RAAD PROPERTY ACQUISITION NO 10 PTY LTD

TRAFFIC AND PARKING IMPACT ASSESSMENT FOR DEVELOPMENT APPLICATION

FOR PROPOSED BUSINESS DEVELOPMENT

AT 2 BACHELL AVENUE LIDCOMBE

REV D

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  - **Existing PM Network Plus Background Traffic Growth to 2032**
  - **Future AM Development**
  - **Future PM Development**

1.0 INTRODUCTION

1.1 Background

This report has been prepared in support of a Development Application to be submitted to Cumberland Council in relation to land at 2 Bachell Avenue, Lidcombe.

This Traffic and Parking report has been prepared to assess the traffic and parking impacts associated with the traffic generated by the proposed development.

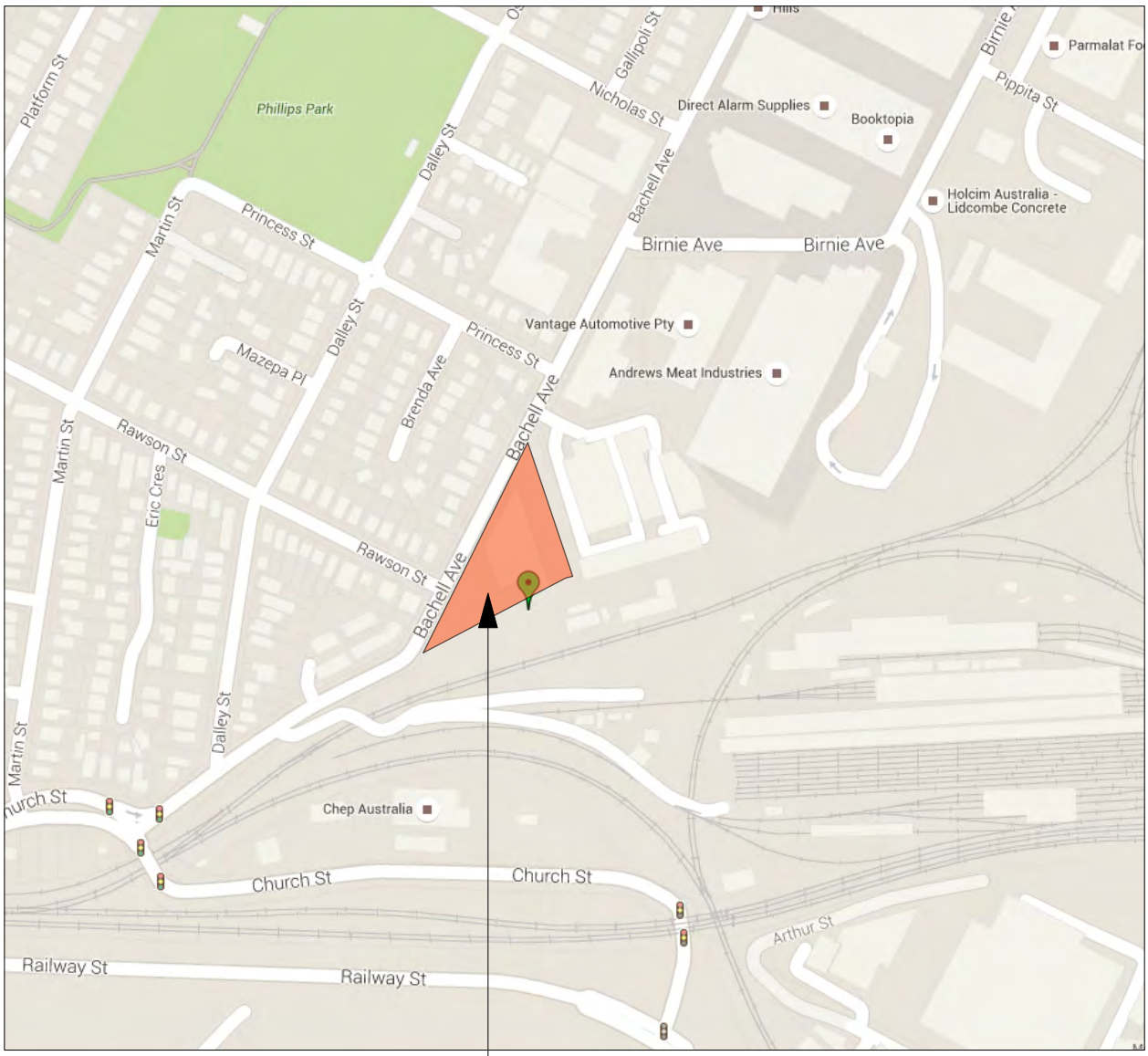
The site is shown in **Figure 1 Locality Plan**. The site is also known as Lot 2 DP 219413 and is located on the eastern side of Bachell Avenue. The site area is 8738m^2.

The proposed development is located approximately 893 metres from Lidcombe Railway Station. The town centre is also located on the northern and southern side of the Railway Station. To the west of Bachell Avenue is a residential area and south of the subject site is the Transport for NSW Flemington Maintenance Centre.

1.2 Scope of Report

This report addresses the traffic and parking impacts arising from the operation of the proposed business development generally in accordance with *Section 2 of the RTA Guide to Traffic Generating Developments* and describes our investigations and findings in respect of the following matters: -

- Road Inventory and Traffic Controls.
- Existing traffic volumes.
- Parking requirements and provision.
- Access to the site.
- Future traffic generation by the development.
- Assignment of Traffic to the Existing Road Network System
- Internal parking layout and traffic circulation.
- Delivery and service vehicles.
- Traffic and parking impacts.
- Future AM Background (BTG 2032) + Development Volumes
- Future PM Background (BTG 2032) + Development Volumes



PROPOSED SITE:
2 BACHELL AVE, LIDCOMBE

N

FIGURE 1
LOCALITY MAP
SCALE 1:6000(A4)

2.0 EXISTING TRAFFIC CONDITIONS

2.1 Existing Road Network

The site has a frontage of approximately **203.935** metres to Bachell Avenue and is triangular in shape and has a site area of **8738m^2**. The site is also known as **Lot 2 D.P. 219413.** The site is located in Lidcombe and is approximately **893** metres from Lidcombe Railway Station from the south western corner (boundary) of the site.

Bachell Avenue runs north-south and has two lanes in each direction (one for kerb side parking and one for traffic flow). Bachell Avenue connects to Church Street south of the subject site and Birnie Avenue north of the subject site. Bachell Avenue connects to Parramatta Road with an unsignalised intersection.

The Road Inventory and number of traffic lanes are illustrated in **Figure 2a Street Inventory**.

2.2 Road Inventory and Parking

Bachell Avenue has a 60km/hr speed limit and is 13.04 metres wide kerb to kerb. The nearest cross street is Rawson Street which has a 50km/hr speed limit and has restricted 2P special event parking. Many of the local residential streets to the west of Bachell Avenue have 2P special event parking to restrict patrons attending events at Olympic Park from parking in these residential streets. These signs are shown in **Photographs P1** and **P2.**

Bachell Avenue has unrestricted parking on both sides. Refer to **Figure 2a Street Inventory**.

Roadworks are under construction at Church Street/Martin Street intersection and the right turn into and out of Martin Street is prevented now by barricades and in the future by roadworks.

Photograph P3 shows traffic controllers at the intersection of Martin Street/Church Street and **Photograph P4** queues forming at the intersection of Church Street/Swete Street taken on 18/11/2022. The construction site is shown in aerial photograph image in **Figure 3a**.

LEGEND

2P
DURING SPECIAL EVENTS
PERMIT HOLDERS EXCEPTED
AREA 2

UNRESTRICTED PARKING

NO STOPPING

PROPOSED SITE:
2 BACHELL AVENUE, LIDCOMBE

CHURCH ST

DALLEY ST

RAWSON ST

BACHELL AVE

PRINCESS ST

BIRNIE AVE

STOP

NO STOPPING

UNRESTRICTED PARKING

2P

0m 50m

FIGURE 2a
STREET INVENTORY
2 BACHELL AVE, LIDCOMBE
SCALE - 1:1750(A3)

Photograph 1: **Sign on the corner of Bachell Avenue and Birnie Avenue**

Photograph 2: **Sign along Rawson Street**

Photo P3: **Traffic Controller located in Church Street Lidcombe on Date of surveys Photo Taken 18/11/22**

Photo P4: **View looking east along Church Street from Swete Street Roundabout. Queue forming past the traffic site. Photo Taken 18/11/22**

FIGURE 3a
AERIAL IMAGE OF CONSTRUCTION SITE AT 2-36
CHURCH STREET LIDCOMBE

2.3 Existing Peak Hour Traffic Volumes

Traffic counts were made at the following intersections in 15-minute intervals on Thursday 17/11/22 and Friday 18/11/22 from 7:00am to 9:00am and 4:00pm to 6:00pm to correspond with the commuter peak hours. The location of the Traffic Counts are shown in **Figure 2b.**

- Church Street/Railway Street 7-9am Wednesday 7/12/22 and 4-6pm Thursday 17/11/22
- Arthur Street/Railway Street 7-9am and 4-6pm Thursday 17/11/22
- Church Street/Bachell Ave 7-9am Wednesday 7/12/22 and 4-6pm Monday 5/12/22
- Church Street/Railway Street Bridge 7-9am and 4-6pm carried out Friday 18/11/22
- Church Street/Swete Street 7-9am Friday 7/12/22 and 4-6pm Monday 5/12/22

The AM peak hour was 8:00am – 9:00am at: -

- Church Street and Railway Street Bridge
- Church Street and Swete Street
- Church Street and Railway Street
- Railway Street and Arthur Street
- Church Street and Bachell Ave

The AM peak hour was 7:45am – 8:45am at Church Street/Bachell Avenue.

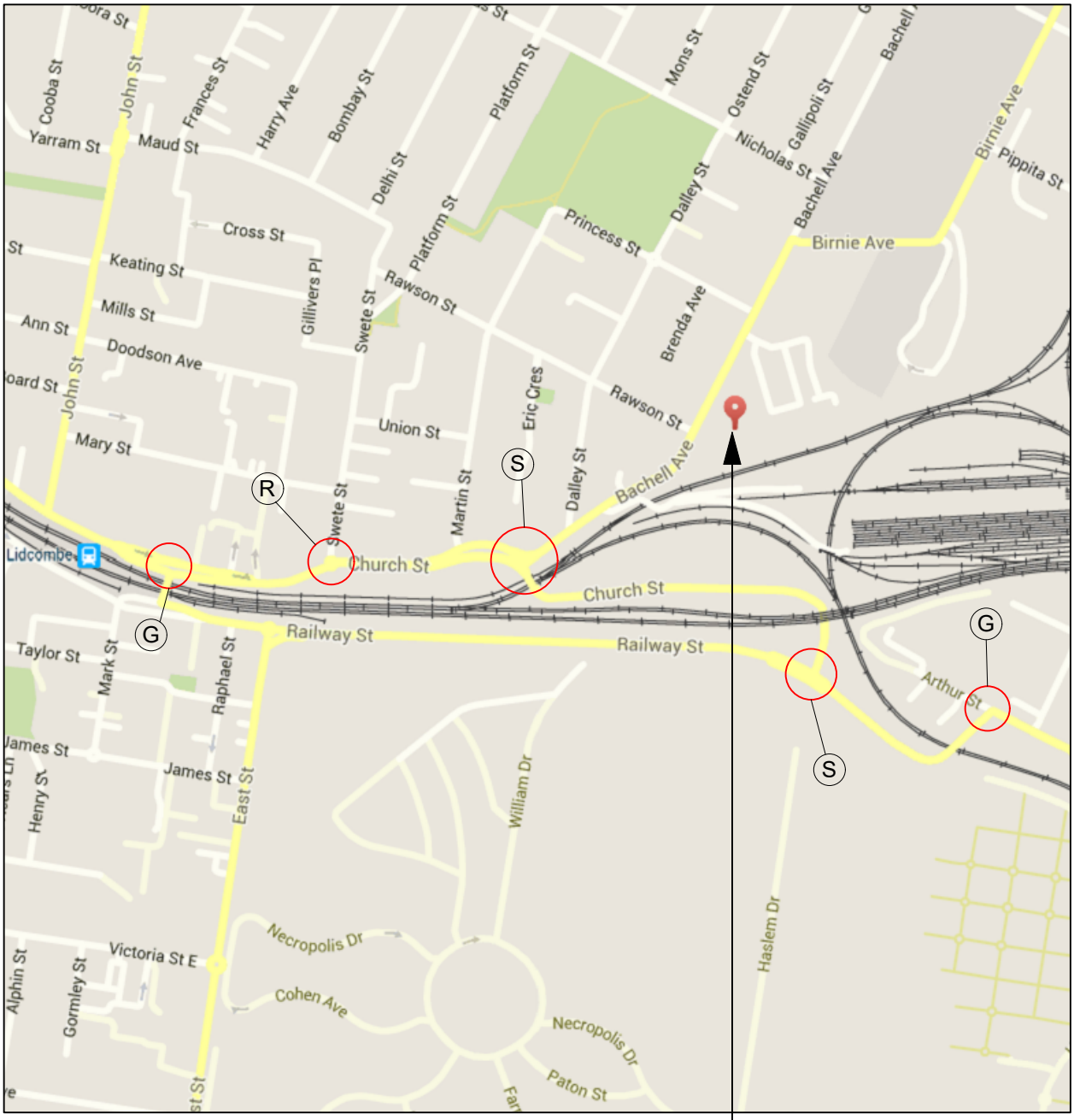
The PM peak hour was 4:45pm to 5:45pm at: -

- Church Street/Railway Street Bridge
- Church Street/Swete Street
- Church Street/Bachell Avenue
- Railway Street/Arthur Street

The PM peak hour was 5:00pm to 6:00pm at

- Church Street/Railway Street

The **AM** and **PM** peak hour Traffic Volume Counts are illustrated in **Figure 3**.

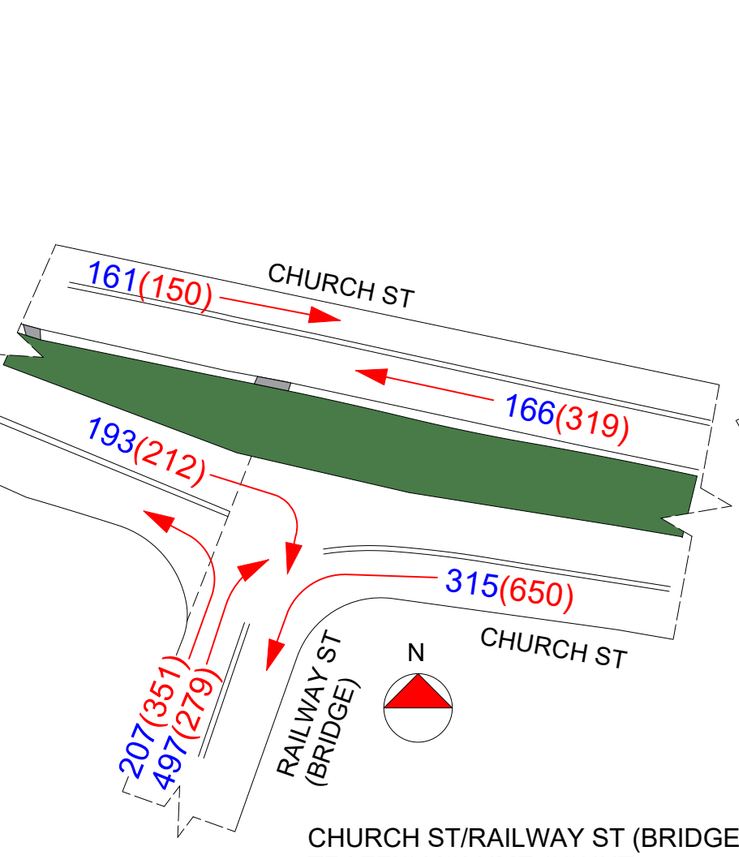


LEGEND

- G — GIVEWAY/STOP
- S — SIGNALS
- R — ROUNDABOUT
- ○ — TRAFFIC COUNT LOCATION

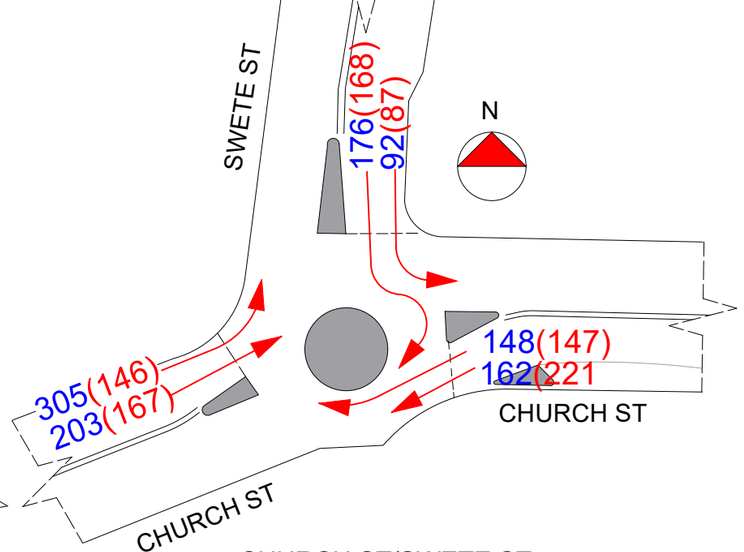
N

FIGURE 2b
TRAFFIC COUNT LOCATIONS



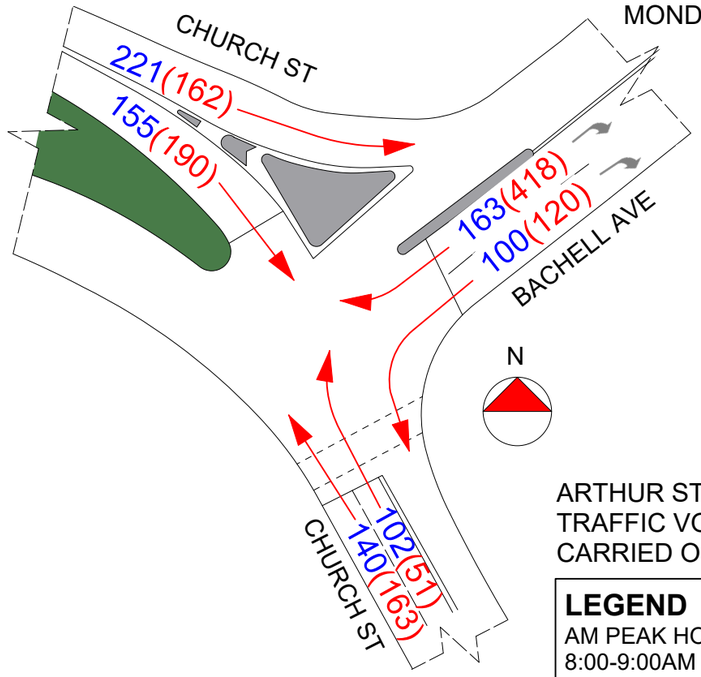
CHURCH ST/RAILWAY ST (BRIDGE)
TRAFFIC VOLUME COUNT
CARRIED OUT
FRIDAY 18/11/22

LEGEND
AM PEAK HOUR
8:00-9:00AM = 497
PM PEAK HOUR
4:45-5:45PM = (279)



CHURCH ST/SWETE ST
TRAFFIC VOLUME COUNT
CARRIED OUT
WEDNESDAY 7/12/22AM
MONDAY 5/12/22 PM

LEGEND
AM PEAK HOUR
8:00-9:00AM = 305
PM PEAK HOUR
4:45-5:45PM = (146)

