRA modelling demonstrate that the additional vehicle trip generation will not have significant impacts on the proposed road network and it is considered that no upgrades will be necessary to accommodate the traffic generation of the proposed development.
- The site will retain a total of twenty-eight off-street car parking spaces (including 2 disabled) for staff. In addition, there is an opportunity to provide an additional eight (8) dedicated on-street pick-up and drop-off parking, along the kerbside of West Street along the frontage of the school.
- The site will provide a school hall which will operate between the hours of 7:00am and 10:00am with the use being ancillary during school hours. Outside of those hours the hall will be utilised by the public for sporting and entertainment events. The parking requirement for these events will be managed through the allocation of parking to ticket holders.
- The future provision of walking and cycling routes and the development of a WTP and TAG will influence future travel modes and encourage a shift towards sustainable transport modes.
- The existing access and parking arrangements comply with the relevant sections of AS 2890.1 (2004), AS 2890.2 (2002), AS 2890.3 (2015) and AS 2890.6 (2009). The development does not propose any changes to the existing car park.

It is therefore concluded that the proposed development is supportable on traffic planning grounds and will operate satisfactorily.

Appendix A

Photographic Record

View looking north from the access driveway at the cul-de-sac of Rodborough Avenue, Crows Nest

View looking west within property 149 West Street, Crows Nest..

View looking west within property 149 West Street, Crows Nest..

Appendix B

North Sydney Council Bike Plan

Northern Sydney Cycling Map

Using this map

This map is designed to help you find the best way of getting around the northern Sydney region by bicycle. The highlighted routes are not always the most direct routes but are usually the best routes when riding a bike. To assist you with choosing a suitable route, some of the hillier sections have been marked with arrows. The arrows point up the hill so you can plan your route accordingly.

Marked cycling routes

Marked cycling routes are shown on the map marked in blue and are cycling routes that are signposted or marked on the road. These often have destination signs that show distances and directions.

Useful cycling routes

Useful cycling routes (marked in green) are mainly quieter streets and routes that avoid busy roads and intersections. These are not official cycle routes but have been suggested by other cyclists.

Off-road and shared paths

Some cycle paths that pass through parks in the region occasionally travel along shared pathways for pedestrians and cyclists. These are often important links and provide low stress options for beginner cyclists. Please give way to pedestrians on shared paths, and warn them of your approach.

Commuting by bike

Cycle commuting is a great way to get that 30 minutes of exercise each day you never find the time for. Commuting to work by bike is cost effective, good for the environment and improves your health and fitness.

So what do you need to get started?

- A bike and a helmet;
- a luggage rack and pannier or a small backpack;
- a good lock, water bottle and cycling gloves;
- a bell or a horn;
- a good raincoat for wet weather;
- lights if you'll be returning after dark;
- a spare tube and a pump;
- a small tool kit for minor repairs.

Plan your route carefully. Use this map to work out the safest way to travel using bike paths and quiet back streets. Ask someone who already commutes to offer their recommendations.

Do a test ride on a weekend before your first commute to get an idea of how long it will take. Add a little more time on your first day to allow for traffic and unforeseen events.

If it is too far to ride all the way to work, consider riding to a train station and lock your bike there.

Many workplaces have showers for their employees. If your workplace doesn't have shower facilities, speak to your employer about installing some. Alternatively, you may be able to arrange to use a shower in a local gym.

Keep your work clothes looking good by rolling them rather than folding them, wearing non-crush fabrics or delivering your weekly clothing needs once a week. Consider asking your employer to purchase an iron.

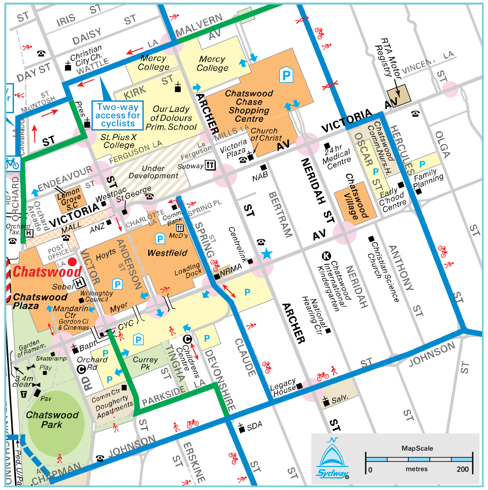
Leave a set of toiletries and several pairs of shoes at work to reduce your daily load.

Ask your employer for a suitable and secure place to leave your bike. Don't leave your bike in a fire escape as it may cause an obstruction in an evacuation and contravene fire regulations.

Safe cycling tips

- Be Seen! When riding at night wear light coloured clothes and if possible, clothes or shoes with reflective material to make you more visible.
- Wear glasses to protect your eyes from glare as well as dirt, dust and insects while riding.
- Buy a bike that fits you in size and in purpose.
- Momentum is the friend of every cyclist. You will be able to cycle much further if you use easy gears and spin the pedals at 70 to 90 revolutions per minute.
- When choosing a route, do not necessarily cycle where you drive. The safest or fastest cycle route may be quite different. Use this map as a guide to some of the more popular cycling routes.
- People riding a bike are allowed to take up a whole lane. Be politely assertive. Riding in the gutter is dangerous as it leaves no room for avoiding obstacles and invites being squeezed by cars.
- Avoid the squeeze by taking over your lane before navigating narrow sections, over speed humps and roundabouts. At roundabouts signal your intentions clearly and always be prepared to stop as motorists are not always ready to give way to cyclists.
- Keep a safe distance from parked cars. A car door that is suddenly opened can cause a serious accident.
- Be predictable – do not weave in and out of parked cars or traffic.
- Make eye contact with drivers at intersections. Make sure they have seen you before moving in front of their path.
- Why not cycle to the nearest railway stations and take the train to work rather than driving your car all the way?
- Try to cycle regularly: you can cycle socially, cycle for local transport and cycle to school or work, or just for fun.

Chatswood - detailed map



Discover the benefits

Cycle to work and your commute will be the best part of your day instead of the worst!

Health and Wellbeing Benefits

Cycling is a simple, low impact way to improve your health and increase your physical activity. Building cycling into your daily life is much more likely to be sustained than structured exercise programmes such as going to the gym. Combined with a healthy diet, cycling is also a great way to lose weight and maintain a healthy lifestyle. Many people who would like to cycle do not because they are concerned about safety. While there are risks associated with cycling, the risks associated with inactivity are even greater.

Financial Benefits

Cycling is a cheap way to commute to and from work. If one member of a family cycles daily it's possible to save the cost of owning and running a second car. With today's escalating petrol prices, the money saved will add up quickly and you'll also save on car parking.

Environmental Benefits

By cycling to work you'll be looking after your local environment. By increasing bicycle trips in preference to car trips there will be reduced greenhouse gas emissions and improved air quality. Road maintenance costs will also be reduced as bicycles produce insignificant wear and tear on roads.

Time Benefits

Cycling is convenient door-to-door transport. Ignore the traffic report and feel the satisfaction of cycling past the cars. You'll have a predictable daily commute time without worrying about traffic congestion or finding a parking space at the other end. Cycling is also a fantastic way of fitting physical activity into your day without having to allocate extra time to it.

Bicycle road rules and regulations

Cyclists have the same rights and responsibilities as drivers and motorcycle riders with some additional rules specifically for bicycles. As cyclists have responsibilities when using the road system they also have the right, like other vehicles, to use the road and be shown courtesy and care by other road users.

- Cyclists must wear an approved, correctly fitted and fastened bike helmet at all times.
- All bicycles must be fitted with an effective brake and bell, horn or similar warning device.
- You must not ride at night without a steady or flashing white light on the front and a red reflector and steady or flashing red light at the rear of the bike.
- Cyclists must use a shared path or marked bicycle lane where they are provided unless it is impractical to do so.
- Cyclists can ride two abreast but must ride within 1.5 metres of each other.
- Bicycles can use bus and transit lanes, but not Bus Only lanes.
- Children aged under 12 years and an adult accompanying a rider under 12 years are permitted to ride on footpaths.
- On a bicycle you are able to overtake another vehicle on the left except when that vehicle is turning left and giving a left change of direction signal. A cyclist can legally travel to the front of a line of traffic on the left hand side of stopped vehicles.
- Always use hand signals when turning or stopping.
- You may turn right from the left hand lane of a multi-lane roundabout as long as you give way to any other vehicle leaving the roundabout.
- You must walk, not ride, across pedestrian crossings unless bicycle lights are provided.
- You must keep to the left of a footpath or shared path and give way to pedestrians and oncoming cyclists.

Bikes on public transport

- Bicycles are permitted on CityRail trains free of charge. However if at least part of your journey is made between 6am and 9am or between 3:30pm and 7:30pm on weekdays, you must purchase a ticket for yourself as well as a child's ticket for the bicycle.
- If you take a bicycle on a train please remember not to block the doorways.
- Riding bicycles, skateboards, scooters or roller blades is not permitted on CityRail stations or trains.
- Bikes are allowed on Sydney Ferries if there is room in the bike racks on board. Ensure that your bike is secure and aisles are kept free from trip hazards.
- Bikes are generally not allowed on Sydney Buses. However, some wheelchair accessible buses may allow the passage of bicycles at the bus driver's discretion. Secure your bike in the wheelchair area of the bus.
- Secure bicycle lockers are available at selected train stations, ferry wharves and bus interchanges.

  For more information about the Secure Bicycle Lockers Program, contact Transport Info on 131 500 or www.131500.com.au

Cycling in the wet

- In heavy rain the visibility of yourself and other road users is reduced. Turn on your lights and wear bright and reflective clothing to increase your visibility. Invest in the best rain jacket you can afford.
- Your brakes may not work as well in wet weather, tyres don't grip as well and road surfaces are more slippery. Ride at a slower speed and keep an eye on what other vehicles are doing.
- Surfaces such as man hole covers, road markings and road plates can be especially slippery in the wet. Puddles may hide pot holes or other surprises. Avoid puddles if possible. If not, take them slowly.
- Be particularly careful on roundabouts and negotiating corners - stay upright rather than leaning into the turn.
- After rain, clean any mud or sand from the chain and other surfaces. You may need to relubricate your chain, hubs and bottom bracket.

Basic bicycle maintenance

Always carry a pump, tyre levers, spare tube, tube patch kits, water bottle, mobile phone and some money. Bike maintenance is very important. Check your tyre condition and pressure, quick release levers and brakes regularly. Clean the drive chain on your bicycle regularly and then apply lubricant. Wipe off the excess as it attracts dirt - less is more! If you do not feel confident working on your bike, take it to a good bicycle shop for servicing.

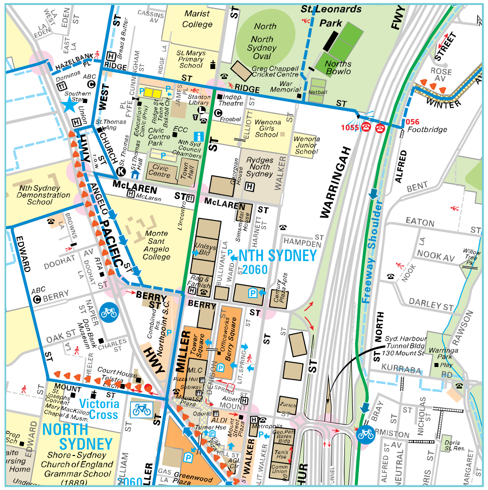
Cycling workshops

A number of Councils now run bike maintenance and cycling skills workshops on a regular basis. These are designed for a range of abilities from beginner cyclists to commuters.

Other annual cycling events include NSW Bike Week in September and National Ride to Work Day in October.

Please contact your local Council for more information on these workshops and events.

North Sydney - detailed map



Shared paths

There are a number of shared paths on this map which provide safe cycling routes separated from traffic. However, shared paths are there to share so please be considerate of pedestrians and other cyclists.

On a shared path please:

- Keep left;
- Be aware of others and slow down;
- Give way to pedestrians as they have right of way;
- Warn pedestrians of your approach by sounding your bell or calling out;
- Watch for vehicles crossing shared paths that may be entering or exiting driveways.

Buying a bicycle

Choosing the right bicycle will make riding more pleasurable. A specialist bicycle retailer will be the best place to offer you professional advice on tailoring a bicycle to fit you. They will be able to help you find a bike that suits your individual needs, expectations and budget.

What kind of bike is right for you?

- **Road bikes** are perfect for all kinds of road riding. They are designed to maximise aerodynamics and minimise weight and they provide better handling, cornering and sprinting ability.
- **Mountain bikes** are designed to tackle off-road tracks. Front and/or rear suspension enables you to soak up rough terrain and stay in control.
- **Hybrid bikes** are made for bicycle trails and city streets, and feature an upright riding position to make cycling more comfortable. They're ideal for commuting, touring and keeping fit.
- **Specialty bikes** such as folding, recumbent or power assisted may suit your needs if traditional styles do not.

Local bike shops

The Bicycle Shop
13 Babbage Rd, Roseville Chase NSW 2069
Ph (02) 9882 2453
www.bicycleshop.com.au

BMX Mafia
242 Victoria Rd, Gladesville NSW 2111
Ph (02) 9879 7000
www.bmxmafia.com

Northside Avanti Plus
815 Pacific Hwy, Chatswood NSW 2067
Ph (02) 9415 1343
www.avantiplus.com.au/chatswood

Renegade Cycles
The Village, 43- 45 Burns Bay Rd, Lane Cove NSW 2066
Ph (02) 9427 1055
www.renegadecycles.com.au

Cranks Bike Shop (North Sydney)
283 Alfred St, North Sydney NSW 2060
Ph (02) 9954 6466
www.cranks.com.au

Cranks Bike Shop (Chatswood)
352A Penshurst St, Chatswood NSW 2067
Ph (02) 9417 5526
www.cranks.com.au

Bikebug
120 Pacific Hwy, North Sydney NSW 2060
Ph (02) 9954 5599
www.bikebug.com

King of the Mountain Cyclery
178 Military Rd, Neutral Bay NSW 2089
Ph (02) 9908 1745
www.komcyclery.com.au

Le Spit Cyclery
20 Spit Road, Mosman NSW 2088
Ph (02) 9968 3920
www.lespitcyclery.com.au

Reporting hazards

If you see a bicycle hazard or problem on the road or path, report it to the relevant Council or RTA. When reporting the hazard ensure that you give details of the type of hazard as well as a precise location.

What to do if you're involved in an accident:

- Make the location as safe as possible;
- Seek medical treatment as appropriate;
- Write down the details of the incident;
- Report the incident to the Police.

Local councils

Hunters Hill Council
Ph (02) 9879 9400
website: www.huntershill.nsw.gov.au
email: council@huntershill.nsw.gov.au

Ku-ring-gai Council
Ph (02) 9424 0888
website: www.kmc.nsw.gov.au
email: kmc@kmc.nsw.gov.au

Lane Cove Council
Ph: (02) 9911 3555
website: www.lanecove.nsw.gov.au
email: lccouncil@lanecove.nsw.gov.au

Mosman Council
Ph: (02) 9978 4000
website: www.mosman.nsw.gov.au
email: webmail@mosman.nsw.gov.au

North Sydney Council
Ph: (02) 9936 8100
website: www.northsydney.nsw.gov.au
email: council@northsydney.nsw.gov.au

Ryde Council
Ph: (02) 9952 8222
website: www.ryde.nsw.gov.au
email: cityofryde@ryde.nsw.gov.au

Willoughby City Council
Ph: (02) 9777 1000
website: www.willoughby.nsw.gov.au
email: email@willoughby.nsw.gov.au

Bike North
website: www.bikenorth.org.au
email: info@bikenorth.org.au

Bike North inc. is a non-profit community-based Bicycle User Group that covers the Northern Sydney region. Bike North promotes the use of bicycles, promotes road safety education and advocates for better outcomes for cyclists. Bike North organises free graded social and recreational rides every weekend for all fitness levels. Rides are open to the public - see their website for further details.

Bicycle NSW
Ph: (02)9704 0800
website: www.bicyclensw.org.au

Bicycle NSW is the organisation that acts for bicycle riders at the state level. All cyclists are encouraged to join Bicycle NSW - member benefits include:

- $20m public liability insurance;
- Personal accident insurance;
- Australian Cyclist magazine subscription;
- Discounts on organised rides.

North Shore Bicycle Group
Phone: (02) 9906 7238
email: north_shore_bike@yahoo.com.au
website: www.sydneyharbourlink.com

Roads and Traffic Authority
Ph: 132 213
website: www.rta.nsw.gov.au

Transport Info Line
Ph: 131 500
website: www.131500.com.au

Cycling Promotion Fund
Ph: (03) 9755 3557
website: www.cyclingpromotion.com.au

Transport Info
Website: www.131500.com.au
Ph: 131 500

Acknowledgments

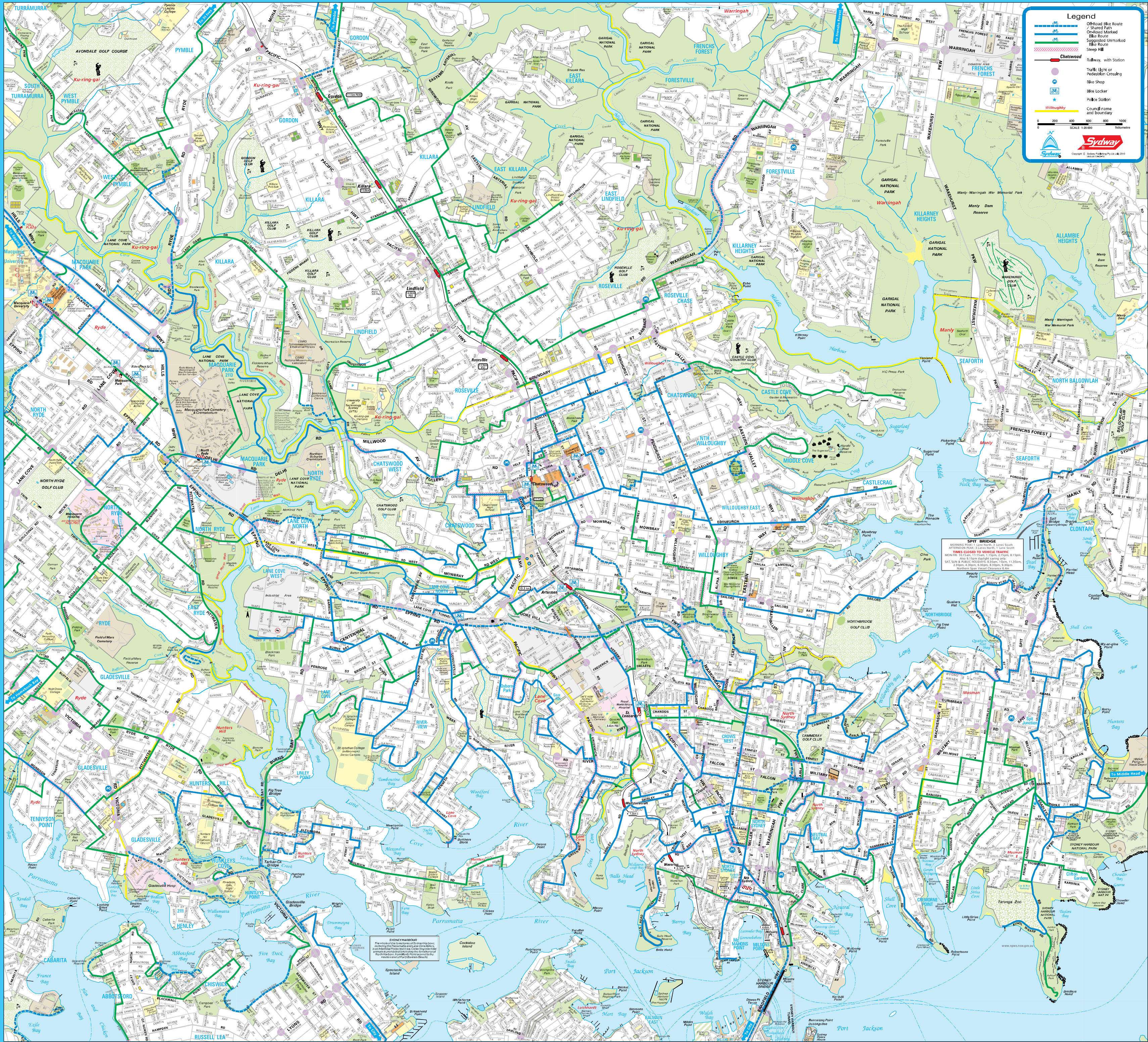
This brochure is a joint project of the Hunters Hill, Lane Cove, Mosman, North Sydney and Willoughby Councils. The Councils thank Bike North, North Shore Bicycle Group and the Councils' Bicycle Consultative Committee for assisting in the development of this map. All contributions are recognised and much appreciated.

Errors/omissions

Every effort has been made to ensure the information contained in this brochure is correct at the time of printing. Should there be any errors or omissions please contact Willoughby Council on 9777 1000 and the changes will be considered in the next reprint of the map.

Other bicycle maps

For cycle routes connecting to this map see the "Live Green" Sydney Cycling Map from City of Sydney Council, City of Ryde Cycling Map, and the Macquarie University Cycling Map.


Legend
Off-Road Bike Route / Shared Path
On-Road Marked Bike Route
Suggested Unmarked Bike Route
Steep Hill
Chatswood
Railway, with Station
Traffic Light or Pedestrian Crossing
Bike Shop
Bike Locker
Police Station
Willoughby
Council name and boundary
0 200 400 600 800 1000
0 SCALE 1:20 000 1kilometre
Sydway
Sydway
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SPIT BRIDGE
MORNING PEAK: 1 Lane North, 3 Lanes South
AFTERNOON PEAK: 3 Lanes North, 1 Lane South
TIMES CLOSED TO VEHICLE TRAFFIC
MON-FRI: 10.15am, 11.15am, 1.15pm, 2.15pm, 8.15pm.
Also 9.15pm daylight saving only.
SAT, SUN & PUBLIC HOLIDAYS: 8.30am, 10am, 11.30am, 2.30pm, 4.30pm, 6.30pm, 8.30pm, 9.30pm.
Northern Span Vessel Clearance 6.4m
SYDNEY HARBOUR
The whole of the foreshores of Sydney Harbour, including the Parramatta and Lane Cove Rivers, is an Intertidal Protected Area. Collecting intertidal animals is prohibited (excluding the foreshores of North Harbour, from Manly Point around to the western end of Forty Baskets Beach).

Appendix C

Intersection Survey Results

TURNING MOVEMENT SURVEY

Intersection of Miller St and Falcon St, Cammeray

Date:	Wed 08/03/17
Weather:	Overcast
Suburban:	Cammeray
Customer:	Traffix

North:	Miller St
East:	Falcon St
South:	Miller St
West:	Falcon St

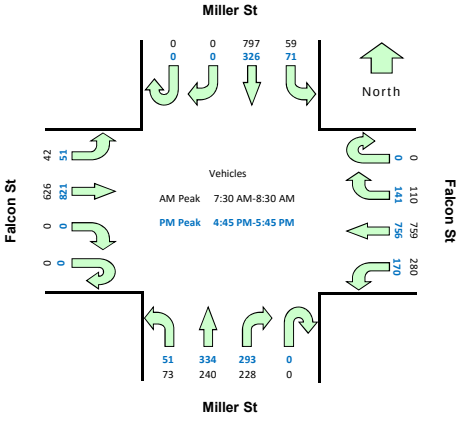
Survey Start	AM:	7:00	PM:	15:00
Vehicular Peakhour		**Pedestrians Peakhour**		
AM:	7:30 AM-8:30 AM	AM:	N/A	
PM:	4:45 PM-5:45 PM	PM:	N/A	

All Vehicles

Time		North Approach Miller St				East Approach Falcon St				South Approach Miller St				West Approach Falcon St				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	116	13	0	29	191	59	0	49	30	12	0	0	139	5	2964	
7:15	7:30	0	0	155	16	0	34	169	69	0	49	26	11	0	0	160	17	3163	
7:30	7:45	0	0	187	16	0	30	199	79	0	41	41	23	0	0	166	18	3214	Peak
7:45	8:00	0	0	190	14	0	26	228	75	0	61	46	18	0	0	148	9	3210	
8:00	8:15	0	0	225	18	0	27	178	70	0	65	76	18	0	0	161	4	3188	
8:15	8:30	0	0	195	11	0	27	154	56	0	61	77	14	0	0	151	11	3036	
8:30	8:45	0	0	179	12	0	22	174	56	0	66	70	27	0	0	176	14	2994	
8:45	9:00	0	0	173	19	0	35	208	68	0	61	55	14	0	0	150	10	2899	
9:00	9:15	0	0	133	19	0	54	180	45	0	48	39	11	0	0	153	8	2729	
9:15	9:30	0	0	114	26	0	33	188	50	0	51	44	9	0	0	184	16		
9:30	9:45	0	0	109	26	0	37	206	46	0	37	44	13	0	0	163	20		
9:45	10:00	0	0	89	20	0	53	200	30	0	24	36	12	0	0	143	16		
15:00	15:15	0	0	79	28	0	56	189	52	0	60	59	28	0	0	171	7	2841	
15:15	15:30	0	0	91	29	0	43	191	30	0	67	64	30	0	0	177	11	2731	
15:30	15:45	0	0	68	19	0	35	179	45	0	64	73	20	0	0	208	13	2677	
15:45	16:00	0	0	81	9	0	43	174	27	0	38	73	14	0	0	189	7	2671	
16:00	16:15	0	0	83	19	0	41	158	21	0	61	29	9	0	0	186	12	2767	
16:15	16:30	0	0	88	10	0	42	177	41	0	56	63	14	0	0	176	12	2815	
16:30	16:45	0	0	90	13	0	32	170	60	0	80	76	17	0	0	171	9	2897	
16:45	17:00	0	0	97	16	0	41	188	48	0	57	78	9	0	0	205	12	3014	Peak
17:00	17:15	0	0	62	18	0	31	176	33	0	72	73	11	0	0	180	11	2988	
17:15	17:30	0	0	81	20	0	39	170	43	0	75	81	15	0	0	221	16		
17:30	17:45	0	0	86	17	0	30	222	46	0	89	102	16	0	0	215	12		
17:45	18:00	0	0	79	15	0	56	182	56	0	74	69	16	0	0	162	16		

Peak Time		North Approach Miller St				East Approach Falcon St				South Approach Miller St				West Approach Falcon St				Peak
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	total
7:30	8:30	0	0	797	59	0	110	759	280	0	228	240	73	0	0	626	42	3214
16:45	17:45	0	0	326	71	0	141	756	170	0	293	334	51	0	0	821	51	3014

Graphic



TURNING MOVEMENT SURVEY

Intersection of Miller St and Ernest St, Cammeray

Date:	Wed 08/03/17
Weather:	Overcast
Suburban:	Cammeray
Customer:	Traffix

North:	Miller St
East:	Ernest St
South:	Miller St
West:	Ernest St

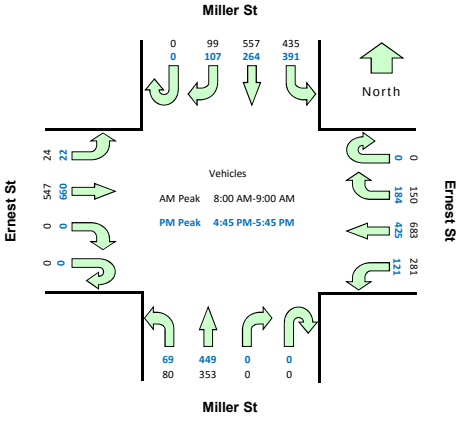
Survey Start	AM:	7:00	PM:	15:00
Vehicular Peakhour		**Pedestrians Peakhour**		
AM:	8:00 AM-9:00 AM	AM:	N/A	
PM:	4:45 PM-5:45 PM	PM:	N/A	

All Vehicles

Time		North Approach Miller St				East Approach Ernest St				South Approach Miller St				West Approach Ernest St				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	9	84	97	0	21	84	41	0	0	53	6	0	0	85	1	2613	
7:15	7:30	0	21	110	125	0	26	151	60	0	0	69	5	0	0	78	5	2913	
7:30	7:45	0	11	123	124	0	24	148	78	0	0	78	9	0	0	114	12	3099	
7:45	8:00	0	21	131	106	0	42	159	76	0	0	73	11	0	0	135	7	3154	
8:00	8:15	0	22	157	85	0	26	170	87	0	0	89	19	0	0	118	8	3209	Peak
8:15	8:30	0	22	145	128	0	54	152	64	0	0	93	23	0	0	148	7	3141	
8:30	8:45	0	23	126	103	0	29	200	65	0	0	87	18	0	0	119	6	2988	
8:45	9:00	0	32	129	119	0	41	161	65	0	0	84	20	0	0	162	3	2821	
9:00	9:15	0	39	89	114	0	44	172	60	0	0	84	18	0	0	85	8	2555	
9:15	9:30	0	20	79	107	0	46	168	58	0	0	71	22	0	0	105	7		
9:30	9:45	0	19	93	100	0	36	127	39	0	0	78	22	0	0	84	11		
9:45	10:00	0	18	74	91	0	47	111	28	0	0	78	26	0	0	72	5		
15:00	15:15	0	33	75	70	0	32	102	33	0	0	98	24	0	0	76	6	2343	
15:15	15:30	0	31	87	64	0	51	101	34	0	0	100	20	0	0	112	11	2347	
15:30	15:45	0	27	53	54	0	43	138	30	0	0	105	19	0	0	95	11	2313	
15:45	16:00	0	20	63	90	0	52	132	24	0	0	97	23	0	0	101	6	2361	
16:00	16:15	0	22	63	63	0	33	118	36	0	0	70	14	0	0	130	4	2394	
16:15	16:30	0	20	72	80	0	39	91	28	0	0	104	14	0	0	124	5	2489	
16:30	16:45	0	20	71	76	0	51	124	30	0	0	96	19	0	0	131	5	2623	
16:45	17:00	0	22	76	88	0	48	91	33	0	0	123	12	0	0	140	8	2692	Peak
17:00	17:15	0	23	49	105	0	50	109	25	0	0	97	15	0	0	168	7	2657	
17:15	17:30	0	33	73	102	0	37	114	31	0	0	110	22	0	0	186	3		
17:30	17:45	0	29	66	96	0	49	111	32	0	0	119	20	0	0	166	4		
17:45	18:00	0	19	56	83	0	52	100	35	0	0	116	22	0	0	113	10		

Peak Time		North Approach Miller St				East Approach Ernest St				South Approach Miller St				West Approach Ernest St				Peak
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	total
8:00	9:00	0	99	557	435	0	150	683	281	0	0	353	80	0	0	547	24	3209
16:45	17:45	0	107	264	391	0	184	425	121	0	0	449	69	0	0	660	22	2692

Graphic



TURNING MOVEMENT SURVEY

Intersection of West St and Ernest St, Cammeray

Date:	Wed 08/03/17
Weather:	Overcast
Suburban:	Cammeray
Customer:	Traffix

North:	West St
East:	Ernest St
South:	West St
West:	Ernest St

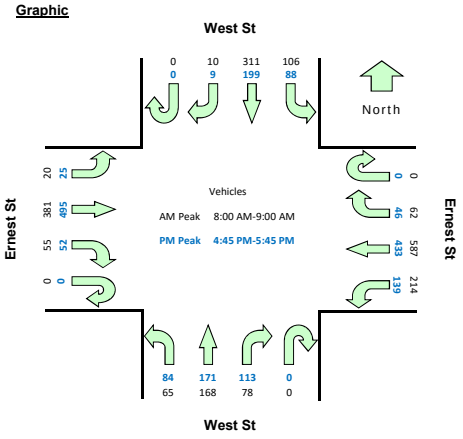
Survey Start	AM:	7:00	PM:	15:00
Vehicular Peakhour		**Pedestrians Peakhour**		
AM:	8:00 AM-9:00 AM	AM:	N/A	
PM:	4:45 PM-5:45 PM	PM:	N/A	

All Vehicles

Time		North Approach West St				East Approach Ernest St				South Approach West St				West Approach Ernest St				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	1	56	18	0	12	61	24	0	17	30	9	0	7	53	3	1549	
7:15	7:30	0	1	43	18	0	19	115	39	0	11	23	9	0	8	55	5	1744	
7:30	7:45	0	1	64	28	0	17	108	45	0	29	35	11	0	11	64	4	1919	
7:45	8:00	0	4	95	22	0	14	125	46	0	18	31	19	0	12	104	5	2022	
8:00	8:15	0	2	92	25	0	12	140	55	0	17	30	9	0	17	81	6	2057	Peak
8:15	8:30	0	2	80	28	0	14	139	50	0	20	48	14	0	15	108	3	2036	
8:30	8:45	0	1	76	25	0	18	165	55	0	21	47	26	0	8	76	2	1962	
8:45	9:00	0	5	63	28	0	18	143	54	0	20	43	16	0	15	116	9	1812	
9:00	9:15	0	6	59	15	0	25	140	65	0	21	44	15	0	12	57	6	1610	
9:15	9:30	0	5	50	17	0	20	149	44	0	17	42	15	0	9	76	3		
9:30	9:45	0	3	34	9	0	20	123	27	0	32	36	15	0	15	55	1		
9:45	10:00	0	3	34	13	0	13	107	39	0	15	26	23	0	5	44	6		
15:00	15:15	0	1	63	13	0	14	117	34	0	15	46	33	0	8	56	3	1633	
15:15	15:30	0	3	47	19	0	15	111	29	0	19	47	16	0	17	87	8	1632	
15:30	15:45	0	5	50	23	0	18	118	44	0	18	43	27	0	8	59	7	1595	
15:45	16:00	0	2	33	12	0	16	110	47	0	21	51	14	0	5	74	7	1578	
16:00	16:15	0	3	51	17	0	9	106	35	0	19	42	15	0	5	93	7	1624	
16:15	16:30	0	3	51	21	0	5	100	25	0	30	36	20	0	4	83	3	1667	
16:30	16:45	0	5	44	23	0	15	109	36	0	26	29	21	0	6	83	6	1797	
16:45	17:00	0	4	42	16	0	12	112	25	0	29	37	21	0	13	119	8	1854	Peak
17:00	17:15	0	2	47	29	0	13	93	36	0	34	47	16	0	3	120	5	1844	
17:15	17:30	0	1	73	21	0	10	113	42	0	35	44	29	0	15	124	4		
17:30	17:45	0	2	37	22	0	11	115	36	0	15	43	18	0	21	132	8		
17:45	18:00	0	2	28	20	0	7	95	35	0	37	57	19	0	7	116	5		

Peak Time		North Approach West St				East Approach Ernest St				South Approach West St				West Approach Ernest St				Peak
Period Start	**Period End**	**U**	**R**	**SB**	**L**	**U**	**R**	**WB**	**L**	**U**	**R**	**NB**	**L**	**U**	**R**	**EB**	**L**	**total**
8:00	9:00	0	10	311	106	0	62	587	214	0	78	168	65	0	55	381	20	2057
16:45	17:45	0	9	199	88	0	46	433	139	0	113	171	84	0	52	495	25	1854

Graphic



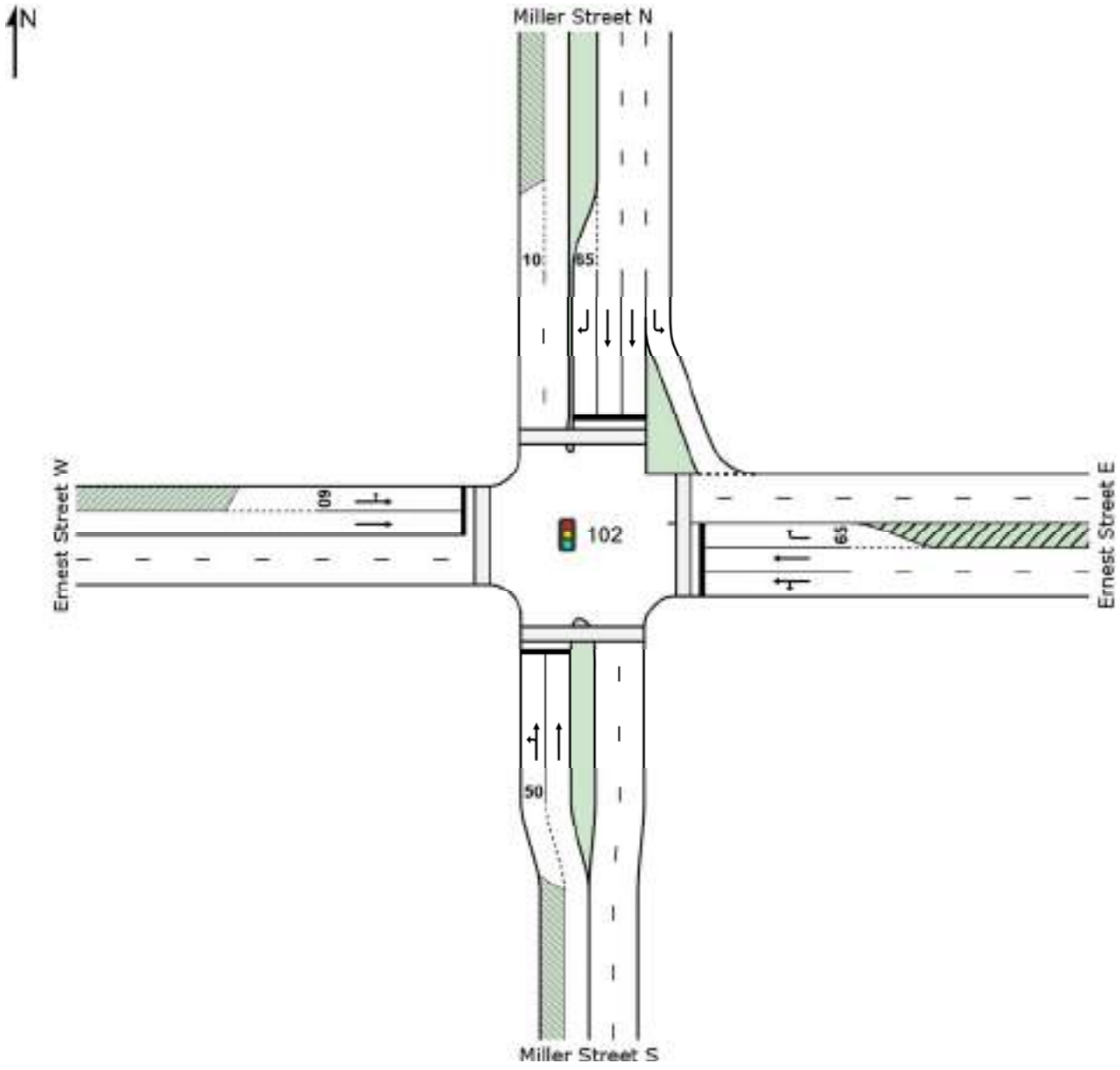
Appendix D

SIDRA Outputs

SITE LAYOUT

Site: 102 [AM EX - Ernest St Miller St]

New Site
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

Site: 102 [AM EX - Ernest St Miller St]

New Site
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Miller Street S											
1	L2	84	2.0	0.458	46.6	LOS D	10.5	74.7	0.90	0.77	20.6
2	T1	372	2.0	0.539	42.6	LOS D	12.6	90.1	0.92	0.77	21.7
Approach		456	2.0	0.539	43.3	LOS D	12.6	90.1	0.91	0.77	21.5
East: Ernest Street E											
4	L2	296	1.0	0.596	27.9	LOS B	22.7	160.0	0.77	0.76	30.5
5	T1	719	1.0	0.596	21.8	LOS B	22.7	160.0	0.73	0.67	32.7
6	R2	158	1.0	0.541	55.7	LOS D	8.7	61.4	0.97	0.80	22.3
Approach		1173	1.0	0.596	27.9	LOS B	22.7	160.0	0.77	0.71	30.2
North: Miller Street N											
7	L2	458	2.0	0.371	7.8	LOS A	7.2	51.3	0.36	0.63	42.7
8	T1	586	2.0	0.381	27.1	LOS B	12.0	85.6	0.75	0.65	27.5
9	R2	104	2.0	0.289	42.1	LOS C	5.0	35.5	0.87	0.77	22.1
Approach		1148	2.0	0.381	20.8	LOS B	12.0	85.6	0.61	0.65	32.3
West: Ernest Street W											
10	L2	25	1.0	0.535	43.0	LOS D	14.7	103.7	0.89	0.77	23.2
11	T1	576	1.0	0.535	38.4	LOS C	14.9	105.0	0.89	0.77	26.4
Approach		601	1.0	0.535	38.6	LOS C	14.9	105.0	0.89	0.77	26.2
All Vehicles		3378	1.5	0.596	29.5	LOS C	22.7	160.0	0.76	0.71	28.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