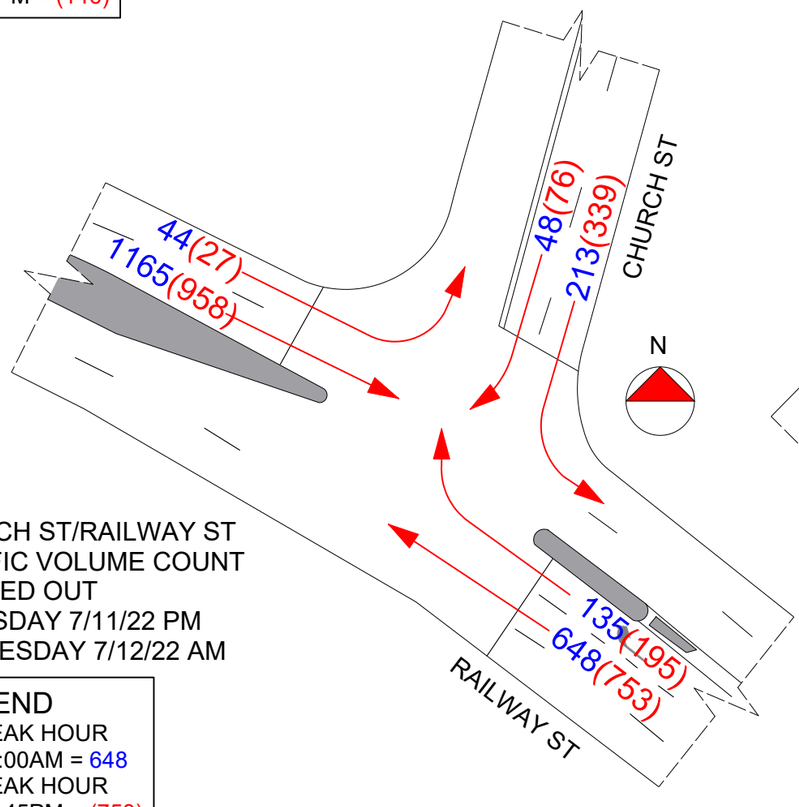


CHURCH ST/BACHELL AVENUE
TRAFFIC VOLUME COUNT
CARRIED OUT
WEDNESDAY 7/12/22 AM
MONDAY 5/12/22 PM

LEGEND
AM PEAK HOUR
8:00-9:00AM = 140
PM PEAK HOUR
4:45-5:45PM = (163)

ARTHUR ST/RAILWAY ST
TRAFFIC VOLUME COUNT
CARRIED OUT THURSDAY 17/11/22

LEGEND
AM PEAK HOUR
8:00-9:00AM = 819
PM PEAK HOUR
4:45-5:45PM = (913)



CHURCH ST/RAILWAY ST
TRAFFIC VOLUME COUNT
CARRIED OUT
THURSDAY 7/11/22 PM
WEDNESDAY 7/12/22 AM

LEGEND
AM PEAK HOUR
8:00-9:00AM = 648
PM PEAK HOUR
4:45-5:45PM = (753)

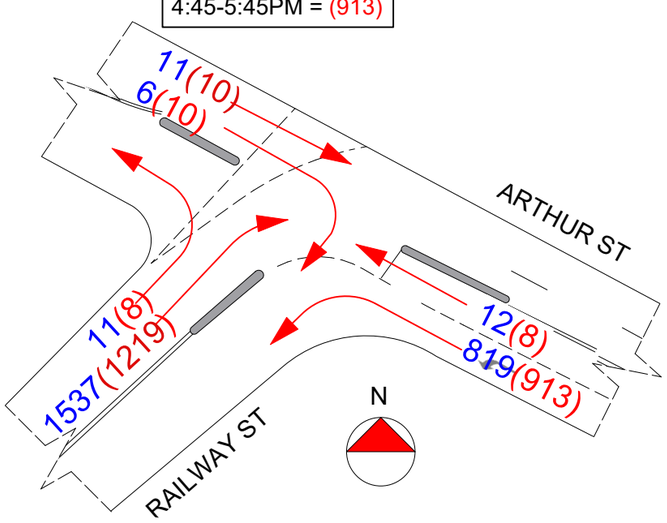


FIGURE 3
EXISTING AM & PM PEAK HOUR
TRAFFIC VOLUME COUNTS
CARRIED OUT ON THURS 17/11/22 & FRI18/11/22
MON 5/12/22 PM, WED 7/12/22 AM

2.4 Intersection Performance

The signalised intersections have been analysed using SIDRA 9.0 for 8:00am – 9:00am at all intersections and for 4:45pm – 5:45pm at all intersections.

The network performance is determined by the Level of Service (LoS) Average Vehicle Delay (AVD), Degree of Saturation (DoS) and maximum delay on the critical movement during peak hours. The Level of Service criteria for intersections are explained in **Table 4.2** taken from the *RTA Guide to Traffic Generating Developments.*

Table 4.2
(RTA Guide to Traffic Generating Developments)
Level of Service Criteria for Intersections.

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

Source: RMS Guide to Traffic Generating Developments Version 2.2 – Oct 2002.

(2.4 continued.)

The results of the analysis are set out in **Table 2.4**

Table 2.4 Existing Intersection Performance

No	Location	Control	Peak Hour	Level of Service (Los)	Degree of Saturation (DoS)	Average Delay (Av)	95% Back of Queue Length veh	Critical Movement / queue length
1	Church Street/ Railway Street	S	AM	F	1.186	219.9	12veh 87.8m	LHT from Railway St (west) 415.8 secs
1	Church Street/ Railway Street	S	PM	D	0.974	54	14.8 veh 103.5m	RHT from Railway St (E) 84.7 secs
2	Arthur Street/ Railway Street	G	AM	(N/A) A*	2	25.9	9.8veh 68.8m	RHT Arthur St (east) 2388 secs
2	Arthur Street/ Railway Street	G	PM	(N/A) A*	0.662	7.3	1.5 10.6m	RHT Arthur St (west) 207 secs
3	Swete St/ Church St	R	AM	A	0.429	6.3	1.8veh 12.3m	RHT from Church St (east) 8.6 secs
3	Swete St/ Church St	R	PM	A	0.324	6.3	2.1veh 14.7m	RHT from Church St (east) 8.6 secs
4	Church St/ Bachell Ave	S	AM	A	0.525	13.1	2.9veh 20.1m	RHT Bachell Ave 20.6 secs
4	Church St/ Bachell Ave	S	PM	B	0.625	16.3	3.1veh 21.7m	THRU Church St (west) 20.9 secs
5	Church Street/ Railway St Bridge	G	AM	(N/A) A*	0.408	5.9	1.7veh 11.8m	RHT Church(W) St 12.7 secs
5	Church Street/ Railway St Bridge	G	PM	(N/A) A*	0.584	6.6	2.7veh 18.6m	RHT Church St (west) 18.3 secs

NOTES:-
S = SIGNALS
G = GIVEWAY
R = ROUNDABOUT

(1) Degree of Saturation is the ratio of demand to capacity for the most disadvantaged movement.
(2) Average delay is the delay experienced on average by all vehicles. The value in brackets represents the delay to the most disadvantaged movement.
(3) Level of Service is a qualitative measure of performance describing operational conditions. There are six levels of service, designated from A to F, with A representing the best operational condition and level of service F the worst. The LoS of the intersection is shown in bold, and the LoS of the most disadvantaged movement is shown in brackets.

- The results in Intersection Summary show NA in the LoS summary however review of the movement summary demonstrates that priority movements operate with plenty of spare capacity.
- Approach refers to the approach direction to the intersection. For each Arthur Street East Approach is the eastern side of Arthur Street to the intersection of Railway Street.

2.5 Previous Use of Existing Site

The existing site is used as a warehouse/factory building for commercial laundry business. The warehouse/factory building has an approximate gross floor area of 1974sqm and an ancillary office area of 200sqm.

A total GFA of 2174sqm. According to the *RMS (RTA) Guide to Traffic Generating Developments* the existing traffic generation can be calculated as follows: -

Factory - Daily Trips = 5 trips per 100m^2

Morning Peak Hour Trips = 1 per 100m^2
= 21.74 trips

2.6 Vehicle Driveway Access to Site

There are two existing vehicular laybacks in Bachell Avenue. One driveway is located near the northern corner of the site and the other one is located near the centre of the site.

2.7 Public Transport

The site is well served by public transport services. Lidcombe Railway Station is 893 metres from the proposed development site, a 15 minute walk. The nearest bus stop is located in Swete Street/Rawson Street intersection which services Sydney Buses Route 401 Lidcombe to Olympic Park and is a 9-minute walk. Public transport networks are shown in **Figure 4**.

2.8 Bicycle Paths in Lidcombe

The nearest *on road cycle route* runs north-south along Bachell Avenue north of Nicholas Avenue to Parramatta Road. A copy of Auburn Council's bicycle network map is located in **Appendix D**.

An off-road cycleway for recreational engagement is located in Philips Park between Nicholas Avenue and Platform Street west of the subject site.

PROPOSED SITE:
2 BACHELL AVENUE, LIDCOMBE

LEGEND

Blue circle	BUS STOPS
Green line	9 MINS WALK TO BUS STOP NO. 214132 *SWETE STREET NEAR RAWSON STREET*
Red arrow	SWETE STREET BUS STOP NO. 214132 TO LIDCOMBE STATION BUS STOP NO. 2141173 *ROUTE NO. 401 (SYDNEY OLYMPIC PARK TO LIDCOMBE)*
Purple circle	LIDCOMBE STATION (1.0KM - 13 MINS WALK/ 2MINS DRIVE)
Orange circle	FLEMINGTON STATION (2.7KM - 6 MINS DRIVE)

N

FIGURE 4
PUBLIC TRANSPORT NETWORKS

3.0 TRAFFIC EFFECTS OF PROPOSED DEVELOPMENT

3.1 Floor Areas and Uses

The gross floor areas for the proposed uses have been calculated by *Two Form Architecture and Interior Design* and is shown on drawings DA700, DA701 and DA702 They are shown on the architectural plans for basement one, lower ground, ground floor and levels 1 to 8. The proposed gross floor areas and uses shown on the plans are summarised in **Table 3.1**.

Table 3.1 Proposed Uses and Gross Floor Areas

	Land Use Groups	Gross Floor Area m^2										Total
		Basement One	LGF	Ground	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	Level 8	
	Food and Drink Premises			1167									1167
	Restaurant				1359								1359
	Café								159				159
	Gym		596	267									863
Note 1*	Heath Services			525			1005	1005					2535
	Dog Daycare											303	303
	Centre Based Childcare								711				711
Note 2*	Light Industries			821		926	66						1813
	Neighbourhood Shop					28							28
	Specialised Retail			904	1115	803	610						3432
Note 4*	Self Storage		392										392
	High Technology					2216	1621	3275					7112
	Office Premises								1487	2191	1680	683	6041
Note 3*	**TOTAL**	**0**	**988**	**3684**	**2474**	**3973**	**3302**	**4280**	**2357**	**2191**	**1680**	**986**	**25915**

Note 1* Includes Health Business Premises Pharmacy at Level 1
Note 2* Tenancies denoted as Workspaces are defined as Light Industries
Note 3* This excludes the lobbies, common WCs and the mail room but includes the self storage.
Note 4* This use does not have an attributable gross floor area as defined by the Cumberland LEP 2021, however is included as it generates parking demand and trip generation.

3.2 Car Parking Requirements

The car parking requirements have been calculated for each main land use group in accordance with *Cumberland DCP Part 6 Table 1*. and *the RMS Guide to Traffic Generating Developments* and RMS data and survey data where there are no specific car parking rates provided.

Table 3.2a Parking Requirement

	Use	Area m^2 GFA	survey data	Rate - CDCP PART G3	TfNSW-RMS GTGD	Rate Decimal	Total	
Note 1A*	Specialised Retail *	3432	1/70sqm			0.0143	49	
	Light Industries	1813		1.3/100sqm		0.013	24	
	High Technology	7112		1.3/100sqm		0.013	92	
Note 1B*	Café	159		1/40 sqm		0.025	4	
	Food and Drink	1167		1/40 sqm		0.025	29	
Note 2*	Food and Drink Restaurant	1359		1/40 sqm		0.025	34	
Note 2*	Dog Daycare	303	1/100sqm			0.01	3	Note 6*
	Health Services	2535			4 spaces per 100m^2 GFA	0.04	101	
	Office Premises	6041		1/40 sqm		0.025	151	
Note 3 *	Centre Base Childcare Facility	711		1/4 children (106 children)	RMS Centre Based Guidelines		27	
	Subtotal						**515**	
Note 8*	Self-Storage	392		1/300 sqm		0.003	1	Note 5*
Note 4 *	Gymnasium	863		3/100m^2	3/100m^2	0.03	26	Note 5*
	Neighbourhood Shop	28		1/40 sqm		0.025	1	
Note 7*	**Total**	**25915**					**542**	

Note 1A* No rate provided in CDCP for specialised retail. A rate of 1 space per 70m2 has been adopted based on RMS survey data. Refer to Appendix I Report 15-23.

Note 1B* The rate of 1/40sqm was approved with the Planning Proposal.

Note 2* Rates taken from approved Doggy Day Care centres at 1 space/100m^2.

Note 3* Parking rate for childcare centre based on number of children. 106 children. RMS rate adopted.

Note 4* Gymnasium located within retail/commercial complex. Peak 5:30 - 6:30 pm weekdays. 8 spaces provided for Gymnasium parking can be shared with the office premises as peak activity for gymnasium occurs in the evenings after 5:30pm. RMS rate of 3/100sqm has been adopted.

Note 5* A Peak Demand Analysis has been prepared that demonstrated that this use does not peak at the same time as office use and therefore the number of spaces required can be reduced.

Note 6* Based on similar approved facilities only requires 1 space per staff and a loading space. (3 staff spaces).

Note 7* Total GFA includes lobbies and toilets but excludes self storage = 25523m2.

(3.2 continued.)

Table 3.2b

PROVISION	Car Spaces	Loading Bays			
		B99	SRV	MRV	Ambulance
B2	194	1			
B1	183	2			
LG	119	5	6		
G	0			4	1
Level 2	0		1		
Total	**496**	**20**			

** Includes Ambulance parking space*
*** This includes rideshare (1) and car share (2) spaces*

Refer to **Table 3.9** of the report for calculation of loading spaces.

The warehouse/ industry units on the Ground Floor and Level 2 have their own self-loading facility. Each unit is designed to accommodate a small rigid vehicle (SRV) or van. There are 11 on Ground Floor (G) and 11 on Level 2. These are included in carparking spaces not loading spaces.

3.3 Car Parking Provision

The car parking spaces shown on the drawings prepared by Two Form Architecture and Interior Design and listed in **Appendix A** are as follows: -

Basement 2	194
Basement 1	183
Lower Ground Floor	116 + 2 car share + 1 ride share
Ground Floor	0
Level 2	0
Total	496

We recommend the provision of 8 spaces to be shared between gymnasium and office use. There are also two (2) car share spaces and 1 ride share space which is included in the parking provided in the table above. Refer to section 2.3 in **Report 15/23** in **Appendix I**.

It should be noted that 24 loading spaces are provided within each of the Light Industrial tenancies. These loading spaces are in additional to the car parking provided and therefore means that the total car parking supply is **520**.

The shortfall is justified by the provision of a Green Travel Plan which includes bicycle car parking, motorbike parking (12) spaces and 2 car share spaces and a ride share space which reduces the car parking dependency. The car parking demand profile analysis contained in **Appendix E**.

3.3.1 Motorbike Parking

Motorbike parking allows an alternative travel mode and more efficient parking layout and the space required for motorbike parking in accordance with *AS/NZS 2890.1 – 2004* is 1.2m wide and 2.5m long.

A provision of 12 (11.4) parking spaces has been provided for motorbike parking. This would cater for alternative transport modes within the centre.

The parking rate provision of 1 space per 50m^2 is similar to the bicycle parking rate for specialized retail use.

We have investigated other Councils and parking provisions for motorbike parking.

Council	Use	
Canterbury/Bankstown	Commercial	Motorbike parking provision for 1 courier parking space, provision of additional parking spaces for motorbike parking is desirable.
Ku-ring-gai Council	Commercial/Business	1 courier space for developments over 200m^2.
Inner West Council	All	5% of car parking required for each use.

3.3.2 Provision for Visitor Parking

There are no specific rates provided for visitor parking under the controls listed in the *CDCP*. The *RMS Guide to Traffic Generating Developments* does not stipulate rates for specialised retail, office premises etc. it only provides rates for residential use.

3.3.3 Rideshare (e.g., UBER)

1 car parking space is allocated within the lower ground floor car park for a courier or Uber car share parking space. This will allow for an alternative travel mode to the facility and reduce car travel dependency, especially for trips to restaurants and cafes or for commercial businesses.

3.3.4 Car Share Spaces

Two (2) car share spaces are allocated for car share similar to “GoGet” provider within the lower ground floor car park.

3.3.5 Provision for Car Parking for Persons with a Disability

Disabled car parking should be provided in accordance with *AS/NZS 2890.6* and space layout dimensions are to be provided in accordance with *Figure 1 Dimensions of Angled Car Parking Spaces*.

There are no specific controls for the number of disabled car parking spaces provided in *Cumberland Development Control Plan 2021*, the number of spaces is provided in accordance with *Part D3.5 Accessible Car Parking* of the *National Construction Code 2019 Amendment.*

Table 3.3.5a Number of Accessible Spaces Required in Accordance with D3.5 (NCC 2019 Amendment 1)

Class of Building Use	Rate
Class 5 office premises	1 space per 100 car parking spaces
Class 6, 7 and 8 (specialised retail, restaurants, cafes)	1 space per every 50 car parking space

Table 3.3.5b Parking Requirements – Persons with a Disability

Use	Rate	Total car parking spaces	Total Accessible Spaces
Specialised Retail	0.02	49	0.98
Light Industries*	0.01	24	0.24
High Technology*	0.01	90	0.9
Café	0.02	4	0.08
Food and Drink	0.02	29	0.58
Food and Drink Restaurant	0.02	34	0.68
Dog Daycare	0.02	3	0.06
Health Services	0.02	108	2.16
Office Premises	0.01	151	1.51
Centre Base Childcare Facility	0.02	27	0.54
Storage	0.01	1	0.01
Gymnasium	0.02	26	0.52
Neighbourhood Shop	N/A	1	
Total			**8.26**

9 spaces rounded up

A total of 11 car parking spaces for persons with a disability are provided within the facility.

3.3.6 Bicycle Storage Facilities

Table 1 in *Part G3 of the Cumberland DCP* lists bicycle parking rates for a number of proposed uses in this business development. The parking requirement has been calculated based upon *Table 1* in the *DCP* and the proposed Uses and Floor Areas are shown in **Table 3.1** of this report. The parking requirement for each use is listed in **Table 3.3.6** and is considered to be conservative.

Table 3.3.6 Bicycle Parking Spaces (Retail)

Use	Gross Floor Area m^2	Bicycle Parking Rate		No of Spaces
		Staff	Visitors	
Food and Drink Premises	1167	1 per 100m^2		12
Restaurant	1359	1 per 100m^2		14
Café	159	1 per 100m^2		2
Gymnasium	861	1 per 4 employees (Assume 4)	1 per 200m^2	1 + 4.3
Specialised Retail * Note 1	3432+28	1 per 10 employees (Assume 1 per 50m^2) Assume 69 employees	1 per 750m^2 over 1000m^2	7 + 3.2
Office Premises	6041	1 per 10 employees (Assume 1 per 25m^2) Assume 241 employees	1 per 750m^2 over 1000m^2	25 + 7
Light Industries	1813	NA	NA	
High Technology	7112	NA	NA	
			Total	**76 (rounded)**

Note 1* No specific rate for specialised retail. The rate for retail has been used

Based upon *AS 2890.3* bicycle racks in a secure room with Security Level B would be appropriate for this development. There are storage cages on Basement 2 that are accessible, have lift access and storage racks have been provided for 82 bicycles: 45 on Lower Ground Floor and 37 on B1 Level.

Further detailed analysis of public transport and green travel incentives is included in Green Travel Plan **Report No 14/23**.

3.3.7 Car Parking Demand Profile Analysis

Parking in land uses, exhibit temporal variation of their demand over the course of the day (uses that attract customers at different times of the day serve to make efficient use of parking supply) from food and drink premises in the morning and to restaurant dining in the evenings, with health services, specialised retail, gymnasium, and office use in the day and light industry and high technology uses.