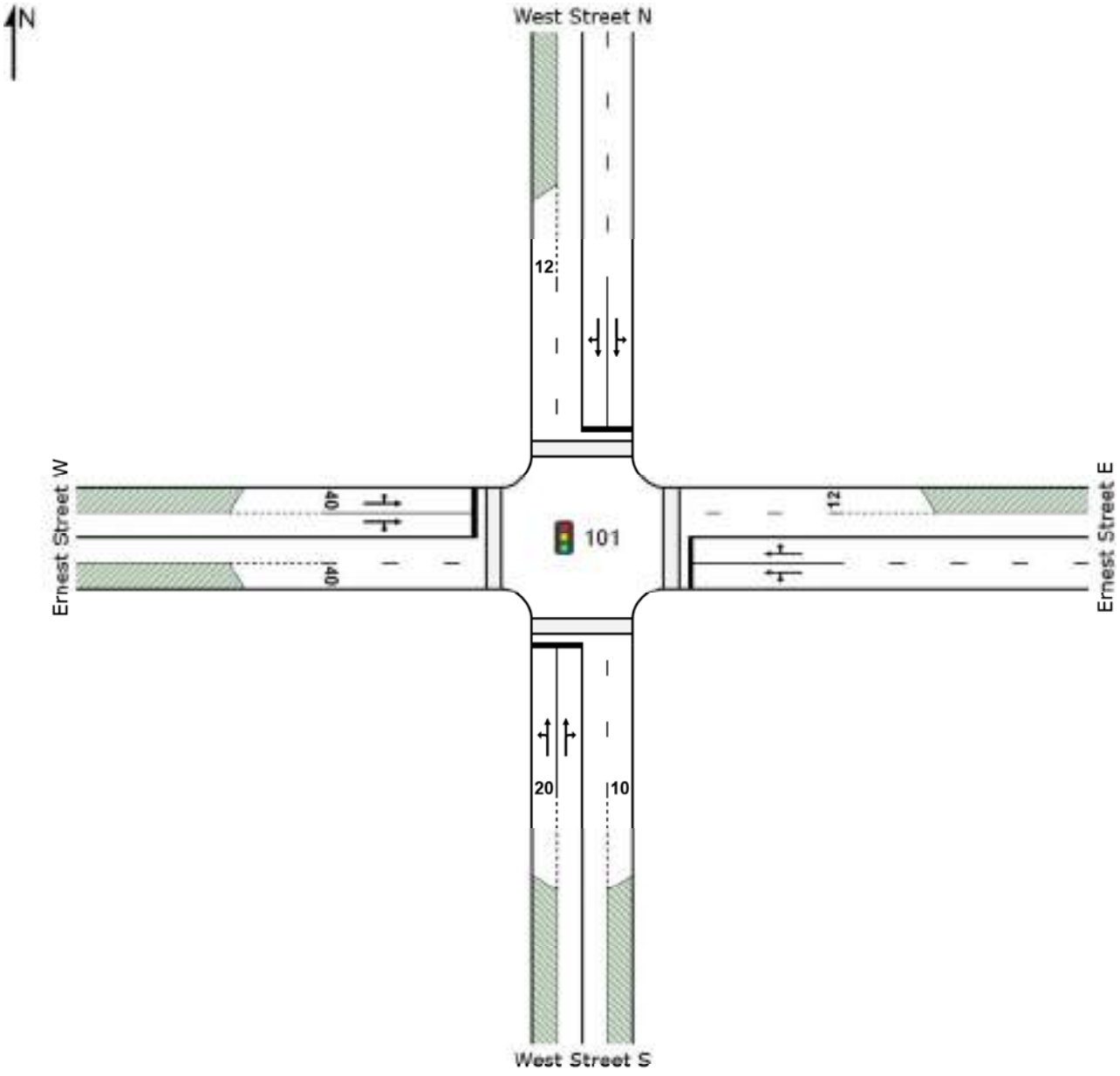
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	22.3	LOS C	0.1	0.1	0.61	0.61
P2	East Full Crossing	53	30.2	LOS D	0.1	0.1	0.71	0.71
P3	North Full Crossing	53	40.1	LOS E	0.1	0.1	0.82	0.82
P4	West Full Crossing	53	42.6	LOS E	0.2	0.2	0.84	0.84
All Pedestrians		211	33.8	LOS D			0.75	0.75

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

SITE LAYOUT

Site: 101 [AM EX - Ernest St West St]

Ernest Street West Street
Signals - Fixed Time Isolated



Organisation: TRAFFIX PTY LTD | Created: Tuesday, 11 April 2017 2:14:27 PM
Project: \\192.168.3.1\tdata\Synergy\Projects\16\16.355\Modelling\HD copy 1704007\16.355s01v01.sip7

MOVEMENT SUMMARY

Site: 101 [AM EX - Ernest St West St]

Ernest Street West Street
Signals - Fixed Time Isolated Cycle Time = 60 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: West Street S											
1	L2	68	1.0	0.409	23.6	LOS B	5.0	35.0	0.87	0.73	31.5
2	T1	177	1.0	0.481	21.3	LOS B	5.0	35.0	0.88	0.74	32.2
3	R2	82	1.0	0.481	27.9	LOS B	3.6	25.1	0.93	0.77	24.9
Approach		327	1.0	0.481	23.4	LOS B	5.0	35.0	0.89	0.75	30.4
East: Ernest Street E											
4	L2	225	2.0	0.458	14.6	LOS B	8.3	59.1	0.68	0.68	33.3
5	T1	618	2.0	0.539	10.8	LOS A	9.4	67.3	0.71	0.67	39.5
6	R2	65	2.0	0.539	15.8	LOS B	9.4	67.3	0.73	0.66	39.5
Approach		908	2.0	0.539	12.1	LOS A	9.4	67.3	0.71	0.67	38.2
North: West Street N											
7	L2	112	1.0	0.429	25.6	LOS B	5.1	36.0	0.89	0.77	32.8
8	T1	327	1.0	0.504	22.1	LOS B	6.4	45.1	0.89	0.77	31.9
9	R2	11	1.0	0.504	25.3	LOS B	6.4	45.1	0.90	0.77	36.3
Approach		449	1.0	0.504	23.1	LOS B	6.4	45.1	0.89	0.77	32.3
West: Ernest Street W											
10	L2	21	1.0	0.271	12.8	LOS A	4.4	31.3	0.58	0.51	43.4
11	T1	401	1.0	0.318	9.5	LOS A	4.4	31.3	0.62	0.55	40.9
12	R2	58	1.0	0.318	16.2	LOS B	3.9	27.5	0.68	0.62	36.6
Approach		480	1.0	0.318	10.4	LOS A	4.4	31.3	0.62	0.56	40.4
All Vehicles		2165	1.4	0.539	15.7	LOS B	9.4	67.3	0.75	0.68	35.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

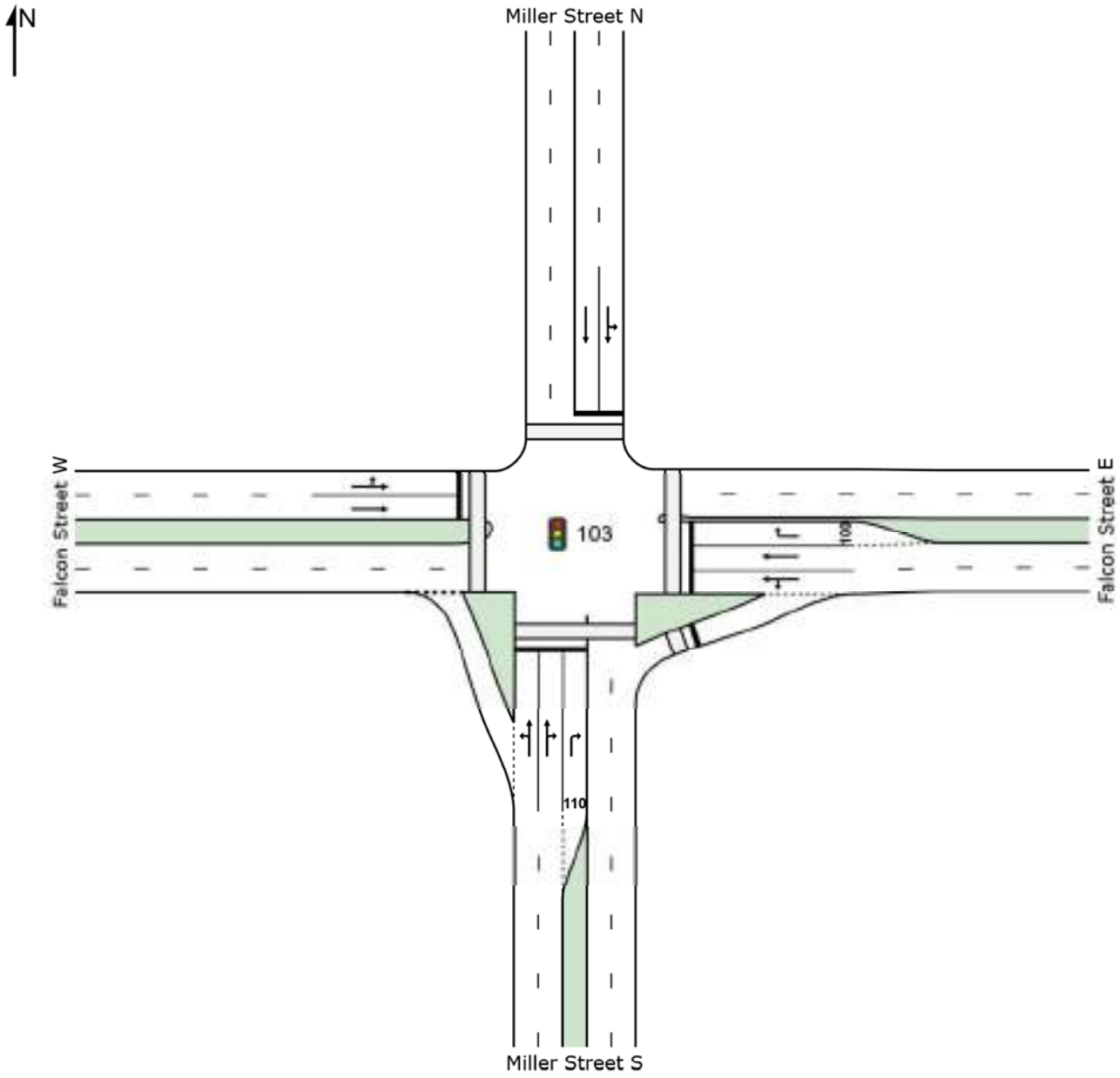
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	12.1	LOS B	0.1	0.1	0.63	0.63
P2	East Full Crossing	53	24.4	LOS C	0.1	0.1	0.90	0.90
P3	North Full Crossing	53	12.1	LOS B	0.1	0.1	0.63	0.63
P4	West Full Crossing	53	24.4	LOS C	0.1	0.1	0.90	0.90
All Pedestrians		211	18.2	LOS B			0.77	0.77

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

SITE LAYOUT

Site: 103 [AM EX - Falcon St Miller St]

New Site
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

Site: 103 [AM EX - Falcon St Miller St]

New Site
Signals - Fixed Time Isolated Cycle Time = 130 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Miller Street S											
1	L2	77	1.0	0.903	55.2	LOS D	10.4	73.6	1.00	1.08	13.7
2	T1	253	1.0	0.903	52.9	LOS D	10.4	73.6	1.00	1.08	16.3
3	R2	240	1.0	0.903	57.4	LOS E	9.1	63.9	1.00	1.08	19.2
Approach		569	1.0	0.903	55.1	LOS D	10.4	73.6	1.00	1.08	17.4
East: Falcon Street E											
4	L2	295	1.0	0.526	23.3	LOS B	9.5	73.3	0.83	0.78	28.3
5	T1	799	4.9	0.930	52.3	LOS D	53.7	376.1	0.96	1.03	17.9
6	R2	116	1.0	0.327	52.5	LOS D	6.4	45.0	0.91	0.77	19.9
Approach		1209	3.6	0.930	45.1	LOS D	53.7	376.1	0.93	0.95	20.1
North: Miller Street N											
7	L2	62	1.0	0.934	85.0	LOS F	34.2	245.2	1.00	1.17	15.6
8	T1	839	3.1	0.934	76.7	LOS F	34.7	249.2	1.00	1.15	13.1
Approach		901	3.0	0.934	77.3	LOS F	34.7	249.2	1.00	1.15	13.3
West: Falcon Street W											
10	L2	44	1.0	0.852	63.9	LOS E	23.4	164.9	1.00	0.99	12.4
11	T1	659	1.0	0.852	60.4	LOS E	23.9	168.4	1.00	0.99	16.3
Approach		703	1.0	0.852	60.6	LOS E	23.9	168.4	1.00	0.99	16.1
All Vehicles		3383	2.4	0.934	58.6	LOS E	53.7	376.1	0.97	1.03	16.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

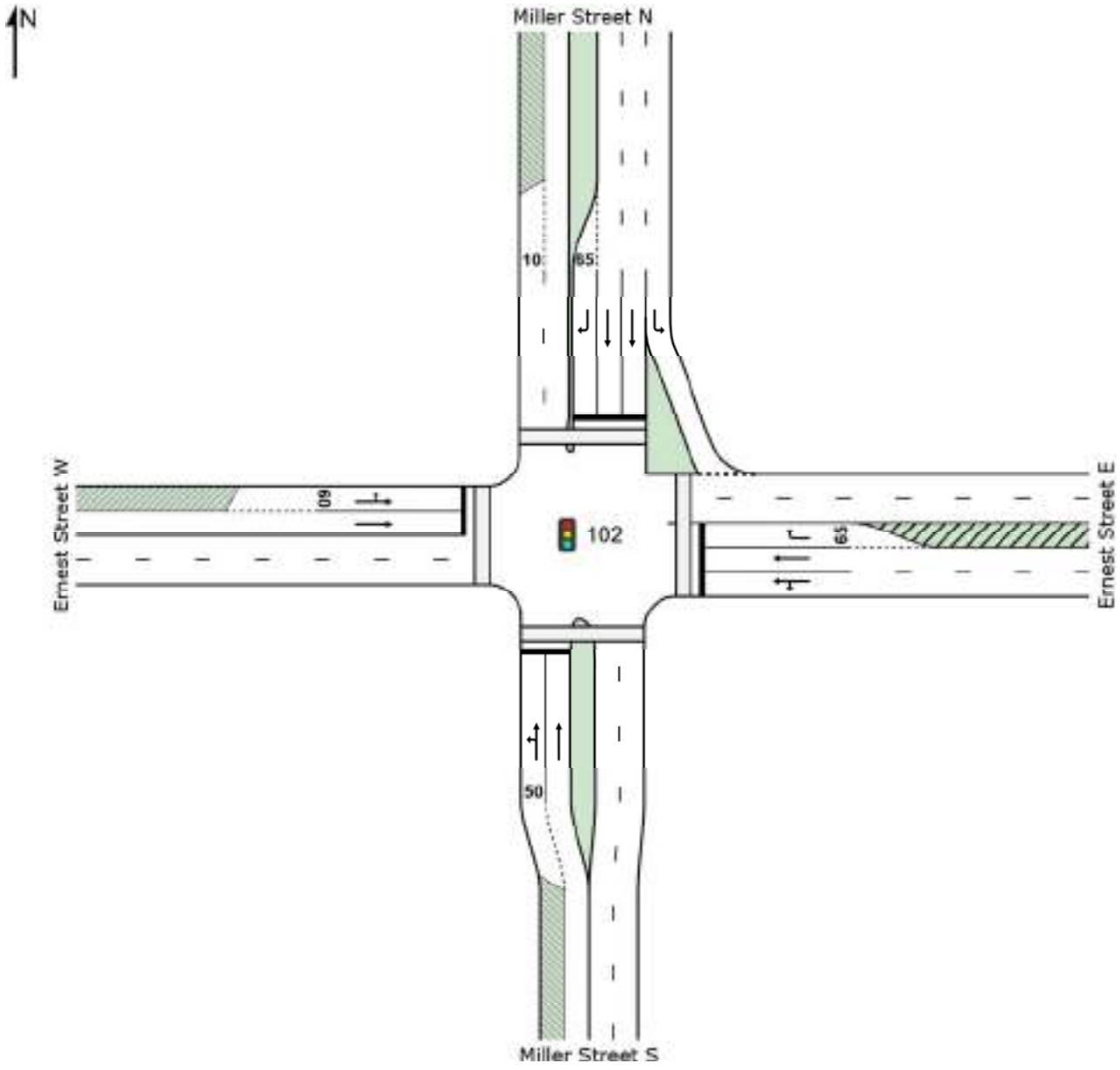
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	27.2	LOS C	0.1	0.1	0.65	0.65
P2	East Full Crossing	53	46.6	LOS E	0.2	0.2	0.85	0.85
P2S	East Slip/Bypass Lane Crossing	53	11.9	LOS B	0.1	0.1	0.56	0.56
P3	North Full Crossing	53	48.4	LOS E	0.2	0.2	0.86	0.86
P4	West Full Crossing	53	27.2	LOS C	0.1	0.1	0.65	0.65
All Pedestrians		263	32.3	LOS D			0.71	0.71

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

SITE LAYOUT

Site: 102 [AM EX+DEV - Ernest St Miller St]

New Site
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

Site: 102 [AM EX+DEV - Ernest St Miller St]

New Site
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Miller Street S											
1	L2	119	1.4	0.509	47.4	LOS D	11.8	83.7	0.92	0.79	20.5
2	T1	372	2.0	0.599	43.1	LOS D	13.4	95.3	0.93	0.79	21.6
Approach		491	1.9	0.599	44.1	LOS D	13.4	95.3	0.92	0.79	21.3
East: Ernest Street E											
4	L2	296	1.0	0.591	26.6	LOS B	22.7	160.5	0.76	0.75	31.2
5	T1	747	1.0	0.591	20.6	LOS B	22.7	160.5	0.72	0.66	33.5
6	R2	158	1.0	0.514	54.6	LOS D	8.6	60.7	0.96	0.80	22.5
Approach		1201	1.0	0.591	26.5	LOS B	22.7	160.5	0.76	0.70	30.9
North: Miller Street N											
7	L2	458	2.0	0.374	7.8	LOS A	7.2	51.3	0.36	0.63	42.7
8	T1	586	2.0	0.397	28.7	LOS C	12.4	88.1	0.78	0.66	26.8
9	R2	104	2.0	0.324	44.9	LOS D	5.2	36.8	0.90	0.77	21.3
Approach		1148	2.0	0.397	21.8	LOS B	12.4	88.1	0.62	0.66	31.7
West: Ernest Street W											
10	L2	25	1.0	0.520	42.1	LOS C	14.5	102.3	0.88	0.76	23.5
11	T1	576	1.0	0.520	37.5	LOS C	14.7	103.6	0.88	0.76	26.7
Approach		601	1.0	0.520	37.7	LOS C	14.7	103.6	0.88	0.76	26.5
All Vehicles		3441	1.4	0.599	29.4	LOS C	22.7	160.5	0.76	0.71	28.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

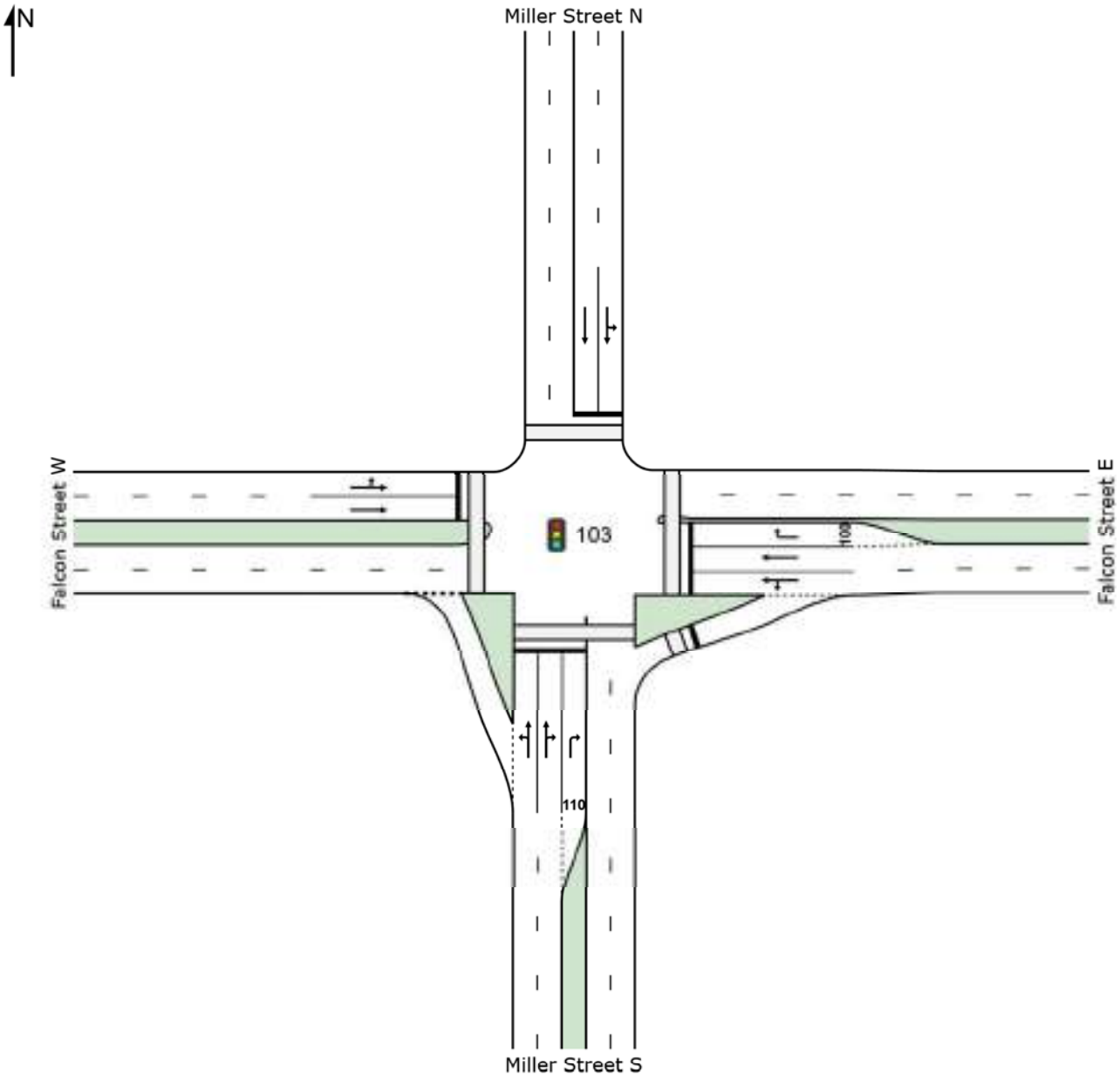
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	21.1	LOS C	0.1	0.1	0.59	0.59
P2	East Full Crossing	53	31.6	LOS D	0.1	0.1	0.73	0.73
P3	North Full Crossing	53	39.3	LOS D	0.1	0.1	0.81	0.81
P4	West Full Crossing	53	42.6	LOS E	0.2	0.2	0.84	0.84
All Pedestrians		211	33.6	LOS D			0.74	0.74

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

SITE LAYOUT

Site: 103 [AM EX+DEV - Falcon St Miller St]

New Site
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

Site: 103 [AM EX+DEV - Falcon St Miller St]

New Site
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Miller Street S											
1	L2	77	1.0	0.915	50.2	LOS D	10.1	71.6	1.00	1.07	14.7
2	T1	263	1.0	0.915	46.6	LOS D	10.1	71.6	1.00	1.06	17.7
3	R2	240	1.0	0.915	49.8	LOS D	8.8	62.0	1.00	1.05	20.6
Approach		580	1.0	0.915	48.4	LOS D	10.1	71.6	1.00	1.06	18.7
East: Falcon Street E											
4	L2	295	1.0	0.355	16.1	LOS B	8.7	67.7	0.60	0.69	31.3
5	T1	799	4.9	0.949	57.1	LOS E	54.1	378.7	0.97	1.10	17.2
6	R2	116	1.0	0.359	51.0	LOS D	6.1	42.8	0.93	0.77	20.2
Approach		1209	3.6	0.949	46.4	LOS D	54.1	378.7	0.88	0.97	19.8
North: Miller Street N											
7	L2	62	1.0	0.949	85.3	LOS F	33.2	238.0	1.00	1.23	15.6
8	T1	839	3.1	0.949	77.3	LOS F	33.7	241.9	1.00	1.20	13.1
Approach		901	3.0	0.949	77.9	LOS F	33.7	241.9	1.00	1.21	13.3
West: Falcon Street W											
10	L2	86	0.5	0.930	73.7	LOS F	26.6	187.9	1.00	1.13	11.5
11	T1	678	1.0	0.930	69.7	LOS E	27.7	195.4	1.00	1.14	15.1
Approach		764	0.9	0.930	70.1	LOS E	27.7	195.4	1.00	1.14	14.7
All Vehicles		3455	2.4	0.949	60.2	LOS E	54.1	378.7	0.96	1.08	16.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

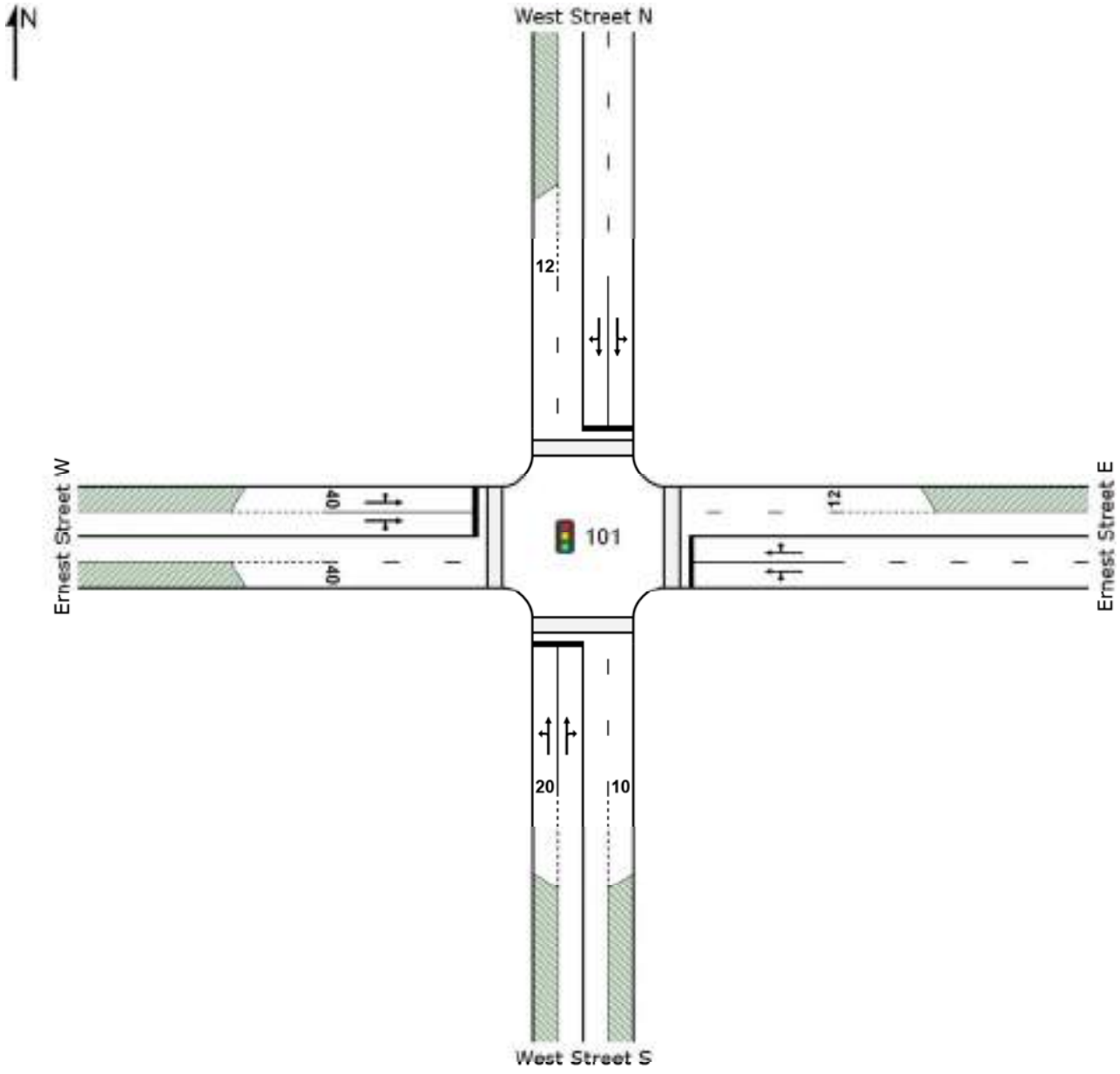
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	26.7	LOS C	0.1	0.1	0.67	0.67
P2	East Full Crossing	53	44.3	LOS E	0.2	0.2	0.86	0.86
P2S	East Slip/Bypass Lane Crossing	53	22.0	LOS C	0.1	0.1	0.72	0.72
P3	North Full Crossing	53	45.2	LOS E	0.2	0.2	0.87	0.87
P4	West Full Crossing	53	25.4	LOS C	0.1	0.1	0.65	0.65
All Pedestrians		263	32.7	LOS D			0.75	0.75

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

SITE LAYOUT

Site: 101 [AM EX+DEV- Ernest St West St]

Ernest Street West Street
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

Site: 101 [AM EX+DEV- Ernest St West St]

Ernest Street West Street
Signals - Fixed Time Isolated Cycle Time = 60 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: West Street S											
1	L2	68	1.0	0.440	24.6	LOS B	5.1	36.2	0.89	0.75	31.1
2	T1	177	1.0	0.518	22.5	LOS B	5.1	36.2	0.91	0.76	31.7
3	R2	82	1.0	0.518	29.7	LOS C	3.6	25.7	0.96	0.78	24.2
Approach		327	1.0	0.518	24.7	LOS B	5.1	36.2	0.92	0.76	29.9
East: Ernest Street E											
4	L2	292	1.5	0.482	14.1	LOS A	8.9	62.9	0.67	0.70	35.2
5	T1	618	2.0	0.567	10.4	LOS A	10.1	72.0	0.71	0.68	39.8
6	R2	65	2.0	0.567	15.4	LOS B	10.1	72.0	0.73	0.67	39.8
Approach		975	1.9	0.567	11.9	LOS A	10.1	72.0	0.70	0.68	38.6
North: West Street N											
7	L2	112	1.0	0.460	26.7	LOS B	5.2	37.1	0.91	0.77	32.6
8	T1	327	1.0	0.542	21.9	LOS B	6.6	46.3	0.91	0.77	33.6
9	R2	11	1.0	0.542	26.4	LOS B	6.6	46.3	0.92	0.76	36.4
Approach		449	1.0	0.542	23.2	LOS B	6.6	46.3	0.91	0.77	33.4
West: Ernest Street W											
10	L2	21	1.0	0.269	12.3	LOS A	4.4	31.1	0.56	0.50	43.7
11	T1	401	1.0	0.317	9.1	LOS A	4.4	31.1	0.60	0.54	41.2
12	R2	58	1.0	0.317	16.2	LOS B	3.8	26.5	0.68	0.62	38.1
Approach		480	1.0	0.317	10.1	LOS A	4.4	31.1	0.61	0.55	40.9
All Vehicles		2232	1.4	0.567	15.7	LOS B	10.1	72.0	0.76	0.68	36.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

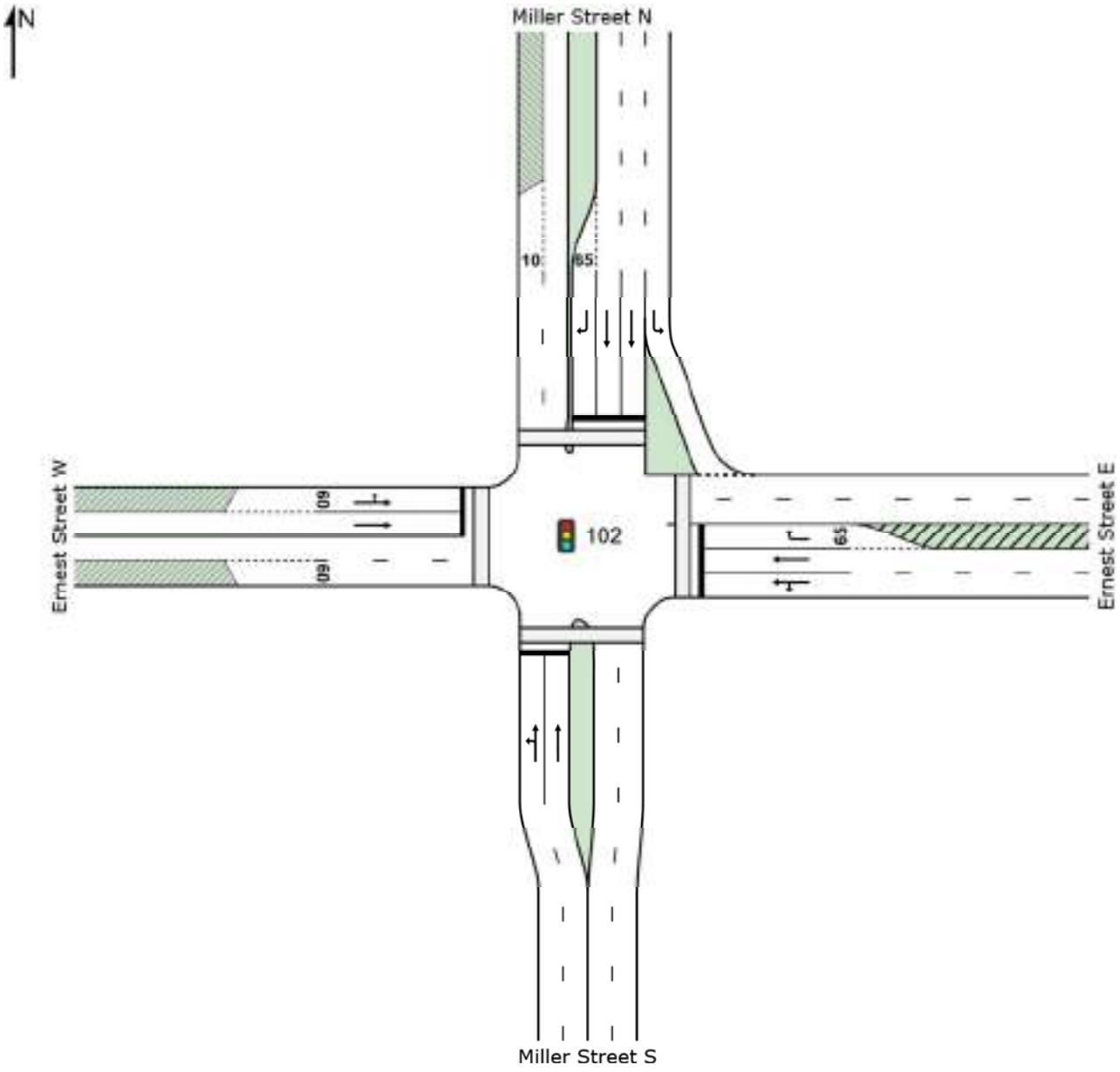
Movement Performance - Pedestrians							
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	11.4	LOS B	0.1	0.1	0.62	0.62
P2	East Full Crossing	53	24.4	LOS C	0.1	0.1	0.90	0.90
P3	North Full Crossing	53	11.4	LOS B	0.1	0.1	0.62	0.62
P4	West Full Crossing	53	24.4	LOS C	0.1	0.1	0.90	0.90
All Pedestrians		211	17.9	LOS B			0.76	0.76

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

SITE LAYOUT

Site: 102 [PM EX - Ernest St Miller St]

New Site
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

Site: 102 [PM EX - Ernest St Miller St]

New Site
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Miller Street S											
1	L2	73	1.0	0.153	36.7	LOS C	3.7	26.1	0.76	0.71	22.9
2	T1	473	1.0	0.766	41.4	LOS C	24.8	175.0	0.96	0.87	22.2
Approach		545	1.0	0.766	40.8	LOS C	24.8	175.0	0.94	0.85	22.3
East: Ernest Street E											
4	L2	127	2.0	0.177	23.7	LOS B	5.1	36.1	0.61	0.68	31.9
5	T1	447	2.0	0.445	20.9	LOS B	15.8	112.6	0.69	0.62	33.5
6	R2	194	2.0	0.747	61.4	LOS E	11.5	82.2	1.00	0.88	21.1
Approach		768	2.0	0.747	31.6	LOS C	15.8	112.6	0.76	0.69	28.8
North: Miller Street N											
7	L2	412	2.0	0.345	8.8	LOS A	7.4	52.4	0.39	0.64	41.8
8	T1	278	2.0	0.177	24.0	LOS B	5.1	36.4	0.67	0.55	29.0
9	R2	113	2.0	0.526	53.7	LOS D	6.2	44.4	0.98	0.80	19.2
Approach		802	2.0	0.526	20.4	LOS B	7.4	52.4	0.57	0.63	32.9
West: Ernest Street W											
10	L2	23	1.0	0.754	45.3	LOS D	18.6	131.6	0.92	0.83	22.6
11	T1	695	1.0	0.754	40.7	LOS C	18.7	132.0	0.92	0.83	25.7
Approach		718	1.0	0.754	40.8	LOS C	18.7	132.0	0.92	0.83	25.6
All Vehicles		2834	1.6	0.766	32.5	LOS C	24.8	175.0	0.78	0.74	27.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

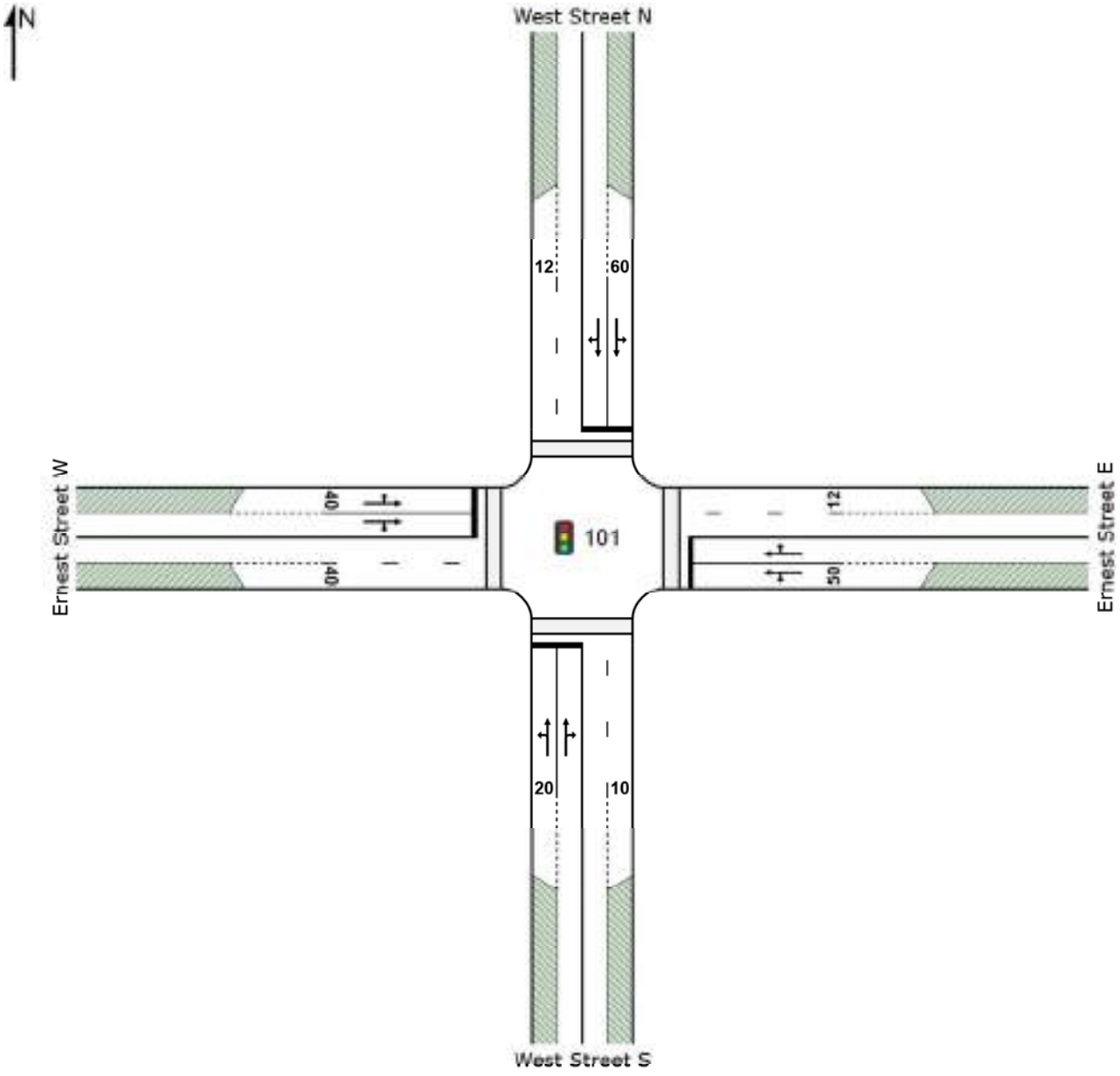
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	22.9	LOS C	0.1	0.1	0.62	0.62
P2	East Full Crossing	53	29.5	LOS C	0.1	0.1	0.70	0.70
P3	North Full Crossing	53	39.3	LOS D	0.1	0.1	0.81	0.81
P4	West Full Crossing	53	36.1	LOS D	0.1	0.1	0.78	0.78
All Pedestrians		211	31.9	LOS D			0.73	0.73