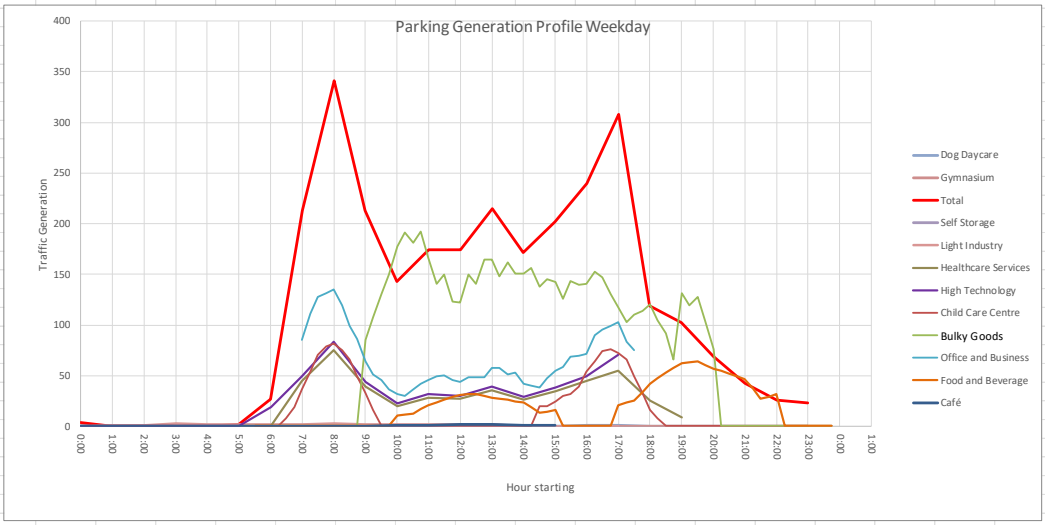
The parking demand profiles which were analysed using real survey data and TfNSW data analysis and ITE analysis data to create the demand profiles for traffic generation. The same methodology can be adopted for car parking demand analysis.

Noting that the parking demand varies per use, the appropriate methodology is to create shared visitor parking. This way, office visitor parking, which does not have a high weekend demand, is not sitting idle whilst the specialised retail visitor parking demand is high. Similarly demand for gymnasium car parking will peak in the evenings outside of normal office business hours.

The hourly peak traffic generation demand was analysed in **Technical Report 19-23 Appendix E**. Parking demand has been analysed based on peak traffic generation demand per hour.

Weekday Profile

1 hour starting	Total
0:00	3
1:00	0
2:00	0
3:00	0
4:00	0
5:00	2
6:00	27
7:00	213
8:00	341
9:00	213
10:00	143
11:00	175
12:00	174
13:00	215
14:00	172
15:00	202
16:00	240
17:00	308
18:00	119
19:00	102
20:00	69
21:00	42
22:00	26
23:00	23



The results of the car parking demand profile analysis is included in **Appendix E** of this report.

3.4 Geometric Layout and Circulation

3.4.1 Basement Carparking Layout B1 and B2

The dimensions of the 90 degree angle parking spaces are 2.6m wide by 5.4m long and the aisle widths vary from a minimum of 5.8 metres to a maximum of 7.1 metres. The geometric layout complies with User Class 3 in *Figure 2.2* in *AS/NZS 2890.1.*

All aisle widths have been adjusted to comply with the requirements for class 3A car parking spaces for the childcare centre. Aisle widths are 6.6 metres wide and car parking spaces are 2.6 metres wide.

Dead End Aisles
In the dead end aisles that exceed the minimum requirements stated in *AS/NZS AS2890.1 Cl 2.4.2 c)* a turning bay has been provided where the number of spaces exceed size car parking spaces.

3.4.2 Carparking Layout Lower Ground Floor

The aisle width with access to SRV and loading Van spaces has increased to 7.1 metres wide to facilitate the turning movements for small rigid vehicles. SRV parking spaces are 3.5 metres wide by 6.4 metres long and comply with *AS2890.2-2018*.

3.4.3 Ramp Layout and Circulation

The ramps to the lower ground floor facilitate Small Rigid vehicles accessing the lower ground floor. Gradients have been provided in accordance with Table 3.3 of *AS2890.2-2018* and are shown on the plans in **Appendix F**.

Ramp Gradients for the ramps to the upper level 2 car park facilitate Small rigid trucks and garbage vehicles up to 8.8 metres long. Ramp Grades are shown with a 2.5% grade for the first 6 metres then a transition grade of 8.3% and then a grade of 13.77% with a maximum grade of 15.4% then another grade of 13.68% then a grade of 6.25% over 7 metres to RL level 20.9 in accordance with *AS2890.2-2018*. The longitudinal section has been provided for the nearside edge of the ramp to show compliance with ramp gradients. This drawing is located in **Appendix F** of this report.

3.5 Estimated Traffic Generation

The traffic generation has been estimated using the rates in *Section 3* of the *RMS Guide to Traffic Generating Developments 2002* and updated traffic surveys TDT 2013/04a. Trip generation rates are described below for the following uses:-

Specialised Retail
The rate of 2.7 trips/100m^2 GFA not GLFA. 20% assignment to AM is acceptable.

In the document (*RMS Guide to Traffic Generating Developments*) a reduction of 20% is acceptable for developments were there are multiple attractors such as specialised retail use, café, dog daycare, restaurant and food and drink premises.

Office Use
The rates for Norwest Business Park in TDT20B/04a of 2.75 trips/100m^2 GFA for AM and 1.17 trips/100m^2 GFA for the PM have been adopted based on recent agreement with TfNSW on DA No 2022/0463.

A green travel plan has been provided for the centre to support the reduction for linked trips and encourage staff employees to use the extensive surrounding off road bicycle paths. It may be possible to further reduce car dependency based on the alternative active travel mode.

A 5% reduction has been adopted to implementation of a green travel plan and the close proximity of an off road cycle path is located north of the development site.

Food and Drink Premises
The rate from the *RMS Guide to Traffic Generating Developments* has been adopted for food and drink premises within commercial retail centres where:-

Vehicle(P) = vehicles trips per 1000m^2 = 46A(SS)
Whereby SS = speciality shops and take away food shops which are not the primary attractors to the centre.

The traffic generation has been calculated as 46 x 1542/1000 = 70.9.100% trips for the PM. In the AM peak hour 20% of trips are assigned to staff.

Restaurant
The rate for the restaurant adopted is 5 trips per 100m^2 GFA in the PM peak hour. An allowance of 1/100m^2 GFA is adopted for the AM peak hour for staff trips.

Café
The café is open in the morning AM peak hour so 5/100m^2 GFA is provided and 1/100m^2 GFA in the PM peak hour. This rate has been adopted at similar developments.

(3.5 continued.)

Light Industry/ High Technology
The rate used has adopted the business and industrial parks rates from TDT2013/04a of AM peak hour Rate 0.52/100m^2 GFA and PM peak hour rate of 0.56/100m^2 GFA.

High technology use uses the same rates as Light industrial.

Self Storage
The rate for warehouse and distribution is adopted from the *RMS Guide to Traffic Generating Developments Section 3.10 Warehouse* of 0.5/100m^2 GFA.

Healthcare Services
The rates for medical centres and medical consulting rooms were reviewed from the following sources: *Roads and Maritime Services Trip Generation Rates for Medical Centres Analysis Report* by TEF Consulting and *RMS Land Use Data* and *Analysis No 20 Extended Hours Medical Centres*. Whilst the facilities in this development may include some medical consulting use there will be other facilities such as medical offices and support facilities. Health services can include a broad range of services including allied health services. Allied health professionals provide a broad range of diagnostic, technical, therapeutic and direct health services to improve the health and wellbeing of the consumers they support. It may include aged care support, social health support services, disability consulting services, herbal or therapeutic remedies.

The following rates have been applied:-
The AM peak hour rate rate of 1.6/100m^2 GFA has been adopted. A PM peak hour rate of 3.1/100m^2 GFA has been adopted.

Dog Day Care
It is assumed for a facility with 303m^2 GFA there will be 2 staff and 40 animals. The traffic generation for this facility has been based on surveys undertaken at a similar sized facility, The Hound Lounge, located at 212-220 Parramatta Road Annandale with a GFA of 339.3m^2 GFA. The traffic generation rate pro-rata to GFA is 7.5 trips in and 7.5 trips out in the AM peak hour and 6.75 trips in and 6.75 trips out in the PM peak hour.

The assumed traffic distribution is 80% IN and 20% OUT in the AM peak hour and 80% OUT and 20% IN in the PM peak hour for light industries, high technology and offices. For specialised retail 20% traffic is generated in the morning for employees and 50% IN and 50% out in the PM (100%). The estimated traffic generation is listed in **Table 3.5a.**

(3.5 continued.)

Table 3.5a Estimated Traffic Generation - Modelled

	Land Use Groups	Peak Hour	Gross Floor Area (m^2)	Generation Rate	Traffic Generation IN	Traffic Generation OUT	Traffic Generation TOTAL	Reductions Linked Trips
	Food and Drink Premises ***	AM	1542	46A/1000 X 20%	7.1	7.1	14.2	11.3
		PM		46A/1000 X 100%	35.5	35.5	70.9	56.7
	Specialised Retail * **	AM	3625	2.7/100m^2x 20%	9.8	9.8	19.6	15.7
		PM		2.7/100m^2x 100%	48.9	48.9	97.9	78.3
	Restaurant * **	AM	1154	1 per 100 m^2	9.2	2.3	11.5	9.2
		PM		5 per 100 m^2	28.9	28.9	57.7	46.2
Note 3	Café ***	AM	159	5 per 100 m^2	4.0	4.0	8.0	6.4
		PM		1 per 100 m^2	0.0	1.6	1.6	1.3
	Reduction Linked trips 20%	AM			6.0	4.6	10.7	Green Travel
	Reduction Linked trips 20%	PM			22.7	23.0	45.6	
	Light Industries****	AM	3036	0.52 per 100 m^2	12.6	3.2	15.8	15.0
		PM		0.56 per 100 m^2	3.4	13.6	17.0	16.2
	High Technology Industry****	AM	5790	0.52 per 100 m^2	24.1	6.0	30.1	28.6
		PM		0.56 per 100 m^2	6.5	25.9	32.4	30.8
Note 1	Centre Based Child Care Facility****	AM	711	0.8 per child	21.2	21.2	42.4	40.3
		PM	(106)	0.7 per child	18.6	18.6	37.1	35.2
Note 7	Self Storage****	AM	954	0.5/100*50% IN &50% OUT	2.4	2.4	4.8	4.56
	Facilities****	PM		0.5/100*50% IN &50% OUT	2.4	2.4	4.8	4.56
Note 2	**Gymnasium **** **	AM	881	0.18 per 100 m^2	0.8	0.8	1.6	1.5
		PM		0.9 per 100 m^2	3.96	4.0	7.9	7.5
	Office & Business Premises ****	AM	6972	2.75 per 100 m^2	153.4	38.3	191.7	182.1
		PM		1.17 per 100 m^2	16.3	65.3	81.6	77.5
Note 4	Health Care Services ****	AM	2695	1.6 per 100 m^2	21.6	21.6	43.1	41.0
		PM		3.1 per 100 m^2	41.8	41.8	83.55	79.4
	Reduction for Green Travel 5%	AM			11.8	4.7	16.5	
	Reduction for Green Travel 5%	PM			4.6	8.6	13.2	
Note 5	**Dog Daycare**	AM	276	see notes	7.0	7.0	14.0	
		PM			6.3	6.3	12.6	
Note 6	**Care Taker**	AM/PM	35				0.0	
Note 8			27830	**TOTAL AM**	**266.2**	**116.7**	**382.8**	
				TOTAL PM	**206.14**	**286.33**	**492.47**	
				AM Reduction for linked trips and green travel	**248.4**	**107.4**	**369.7**	
				PM Reduction for linked trips and green travel	**178.8**	**254.8**	**446.2**	

Note 1 Traffic generation for childcare centres is calculated in accordance with the *RMS Guide to Traffic Generating Developments – Table 3.6 Traffic Generation Rates for Childcare Centres.* Long day is 0.8 trips per child over 2 hours 7 – 9am and 0.7 trips per child over 2 hours 4 – 6pm. Rates are for a 2 hour period and 106 children.

Note 2 AM rate based upon average 7 sub-regional centres.

Note 3 Most cafes are very busy in the AM peak hour period. Same rate as for restaurants.

Note 4 Based upon RTA data.

Note 5 40 animals. Surveys carried out at a similar centre determined trip generation rate.
Factor 0.7 x 20 = 14 AM trips and 0.7 x 18 = 12.6 trips PM

Note 6 Caretaker on site. No traffic generation during AM/PM Peak Hours.

Note 7 This use does not have an attributable gross floor area as defined by the Cumberland LEP 2021, however is included as it generates parking demand and trip generation.

Note 8 Total GFA includes lobbies and toilets but excludes self storage = 28,075m^2.

Note *** Reduction of 20% for linked multipurpose trips.

Note **** Reduction of 5% for green travel.

(3.5 continued.)

The modelling and SIDRA analysis has been carried out for a higher traffic generation as shown in **Table 3.5a**. Due to reduction in Gross Floor Area and the areas shown in **Table 3.1** of this Report, the traffic generation will be reduced as shown in **Table 3.5b.** There is a reduction in traffic generation in the morning AM peak hour of **26.7** trips and **23.2** trips in the PM Peak Hour.

Table 3.5b Estimated Traffic Generation - Reduced

	Land Use Groups	Peak Hour	Gross Floor Area (m^2)	Generation Rate	Traffic Generation			Reductions
					IN	OUT	TOTAL	Linked Trips
	Food and Drink Premises ***	AM	1167	46A/1000 X 20%	7.1	7.1	10.7	8.6
		PM		46A/1000 X 100%	26.8	26.8	53.7	42.9
Note 6	**Specialised Retail** ***	AM	3460	2.7/100m^2x 20%	9.3	9.3	18.7	14.9
		PM		2.7/100m^2x 100%	46.7	46.7	93.4	74.7
	Restaurant ***	AM	1359	1 per 100 m^2	10.9	2.7	13.6	10.9
		PM		5 per 100 m^2	34.0	34.0	68.0	54.4
Note 3	Café ***	AM	159	5 per 100 m^2	4.0	4.0	8.0	6.4
		PM		1 per 100 m^2	0.0	1.6	1.6	1.3
	Reduction Linked trips 20%	AM			6.3	4.6	10.2	Green Travel
	Reduction Linked trips 20%	PM			21.5	21.8	43.3	
	Light Industries****	AM	1813	0.52 per 100 m^2	7.5	1.9	9.4	9.0
		PM		0.56 per 100 m^2	3.4	13.6	10.2	9.6
	High Technology Industry****	AM	7112	0.52 per 100 m^2	29.6	7.4	37.0	35.1
		PM		0.56 per 100 m^2	8.0	31.9	39.8	37.8
Note 1	Centre Based Child Care Facility****	AM	711	0.8 per child	21.2	21.2	42.4	40.3
		PM	(106)	0.7 per child	18.6	18.6	37.1	35.2
	Self Storage****	AM	392	0.5/100*50% IN &50% OUT	2.4	2.4	4.8	4.56
	Storage Facilities****	PM		0.5/100*50% IN &50% OUT	2.4	2.4	4.8	4.56
Note 2	**Gymnasium** ****	AM	863	0.18 per 100 m^2	0.8	0.8	1.6	1.5
		PM		0.9 per 100 m^2	3.88	3.9	7.8	7.4
	Office & Business Premises ****	AM	6041	2.75 per 100 m^2	132.9	33.2	166.1	157.8
		PM		1.17 per 100 m^2	14.1	56.5	70.7	67.1
Note 4	Health Care Services ****	AM	2535	1.6 per 100 m^2	20.3	20.3	40.6	38.5
		PM		3.1 per 100 m^2	39.3	39.3	78.59	74.7
	Reduction for Green Travel 5%	AM			10.7	4.4	15.1	
	Reduction for Green Travel 5%	PM			4.5	8.3	12.4	
Note 5	**Dog Daycare**	AM	303	see notes	7.5	7.5	15.0	
		PM			6.8	6.8	13.5	
			27795	**TOTAL AM**	**246.0**	**110.3**	**352.9**	
				TOTAL PM	**197.15**	**275.25**	**465.55**	
				AM Reduction for linked trips and green travel	**229**	**101**	**343**	
				PM Reduction for linked trips and green travel	**171**	**245**	**423**	

Note 1: Traffic generation for childcare centres is calculated in accordance with the RMS Guide to Traffic Generating Developments – Table 3.6 Traffic Generation Rates for Childcare Centres. Long day is 0.8 trips per child over 2 hours 7 – 9am and 0.7 trips per child over 2 hours 4 – 6pm. Rates are for a 2 hour period and 106 children.

Note 2: AM rate based upon average 7 sub-regional centres

Note 3: Most cafes are very busy in in the AM peak hour period. Same Rate as for restaurants

Note 4: Based upon RTA data

Note 5: 40 animals. Surveys carried out at a similar centre determined trip generation rate.
Factor 0.75 x 20=15 AM trips and 0.75 x 18=13.5 trips PM

Note *** Reduction of 20% for linked multipurpose trips

Note**** Reduction of 5% for green travel

3.5.1 Multi-purpose Trips and Reduction in Traffic Generation

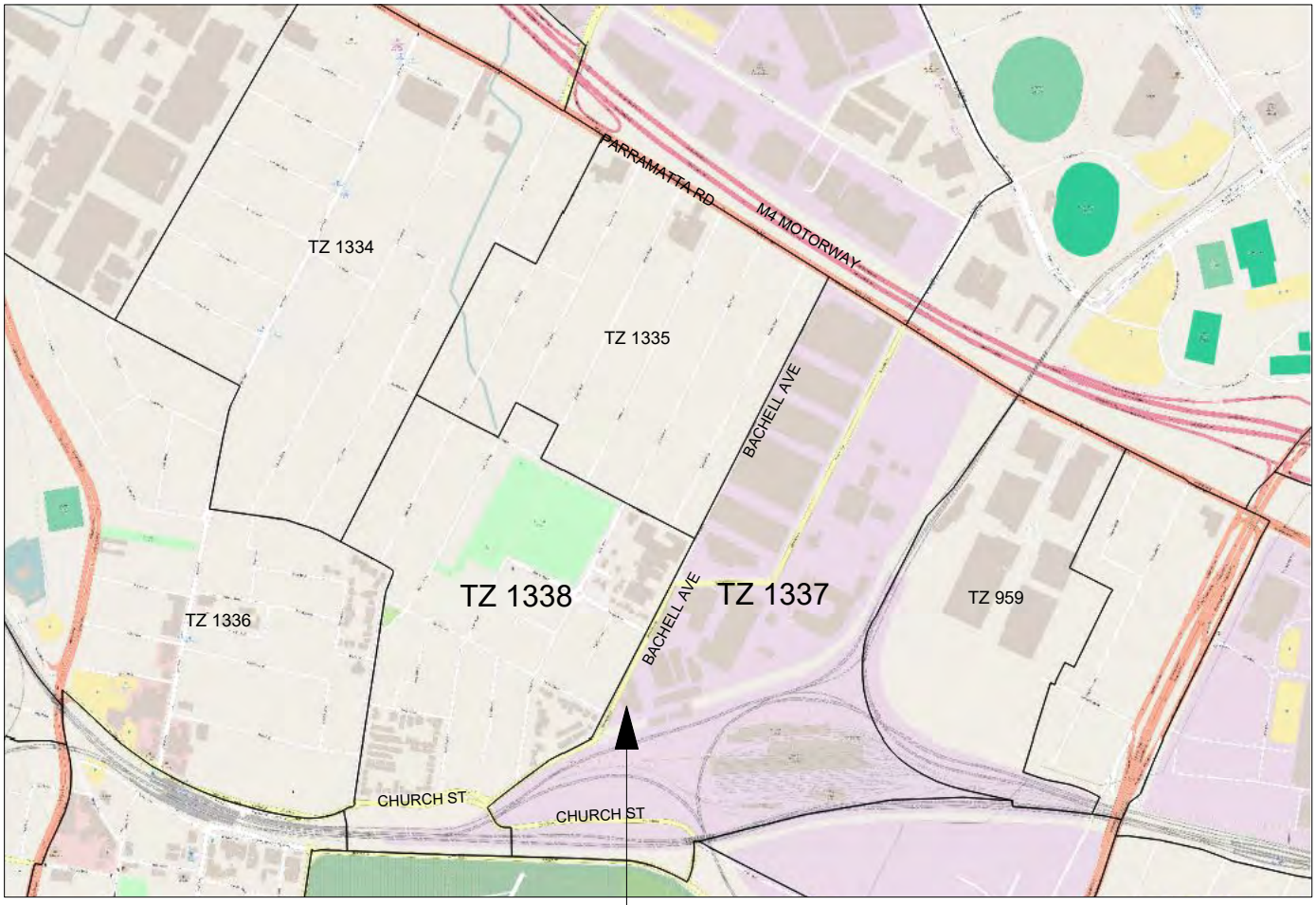
A multi-purpose trip is where more than one shop or facility is visited. Any trip discounts would apply differently in new free-standing centres and for new shops within existing centres. *"An average discount of about 20% is suggested, with this figure reducing with increasing centre size, with rates of 25% (less than 10,000m^2 GLFA), 20% (10,000-30,000m^2 GLFA) and 15% (over 30,000m^2 GLFA) indicative"* as stated in the *RMS Guide to Traffic Generating Developments Section 3 Land-Use Traffic Generation*.