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

SITE LAYOUT

Site: 101 [PM EX - Ernest St West St]

Ernest Street West Street
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

Site: 101 [PM EX - Ernest St West St]

Ernest Street West Street
Signals - Fixed Time Isolated Cycle Time = 60 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: West Street S											
1	L2	88	1.0	0.364	20.1	LOS B	5.0	35.5	0.80	0.70	33.1
2	T1	180	1.0	0.428	17.5	LOS B	5.0	35.5	0.82	0.72	33.9
3	R2	119	1.0	0.428	23.2	LOS B	4.2	29.3	0.86	0.75	26.8
Approach		387	1.0	0.428	19.9	LOS B	5.0	35.5	0.83	0.73	31.8
East: Ernest Street E											
4	L2	146	2.0	0.378	15.9	LOS B	6.2	43.8	0.69	0.67	32.5
5	T1	456	2.0	0.445	12.0	LOS A	6.8	48.1	0.72	0.66	38.7
6	R2	48	2.0	0.445	17.0	LOS B	6.8	48.1	0.73	0.65	38.7
Approach		651	2.0	0.445	13.2	LOS A	6.8	48.1	0.71	0.66	37.6
North: West Street N											
7	L2	93	1.0	0.239	21.2	LOS B	3.1	21.8	0.78	0.72	34.8
8	T1	209	1.0	0.282	17.6	LOS B	3.8	26.7	0.78	0.70	34.1
9	R2	9	1.0	0.282	20.7	LOS B	3.8	26.7	0.78	0.69	38.4
Approach		312	1.0	0.282	18.7	LOS B	3.8	26.7	0.78	0.70	34.4
West: Ernest Street W											
10	L2	26	2.0	0.355	15.7	LOS B	6.0	42.4	0.68	0.59	41.6
11	T1	521	2.0	0.417	11.9	LOS A	6.0	42.4	0.70	0.62	39.2
12	R2	55	2.0	0.417	17.5	LOS B	5.9	42.2	0.74	0.65	36.1
Approach		602	2.0	0.417	12.6	LOS A	6.0	42.4	0.71	0.62	39.0
All Vehicles		1952	1.6	0.445	15.2	LOS B	6.8	48.1	0.74	0.67	36.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

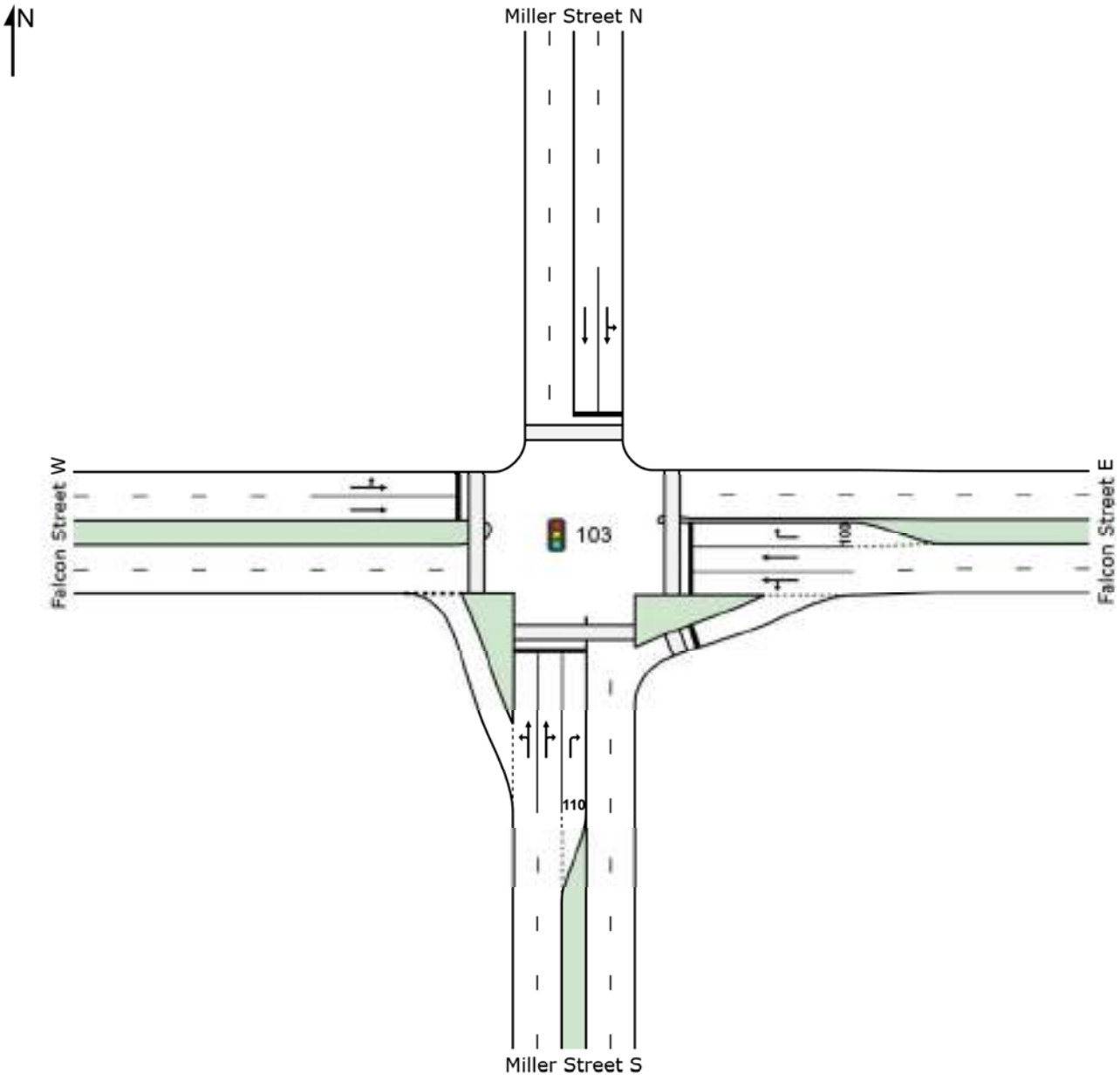
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	14.7	LOS B	0.1	0.1	0.70	0.70
P2	East Full Crossing	53	20.9	LOS C	0.1	0.1	0.84	0.84
P3	North Full Crossing	53	14.7	LOS B	0.1	0.1	0.70	0.70
P4	West Full Crossing	53	20.9	LOS C	0.1	0.1	0.84	0.84
All Pedestrians		211	17.8	LOS B			0.77	0.77

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

SITE LAYOUT

Site: 103 [PM EX - Falcon St Miller St]

New Site
Signals - Fixed Time Isolated



Organisation: TRAFFIX PTY LTD | Created: Tuesday, 11 April 2017 2:18:05 PM
Project: \\192.168.3.1\tdata\Synergy\Projects\16\16.355\Modelling\HD copy 1704007\16.355s01v01.sip7

MOVEMENT SUMMARY

Site: 103 [PM EX - Falcon St Miller St]

New Site
Signals - Fixed Time Isolated Cycle Time = 130 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Miller Street S											
1	L2	54	1.0	0.822	46.7	LOS D	12.4	87.4	1.00	0.97	15.5
2	T1	352	1.0	0.822	43.1	LOS D	12.4	87.4	1.00	0.96	18.4
3	R2	308	1.0	0.822	46.2	LOS D	12.2	86.2	1.00	0.95	21.4
Approach		714	1.0	0.822	44.7	LOS D	12.4	87.4	1.00	0.96	19.6
East: Falcon Street E											
4	L2	179	1.0	0.178	8.6	LOS A	3.7	29.0	0.39	0.52	35.4
5	T1	796	3.3	0.842	28.1	LOS B	39.9	279.5	0.84	0.80	24.0
6	R2	148	1.0	0.419	53.5	LOS D	8.4	59.0	0.93	0.79	19.7
Approach		1123	2.6	0.842	28.3	LOS B	39.9	279.5	0.78	0.75	24.6
North: Miller Street N											
7	L2	75	1.0	0.799	69.3	LOS E	12.7	90.6	1.00	1.03	17.5
8	T1	343	3.1	0.799	64.7	LOS E	14.0	100.2	1.00	0.98	14.6
Approach		418	2.7	0.799	65.5	LOS E	14.0	100.2	1.00	0.99	15.2
West: Falcon Street W											
10	L2	54	1.0	0.840	56.2	LOS D	29.3	206.7	1.00	0.96	13.7
11	T1	864	1.0	0.840	52.6	LOS D	29.7	210.0	1.00	0.96	17.7
Approach		918	1.0	0.840	52.8	LOS D	29.7	210.0	1.00	0.96	17.5
All Vehicles		3173	1.8	0.842	44.0	LOS D	39.9	279.5	0.92	0.89	19.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

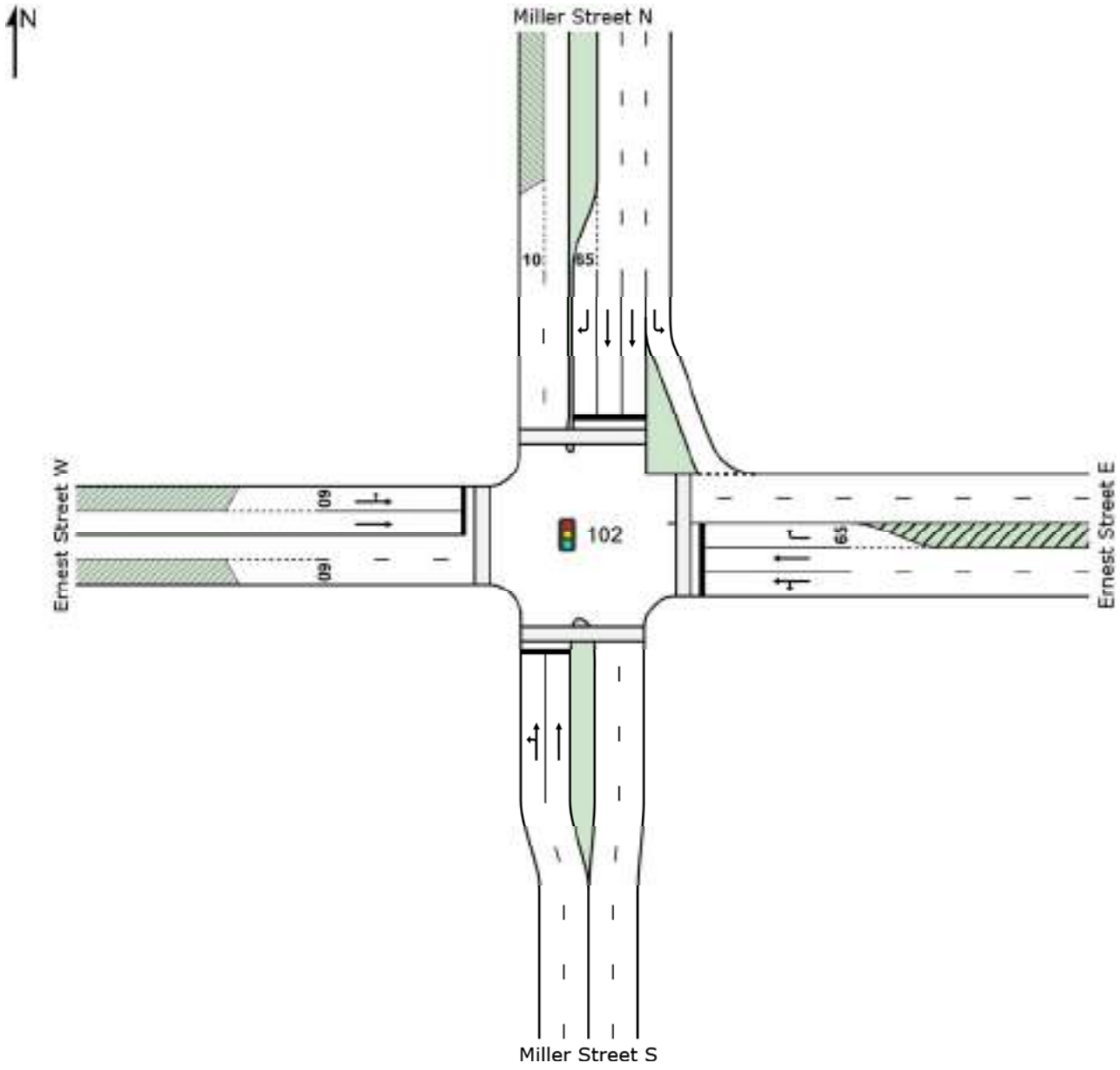
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	21.7	LOS C	0.1	0.1	0.58	0.58
P2	East Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P2S	East Slip/Bypass Lane Crossing	53	33.0	LOS D	0.1	0.1	0.83	0.83
P3	North Full Crossing	53	40.9	LOS E	0.2	0.2	0.79	0.79
P4	West Full Crossing	53	33.3	LOS D	0.1	0.1	0.72	0.72
All Pedestrians		263	37.6	LOS D			0.78	0.78

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

SITE LAYOUT

Site: 102 [PM EX+DEV - Ernest St Miller St]

New Site
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

Site: 102 [PM EX+DEV - Ernest St Miller St]

New Site
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Miller Street S											
1	L2	81	0.9	0.160	37.7	LOS C	3.8	26.8	0.77	0.73	22.6
2	T1	473	1.0	0.800	44.4	LOS D	26.3	185.4	0.98	0.91	21.3
Approach		554	1.0	0.800	43.4	LOS D	26.3	185.4	0.95	0.88	21.5
East: Ernest Street E											
4	L2	127	2.0	0.218	25.3	LOS B	6.3	45.1	0.64	0.67	31.4
5	T1	456	2.0	0.547	22.0	LOS B	15.3	109.2	0.70	0.63	33.0
6	R2	194	2.0	0.793	64.2	LOS E	11.9	84.7	1.00	0.91	20.5
Approach		777	2.0	0.793	33.1	LOS C	15.3	109.2	0.77	0.70	28.3
North: Miller Street N											
7	L2	412	2.0	0.342	8.8	LOS A	7.4	52.5	0.39	0.64	41.8
8	T1	278	2.0	0.170	22.6	LOS B	5.0	35.3	0.66	0.54	29.7
9	R2	113	2.0	0.456	52.6	LOS D	6.2	44.0	0.96	0.79	19.4
Approach		802	2.0	0.456	19.8	LOS B	7.4	52.5	0.56	0.63	33.2
West: Ernest Street W											
10	L2	23	1.0	0.783	47.7	LOS D	19.3	136.2	0.93	0.86	21.9
11	T1	695	1.0	0.783	43.1	LOS D	19.3	136.6	0.93	0.86	24.9
Approach		718	1.0	0.783	43.2	LOS D	19.3	136.6	0.93	0.86	24.9
All Vehicles		2851	1.5	0.800	33.9	LOS C	26.3	185.4	0.79	0.76	27.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

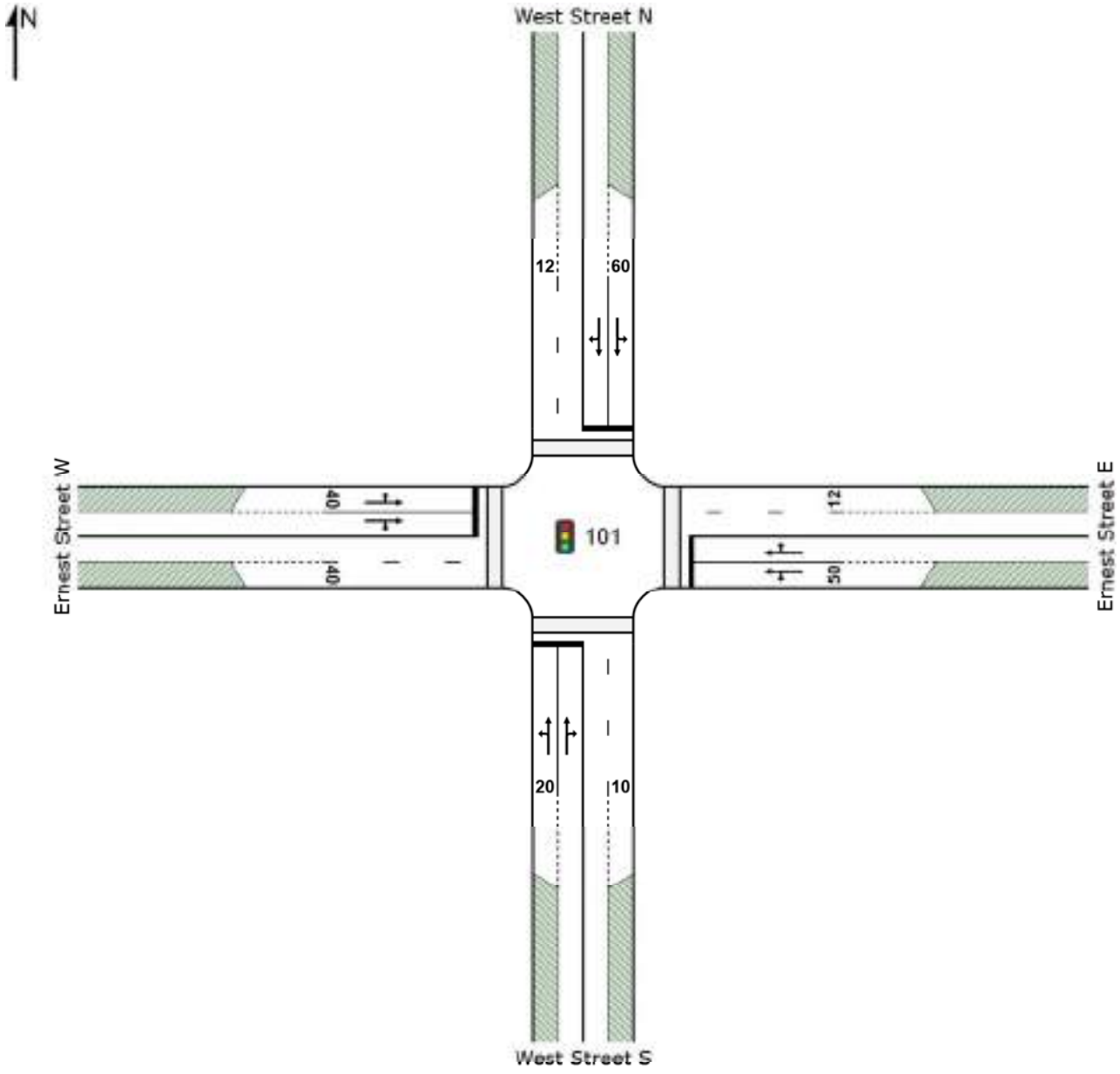
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	24.1	LOS C	0.1	0.1	0.63	0.63
P2	East Full Crossing	53	28.1	LOS C	0.1	0.1	0.68	0.68
P3	North Full Crossing	53	40.1	LOS E	0.1	0.1	0.82	0.82
P4	West Full Crossing	53	36.9	LOS D	0.1	0.1	0.79	0.79
All Pedestrians		211	32.3	LOS D			0.73	0.73