The following uses will be multi-purpose or linked trips within the centre. These are specialised retail, food and drink premises, restaurant and café uses. An applied discount rate of 20% is applied to these uses. The office and business premises and health services will have a 5% discount rate applied for the implication of the green travel plan and provision of bicycle parking to promote active travel.

The areas defined in **Table 3.6** are gross floor area (GFA). Based upon RTA data GLFA is 75% of the GFA. For this report traffic generation has been calculated based upon the GFA areas. For a building area of 27830m^2 GFA (20873m^2 GLFA) a 20% reduction would apply to this development for some of the uses such as café, restaurant, specialised retail and food and drink premises.

3.6 Future Traffic Volume Assignment to Road Network

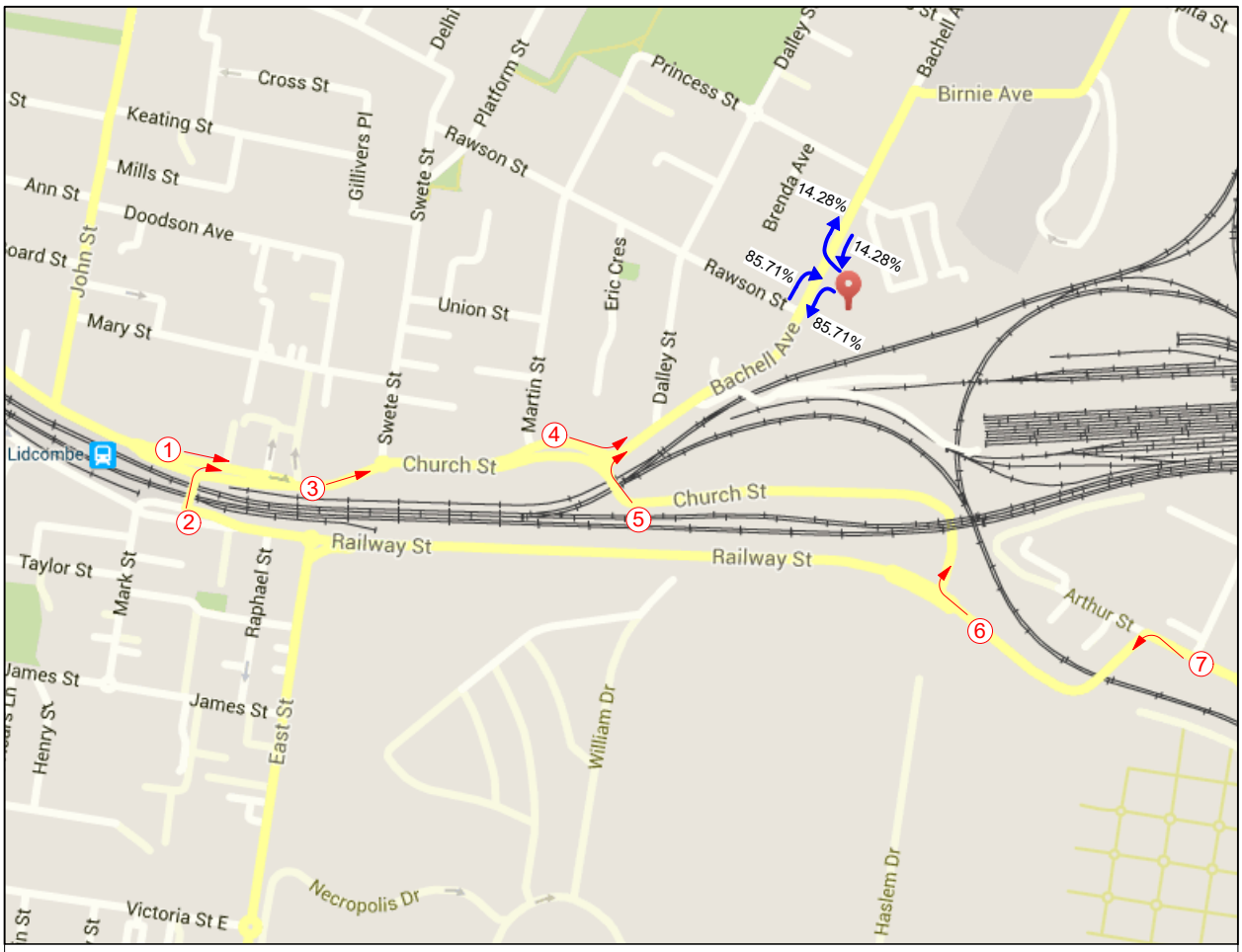
We refer to **Technical Report No 15/23** included in **Appendix I** of this report which describes trip distribution and traffic generation for the development and assignment to the road network. The additional traffic volumes due to employees and retail customers travelling to TZ 1337 and TZ1338 (**Table 3.6)** in the **AM** peak hour and returning from work/ shopping in the **PM** peak hours have been distributed to the road network in the study area based upon using the *BTS-JTW (Bureau of Statistics Journey to Work Explorer) travel zone 1337 and 1338.* The travel zones are shown in **Figure 5**. The travel routes for employees and retail customers have been assigned to the road network as shown in **Figure 6A** and **6B.**



PROPOSED SITE:
2 BACHELL AVE, LIDCOMBE

N

FIGURE 5
TRAVEL ZONE LOCATIONS



1 CHURCH ST W THRU

FAIRFIELD	7.50%
CAMPBELLTOWN	3.59%
MERRYLANDS	8.30%
AUBURN	6.63%
GROUP NORTH & WEST	21.41%
TOTAL	**47.43%**

2 RAILWAY ST BRIDGE RHT

BANKSTOWN	7.13%
LIVERPOOL	3.40%
BRINGELLY	3.27%
SUTHERLAND	2.56%
TOTAL	**16.36%**

3 CHURCH ST W THRU

FAIRFIELD	7.50%
BANKSTOWN	7.13%
CAMPBELLTOWN	3.59%
LIVERPOOL	3.40%
BRINGELLY	3.27%
SUTHERLAND	2.56%
MERRYLANDS	8.30%
AUBURN	6.63%
GROUP NORTH & WEST	21.41%
TOTAL	**63.79%**

4 CHURCH ST W LHT

FAIRFIELD	7.50%
BANKSTOWN	7.13%
CAMPBELLTOWN	3.59%
LIVERPOOL	3.40%
BINGELLY	3.27%
SUTHERLAND	2.56%
MERRYLANDS	8.30%
AUBURN	6.63%
GROUP NORTH & WEST	21.41%
TOTAL	**63.79%**

5 CHURCH ST E RHT

STRATHFIELD	4.11%
CANTERBURY	3.51%
KOGARAH-ROCKDALE	2.93%
CANADA BAY	2.12%
CRONULLA	2.07%
HURSTVILLE	2.05%
CAMDEN	1.52%
CITY	1.25%
LEICHHARDT	1.24%
WARRINGAH	1.12%
TOTAL	**21.92%**

6 RAILWAY ST W RHT

STRATHFIELD	4.11%
CANTERBURY	3.51%
KOGARAH-ROCKDALE	2.93%
CANADA BAY	2.12%
CRONULLA	2.07%
HURSTVILLE	2.05%
CAMDEN	1.52%
CITY	1.25%
LEICHHARDT	1.24%
WARRINGAH	1.12%
TOTAL	**21.92%**

7 ARTHUR ST W LHT

STRATHFIELD	4.11%
CANTERBURY	3.51%
KOGARAH-ROCKDALE	2.93%
CANADA BAY	2.12%
CRONULLA	2.07%
HURSTVILLE	2.05%
CAMDEN	1.52%
CITY	1.25%
LEICHHARDT	1.24%
WARRINGAH	1.12%
TOTAL	**21.92%**

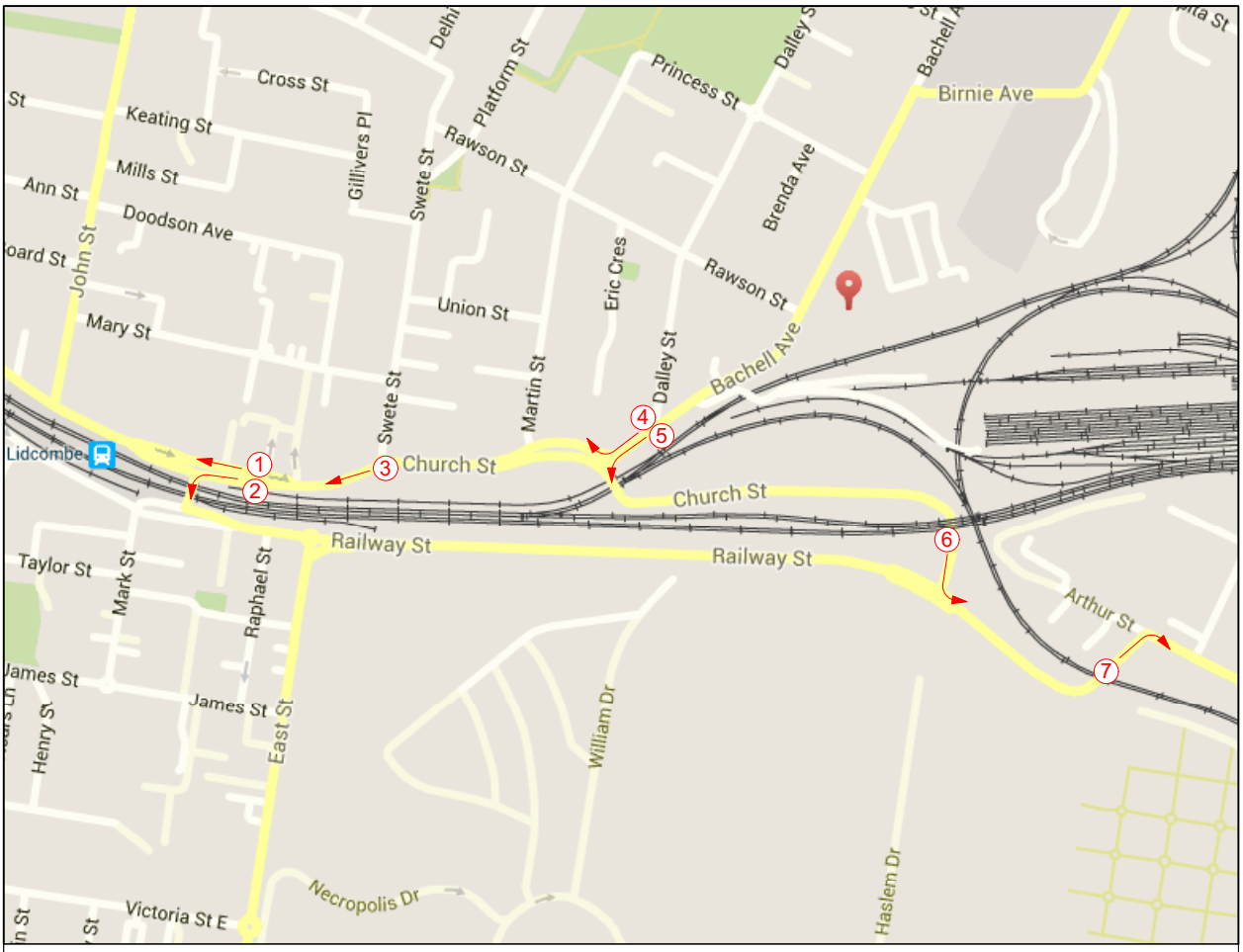
GROUP NORTH & WEST

-PARRAMATTA	5.47%
-BLACKTOWN	5.44%
-MOUNT DRUITT	5.10%
-BAULKHAM HILLS	4.55%
-PENRITH	3.44%
-BLACKTOWN	3.23%
-ST MARYS	2.57%
-RYDE	2.44%
-CARLINGFORD	1.98%
-KU-RING-GAI	1.47%
TOTAL	**35.69%**

-VIA PARRAMATTA RD	14.28%
-VIA CHURCH ST/ OLYMPIC DRIVE	21.41%

N

FIGURE 6A
TRIP ASSIGNMENT
EMPLOYEES JOURNEY TO WORK



①	CHURCH ST W THRU	
	FAIRFIELD	7.50%
	CAMPBELLTOWN	3.59%
	MERRYLANDS	8.30%
	AUBURN	6.63%
	GROUP NORTH & WEST	21.41%
	STRATHFIELD	4.11%
	HURSTVILLE	2.06%
	CAMDEN	1.52%
	TOTAL	**55.12%**

②	RAILWAY ST BRIDGE RHT	
	BANKSTOWN	7.13%
	LIVERPOOL	3.40%
	BRINGELLY	3.27%
	SUTHERLAND	2.56%
	CRONULLA	2.07%
	TOTAL	**18.43%**

③	CHURCH ST W THRU	
	FAIRFIELD	7.50%
	BANKSTOWN	7.13%
	CAMPBELLTOWN	3.59%
	LIVERPOOL	3.40%
	BRINGELLY	3.27%
	SUTHERLAND	2.56%
	MERRYLANDS	8.30%
	AUBURN	6.63%
	GROUP NORTH & WEST	21.42%
	STRATHFIELD	4.11%
	HURSTVILLE	2.06%
	CAMDEN	1.52%
	CRONULLA	2.07%
	TOTAL	**73.56%**

④	CHURCH ST W LHT	
	FAIRFIELD	7.50%
	BANKSTOWN	7.13%
	CAMPBELLTOWN	3.59%
	LIVERPOOL	3.40%
	BINGELLY	3.27%
	SUTHERLAND	2.56%
	MERRYLANDS	8.30%
	AUBURN	6.63%
	GROUP NORTH & WEST	21.42%
	STRATHFIELD	4.11%
	HURSTVILLE	2.06%
	CAMDEN	1.52%
	CRONULLA	2 07%
	TOTAL	**73.56%**

⑤	CHURCH ST E RHT	
	CANTERBURY	3.51%
	KOGARAH-ROCKDALE	2.93%
	CANADA BAY	2.12%
	CITY	1.25%
	LEICHHARDT	1.24%
	WARRINGAH	1.12%
	TOTAL	**12.17%**

⑥	RAILWAY ST W RHT	
	CANTERBURY	3.51%
	KOGARAH-ROCKDALE	2.93%
	CANADA BAY	2.12%
	CITY	1.25%
	LEICHHARDT	1.24%
	WARRINGAH	1.12%
	TOTAL	**12.17%**

⑦	ARTHUR ST W LHT	
	CANTERBURY	3.51%
	KOGARAH-ROCKDALE	2.93%
	CANADA BAY	2.12%
	CITY	1.25%
	LEICHHARDT	1.24%
	WARRINGAH	1.12%
	TOTAL	**12.17%**

GROUP NORTH & WEST	
-PARRAMATTA	5.47%
-BLACKTOWN	5.44%
-MOUNT DRUITT	5.10%
-BAULKHAM HILLS	4.55%
-PENRITH	3.44%
-BLACKTOWN	3.23%
-ST MARYS	2.57%
-RYDE	2.44%
-CARLINGFORD	1.98%
-KU-RING-GAI	1.47%
TOTAL	**35.69%**
-VIA PARRAMATTA RD	14.28%
-VIA CHURCH ST/ OLYMPIC DRIVE	21.41%

N

FIGURE 6B
TRIP ASSIGNMENT
EMPLOYEES JOURNEY FROM WORK

(3.6 continued.)

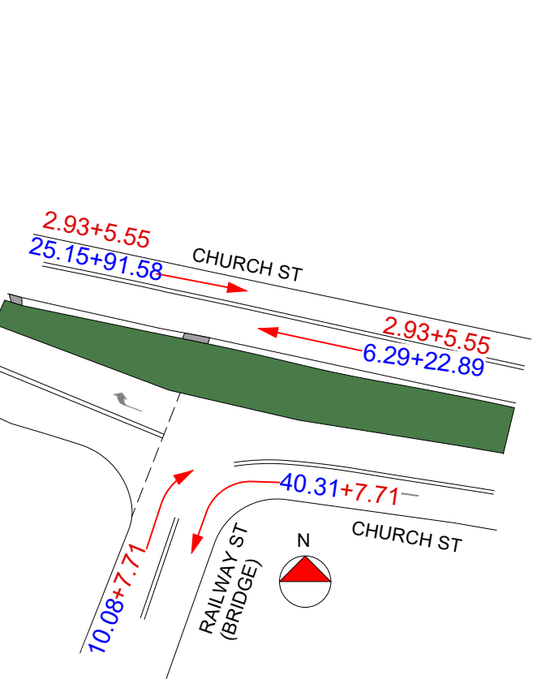
Table 3.6 Journey to Work to Travel Zones: 1337 and 1338 for Employees

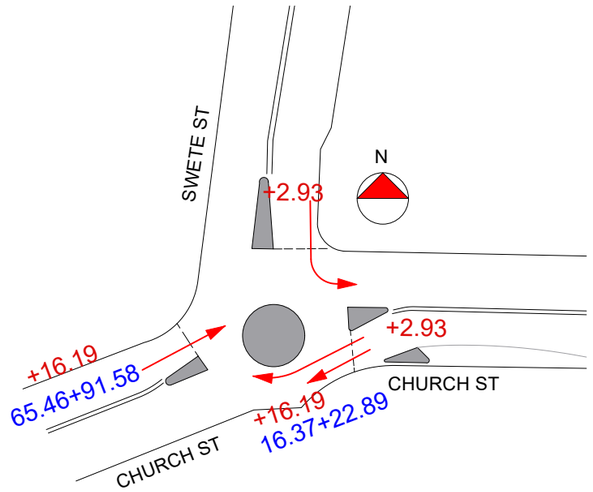
Origin SA3	Origin SA3 ID	No. of Vehicle Drivers	%
Merrylands - Guildford	12503	142.2	8.30%
Fairfield	12702	128.6	7.50%
Bankstown	11901	122.2	7.13%
Auburn	12501	113.6	6.63%
Parramatta	12504	93.8	5.47%
Blacktown	11601	93.2	5.44%
Mount Druitt	11603	87.4	5.10%
Baulkham Hills	11501	78	4.55%
Strathfield - Burwood - Ashfield	12003	70.4	4.11%
Campbelltown (NSW)	12302	61.6	3.59%
Canterbury	11902	60.2	3.51%
Penrith	12403	59	3.44%
Liverpool	12703	58.2	3.40%
Bringelly - Green Valley	12701	56	3.27%
Blacktown - North	11602	55.4	3.23%
Kogarah - Rockdale	11904	50.2	2.93%
St Marys	12405	44	2.57%
Sutherland - Menai - Heathcote	12802	43.8	2.56%
Ryde - Hunters Hill	12602	41.8	2.44%
Canada Bay	12001	36.4	2.12%
Cronulla - Miranda - Caringbah	12801	35.4	2.07%
Hurstville	11903	35.2	2.05%
Carlingford	12502	34	1.98%
Camden	12301	26	1.52%
Ku-ring-gai	12103	25.2	1.47%
Sydney Inner City	11703	21.4	1.25%
Leichhardt	12002	21.2	1.24%
Warringah	12203	19.2	1.12%
Total		**1713.6**	**100.00%**

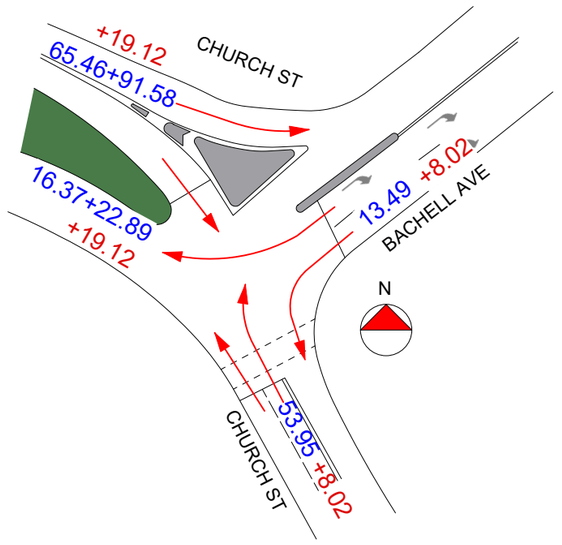
Note: Employees travelling from Origin SA3 to Travel Zones 1337 and 1338 with vehicle driver trips less than 1% of total trips have been omitted.