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

SITE LAYOUT

Site: 101 [PM EX+DEV - Ernest St West St]

Ernest Street West Street
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

Site: 101 [PM EX+DEV - Ernest St West St]

Ernest Street West Street
Signals - Fixed Time Isolated Cycle Time = 60 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: West Street S											
1	L2	88	1.0	0.387	21.0	LOS B	5.1	36.3	0.82	0.72	32.6
2	T1	180	1.0	0.455	18.4	LOS B	5.1	36.3	0.84	0.73	33.4
3	R2	119	1.0	0.455	24.2	LOS B	4.3	30.3	0.88	0.76	26.3
Approach		387	1.0	0.455	20.8	LOS B	5.1	36.3	0.85	0.74	31.3
East: Ernest Street E											
4	L2	162	1.8	0.373	15.9	LOS B	6.2	44.4	0.69	0.67	33.0
5	T1	456	2.0	0.438	11.6	LOS A	6.8	48.3	0.70	0.65	39.0
6	R2	48	2.0	0.438	16.3	LOS B	6.8	48.3	0.71	0.64	39.2
Approach		666	2.0	0.438	13.0	LOS A	6.8	48.3	0.70	0.66	37.8
North: West Street N											
7	L2	93	1.0	0.253	22.1	LOS B	3.2	22.4	0.80	0.73	34.3
8	T1	209	1.0	0.297	18.4	LOS B	3.9	27.5	0.80	0.71	33.6
9	R2	9	1.0	0.297	21.6	LOS B	3.9	27.5	0.80	0.70	38.0
Approach		312	1.0	0.297	19.6	LOS B	3.9	27.5	0.80	0.71	34.0
West: Ernest Street W											
10	L2	26	2.0	0.339	15.0	LOS B	5.7	40.5	0.66	0.58	42.0
11	T1	521	2.0	0.399	11.2	LOS A	5.8	41.3	0.68	0.60	39.7
12	R2	55	2.0	0.399	16.7	LOS B	5.8	41.3	0.71	0.64	36.6
Approach		602	2.0	0.399	11.8	LOS A	5.8	41.3	0.68	0.61	39.5
All Vehicles		1967	1.6	0.455	15.2	LOS B	6.8	48.3	0.74	0.67	36.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

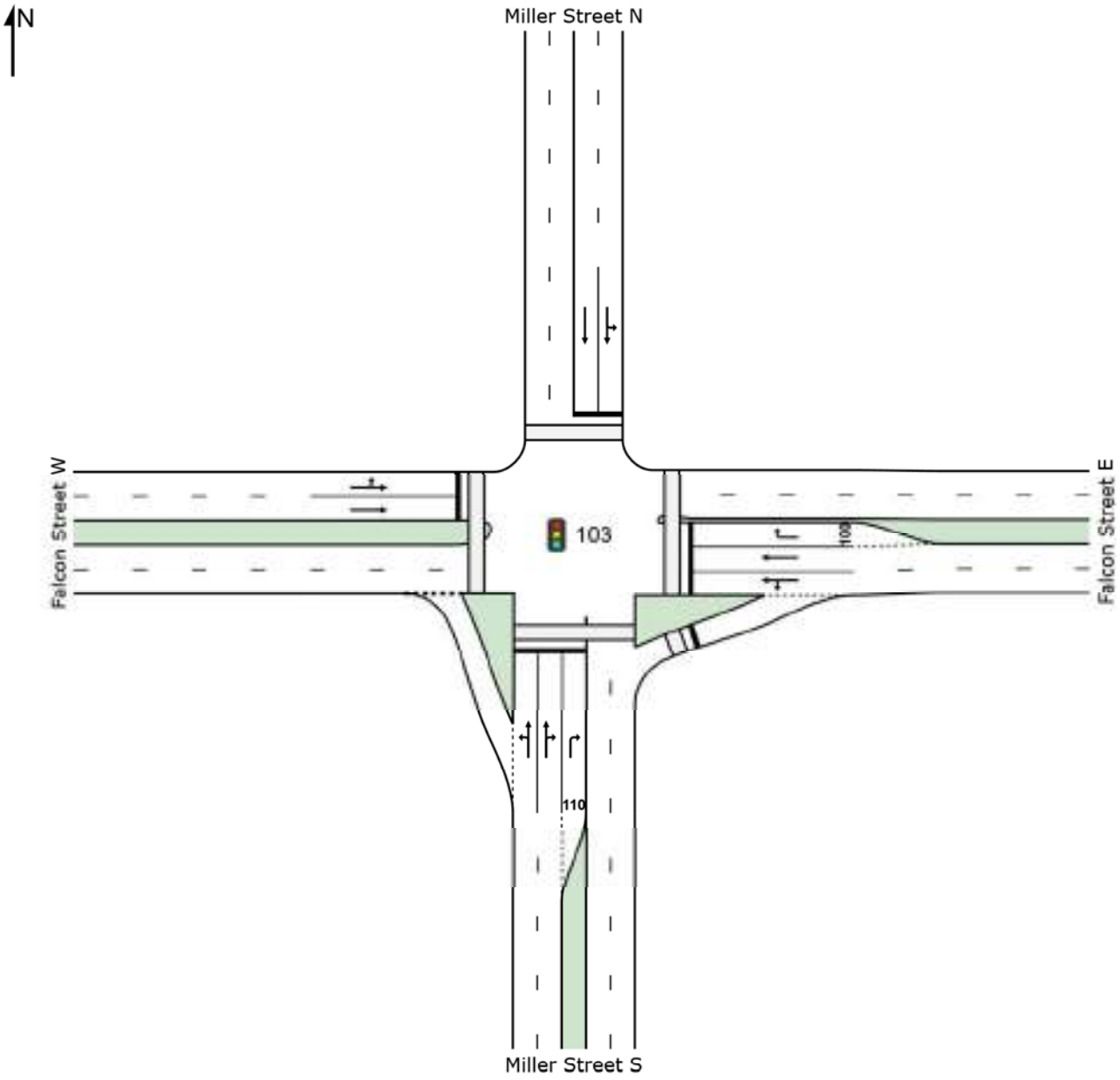
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	14.0	LOS B	0.1	0.1	0.68	0.68
P2	East Full Crossing	53	21.7	LOS C	0.1	0.1	0.85	0.85
P3	North Full Crossing	53	14.0	LOS B	0.1	0.1	0.68	0.68
P4	West Full Crossing	53	21.7	LOS C	0.1	0.1	0.85	0.85
All Pedestrians		211	17.9	LOS B			0.77	0.77

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

SITE LAYOUT

Site: 103 [PM EX+DEV - Falcon St Miller St]

New Site
Signals - Fixed Time Isolated



Organisation: TRAFFIX PTY LTD | Created: Tuesday, 11 April 2017 2:19:13 PM
Project: \\192.168.3.1\tdata\Synergy\Projects\16\16.355\Modelling\HD copy 1704007\16.355s01v01.sip7

MOVEMENT SUMMARY

Site: 103 [PM EX+DEV - Falcon St Miller St]

New Site
Signals - Fixed Time Isolated Cycle Time = 125 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Miller Street S											
1	L2	54	1.0	0.834	45.4	LOS D	12.2	85.9	1.00	0.97	15.8
2	T1	354	1.0	0.834	41.8	LOS C	12.2	85.9	1.00	0.97	18.7
3	R2	308	1.0	0.834	44.8	LOS D	12.0	84.6	1.00	0.95	21.7
Approach		716	1.0	0.834	43.4	LOS D	12.2	85.9	1.00	0.96	20.0
East: Falcon Street E											
4	L2	179	1.0	0.189	9.1	LOS A	3.6	28.2	0.44	0.54	35.1
5	T1	796	3.3	0.844	28.1	LOS B	39.2	274.1	0.84	0.81	24.0
6	R2	148	1.0	0.457	53.8	LOS D	8.2	58.1	0.94	0.79	19.7
Approach		1123	2.6	0.844	28.4	LOS B	39.2	274.1	0.79	0.76	24.5
North: Miller Street N											
7	L2	75	1.0	0.814	68.3	LOS E	12.3	88.2	1.00	1.06	17.7
8	T1	343	3.1	0.814	63.6	LOS E	13.6	97.8	1.00	1.00	14.8
Approach		418	2.7	0.814	64.4	LOS E	13.6	97.8	1.00	1.01	15.4
West: Falcon Street W											
10	L2	68	0.8	0.829	52.6	LOS D	28.4	200.6	1.00	0.95	14.6
11	T1	873	1.0	0.829	49.0	LOS D	29.0	204.5	1.00	0.95	18.4
Approach		941	1.0	0.829	49.3	LOS D	29.0	204.5	1.00	0.95	18.2
All Vehicles		3198	1.8	0.844	42.6	LOS D	39.2	274.1	0.93	0.90	20.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	53	21.4	LOS C	0.1	0.1	0.59	0.59
P2	East Full Crossing	53	56.8	LOS E	0.2	0.2	0.95	0.95
P2S	East Slip/Bypass Lane Crossing	53	29.9	LOS C	0.1	0.1	0.83	0.83
P3	North Full Crossing	53	38.5	LOS D	0.1	0.1	0.79	0.79
P4	West Full Crossing	53	32.5	LOS D	0.1	0.1	0.72	0.72
All Pedestrians		263	35.8	LOS D			0.78	0.78

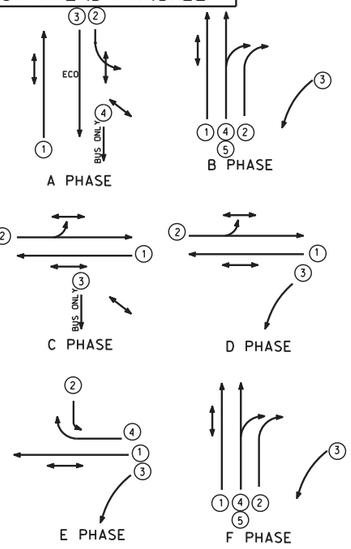
Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

Appendix E

Signal Layout Plans

0164.329.VV.0088

DRAWN BY CADD
DO NOT AMEND MANUALLY



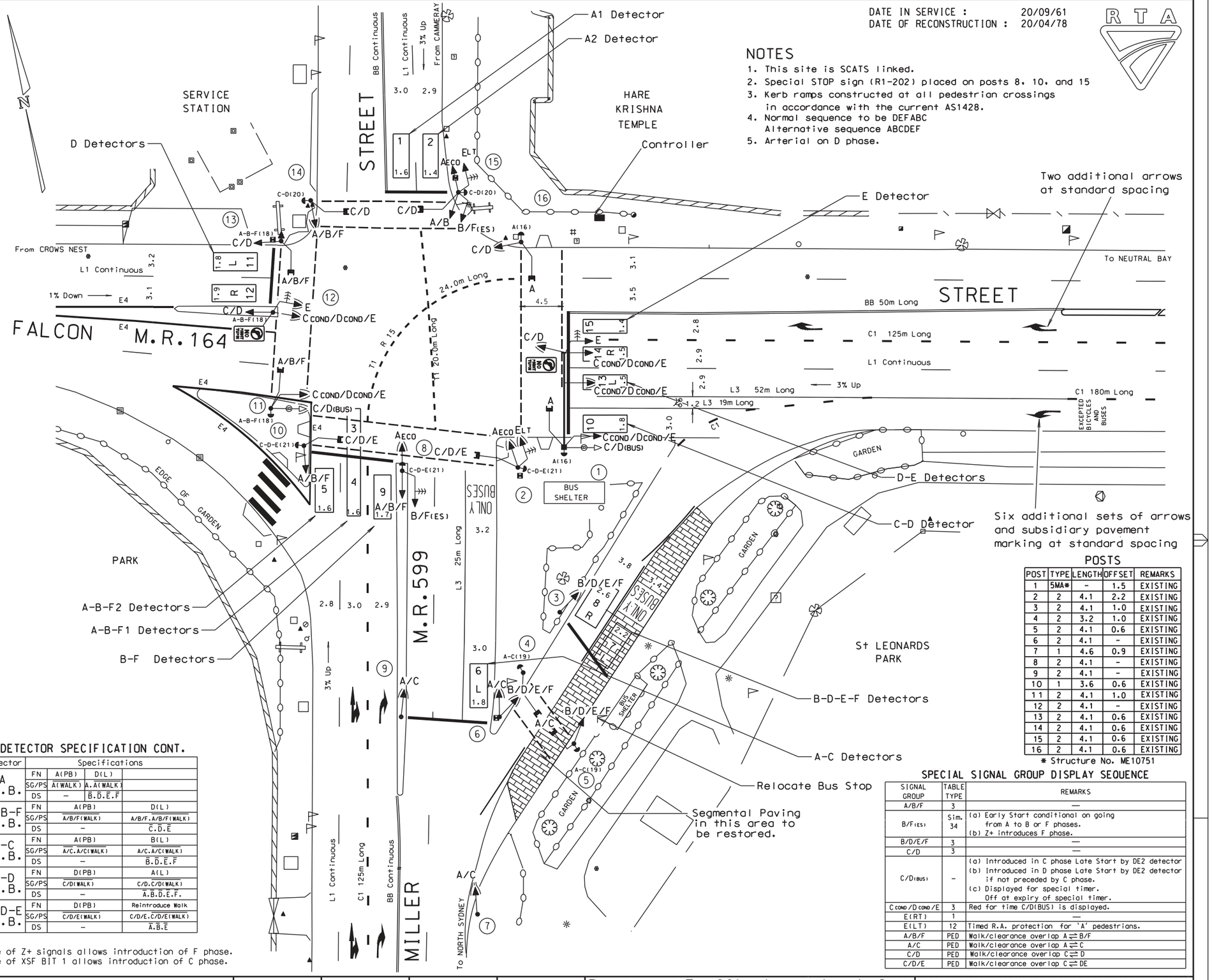
Z+ permits introduction of F phase

MOVEMENTS

DATE IN SERVICE : 20/09/61
DATE OF RECONSTRUCTION : 20/04/78

RTA

NOTES
1. This site is SCATS linked.
2. Special STOP sign (R1-202) placed on posts 8, 10, and 15
3. Kerb ramps constructed at all pedestrian crossings in accordance with the current AS1428.
4. Normal sequence to be DEFABC
   Alternative sequence ABCDEF
5. Arterial on D phase.



POSTS

POST	TYPE	LENGTH	OFFSET	REMARKS
1	5MA*	-	1.5	EXISTING
2	2	4.1	2.2	EXISTING
3	2	4.1	1.0	EXISTING
4	2	3.2	1.0	EXISTING
5	2	4.1	0.6	EXISTING
6	2	4.1	-	EXISTING
7	1	4.6	0.9	EXISTING
8	2	4.1	-	EXISTING
9	2	4.1	-	EXISTING
10	1	3.6	0.6	EXISTING
11	2	4.1	1.0	EXISTING
12	2	4.1	-	EXISTING
13	2	4.1	0.6	EXISTING
14	2	4.1	0.6	EXISTING
15	2	4.1	0.6	EXISTING
16	2	4.1	0.6	EXISTING

* Structure No. ME10751

DETECTOR SPECIFICATION

Detector		Specifications				
A1	FN	A(L)	A(E3)			
	SG/PS	$\overline{A}$	A			
	DS	–	–			
A2	FN	A(PR)	A(E2)			
	SG/PS	$\overline{A}$	A			
	DS	–	–			
A-B-F1 Depart. & Approach	FN	B(PR)	F(PR)	B(E5)	F(E5)	
	SG/PS	A	A	B	F	
	DS	–	Z+	A(NEXT)	A(NEXT)	
A-B-F1 Approach	FN	A(L).B(L)	F(L)	A(E6)		
	SG/PS	$\overline{A/B/F}$	$\overline{A/B/F}$	A		
	DS	–	Z+	A-B-F1(PR).B(NEXT).F(NEXT)		
cont. A-B-F1 Approach	FN	B(E6)		F(E6)		
	SG/PS	B		F		
	DS	A(NEXT).F(NEXT)		A(NEXT).B(NEXT)		
A-B-F2	FN	A(L)	A(E1)		B(E1)	
	SG/PS	$\overline{A/B/F}$	A		B	
	DS	–	B(NEXT).F(NEXT)		A(NEXT).F(NEXT)	
cont. A-B-F2	FN	F(E1)				
	SG/PS	F				
	DS	A(NEXT).B(NEXT)				
A-C	FN	A(NL)	A(E4)	C(NL)	C(E1)	
	SG/PS	$\overline{A}$	A	$\overline{C}$	C	
	DS	–	–	XSF1	–	
B-D-E-F	FN	B(L)	B(E3)		D(E3)	
	SG/PS	$\overline{B/D/E/F}$	B		D	
	DS	–	D(NEXT).E(NEXT).F(NEXT)		B(NEXT).E(NEXT).F(NEXT)	
cont. B-D-E-F	FN	E(E3)		F(E3)		
	SG/PS	E		F		
	DS	B(NEXT).D(NEXT).F(NEXT)		B(NEXT).D(NEXT).E(NEXT)		
B-F	FN	B(L)	F(L)	B(E2)	F(E2)	
	SG/PS	$\overline{B/F}$	$\overline{B/F}$	B	F	
	DS	–	Z+	F(NEXT)	B(NEXT)	
C-D	FN	C/D(BUS)PR				
	SG/PS	$\overline{C/D}$				
	DS	–				
D	FN	D(L)	D(E1)			
	SG/PS	$\overline{D}$	D			
	DS	–	–			
D-E	FN	D(L)	D(E1)	E(E1)		
	SG/PS	$\overline{D/E}$	D	E		
	DS	–	E(NEXT)	D(NEXT)		
E	FN	E(L)	E(E4)			
	SG/PS	$\overline{E}$	E			
	DS	–	–			

DETECTOR SPECIFICATION CONT.

Detector		Specifications		
A P.B.	FN	A(PB)	D(L)	
	SG/PS	A(WALK)	A.A(WALK)	
	DS	–	$\overline{B.D.E.F}$	
A-B-F P.B.	FN	A(PB)		D(L)
	SG/PS	A/B/F(WALK)		A/B/F.A/B/F(WALK)
	DS	–		$\overline{C.D.E}$
A-C P.B.	FN	A(PB)		B(L)
	SG/PS	A/C.A/C(WALK)		A/C.A/C(WALK)
	DS	–		$\overline{B.D.E.F}$
C-D P.B.	FN	D(PB)		A(L)
	SG/PS	C/D(WALK)		C/D.C/D(WALK)
	DS	–		$\overline{A.B.D.E.F}$
C-D-E P.B.	FN	D(PB)		Reintroduce Walk
	SG/PS	C/D/E(WALK)		C/D/E.C/D/E(WALK)
	DS	–		$\overline{A.B.E}$

The presence of Z+ signals allows introduction of F phase.
The presence of XSF BIT 1 allows introduction of C phase.

SPECIAL SIGNAL GROUP DISPLAY SEQUENCE

SIGNAL GROUP	TABLE TYPE	REMARKS
A/B/F	3	—
B/F(ES)	Sim. 34	(a) Early Start conditional on going from A to B or F phases. (b) Z+ introduces F phase.
B/D/E/F	3	—
C/D	3	—
C/D(BUS)	–	(a) Introduced in C phase Late Start by DE2 detector (b) Introduced in D phase Late Start by DE2 detector if not preceded by C phase. (c) Displayed for special timer. Off at expiry of special timer.
C COND/D COND/E	3	Red for time C/D(BUS) is displayed.
E(RT)	1	—
E(LT)	12	Timed R.A. protection for 'A' pedestrians.
A/B/F	PED	Walk/clearance overlap A ⇄ B/F
A/C	PED	Walk/clearance overlap A ⇄ C
C/D	PED	Walk/clearance overlap C ⇄ D
C/D/E	PED	Walk/clearance overlap C ⇄ DE

M Issue J/1 SE1200 6/5/'97
Added
-Bicycle Lane
-Bus lanterns
-Slip lane signalised
-Dual right turn
-Large island modified
A.N. 19/8/'97

N ISSUE J1 YEN 98/020 9/7/98
AMENDED: POST CHART & NOTES.
M.L.C. 16/11/98
N.L.

'O' ISSUE:- MAE LED LANTERN UPGRADE. UPSTAIR LANTERN ON POST 1 WAS 300mm.
PWLC 24/01/2017.