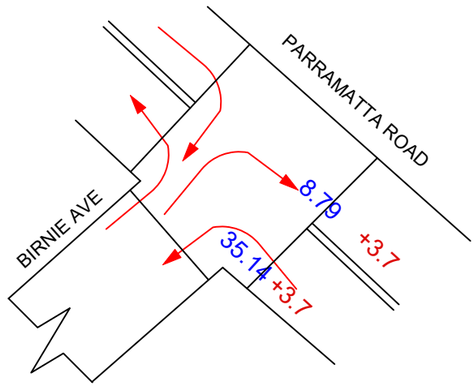
3.7 Future Intersection Performance

Development Traffic volumes are assigned to the road network for the different users, local customers, employees and customers to specialised retail as shown in Figures **7A** and **7B**. Development Volumes at the Site Driveway Intersection with Bachell Avenue and Rawson Street are shown in **Figure 7c**. The future AM and PM peak hour traffic volumes comprising development traffic plus existing traffic volumes at the 5 intersections being analysed are shown in **Figures 8A** and **8B** respectively. The Intersections have been analysed using computer program SIDRA 9.1.









LEGEND

65.46 EMPLOYEES

+16.19 CUSTOMERS

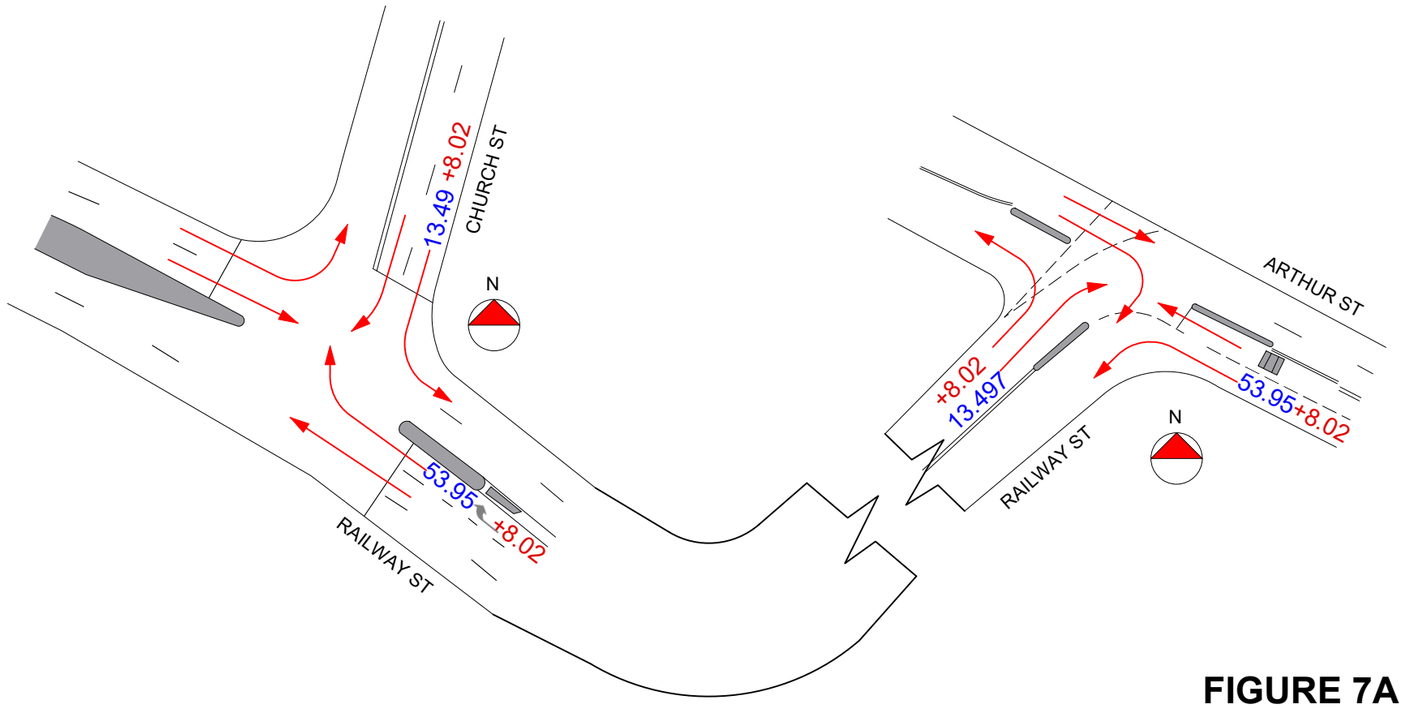
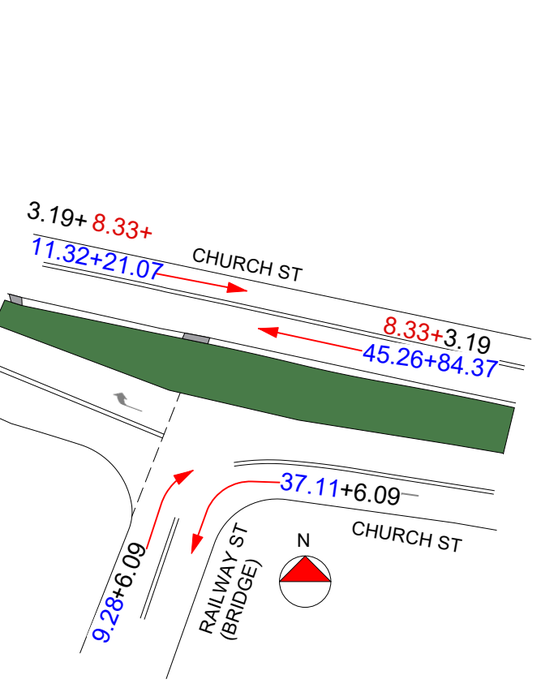
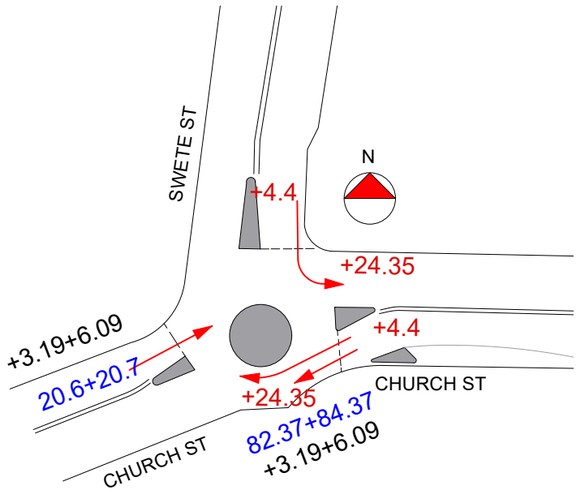
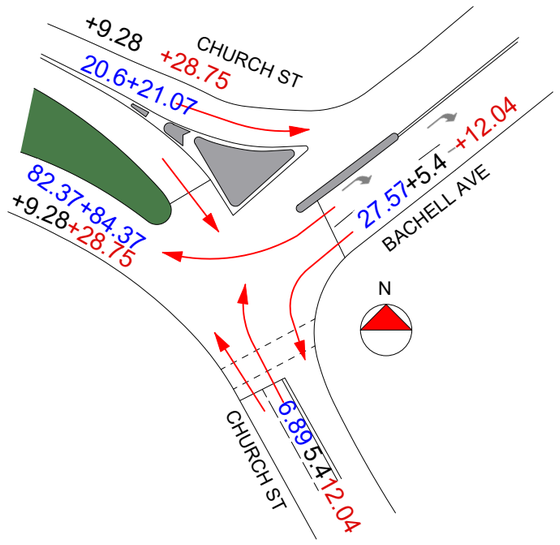


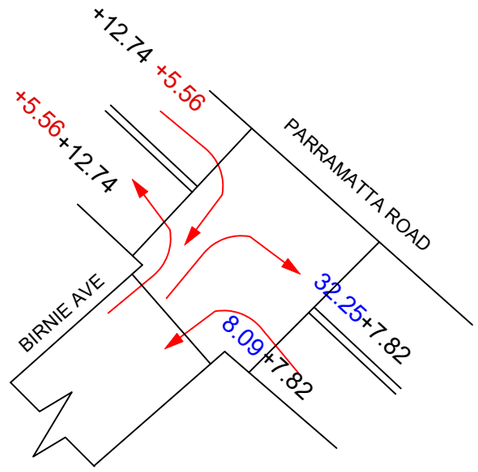
FIGURE 7A

FUTURE DEVELOPMENT
TRAFFIC VOLUMES
ASSIGNMENT TO ROAD NETWORK
AM PEAK HOUR









LEGEND

37.11 EMPLOYEES
+6.09 SPECIALISED RETAIL
+8.33 CUSTOMERS

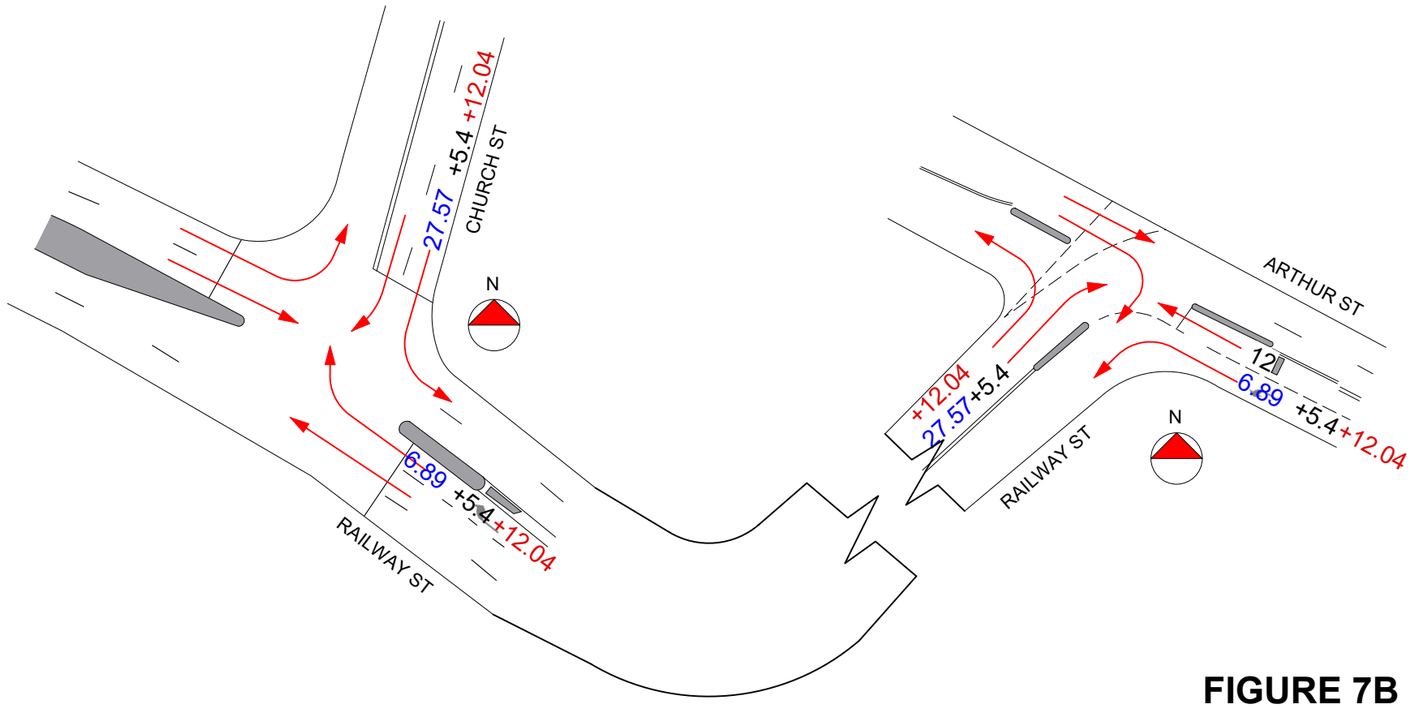


FIGURE 7B
FUTURE DEVELOPMENT
TRAFFIC VOLUMES
ASSIGNMENT TO ROAD NETWORK

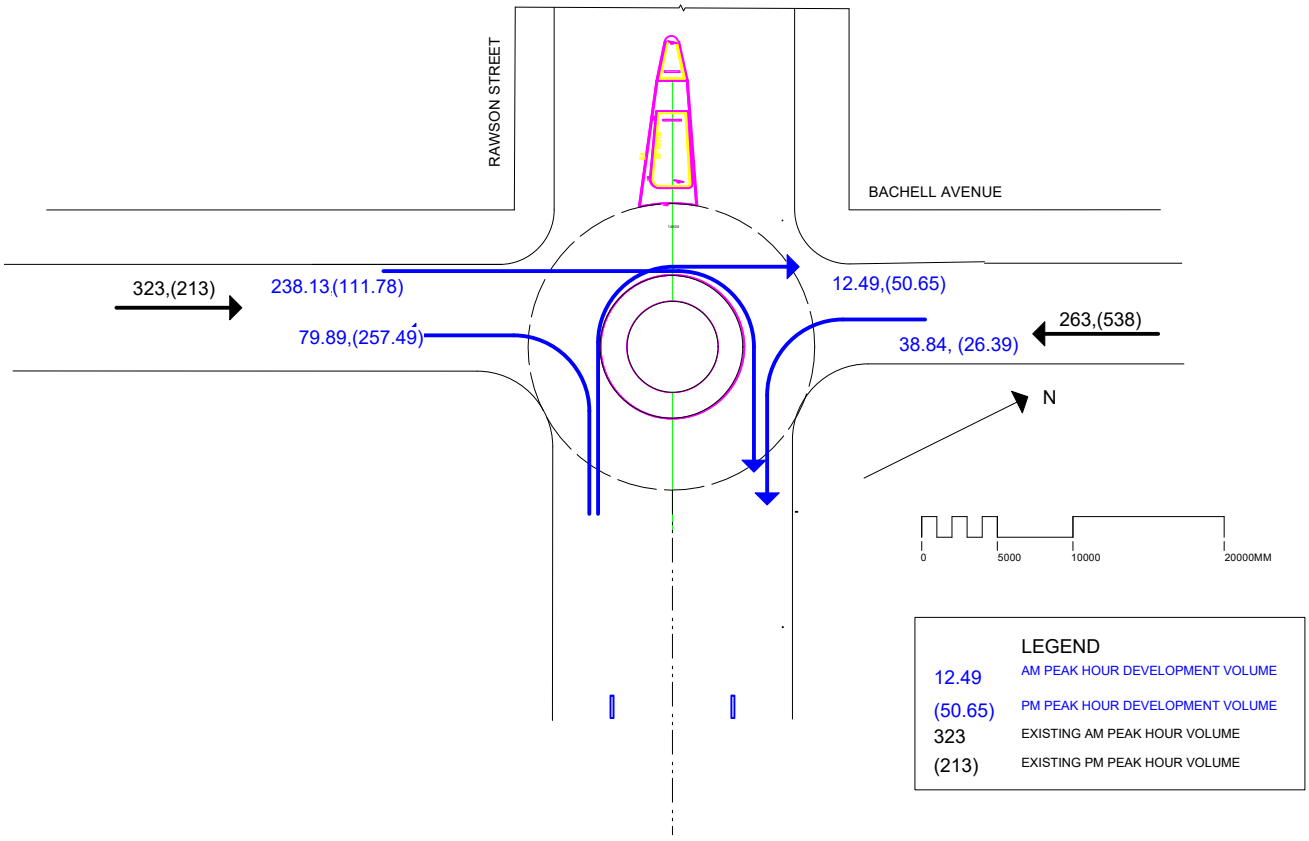
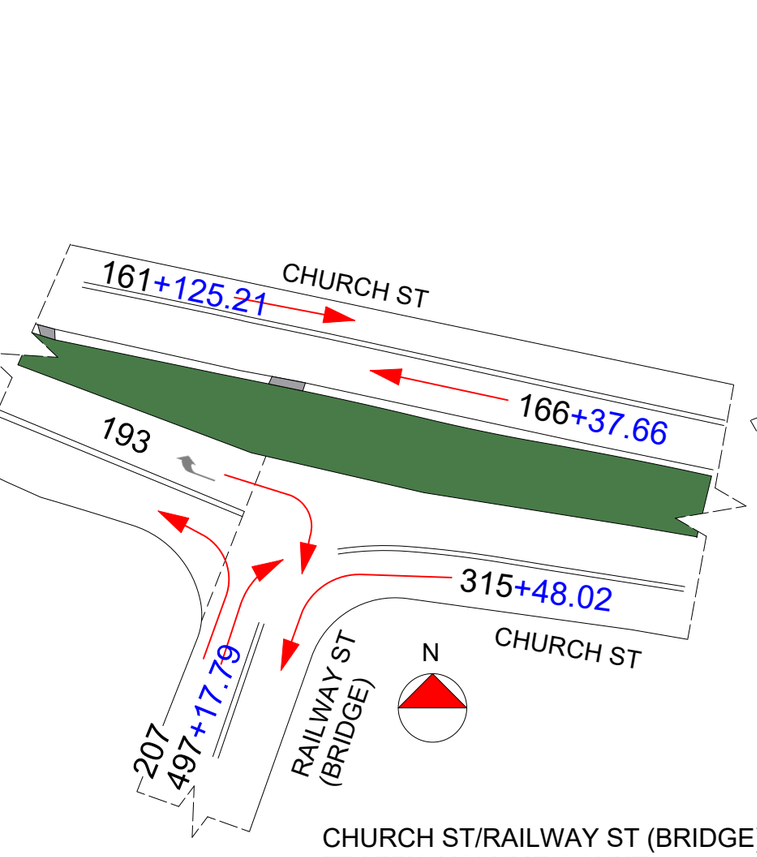


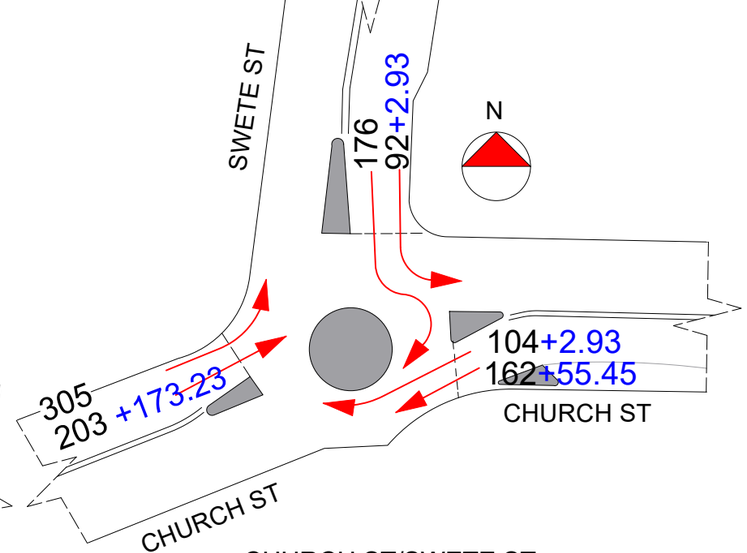
FIGURE 7C
FUTURE DEVELOPMENT PEAK HOUR VOLUMES AT SITE DRIVEWAY AND BACHELL AVENUE/RAWSON STREET INTERSECTION