PUBLIC UTILITY LEGEND	
HYDRANT	□
STOP VALVE	▲
GAS VALVE	#
SEWER MANHOLE	⊛
TELECOM PIT	◪
ELECT LIGHT POLE	○
POWER POLE	○
STAY POLE	⊘
TELEPHONE BOX	T
TELECOM PILLAR	◕

REFERENCE PLANS	
SYMBOLS/ABBS.	VD003-6
STD POSIT	VD001-5
DET SCHED EXP	VD018-10
PRES. DETECT	VC005-17
SSG DIS. SEQ.	VD018-8
R.T.A. PIT	
SURVEYOR : N/A	
DATE : N/A	

U.B.D. Ref. MAP 216 D8
I.S.G. CO-ORDS E: 319 225 N: 1 255 330

DESIGNED A.T.NEILL
CHECKED M.A.CLEAVER
A.T.NEILL SITE CHECKED
J.J.ZOUTENDYK RECOMMENDED

APPROVED
F.F. HAWES
FOR ENGINEER IN CHIEF
23/9/1977 DATE

Roads and Traffic Authority.N.S.W

NORTH SYDNEY CITY COUNCIL
TRAFFIC SIGNALS AT THE INTERSECTION OF FALCON STREET AND MILLER STREET
NORTH SYDNEY

DESIGN LAYOUT TCS No 0088

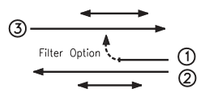
DESIGN OFFICE PARRAMATTA - SYDNEY TECHNICAL SERVICES
CADD FILE: VV0088_70.dgn
SCALE 5 0 (1:200) 5 10
ISSUE 0
FILE 329 TS 145
SUPERSEDES SHEET/ISSUE 7N
REGN. 0164.329.VV.0088
SHEET 7

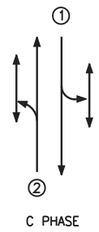
DRAWN BY CADD
DO NOT AMEND MANUALLY

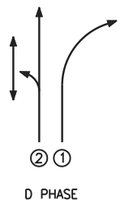
DATE IN SERVICE : 18/6/68

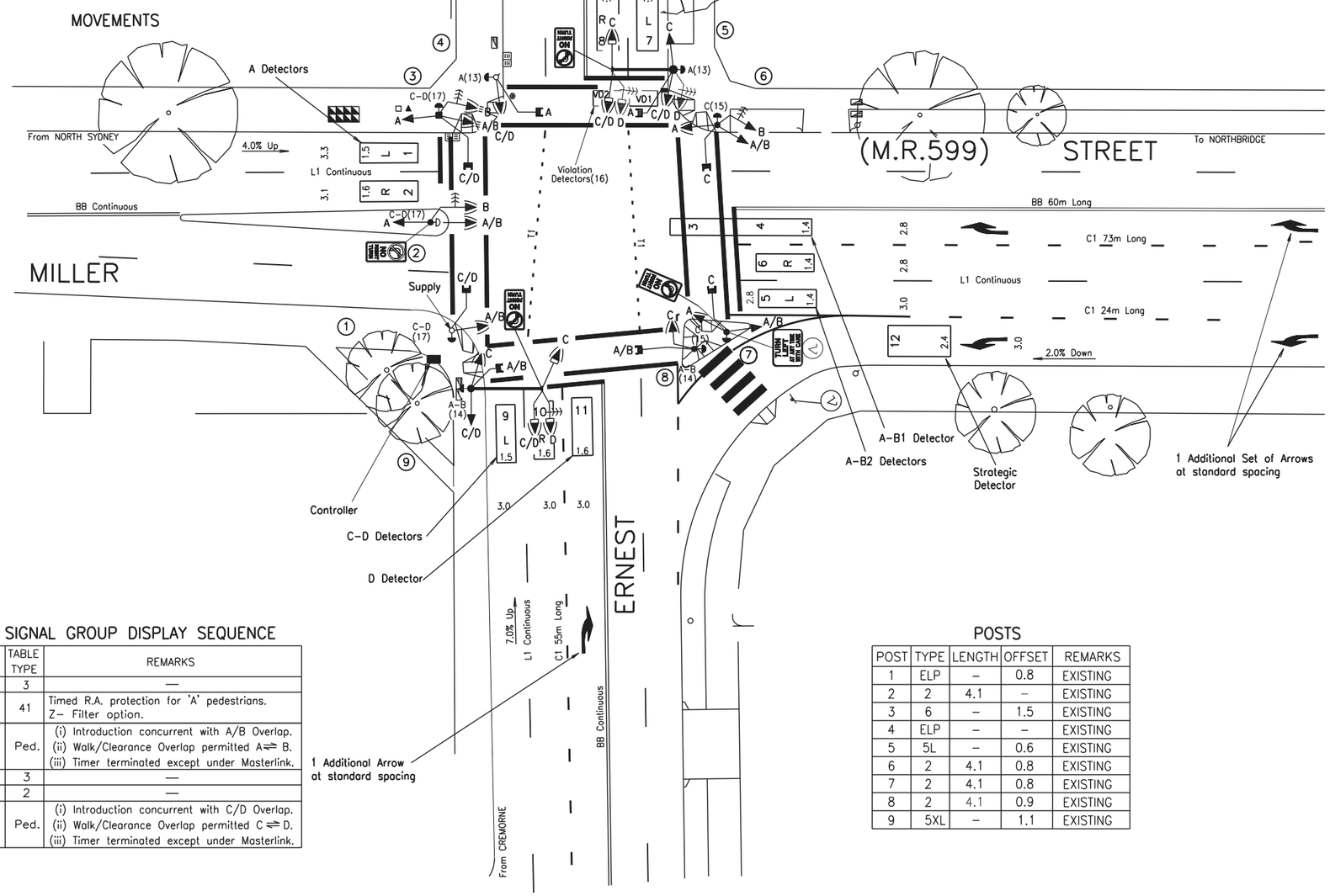
R T A

0599.329.VV.0151









DETECTOR SPECIFICATION

Detector		Specifications				
A	FN	A(L)	A(E3)			
	SG/PS	$\overline{A}$	A			
	DS	–	–			
A–B1 Depart. & Approach	FN	B(PR)				
	SG/PS	A				
	DS	Z–				
A–B1 Approach	FN	A(L).B(L)	B(L)	A(E1)		B(E1)
	SG/PS	$\overline{A/B}$	$\overline{B}$	A		B
	DS	Z–	$\overline{Z}$–	Z–.$\overline{A–B1(PR)}$.$\overline{B(NEXT)}$		–
A–B2	FN	A(L)	A(E2)	B(E2)		
	SG/PS	$\overline{A/B}$	A	B		
	DS	$\overline{B}$	$\overline{B(NEXT)}$	$\overline{A(NEXT)}$		
C	FN	C(L)	C(E1)			
	SG/PS	$\overline{C}$	C			
	DS	–	–			
C–D	FN	C(L)	C(E2)	D(E2)		
	SG/PS	$\overline{C/D}$	C	D		
	DS	$\overline{D}$	$\overline{D(NEXT)}$	$\overline{C(NEXT)}$		
D	FN	D(L)	D(E1)			
	SG/PS	$\overline{D}$	D			
	DS	–	–			
A P.B.	FN	A(PB)	C(L)			
	SG/PS	$\overline{A(WALK)}$	$\overline{A.A(WALK)}$			
	DS	–	$\overline{D}$			
A–B P.B.	FN	A(PB)		Reintroduce Walk		
	SG/PS	$\overline{A/B.A/B(WALK)}$		A/B.A/B(WALK)		
	DS	$\overline{B}$		$\overline{C.D}$		
C P.B.	FN	C(PB)	A(L)			
	SG/PS	$\overline{C(WALK)}$	$\overline{C.C(WALK)}$			
	DS	–	$\overline{D}$			
C–D P.B.	FN	C(PB)		A(L)		
	SG/PS	$\overline{C/D.C/D(WALK)}$		C/D.$\overline{C/D(WALK)}$		
	DS	$\overline{D}$		–		

SPECIAL SIGNAL GROUP DISPLAY SEQUENCE

SIGNAL GROUP	TABLE TYPE	REMARKS
A/B	3	—
B(RT)	41	Timed R.A. protection for 'A' pedestrians. Z– Filter option.
A/B	Ped.	(i) Introduction concurrent with A/B Overlap. (ii) Walk/Clearance Overlap permitted A⇌B. (iii) Timer terminated except under Masterlink.
C/D	3	—
D(RT)	2	—
C/D	Ped.	(i) Introduction concurrent with C/D Overlap. (ii) Walk/Clearance Overlap permitted C⇌D. (iii) Timer terminated except under Masterlink.

POSTS

POST	TYPE	LENGTH	OFFSET	REMARKS
1	ELP	–	0.8	EXISTING
2	2	4.1	–	EXISTING
3	6	–	1.5	EXISTING
4	ELP	–	–	EXISTING
5	5L	–	0.6	EXISTING
6	2	4.1	0.8	EXISTING
7	2	4.1	0.8	EXISTING
8	2	4.1	0.9	EXISTING
9	5XL	–	1.1	EXISTING

NOTES:

1. This site is SCATS linked.
2. Audio tactile push buttons provided on Posts 1, 3, 4, 5, 6, 7, 8 and 9.
3. Special stop sign (R1–202) placed onposts 5 and 9.

J ISSUE J1 SS209 DRAWING CONVERTED TO MICRO-STATION AND UPDATED. AMENDED DET SPEC. SSCOS. T.K. 22/1/2 19/4/2

K ISSUE J1 SS263 ADDED : AUDIO TACTILE PB's ON POSTS 2, 3, 4, 5, 6, 7, 8 & 9 PHASE 2 ICONS ON POSTS 4 & 5 MOVED NRT SIGN FROM POST 9 TO POST 8. P.H. 16/07/02 05/06/03

L ISSUE (PREVIOUSLY K ISSUE) ERNEST STREET WIDENED D PHASE ADDED AND POSTS 6–8 RELOCATED REMOVED NRT SIGNS FROM POST 4 & 8. TTPA 2/5/03

M ISSUE PLAN AMENDED TO SUIT WAE CORRIGAN 01/05

PUBLIC UTILITY LEGEND		REFERENCE PLANS	
HYDRANT	□	SYMBOLS/ABBS.	VD003–6
STOP VALVE	▲	STD POSIT	VD001–5
GAS VALVE	#	DET SCHED EXP	VD018–10
SEWER MANHOLE	⊗	PRES. DETECT	VC005–17
TELECOM PIT	◪	SSG DIS. SEQ.	VD018–8
ELECT LIGHT POLE	☌		
POWER POLE	○		
STAY POLE	⊘		
TELEPHONE BOX	☎	SURVEYOR : N/A	
TELECOM PILLAR	◕	DATE : N/A	

U.B.D. Ref. Map 216 D7
I.S.G. E: 319 259
CO-ORDS N: 1 255 551

Refer to Sheet 1 Issue 1 for original details

DESIGNED I.TAYLOR
CHECKED I.JANSONS
SITE CHECKED & RECOMMENDED

DESIGN APPROVAL
APPROVED
ROSS NETTLE
POSITION DIRECTOR
DATE 08.10.03
DESIGN PREPARED BY
TRANSPORT AND TRAFFIC PLANNING ASSOCIATES

RTA ACCEPTANCE
RECOMMENDED
Team Leader Network Operations
POSITION
DATE 21.10.2003
ACCEPTED
Road Network Manager
POSITION
DATE 24.10.2004

Roads and Traffic Authority, N.S.W

NORTH SYDNEY COUNCIL AREA
TRAFFIC SIGNALS AT THE INTERSECTION OF MILLER STREET (M.R.599) & ERNEST STREET
CAMMERAY

DESIGN LAYOUT TCS No 0151

EXISTING ☒ PROPOSED ☐
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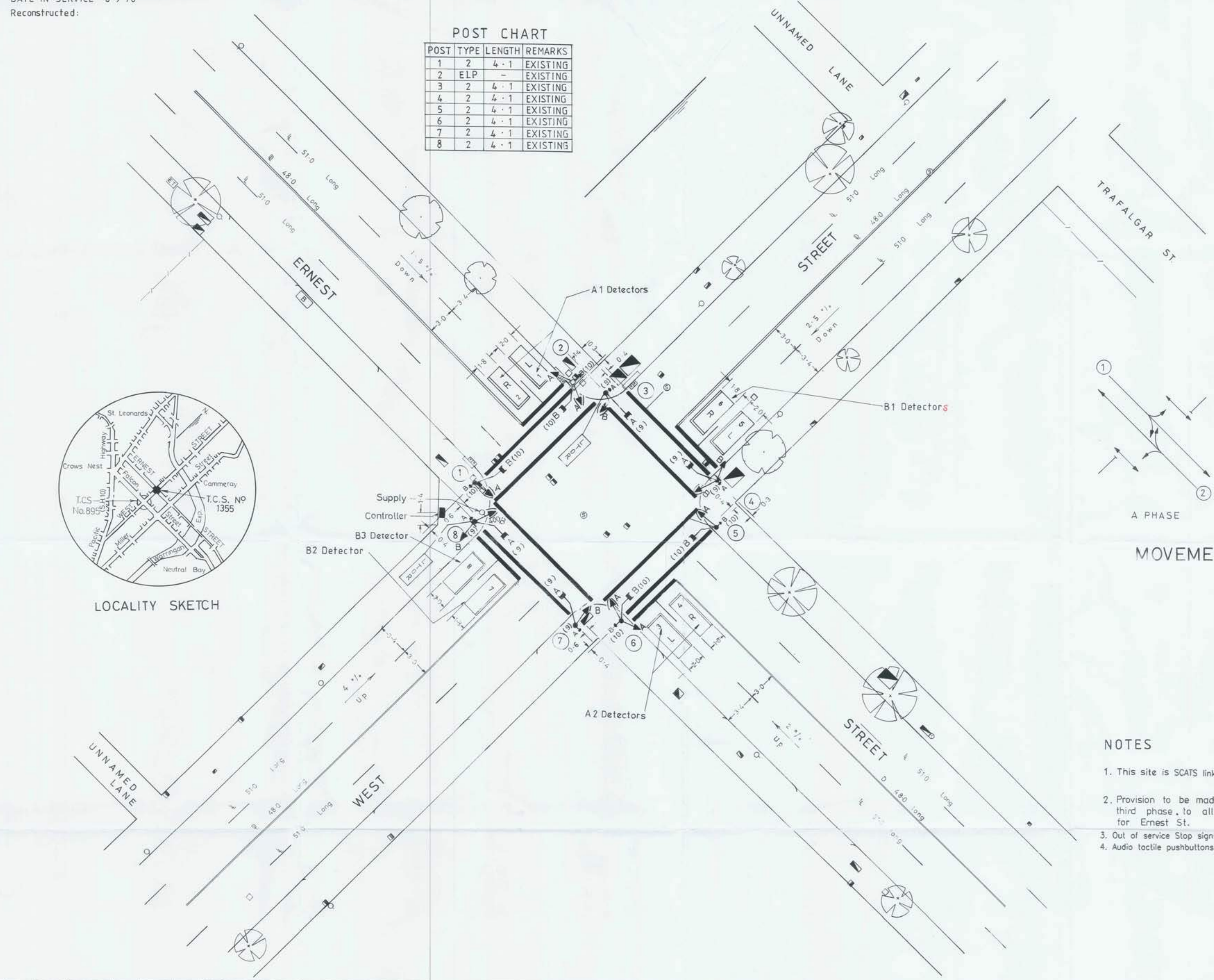
SCALE 5 0 (1:200) 5 10
ISSUE M
FILE 329 TS 146
SUPERSEDES SHEET/ISSUE 7L
REGN. 0599.329.VV.0151
SHEET 7

$DATE$ $TIME$ $FILEABBREV$

DATE IN SERVICE 8-9-78
Reconstructed:

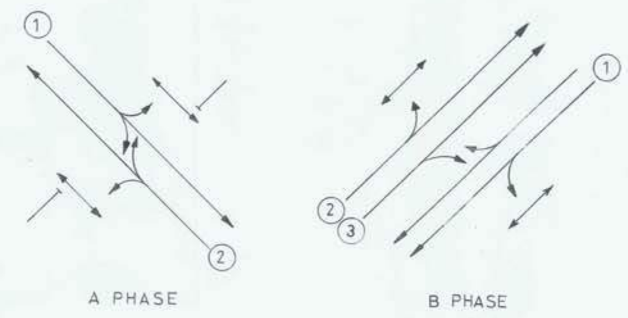
POST CHART

POST	TYPE	LENGTH	REMARKS
1	2	4·1	EXISTING
2	ELP	-	EXISTING
3	2	4·1	EXISTING
4	2	4·1	EXISTING
5	2	4·1	EXISTING
6	2	4·1	EXISTING
7	2	4·1	EXISTING
8	2	4·1	EXISTING



DETECTOR SPECIFICATION SCHEDULE

DETECTOR	SPECIFICATION			
A1 1,2	FN	A(L)	A(E1)	
	SG/PS	$\overline{A}$	A	
	DS	-	-	
A2 3,4	FN	A(L)	A(E2)	
	SG/PS	$\overline{A}$	A	
	DS	-	-	
B1 5,6	FN	B(L)	B(E1)	
	SG/PS	$\overline{B}$	B	
	DS	-	-	
B3 8	FN	B(PR)	B(E3)	
	SG/PS	$\overline{B}$	B	
	DS	-	-	
B2 7	FN	B(L)	B(E2)	
	SG/PS	$\overline{B}$	B	
	DS	-	-	
A(PB) 9	FN	A(PB)	B(L)	
	SG/PS	$\overline{A}$ WALK	A.$\overline{A}$ WALK	
	DS	-	$\overline{B}$	
B(PB) 10	FN	B(PB)	A(L)	
	SG/PS	$\overline{B}$ WALK	B.$\overline{B}$ WALK	
	DS	-	A	



MOVEMENT DIAGRAMS

VV1355

NOTES

1. This site is SCATS linked
2. Provision to be made in the cabling for a future third phase, to allow split approach phasing for Ernest St.
3. Out of service Stop signs on posts 4 and 8.
4. Audio tactile pushbuttons are provided on all posts.

PUBLIC UTILITY SYMBOLS

HYDRANT	◻	TELECOM PILLAR	Ⓣ
STOP VALVE	▣	ELECTRIC LIGHT POLE	○
GAS VALVE	⊞	TELEPHONE POLE	◑
SEWER MANHOLE	Ⓢ	TELEPHONE BOX	T
TELECOM PIT	◪	STAY POLE	⌀

A ORIGINAL ISSUE

B Issue J.O. M.E 540 All posts 10m in from kerb. Posts 1 & 3 are type 1. Controller & Presence Detectors amended to Cable Instal. plan.

"C" Issue J/I SYN 2378 27.9.84 Detector logic altered to be compatible with LTOR

PLAN UPDATED 22-1-91

D ISSUE JI SYN4821 LTOR Posts 1,2,5 & 6 22-5-93

E Issue 09-04-2010 JI SS578 Amended: removed the existing "Left Turn on Red Permitted After Stopping" signs from posts 1, 2, 4, 5, 6, 7. Removed the presence timer on detector B2. Notes: 3 & 4 added. O. Islam 28-06-2010

REFERENCE PLANS			
Symbols & Abbr	BD003-5	FLD BK	
Standard Position	BD001-3	U.B.D. REF	Map 57 G6
Standard Notes	PD018-3	DESIGNED	D. D.
Presence Detector	2C005-9	DRAWN	
Type 2 Posts	PM202-1	CHECKED	
Cable Inst	1355-2	CHECKED	
Wiring Chart	1355-3	PASSED	

SURVEYOR B. Jackson
DATE 3-3-77

THESE DRAWINGS HAVE BEEN TAKEN TO THE SITE OF THE WORK AND ARE RECOMMENDED

METROPOLITAN ENGINEER
DATE 12.10.77

APPROVED
ENGINEER-IN-CHIEF
DATE 10.12.77

ROADS & TRAFFIC AUTHORITY OF N.S.W.