CHURCH ST/RAILWAY ST (BRIDGE)
TRAFFIC VOLUME COUNT
CARRIED OUT
FRIDAY 18/11/22

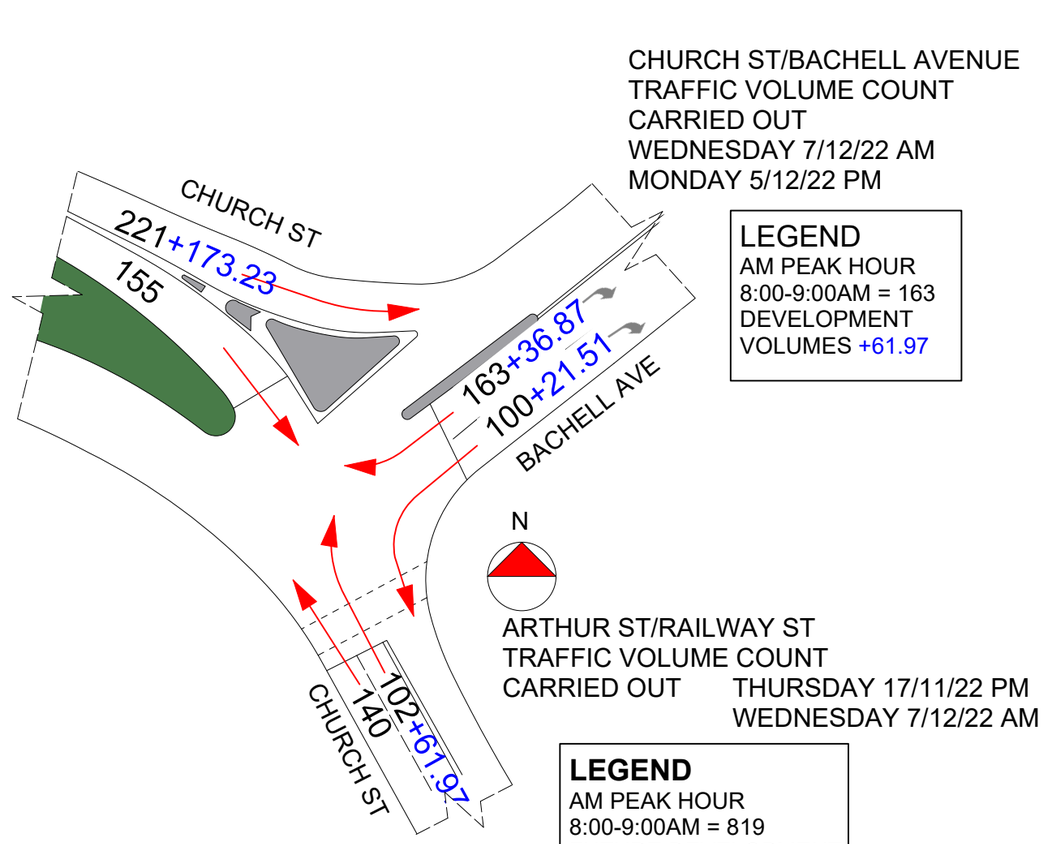
LEGEND
AM PEAK HOUR
8:00-9:00AM = 497

NEW DEVELOPMENT
VOLUMES=+48.02



CHURCH ST/SWETE ST
TRAFFIC VOLUME COUNT
CARRIED OUT
WEDNESDAY 7/12/22AM
MONDAY 5/12/22 PM

LEGEND
AM PEAK HOUR
8:00-9:00AM = 162
NEW DEVELOPMENT
+173.23

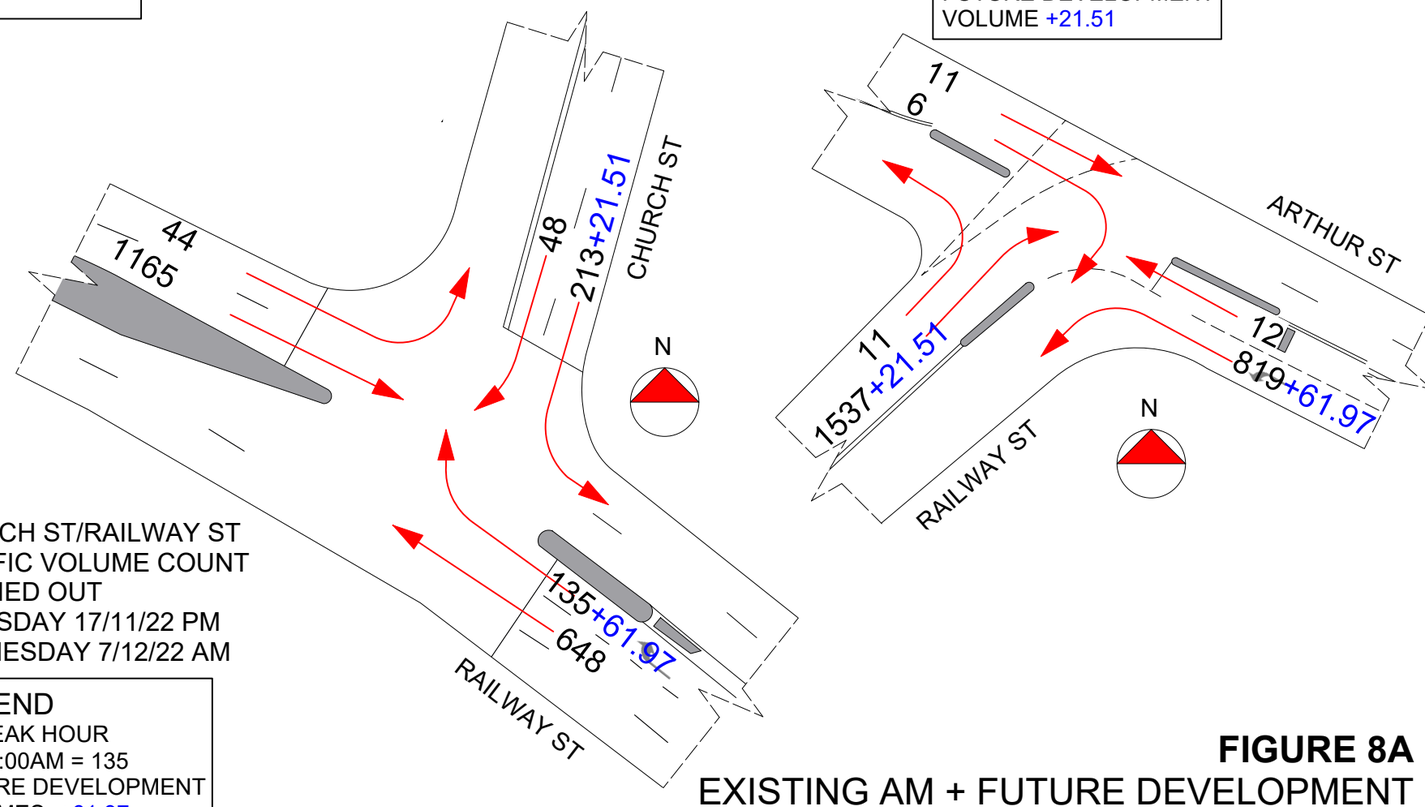


CHURCH ST/BACHELL AVENUE
TRAFFIC VOLUME COUNT
CARRIED OUT
WEDNESDAY 7/12/22 AM
MONDAY 5/12/22 PM

LEGEND
AM PEAK HOUR
8:00-9:00AM = 163
DEVELOPMENT
VOLUMES +61.97

ARTHUR ST/RAILWAY ST
TRAFFIC VOLUME COUNT
CARRIED OUT THURSDAY 17/11/22 PM
WEDNESDAY 7/12/22 AM

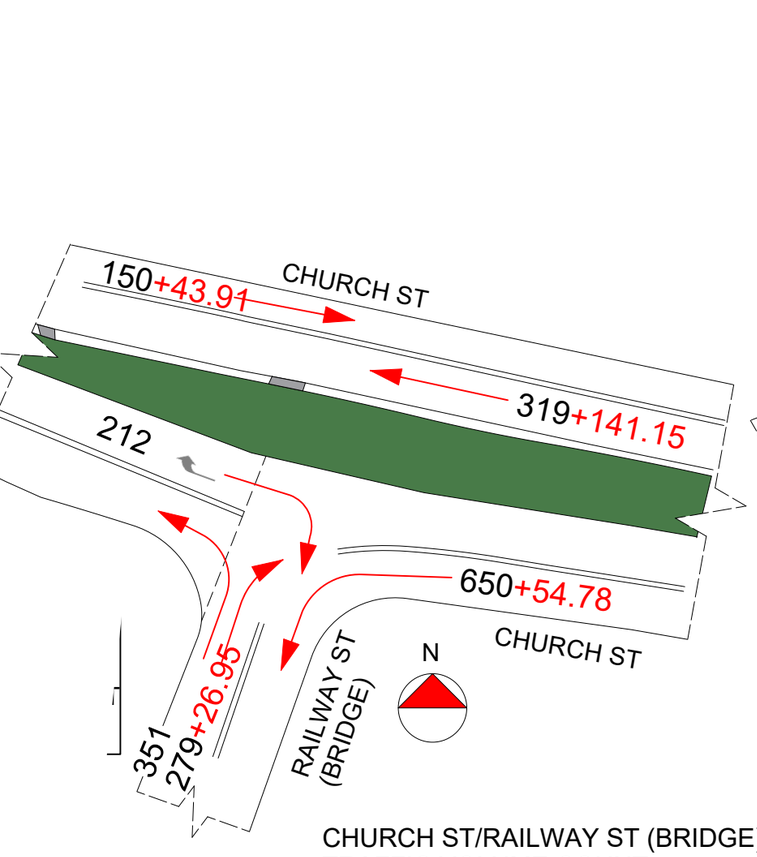
LEGEND
AM PEAK HOUR
8:00-9:00AM = 819
FUTURE DEVELOPMENT
VOLUME +21.51



CHURCH ST/RAILWAY ST
TRAFFIC VOLUME COUNT
CARRIED OUT
THURSDAY 17/11/22 PM
WEDNESDAY 7/12/22 AM

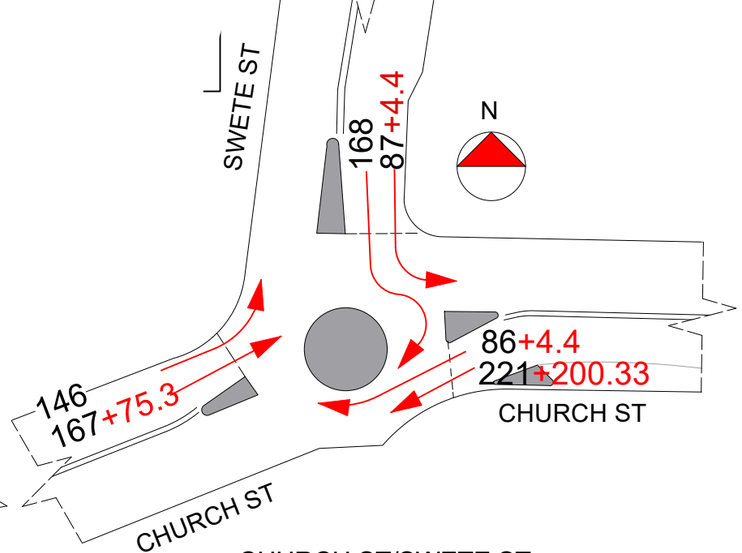
LEGEND
AM PEAK HOUR
8:00-9:00AM = 135
FUTURE DEVELOPMENT
VOLUMES=+61.97

FIGURE 8A
EXISTING AM + FUTURE DEVELOPMENT
TRAFFIC VOLUMES
CARRIED OUT ON THURS 17/11/22 & FRI18/11/22
MON 5/12/22 PM, WED 7/12/22 AM



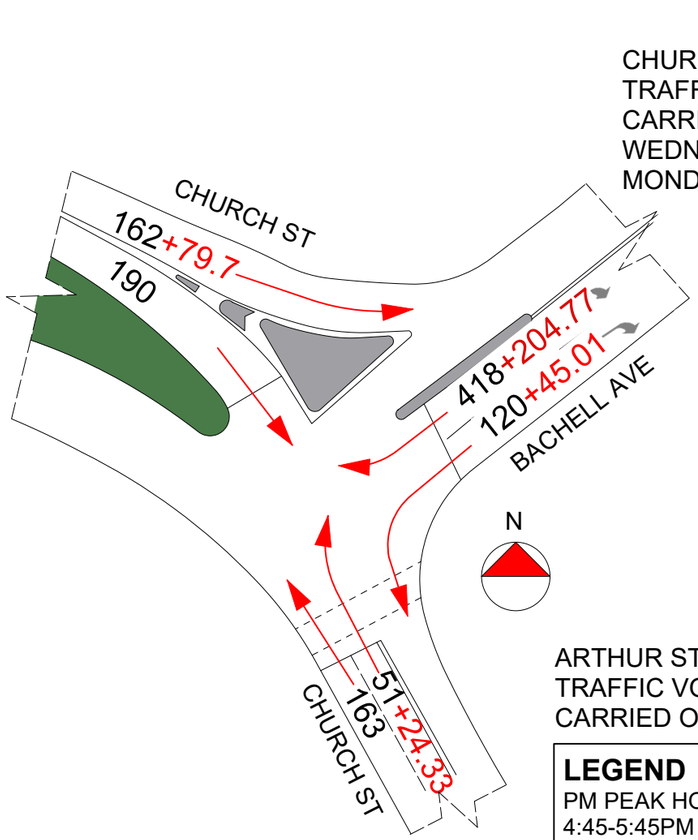
CHURCH ST/RAILWAY ST (BRIDGE)
TRAFFIC VOLUME COUNT
CARRIED OUT
FRIDAY 18/11/22

LEGEND
PM PEAK HOUR
4:45-5:45PM = 279
FUTURE DEVELOPMENT
VOLUMES +26.95



CHURCH ST/SWETE ST
TRAFFIC VOLUME COUNT
CARRIED OUT
WEDNESDAY 7/12/22AM
MONDAY 5/12/22 PM

LEGEND
PM PEAK HOUR
4:45-5:45PM = 167
FUTURE DEVELOPMENT
VOLUMES = +75.3

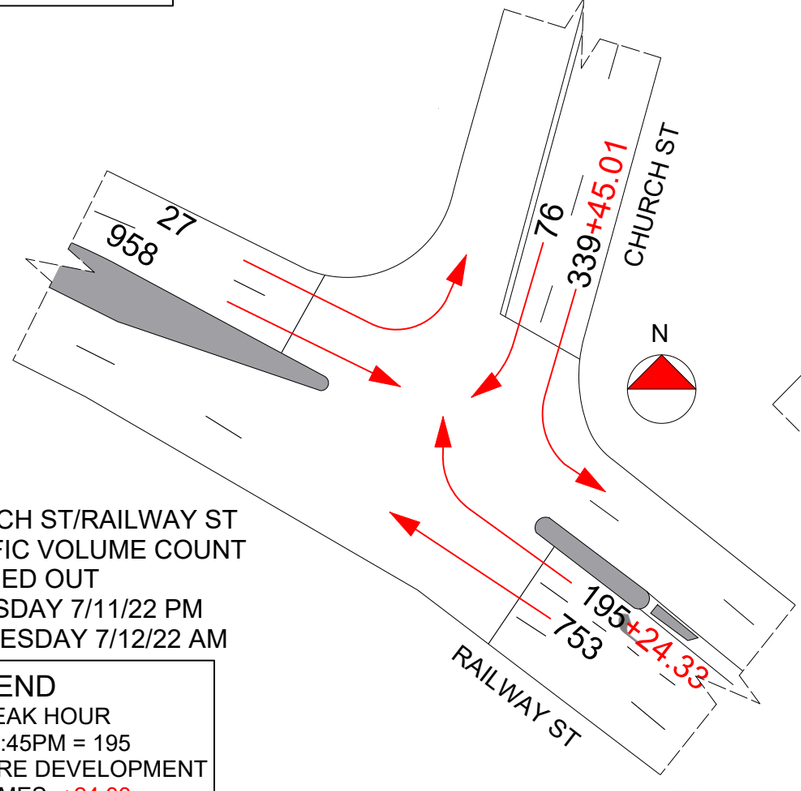


CHURCH ST/BACHELL AVENUE
TRAFFIC VOLUME COUNT
CARRIED OUT
WEDNESDAY 7/12/22 AM
MONDAY 5/12/22 PM

LEGEND
PM PEAK HOUR
4:45-5:45PM = 162
FUTURE DEVELOPMENT
VOLUMES
= +24.33

ARTHUR ST/RAILWAY ST
TRAFFIC VOLUME COUNT
CARRIED OUT THURSDAY 17/11/22

LEGEND
PM PEAK HOUR
4:45-5:45PM = 913
FUTURE DEVELOPMENT
VOLUME = +24.33



CHURCH ST/RAILWAY ST
TRAFFIC VOLUME COUNT
CARRIED OUT
THURSDAY 7/11/22 PM
WEDNESDAY 7/12/22 AM

LEGEND
PM PEAK HOUR
4:45-5:45PM = 195
FUTURE DEVELOPMENT
VOLUMES=+24.33

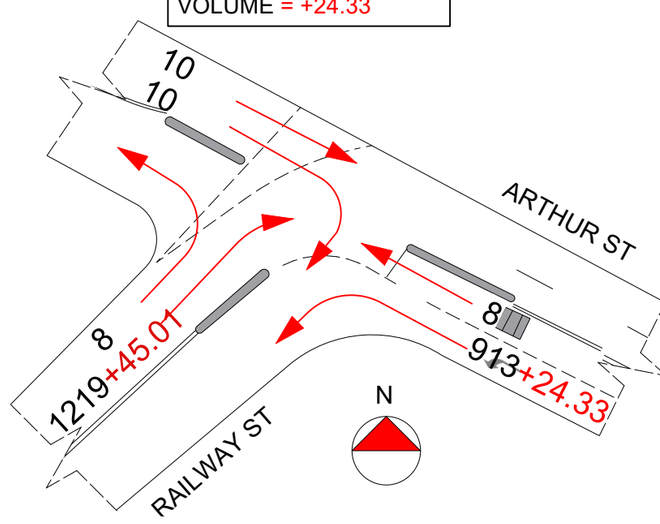


FIGURE 8B
EXISTING PM PEAK HOUR PLUS FUTURE DEVELOPMENT TRAFFIC VOLUMES
CARRIED OUT ON THURS 17/11/22 & FRI18/11/22
MON 5/12/22 PM, WED 7/12/22 AM

(3.7 continued.)

Table 3.7a SIDRA Existing Plus Future Development Volumes Intersection Performance

No	Location	Sign/ Control	Peak Hour	Level of Service (LoS)	Degree of Saturation (DoS)	Average Delay (Av)	95a% Back of Queue Length (Veh)	Critical Movement
1	Church Street/ Railway Street	S	AM	F	1.186	219.9	12veh 86.6m	LHT from Railway St (west) 410.6 secs
1	Church Street/ Railway Street	S	PM	D	0.974	54.9	17.9veh 125m	RHT from Railway St (E) 93.7secs
2	Arthur Street/ Railway Street	G	AM	A*	2.0	25.1	9.1veh 63.4m	RHT Arthur St (west) 1291.7secs
2	Arthur Street/ Railway Street	G	PM	A*	0.698	8.0	2veh 13.7m	RHT Arthur St (west) 298.3secs
3	Swete St/ Church St	R	AM	A	0.532	6.2	1.9veh 13.2m	RHT from Swete St 9.1secs
3	Swete St/ Church St	R	PM	A	0.444	6.1	3.3veh 23.3m	RHT from Church St (east) 8.7 secs
4	Church St/ Bachell Ave	S	AM	A	0.479	12.4	3.6 veh 25.3m	RHT Bachell Ave 21 secs
4	Church St/ Bachell Ave	S	PM	B	0.754	19.9	4.7veh 32.8m	RHT Church St E Ave (west) 29.3secs
5	Church Street/ Railway St Bridge	G	AM	A*	0.496	6.3	2.1veh 14.7m	RHT Church St (west) 15.9 secs
5	Church Street/ Railway St Bridge	G	PM	A*	0.670	7.1	3.2veh 22.4m	RHT Church St (west) 22.7 secs

NOTES: -
S = SIGNALS G = GIVEWAY R = ROUNDABOUT
Analysed using SIDRA 9.1
*Refer to **Table 4.2** Level of Service Criteria in **Section 2.4** of this report.

1) Degree of Saturation is the ratio of demand to capacity for the most disadvantaged movement.
2) Average delay is the delay experienced on average by all vehicles. The value in brackets represents the delay to the most disadvantaged movement.
3) Level of Service is a qualitative measure of performance describing operational conditions. There are six levels of service, designated from A to F, with A representing the best operational condition and level of service F the worst. The LoS of the intersection is shown in bold, and the LoS of the most disadvantaged movement is shown in brackets.

- The results in Intersection Summary show NA in the LoS summary however review of the movement summary demonstrates that priority movements operate with plenty of spare capacity.

(3.7 continued.)

The Level of Service at Church Street/ Railway Street is unchanged at F in the AM peak hour and D in the PM Peak Hour and there is no change as a result of development volumes. The existing Level of Service at this intersection is already unsatisfactory and is not as a result of this development.

All other intersections continue to operate with spare capacity in the AM and PM peak hours.

The development site intersection is operating with plenty of spare capacity as shown in Table 3.7b. The turning movements at this intersection has been checked for the probability of delay. This analysis work is included in **Appendix H.**

Table 3.7b Site Access Driveway and Bachell Avenue Roundabout Intersection

No	Location	Sign/ Control	Peak Hour	Level of Service (LoS)	Degree of Saturation (DoS)	Average Delay (Av)	95a% Back of Queue Length (Veh)	Critical Movement
6	Bachell Avenue/Site Driveway	G	AM	A*	0.388	6.1	0.0veh 0.1m	RHT Rawson Streett) 11.9secs
6	Church Street/ Railway St Bridge	G	PM	A*	0.443	6.1	0.0veh 0.1m	Rawson Street10.4secs

3.8 Background Traffic Intersection Performance to 2032

Future background traffic growth for 10 years plus existing traffic volumes are modelled and summarised in Table 3.8. The intersections of Church Street/ Railway Street experience delays from Church Street (West) as a result of Background traffic growth which has been modelled on all approaches of 2 % per annum.

Background traffic growth to 2032 SIDRA results are included in **Appendix C** of this report.

A possible mitigation measure to increase capacity as a result of background traffic growth to the Church Street/ Railway Street Intersection is explained in detail in **Appendix G** of this report.

(3.8 continued.)

Table 3.8 Existing plus Background Traffic Growth to 2032

No	Location	Sign/ Control	Peak Hour	Level of Service (LoS)	Degree of Saturation (DoS)	Average Delay (Av)	95a% Back of Queue Length (Veh)	Critical Movement
1	Church Street/ Railway Street	S	AM	F	1.413	442.5	23.5veh 164.8m	LHT from Railway St (west) 839.5 secs
1	Church Street/ Railway Street	S	PM	F	1.169	177.2	9.6veh 67.1m	LHT from Church St (west) 377.2secs
2	Arthur Street/ Railway Street	G	AM	A*	3.4	56.0	19.9vh 139.6m	THRU Arthur St (west) 4690secs
2	Arthur Street/ Railway Street	G	PM	A*	2.28	32.0	19.9veh 133.2m	RHT Arthur St (west) 2594 secs
3	Swete St/ Church St	R	AM	A	0.530	6.7	2.3veh 16.4m	RHT from Church St 8.6 secs
3	Swete St/ Church St	R	PM	A	0.404	6.6	2.8veh 19.9m	RHT from Church St (east) 8.9 secs
4	Church St/ Bachell Ave	S	AM	B	0.446	13.9	4.2 veh 29.8m	RHT Bachell Ave 23.7 secs
4	Church St/ Bachell Ave	S	PM	B	0.750	17.9	12.0veh 84m	RHT Bachell Ave (west) 23.3 secs
5	Church Street/ Railway St Bridge	G	AM	A*	0.652	7.2	3.2veh 22.2m	RHT Church St (west) 20.1 secs
5	Church Street/ Railway St Bridge	G	PM	A*	1.025	22.1	19.9veh 139.5m	RHT Church St (west) 127 secs

NOTES: -
S = SIGNALS
G = GIVEWAY
R = ROUNDABOUT
Analysed using SIDRA 9.1
*Refer to **Table 4.2** Level of Service Criteria in **Section 2.4** of this report.

1) Degree of Saturation is the ratio of demand to capacity for the most disadvantaged movement.
2) Average delay is the delay experienced on average by all vehicles. The value in brackets represents the delay to the most disadvantaged movement.
3) Level of Service is a qualitative measure of performance describing operational conditions. There are six levels of service, designated from A to F, with A representing the best operational condition and level of service F the worst. The LoS of the intersection is shown in bold, and the LoS of the most disadvantaged movement is shown in brackets.

- The results in Intersection Summary show NA in the LoS summary however review of the movement summary demonstrates that priority movements operate with plenty of spare capacity.

3.9 Network Model

The intersections included in a SIDRA networked model are the intersections of Bachell Avenue/Church Street, Church Street/Swete Street and Martin Street/Church Street. Please note that turning volumes for Martin Street have been estimated using the turning volumes at Sweet Street for analysis purposes. The volumes in Martin Street would probably be lower as this route would not be used for north-south trips (i.e. rat running) based upon the number of residential dwellings within Martin Street and it only provides a connection to Rawson Street which runs east west. The updated Traffic and Parking Impact Assessment has been revised to network those identified intersections.

The summary of the analysis is provided in the following tables. Full SIDRA results are included in **Appendix K** of this report.

Table 3.9.1 Existing Network Model

No	Location	Control	Peak Hour	Level of Service (Los)	Degree of Saturation (DoS)	Average Delay (Av)	95% Back of Queue Length veh	Critical Movement / queue length
3	Swete St/ Church St	R	AM	A	0.455	6.4	0.7 veh 4.7m	RHT from Church St (east) 7.9 secs
3	Swete St/ Church St	R	PM	A	0.344	6.4	0.9 veh 6.4m	RHT from Church St (east) 8.7 secs
3a	Martin St/Church ST	R	AM	A	0.442	7.0	0.8 veh and 5.3m	RHT from Martin St 10 secs
3b			PM	A	0.344	7.0	0.9 veh 6.3m	RHT from Martin St 9.8 secs
4	Church St/ Bachell Ave	S	AM	B	0.626	13.3	1.9veh 13.1m	RHT Bachell Ave 20.7 secs
4	Church St/ Bachell Ave	S	PM	B	0.658	16.6	3.1veh 21.4m	THRU Church St (west) 23.2 secs

NOTES:-
S = SIGNALS G = GIVEWAY R = ROUNDABOUT

1) Degree of Saturation is the ratio of demand to capacity for the most disadvantaged movement.
2) Average delay is the delay experienced on average by all vehicles. The value in brackets represents the delay to the most disadvantaged movement.
3) Level of Service is a qualitative measure of performance describing operational conditions. There are six levels of service, designated from A to F, with A representing the best operational condition and level of service F the worst. The LoS of the intersection is shown in bold, and the LoS of the most disadvantaged movement is shown in brackets.

- The results in Intersection Summary show NA in the LoS summary however review of the movement summary demonstrates that priority movements operate with plenty of spare capacity.
- Approach refers to the approach direction to the intersection. For each Arthur Street East Approach is the eastern side of Arthur Street to the intersection of Railway Street.

(3.9 Continued)

Table 3.9.2 Existing plus Background Traffic Growth-2032 Network Model

No	Location	Control	Peak Hour	Level of Service (Los)	Degree of Saturation (DoS)	Average Delay (Av)	95% Back of Queue Length veh	Critical Movement / queue length
3	Swete St/ Church St	R	AM	A	0.455	6.4	0.8 veh 5.4m	RHT from Church St (east) 8.7 secs
3	Swete St/ Church St	R	PM	A	0.344	6.4	0.9 veh 6.4m	RHT from Church St (east) 8.7 secs
3a	Martin St/Church ST	R	AM	A	0.442	7.0	0.8 veh and 5.3m	RHT from Martin St 10 secs
3b			PM	A	0.344	7.0	0.9 veh 6.3m	RHT from Martin St 9.8 secs
4	Church St/ Bachell Ave	S	AM	B	0.626	13.3	1.9veh 13.9m	RHT Bachell Ave 20.7 secs
4	Church St/ Bachell Ave	S	PM	B	0.658	16.6	3.1veh 21.4m	THRU Church St (west) 23.2 secs

NOTES:-
S = SIGNALS G = GIVEWAY R = ROUNDABOUT

1) Degree of Saturation is the ratio of demand to capacity for the most disadvantaged movement.
2) Average delay is the delay experienced on average by all vehicles. The value in brackets represents the delay to the most disadvantaged movement.
3) Level of Service is a qualitative measure of performance describing operational conditions. There are six levels of service, designated from A to F, with A representing the best operational condition and level of service F the worst. The LoS of the intersection is shown in bold, and the LoS of the most disadvantaged movement is shown in brackets.
   - The results in Intersection Summary show NA in the LoS summary however review of the movement summary demonstrates that priority movements operate with plenty of spare capacity.
   - Approach refers to the approach direction to the intersection. For each Arthur Street East Approach is the eastern side of Arthur Street to the intersection of Railway Street.

There is very little change over 10 years to the networked intersections. Small changes in queue length were recorded in the Swete Street/Church Street Intersection.

(3.9 Continued)

The future networked intersections include the intersection of the proposed driveway roundabout. The site access is operating with plenty of spare capacity under networked conditions. There is a change in average delay form the intersection of Bachell Avenue and Church Street in the PM Peak Hour of 5.3 seconds.

Table 3.9.3 Existing Plus Future Development Traffic Network Model

No	Location	Control	Peak Hour	Level of Service (Los)	Degree of Saturation (DoS)	Average Delay (Av)	95% Back of Queue Length veh	Critical Movement / queue length
3	Swete St/ Church St	R	AM	A	0.563	6.3	0.8 veh 5.8m	RHT from Swete St(east) 9.3s
3	Swete St/ Church St	R	PM	A	0.471	6.2	1.5 veh 10.3m	RHT from Church St (east) 8.8 secs
3a	Martin St/Church ST	R	AM	A	0.584	7.3	0.9 veh and 6.6m	RHT from Martin St 11.5 secs
3b			PM	A	0.489	7.0	0.7 veh 4.9m	RHT from Martin St 10 secs
4	Church St/ Bachell Ave	S	AM	B	0.504	12.5	2.3veh 16.4m	RHT Bachell Ave 21.1 secs
4*	Church St/ Bachell Ave	S	PM	C	0.810	21.9	3.9veh 27.4m	THRU Church St (west) 31.3 secs
5	Site Access	S	AM	A	0.403	6.5	0eh 0.1ps m	RHT Rawson St 11.6secs
5	Site Access	S	PM	A	0.471	6.9	1.2veh 8.1mmm	RHT Site Access 12.3s

NOTES:-
S = SIGNALS G = GIVEWAY R = ROUNDABOUT

1) Degree of Saturation is the ratio of demand to capacity for the most disadvantaged movement.
2) Average delay is the delay experienced on average by all vehicles. The value in brackets represents the delay to the most disadvantaged movement.
3) Level of Service is a qualitative measure of performance describing operational conditions. There are six levels of service, designated from A to F, with A representing the best operational condition and level of service F the worst. The LoS of the intersection is shown in bold, and the LoS of the most disadvantaged movement is shown in brackets.
   - The results in Intersection Summary show NA in the LoS summary however review of the movement summary demonstrates that priority movements operate with plenty of spare capacity.
   - Approach refers to the approach direction to the intersection. For each Arthur Street East Approach is the eastern side of Arthur Street to the intersection of Railway Street.

3.10 Delivery / Service Vehicles

The following gross floor area will facilitate a requirement for delivery based on a gross floor area of **25915 sqm**.

The provision for delivery and service vehicles in *Table 2* in *Part G3 Traffic Parking, Transport and Access* in *Cumberland DCP* is the same as *Table 1* in the *RMS Guide to Traffic Generating Developments*. The Delivery Loading requirements based on *Table 2 Part G3* and *Table 1* in *RMS Guide to Traffic Generating Developments* are listed in **Table 3.8**. A Loading Dock Management Plan **Report No 04/23** is provided with details of the access, security and management of all loading spaces within the development.

Table 3.10a Delivery Loading Requirements

	Use	Area m2 GFA	Area m2 GFA	Rate - CDCP	Rate PART G3 - CDCP-2021	Total	RMS-Rate	RMS	Total
Note 1*	Specialised Retail	3432	3432	Not listed		1.20			1.20
Note 2*	Light Industries	1813	1813	1/800 sqm	0.00125	2.27	1/800 sqm	0.00125	2.27
Note 2*	High Technology 2	7112	7112	1/800 sqm	0.00125	8.89	1/800 sqm	0.00125	8.89
	Food and Drink	1167	2685	1/400 sqm up to 2000sqm, plus 1/1000sqm	0.0025	5.86	1/400 sqm up to 2000sqm, plus 1/1000sqm	0.0025 x 2000+0.001 x 855	5.86
	Food and Drink Restaurant	1359							
	Café	159							
	Gym	863	863	1/2000 sqm	0.0005	0.44	1/2000 sqm	0.0005	0.44
	Health Services	2535	2535	1/2000 sqm	0.0005	1.35	1/2000 sqm	0.0005	1.35
	Office Premises	6041	6041	1/4000 up to 8000sqm	0.00025	1.51	1/4000 < 20,000sqm	0.00025	1.51
Note 4*	Self Storage	392	392	Not listed	0.0005	0.20	1/2000 sqm	0.0005	0.20
	Centre Base Childcare Facility	711	711	1/2000 sqm	0.0005	0.36	1/2000 sqm	0.0005	0.36
Note 3*	Dog Daycare	303	303	Not listed		0.07	1/4000 sqm 0.00025	0.00025	0.07
	Care Taker Residence	28	28	1/Dwelling	-	0.00			0.00
Note 5*	**Total**		**25915**			**22.14**			**22.14**
	Total excluding Light Industry Tenancies					**19.87**			**19.87**
	Rounded Up					**20**			**20**

Note 1* A pro-rata rate of 0.149 x 8 bays= 1.2 bays based upon survey data at a Specialised retail centre. This equates to 1.2 service bays. Report No 18-23 prepared by this firm on Parking Utlisation and Capacity Analysis of Loading Facilities for Specialised Retail.

Note 2* Light and Hight Technology units have parking within tenancy space on Ground Floor (11) and Level 2 (13

Note 3* RMS Rate for commercial applied to Dog Daycare

Note 4* This use does not have an attributable gross floor area as defined by the Cumberland LEP 2021, however is included as it generates parking demand and trip generation.

Note 5* Total GFA includes lobbies and toilets but excludes self storage = 28,075m^2.

(3.10 continued.)

Table 3.10b Loading Bay Provision

PROVISION	HRV	MRV	SRV	B99	Ambulance	Total
B2				1		1
B1				2		3
LG			6	5	1*	11*
GROUND		4				5
LEVEL 2			1			1
Total		**4**	**7**	**8**	**1**	**20***

*Includes ambulance bay used for recreation facility/gym and health services.

A total of 4/MRV's, 7/SRV's and 8/B99 vehicle loading bays have been provided plus a further 24 bays suitable for B99 or SRV vehicles have been provided in the Workspaces (Light Industry) units on the ground floor and level 2. Hence the 19 loading bays plus a potential further 24 in the Light Industry units are considered adequate for this development.

These 24 spaces are excluded in the car parking provision, and these spaces can be used by small rigid vehicles for loading for individual tenancies.

4.0 GEOMETRIC DESIGN OF CAR PARKS AND RAMPS

4.1 General

Access for MRV trucks is provided from the northern end of the site from Bachell Ave. MRV access is also required to service the garbage room at Level 2 and access is from the southern entrance in Bachell Avenue. SRV access is provided from the southern entrance for SRV and B99 vehicles. There are SRV and B99 Loading Bays on the Lower Ground Floor. There is 1 loading bay for a B99 vehicle on Basement 2 and 3 loading bays for a B99 vehicle on Basement 1.

If a MRV (medium rigid vehicle) does travel up to Level 2 the ramps are designed to accommodate this vehicle, should it enter Level 2 accidentally. Swept paths showing MRV vehicles on the ramp to Level 2 checked using Autoturn Pro software as shown on Drawing Sheet No **1194-1-22-19** in **Appendix F**.

4.2 Geometric Design of Car Parks

The minimum aisle width on parking levels B2, B1 and Lover Ground Floor is 5.8 metres, and the parking bays are 2.6 wide by 5.4 metres long. The parking bay widths are clear of columns. The external face of the columns are set back 750mm from the end of the parking bays. The car park layout complies with User Class 3 in *Table 1.1* and *Figure 2.2* in *AS/NZS 2890.1*.

4.3 Swept Path Analysis

The swept path figures are included in **Appendix F**.

The swept paths for a B99 vehicle to enter and exit from Basements B1 and B2 via the lower ground floor to Bachell Avenue are shown in Drawing No**1194-1-22-02, 1194-1-22-03, 1194-1-22-05 and 1194-1-22-06.**

The swept paths of a SRV vehicle to enter and exit from the Lower Ground Floor are shown on drawing **1194-1-22-08 and 1194-1-22-09.**

The swept paths of a MRV vehicle entering and exiting from the two MRV loading bays near the garbage room at Ground Level are shown on drawing **1194-1-22-14,** and **1194-1-22-16.**

The swept paths of a MRV vehicle negotiating the ramps for entry to and exit from Level 2 are shown on drawing No **1194-1-22-16.**. The swept paths of a MRV vehicle entering and exiting from the unloading area near the garbage room on Level 2 are shown in **1194-1-22-20.**

The swept paths of a MRV vehicle entering and exiting from the Ground Floor Level to Bachell Ave at the northern end of the site are shown on Drawing **1194-1-22-Sheet 16.**

4.4 Ramp Gradients

The ramp gradient of 1 in 5 over 13.5 metres with 1 in 8 transitions 2 metres long at the top and bottom of the ramp are shown on the architects' drawings DA102, DA101 and DA100 for the ramps from Lower Ground Floor to Basement 1 and from Basement 1 to Basement 2. The gradients comply with *AS/NZS 2890.1* for B99 vehicle access.

The ramp gradients for the ramps from Bachell Avenue to the unloading area on Level 2 are shown in **1194-1-22-19** (in **appendix F**) and comply with maximum gradient of 15.4% and provide transitions from grade changes of 6.25% over 7 metres as required for MRV vehicles in *Table 3.2* and *3.3* in *AS 2890.2.*

5.0 SUMMARY

- The report has been prepared in support of a development application for business development.

- The proposed business development based upon architects' plans comprises specialised retail, light industry, warehousing, high technology, dog daycare, office, food and drink, health services, childcare and gymnasium totaling **25915m^2**. The total Site GFA including Lobbies and toilets is 25,078m^2.

- Peak hour traffic counts were conducted at 5 intersections in November and December 2022 on approach and departure routes from the proposed site. SIDRA analysis showed that the Church Street/Railway Street intersection was operating at Level of Service F in the AM and D in the PM peak hours.

- The other 4 intersections were providing satisfactory performance with spare capacity.

- The car parking requirement to comply with the *Cumberland Council DCP 2021 Part G3* is approximately **542 spaces**. The architects' plans show **496** car parking spaces including 2 car share spaces and 1 ride share space plus **12** motorbike spaces and **82** bicycle parking spaces. In addition to the car parking provided there are 24 light industry loading spaces. If there are added into the total supply this brings the total to **520** car parking spaces. Each car share space is the equivalent of 10 car parking spaces plus the ride share space.

- Vehicular access is proposed to and from Bachell Avenue at two locations.

- The peak traffic volume generated by the development was modelled for a higher number of vehicles. There has been a reduction in traffic generated by the development of 26.7 vehicles in the AM Peak Hour and 23.2 vehicles in the PM Peak Hour. The revised traffic generation is **343** vehicles in the AM Peak hour and **423** vehicles in the PM Peak Hour.

- A network model has been provided to intersections in closest proximity and is contained in **Appendix K** of this report. The network is operating with spare capacity in the morning and evening peak hours.

- Additional analysis for car parking demand has been based on use traffic generation profiles which shows that the peak car parking demand for each use is offset and that the peak weekday demand occurs at 8:00am with 341 spaces.

- Detailed trip distribution and assignment to the road network is included in the Supplementary Technical **Report No 15-23** included in **Appendix I** of this report.

(5.0 continued.)

- The volumes have been assigned to the Road Network and SIDRA analysis has been carried out. The Railway Street/Church Street is currently operating at Level of Service F in the AM and D in the PM peak hours. Traffic volumes generated by this development do not change the Level of Service and only increase the average delay in the AM peak hour by 2 seconds. There is no change to the Level of Service at the other intersections in the future as they are operating within plenty of space capacity.

- Based upon *RMS Guidelines* and *Cumberland Council DCP 2021 Part G3*, 22 spaces are required for delivery/service vehicles. 20 spaces have been provided and there are a further 25 bays suitable for B99 and SRV vehicles in the Light Industry Units.

- A Loading Management Plan has been prepared as **Report No 04/23**.

- A Green Travel Plan **Report No 14/23** has been provided to increase travel by other modes such as walking and cycling and to reduce car travel dependency.

- This assessment has found that all intersections within the vicinity of the site operate satisfactorily under existing and future conditions and under full development, with the exception of the Church Street/ Railway Street intersection that is already operating at LoS F in the AM peak hour.

- Background Traffic Growth to 2032 shows that capacity constraints continue at the intersection of Church Street and Railway Street.

- The intersection of Church St/Railway Street Bridge located 890 metres to the west of the intersection of Church Street/Railway Street operates at Level of Service A in both peak hours in the future and is an alternative route for drivers travelling eastbound. As the intersection of Church Street/Railway Street reaches capacity, driver behaviour would indicate that the fastest route without delays will be sought.

- A mitigation option to improve the existing operational performance at the intersection of Church Street/Railway Street Intersection is investigated in **Appendix G** and would change the operational Level of Service to C in the AM and A in the PM peak hours.