MUNICIPALITY OF NORTH SYDNEY
WEST STREET
AND
ERNEST STREET
CROWS NEST

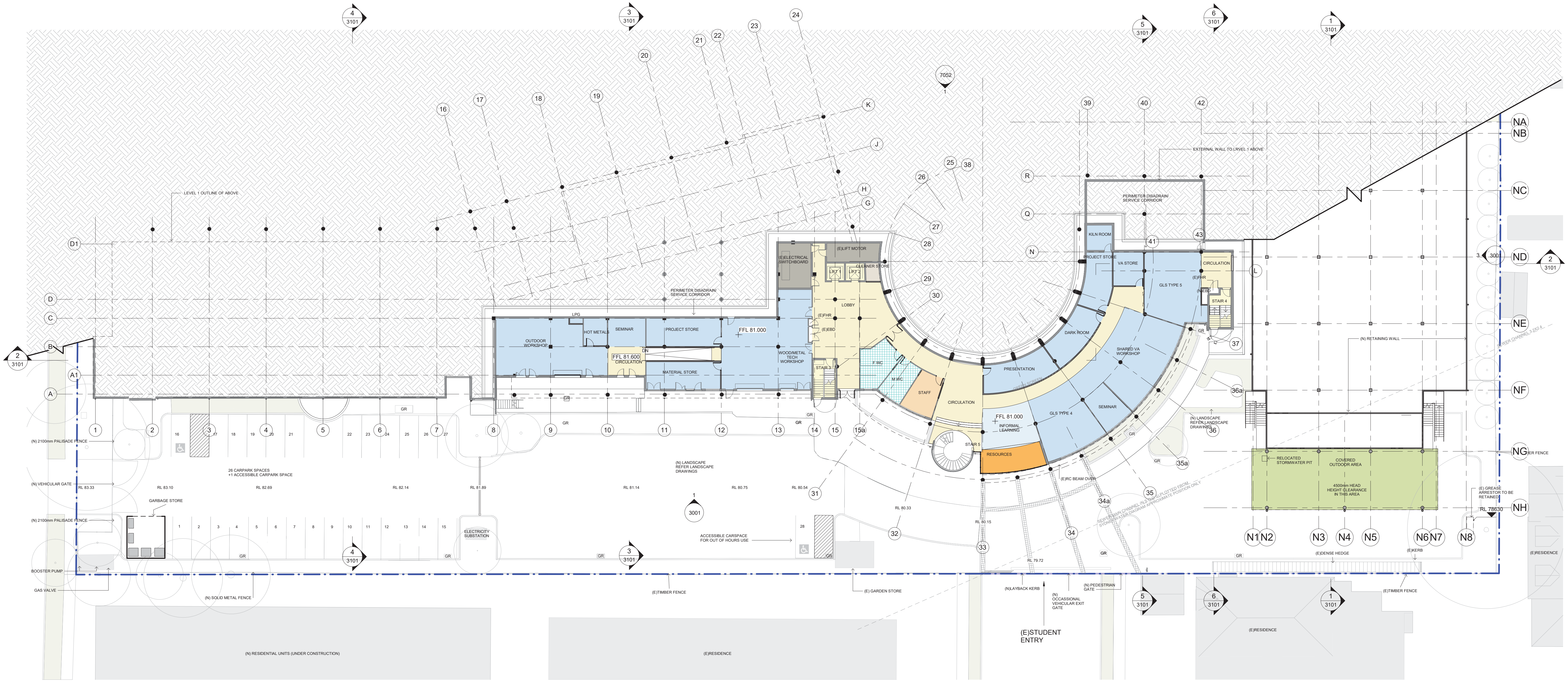
REGION : CENTRAL
FILE No 329·TS·160
No OF SHEETS 3
SHEET No 1
SUPERSEDES
ISSUE A B C D E
SCALE 1:200
Reg. No 7000.329.VV.1355

TRACED M.A. 23-5-77
CHECKED

Appendix F

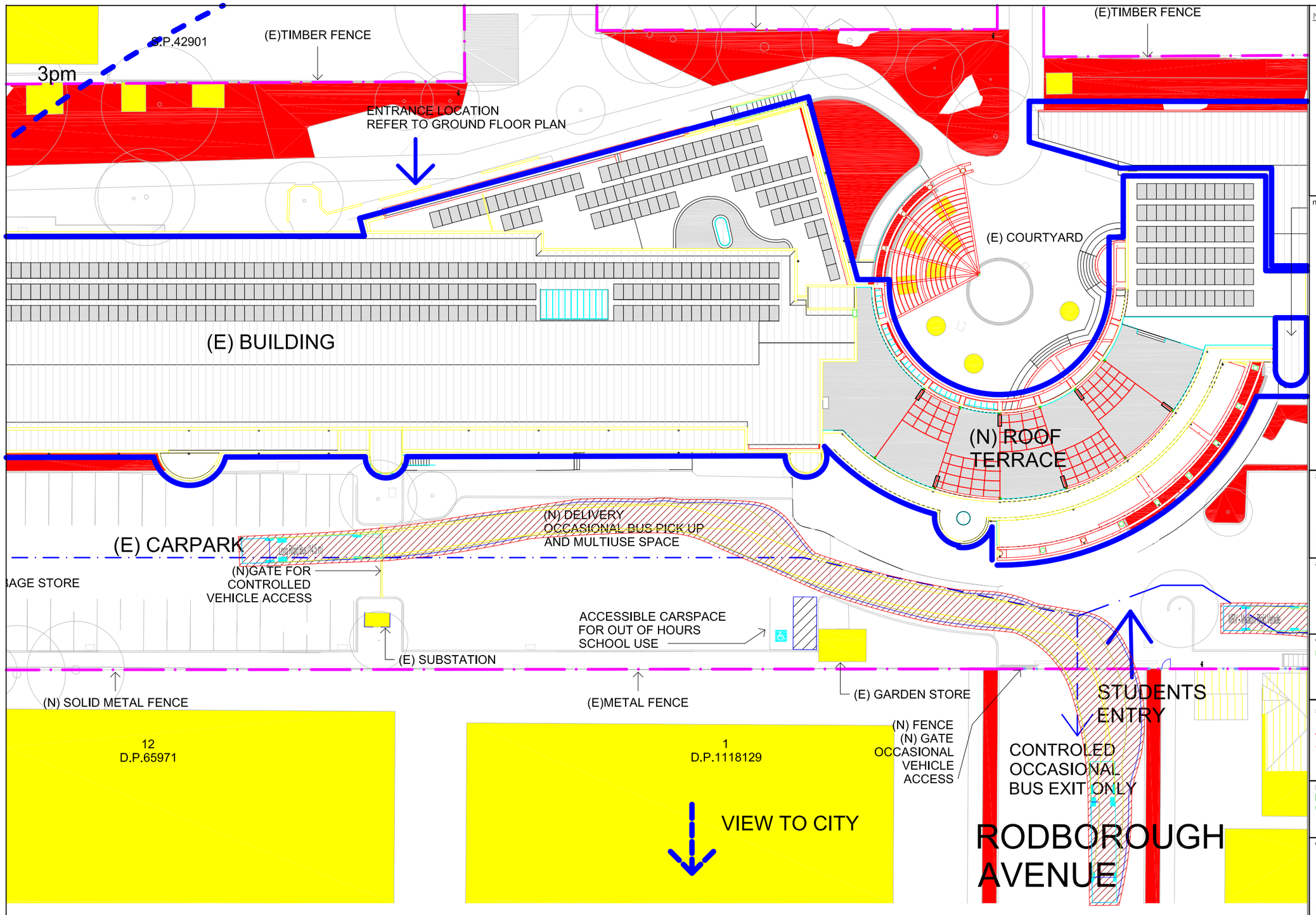
Reduced Architectural Plans

TKDArchitects
Tanner Kibble Denton



Appendix G

Swept Path Analysis



Notes

This drawing is prepared for information purposes only. It is not to be used for construction.

TRAFFIX is responsible for vehicle swept path diagrams and/or drawing mark-ups only. Base drawing prepared by others.

Vehicle swept path diagrams prepared using computer generated turning path software and associated CAD drawing platforms. Vehicle data based upon relevant Australian Standards (*AS/NZS 2890.1-2004 Parking facilities - Off-street car parking*, and/or *AS 2890.2-2002 Parking facilities - Off-street commercial vehicle facilities*). These standards embody a degree of tolerance, however the vehicle characteristics in these standards represent a suitable design vehicle and do not account for all variations in vehicle dimensions / specifications and/or driver ability or behaviour.

no.	revision note	by.	date

Swept Path Legend:

- Wheel Path
- Vehicle Body Envelope
- Clearance Envelope (300mm)

architect

TKD Architects
Level 1, 19 Foster Street
Surry Hills
Sydney NSW 2010

client

NSW Department of Education

scale

1:400 @ A3

0m 4 8 12 16

project

Proposed Cammeray High School Senior Campus.

drawing prepared by

TRAFFIX
traffic and transport planners

Suite 2.08, 50 Holt Street
Surry Hills NSW 2010

PO Box 1124
Strawberry Hills NSW 2012

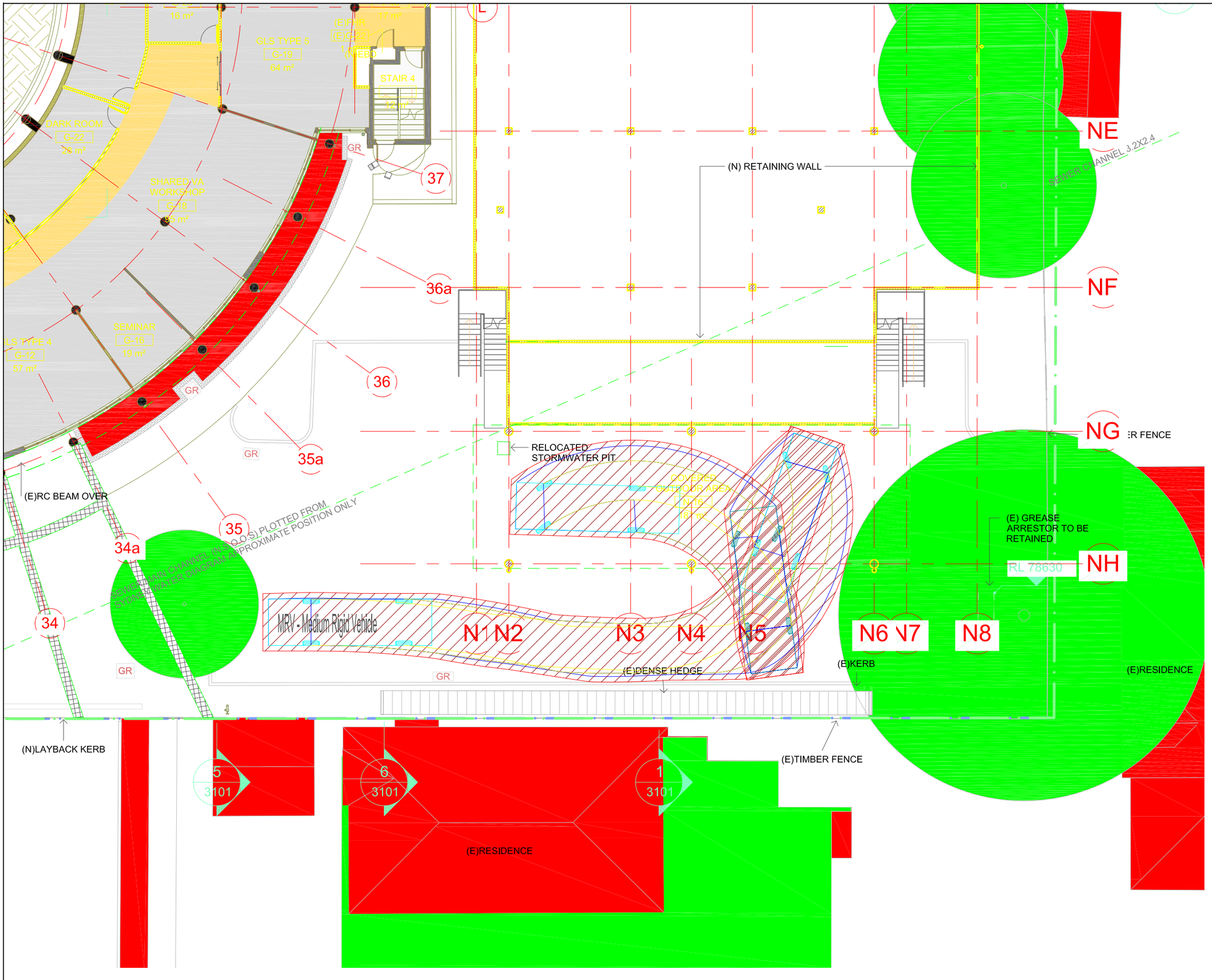
t: +61 2 8324 8700
f: +61 2 9380 4481
e: info@traffix.com.au

drawing title

Bus Loading - Swept Path Analysis.
14.5m Rigid Bus Design Vehicle.

drawn:	checked:	date:
AK	TY	22-05-2017

project no.	drawing phase.	drawing no.	rev
16.355	-	TX.01	-



Notes

This drawing is prepared for information purposes only. It is not to be used for construction.

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Vehicle swept path diagrams prepared using computer generated turning path software and associated CAD drawing platforms. Vehicle data based upon relevant Australian Standards (*AS/NZS 2890.1-2004 Parking facilities - Off-street car parking*, and/or *AS 2890.2-2002 Parking facilities - Off-street commercial vehicle facilities*). These standards embody a degree of tolerance, however the vehicle characteristics in these standards represent a suitable design vehicle and do not account for all variations in vehicle dimensions / specifications and/or driver ability or behaviour.

no.	revision note	by.	date

Swept Path Legend:

- Wheel Path
- Vehicle Body Envelope
- Clearance Envelope (300mm)

architect

TKD Architects
Level 1, 19 Foster Street
Surry Hills
Sydney NSW 2010

client

NSW Department of Education

scale

1:200 @ A3

0m 2 4 6 8

project

Proposed Cammeray High School Senior Campus.

drawing prepared by

TRAFFIX
traffic and transport planners

Suite 2.08, 50 Holt Street
Surry Hills NSW 2010

PO Box 1124
Strawberry Hills NSW 2012

t: +61 2 8324 8700
f: +61 2 9380 4481
e: info@traffix.com.au

drawing title

Grease Arrestor- Swept Path Analysis.
8.8m MRV Design Vehicle.

drawn:	checked:	date:
AK	-	22-05-2017

project no.	drawing phase.	drawing no.	rev
16.355	-	TX.02	A

Appendix H

TAG

CAR

There are Kiss & Ride parking spaces along West Street, Randwick for the convenience of parents to safely drop their children to school. By Car Share: Car Share is a great way to reduce traffic congestion. Please consider neighbours and other students attending the school that you may be able to start your own schedules with.

BUS

Bus stops and routes have been marked on the plan on this TAG. There are bus stops on Ernest Street, Falcon Street and Miller Street transporting passengers to Chatswood, Manly, Cremorne, City, Northbridge, Castlecrag, Linfield, Kingsford and Balmoral

TRAIN

Bus services can transport passengers from the school to Bondi Junction, Wolli Creek, Burwood or Rockdale train stations for the T4, T2 or T1 lines.

BICYCLE

Suggested cycling routes to the School are marked on the TAG. Students and staff can use the bike racks on school grounds to store their bikes securely. Showers and lockers are also available for students and staff. Parents and visitors can secure their bikes near the West Street pedestrian entrance. Please ensure that bikes are securely stored at all times within school property. A cycle and walking route has been included in this TAG for Crows Nest and surrounding suburbs.

WALKING

A great way to get moving in the morning and encourage active travel for students. A cycle and walking route has been included in this TAG.

Active Travel

This Transport Access Guide (TAG) provides information to Cammeray High school staff, students, parents and visitors on how to go to and from the School by active travel- without a car.

Active Travel means walking, cycling and/or using public transport. It is easy to go to and from the Bardia Public School by active public transport, as there are many public transport services nearby.

The Department of Education supports active travel as its benefits include:

- Less car use
- Reduced carbon emissions and improved air quality
- Less traffic congestion
- A safer, more pleasant urban environment
- Opportunities for parents, staff & kids to be more active

Transport Access Guide

Cammeraygal

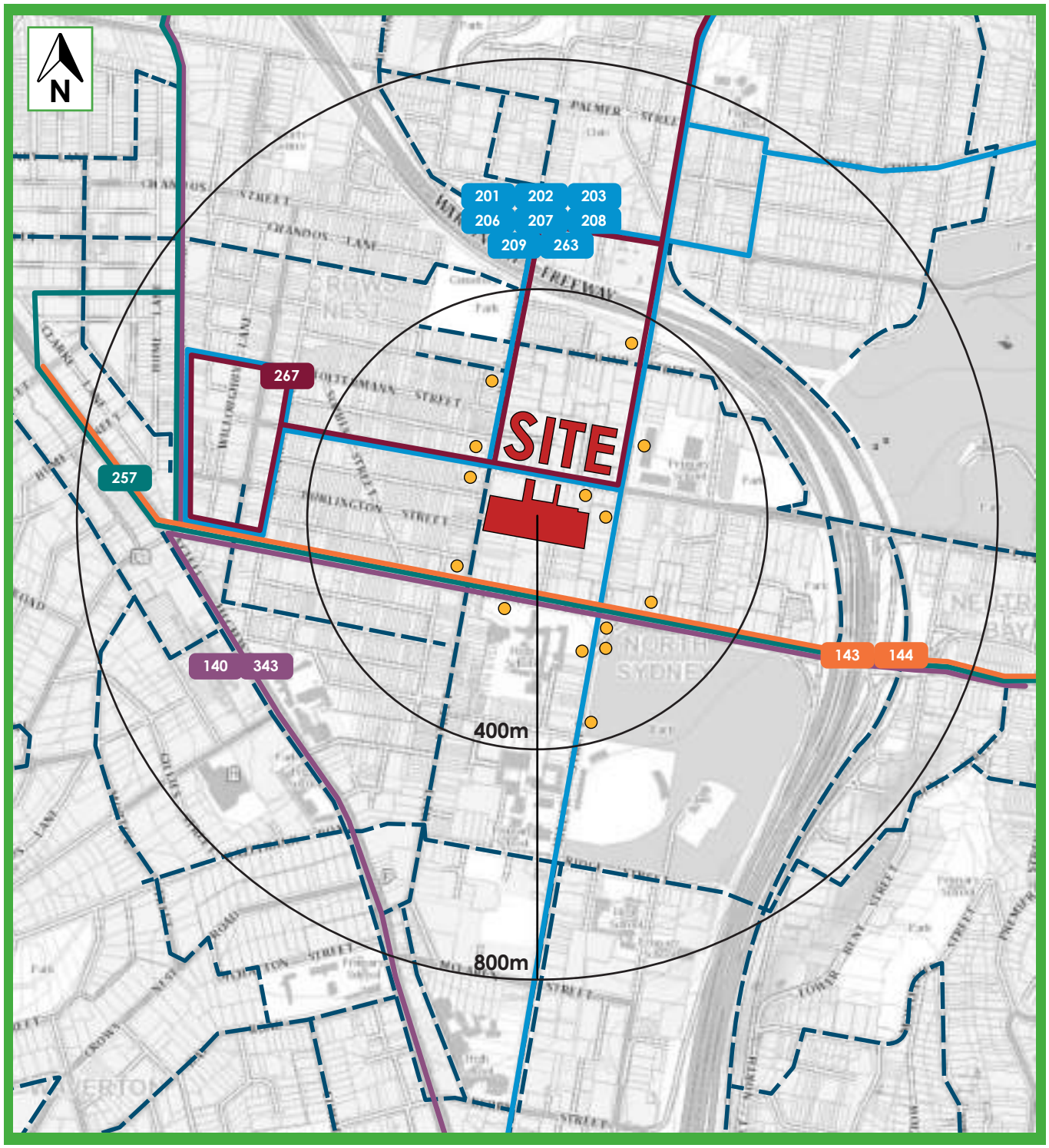
High School Senior Campus

149 West Street

Crows Nest NSW 2065

CAMMERAYGAL HIGH SCHOOL

EMPOWERED TO ACHIEVE



Transport Access Guide

Cammeraygal High School Senior Campus

149 West Street

Crows Nest NSW 2065

Legend

Cycle Route

Sydney Bus Services

Bus Stop

- 143 Manly to Chatswood
- 144 Manly to Chatswood
- 201 Cremorne to City
- 202 Northbridge to City
- 203 Castlecrag to City
- 206 East Lindfield to City
- 207 East Lindfield to City
- 208 East Lindfield to City
- 209 East Lindfield to Milsons Point
- 263 Crows Nest to City
- 140 Manly Wharf to Epping
- 343 Kingsford to Chatswood
- 257 Chatswood to Bamoral
- 267 Crows Nest to Chatswood

For further public transport information go to **www.131500.com.au** or call **131 500**