APPENDICES

APPENDIX A

two form
ARCHITECTURE + INTERIOR DESIGN
Suite 203 level 2 34 Charles Street Parramatta NSW 2150
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CAR PARKING :	187
ACCESSIBLE CAR PARKING :	2
B99 LOADING BAYS :	1
MOTORBIKES :	10
BICYCLE SPACES :	5

the HUB @ LIDCOMBE

PROJECT:
THE HUB @ LIDCOMBE

DRAWING:
BASEMENT 2 FLOOR PLAN

ADDRESS:
2 BACHELL AVENUE LIDCOMBE

CLIENT:
PACIFIC PLANNING

STATUS:
RFI RESPONSE

JOB No.		ISSUE DATE:
18107.3		18.09.2024
DWG. NO: DA 100	SCALE: 1:250 AT A1 1:500 AT A3	REV: B

two form
ARCHITECTURE + INTERIOR DESIGN
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CAR PARKING :	180
ACCESSIBLE CAR PARKING :	2
B99 LOADING BAYS :	2
MOTORBIKES :	5
BICYCLE SPACES :	32

the HUB @ LIDCOMBE

PROJECT:
THE HUB @ LIDCOMBE

DRAWING:
BASEMENT 1 FLOOR PLAN

ADDRESS:
2 BACHELL AVENUE LIDCOMBE

CLIENT:
PACIFIC PLANNING

STATUS:
RFI RESPONSE

JOB No.		ISSUE DATE:
18107.3		18.09.2024
DWG. NO:	SCALE:	REV:
DA 101	1:250 AT A1 1:500 AT A3	B

two form
ARCHITECTURE + INTERIOR DESIGN
Suite 203 level 2 34 Charles Street Parramatta NSW 2150
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LEGEND

- SELF STORAGE 392 m²
- RECREATION FACILITY (INDOOR) GYM 596 m²

NOTE: CCC - CHILDCARE CENTRE PARKING
27 CAR SPACES PROVIDED

CAR PARKING :	109
ACCESSIBLE CAR PARKING :	7
SRV LOADING BAYS :	6
B99 LOADING BAYS :	5
RIDE SHARE SPACE :	1
CAR SHARE SPACES :	2
BICYCLE SPACES :	45

the HUB @ LIDCOMBE

PROJECT:
THE HUB @ LIDCOMBE

DRAWING:
LOWER GROUND FLOOR

ADDRESS:
2 BACHELL AVENUE LIDCOMBE

CLIENT:
PACIFIC PLANNING

STATUS:
RFI RESPONSE

JOB No.
18107.3

ISSUE DATE:
18.09.2024

DWG. NO:
DA 102

SCALE:
1:250 AT A1
1:500 AT A3

REV:
B

two form
ARCHITECTURE + INTERIOR DESIGN
Suite 203 level 2 34 Charles Street Parramatta NSW 2150
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LEGEND

SPECIALISED RETAIL PREMISES	904 m²	RECREATION FACILITY (INDOOR) GYM	267 m²	NEIGHBOURHOOD SHOP	28 m²
FOOD AND DRINK INDUSTRIES	1167 m²	WORKSPACES (LIGHT INDUSTRY)	753 m²		

AMBULANCE BAY :	1
MRV LOADING BAYS :	4

the HUB @ LIDCOMBE

PROJECT:
THE HUB @ LIDCOMBE

DRAWING:
GROUND FLOOR

ADDRESS:
2 BACHELL AVENUE LIDCOMBE

CLIENT:
PACIFIC PLANNING

STATUS:
RFI RESPONSE

JOB No.		ISSUE DATE:
18107.3		18.09.2024
DWG. NO:	SCALE:	REV:
DA 103	1:250 AT A1 1:500 AT A3	B

BACHELL AVENUE

D1.02
D1.01
RL 17.60
D1.03
VOID
LOBBY
RL 17.60
TERRACE
C1.01
C1.02
C1.03
C1.05
VOID
C1.04
CG.05
CG.04
CG.03
CG.02
CG.01
VOID
BRIDGE ABOVE
RL 17.60
WALKWAY ABOVE
A1.01
VOID
LOBBY
RL 17.60
LIFT 3
LIFT 4
LOBBY
RL 16.90
B1.04
B1.03
B1.02
B1.01
FEMALE
MALE
AG.05
AG.06
AG.07
AG.08
AG.09
AG.10
AG.11
AG.12
BG.07
BG.06
BG.05
VOID

LEGEND

- SPECIALISED RETAIL PREMISES 1115 m²
- FOOD AND DRINK INDUSTRIES 1359 m²
- HEALTH & COMMUNITY 525 m²

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the HUB @ LIDCOMBE

PROJECT:
THE HUB @ LIDCOMBE

DRAWING:
LEVEL 1 FLOOR PLAN

ADDRESS:
2 BACHELL AVENUE LIDCOMBE

CLIENT:
PACIFIC PLANNING

STATUS:
RFI RESPONSE

JOB No.		ISSUE DATE:
18107.3		18.09.2024
DWG. NO:	SCALE:	REV:
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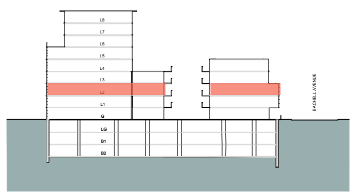

two form
ARCHITECTURE + INTERIOR DESIGN

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LEGEND

SPECIALISED RETAIL PREMISES	803 m^2
WORKSPACES (LIGHT INDUSTRY)	926 m^2
HIGH TECHNOLOGY INDUSTRY	2216 m^2

PROJECT:
THE HUB @ LIDCOMBE

DRAWING:
LEVEL 2 FLOOR PLAN

ADDRESS:
2 BACHELL AVENUE LIDCOMBE

CLIENT:
PACIFIC PLANNING

STATUS:
RFI RESPONSE

JOB No.		ISSUE DATE:
18107.3		18.09.2024
DWG. NO:	SCALE:	REV:
DA 105	1:250 AT A1 1:500 AT A3	B

LEGEND

- SPECIALISED RETAIL PREMISES 610 m²
- HIGH TECHNOLOGY INDUSTRY 1621 m²
- WORKSPACES (LIGHT INDUSTRY) 66 m²
- HEALTH & COMMUNITY 1005 m²

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PROJECT:
THE HUB @ LIDCOMBE

DRAWING:
LEVEL 3 FLOOR PLAN

ADDRESS:
2 BACHELL AVENUE LIDCOMBE

CLIENT:
PACIFIC PLANNING

STATUS:
RFI RESPONSE

JOB No.		ISSUE DATE:
18107.3		18.09.2024
DWG. NO:	SCALE:	REV:
DA 106	1:250 AT A1 1:500 AT A3	B

LEGEND

HIGH TECHNOLOGY INDUSTRY 3275 m²

HEALTH & COMMUNITY 1005 m²

two form
ARCHITECTURE + INTERIOR DESIGN
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PROJECT:
THE HUB @ LIDCOMBE

DRAWING:
LEVEL 4 FLOOR PLAN

ADDRESS:
2 BACHELL AVENUE LIDCOMBE

CLIENT:
PACIFIC PLANNING

STATUS:
RFI RESPONSE

JOB No.		ISSUE DATE:
18107.3		18.09.2024
DWG. NO:	SCALE:	REV:
DA 107	1:250 AT A1 1:500 AT A3	B

two form
ARCHITECTURE + INTERIOR DESIGN
Suite 203 level 2 34 Charles Street Parramatta NSW 2150
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LEGEND

- CENTRE-BASED CHILDCARE FACILITY 711 m²
- FOOD AND DRINK INDUSTRIES 159 m²
- OFFICE 1487 m²

the HUB @ LIDCOMBE

PROJECT:
THE HUB @ LIDCOMBE

DRAWING:
LEVEL 5 FLOOR PLAN

ADDRESS:
2 BACHELL AVENUE LIDCOMBE

CLIENT:
PACIFIC PLANNING

STATUS:
RFI RESPONSE

JOB No.		ISSUE DATE:
18107.3		18.09.2024
DWG. NO:	SCALE:	REV:
DA 108	1:250 AT A1 1:500 AT A3	B

LEGEND

OFFICE 2191 m²

two form
ARCHITECTURE + INTERIOR DESIGN
Suite 203 level 2 34 Charles Street Parramatta NSW 2150
p 02 9098 8921 e info@twoform.com.au twoform.com.au

the HUB @ LIDCOMBE

PROJECT:
THE HUB @ LIDCOMBE

DRAWING:
LEVEL 6 FLOOR PLAN

ADDRESS:
2 BACHELL AVENUE LIDCOMBE

CLIENT:
PACIFIC PLANNING

STATUS:
RFI RESPONSE

JOB No.		ISSUE DATE:
18107.3		18.09.2024
DWG. NO:	SCALE:	REV:
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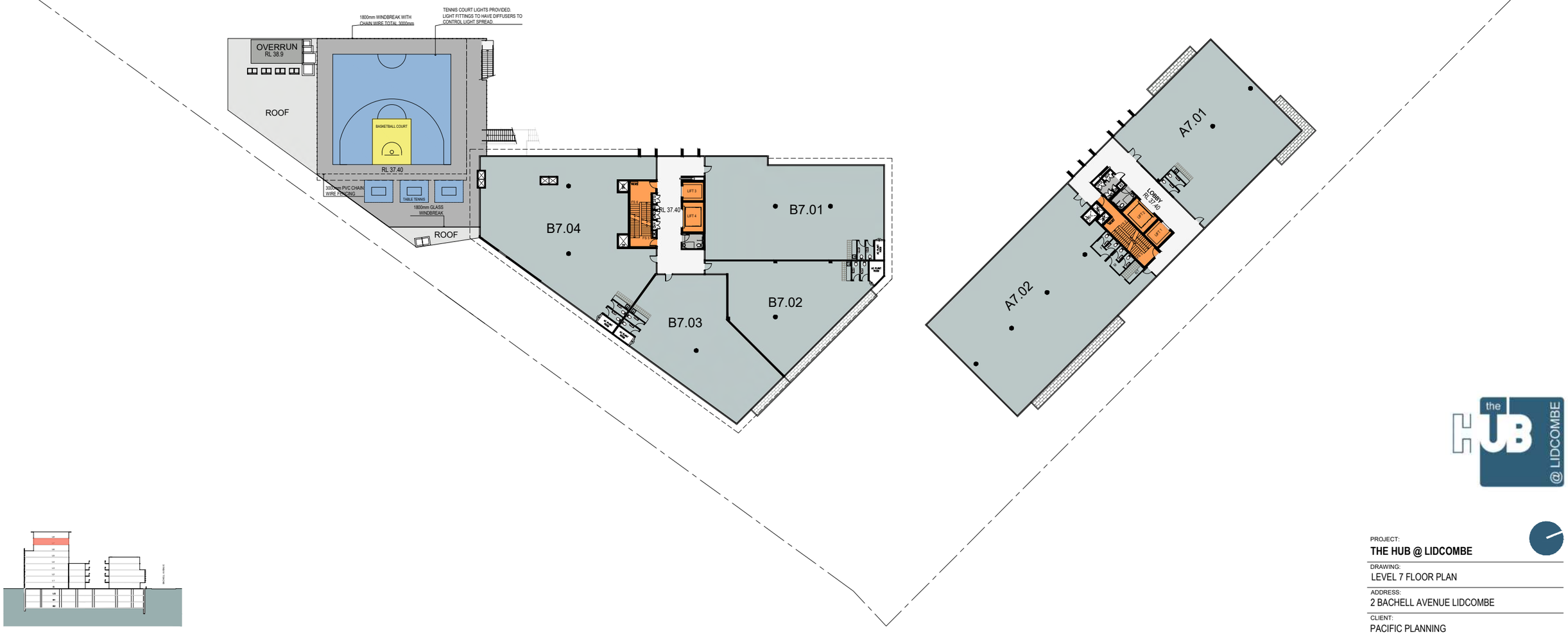

two form
ARCHITECTURE + INTERIOR DESIGN
Suite 203 level 2 34 Charles Street Parramatta NSW 2150
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LEGEND

OFFICE 1680 m²

the HUB @ LIDCOMBE

PROJECT:
THE HUB @ LIDCOMBE

DRAWING:
LEVEL 7 FLOOR PLAN

ADDRESS:
2 BACHELL AVENUE LIDCOMBE

CLIENT:
PACIFIC PLANNING

STATUS:
RFI RESPONSE

JOB No.		ISSUE DATE:
18107.3		18.09.2024
DWG. NO:	SCALE:	REV:
DA 110	1:250 AT A1 1:500 AT A3	B

two form
ARCHITECTURE + INTERIOR DESIGN
Suite 203 level 2 34 Charles Street Parramatta NSW 2150
p 02 9098 8921 e info@twoform.com.au twoform.com.au

LEGEND

	OFFICE	683 m^2
	DOG DAYCARE	303 m^2

the HUB @ LIDCOMBE

PROJECT:
THE HUB @ LIDCOMBE

DRAWING:
LEVEL 8 FLOOR PLAN

ADDRESS:
2 BACHELL AVENUE LIDCOMBE

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JOB No.		ISSUE DATE:
18107.3		18.09.2024
DWG. NO:	SCALE:	REV:
DA 111	1:250 AT A1 1:500 AT A3	B

APPENDIX B

Lyle Marshall Partners
PHONE (02) 9436 0086

INTERSECTION: CHURCH ST/RAILWAY ST

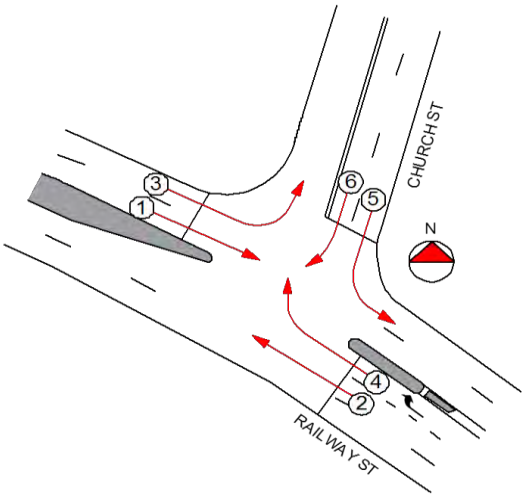
TRAFFIC VOLUME COUNT

DAY: . ..... DATE: .....WEATHER.....OBSERVER.....

07/12/22

Fine

MC



Time AM	MOVEMENT NUMBER											
	1	QV	2	QV	3	QV	4	QV	5	QV	6	QV
8:00AM TO 8.15AM	244	10	152	3	12		27	2	49		8	8
8:15AM TO 8:30AM	265	14	152	5	11		25	4	47		11	7
8:30AM TO 8:45AM	321	11	149	6	11		38	3	65		15	8
8:45AM TO 9:00AM	335	12	195	5	10		45	3	52		14	5

QV = Maximum number of queued vehicles

QV volumes checked 20/5/21

	1	QV	w	QV	3	QV	4	QV	5	QV	6	QV
8:00-9:00am	1165	47	648	19	44	0	135	12	213	0	48	28

Lyle Marshall Partners
PHONE (02) 9436 0086

INTERSECTION: CHURCH ST/RAILWAY ST

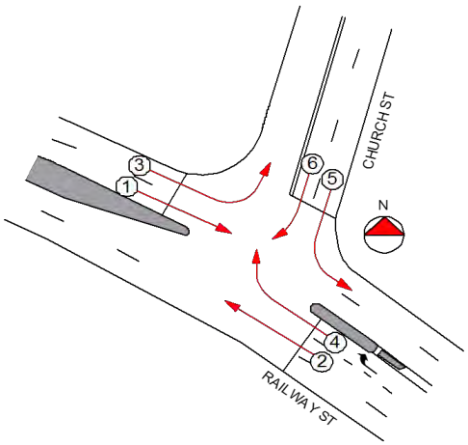
TRAFFIC VOLUME COUNT

DAY: . ..... DATE: .....WEATHER.....OBSERVER.....

17/11/22

Fine

MC



Time AM	MOVEMENT NUMBER											
	1	QV	2	QV	3	QV	4	QV	5	QV	6	QV
4.00PM TO 4.15PM	228	5	254	12	9	3	47	3	38	10	26	5
4.15PM TO 4.30PM	228	6	198	9	4	2	31	3	60	6	17	7
4.30PM TO 4.45PM	211	14	160	9	5	1	33	2	71	5	15	5
4.45PM TO 5.00PM	226	10	165	8	3	0	41	4	76	8	16	7
5.00PM TO 5.15PM	206	10	176	10	9	0	26	5	95	11	17	6
5.15PM TO 5.30PM	254	9	195	11	5	0	35	3	81	5	20	10
5.30PM TO 5.45PM	263	12	197	10	7	0	75	4	88	8	22	11
5.45PM TO 6.00PM	235	8	185	8	6	0	59	6	75	10	17	5

QV = Maximum number of queued vehicles

QV volumes checked 20/5/21

	1	QV	w	QV	3	QV	4	QV	5	QV	6	QV
4:00-5:00pm	893	35	777	38	21	6	152	12	245	29	74	24
4:15-5:15pm	871	40	699	36	21	3	131	14	302	30	65	25
4:30-5:30pm	897	43	696	38	22	1	135	14	323	29	68	28
4:45-5:45pm	949	41	733	39	24	0	177	16	340	32	75	34
5:00-6:00pm	958	39	753	39	27	0	195	18	339	34	76	32

Lyle Marshall Partners
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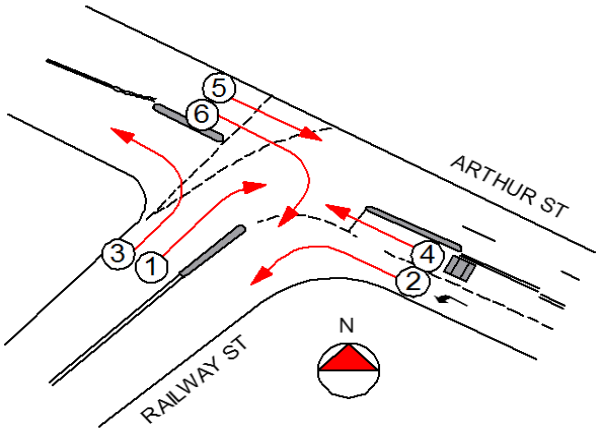
INTERSECTION: ARTHUR ST/RAILWAY ST

TRAFFIC VOLUME COUNT

DAY: . ..... DATE: .....WEATHER.....OBSERVER.....
17/11/22

Fine

PF



Time AM	MOVEMENT NUMBER 1	2	3	4	5	6
7:00AM TO 7.15AM	278	145	4	4	3	1
7:15AM TO 7.30AM	310	132	5	4	1	0
7:30AM TO 7.45AM	411	159	2	3	2	0
7:45AM TO 8.00AM	402	191	4	5	2	1
8:00AM TO 8.15AM	395	162	4	2	3	2
8:15AM TO 8:30AM	315	171	2	3	4	2
8:30AM TO 8:45AM	452	210	2	4	2	0
8:45AM TO 9:00AM	375	276	3	3	2	2

	1	2	3	4	5	6
7-8:00am	1401	627	15	16	8	2
7:15-8:15am	1518	644	15	14	8	3
7:30-8:30am	1523	683	12	13	11	5
7:45-8:45am	1564	734	12	14	11	5
8:00-9:00am	1537	819	11	12	11	6

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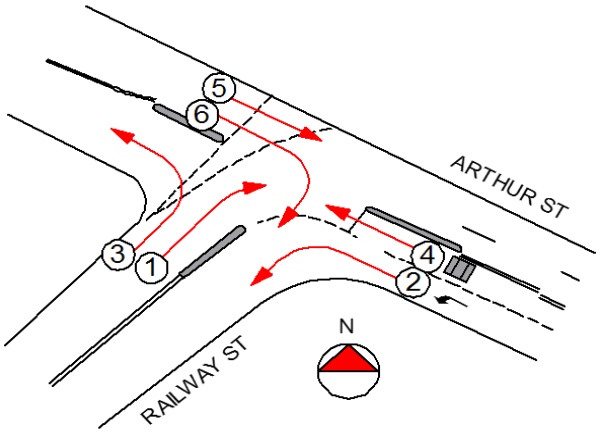
INTERSECTION: ARTHUR ST/RAILWAY ST

TRAFFIC VOLUME COUNT

DAY: . ..... DATE: .....WEATHER.....OBSERVER.....
17/11/22

Fine

PF



Time	MOVEMENT NUMBER					
AM	1	2	3	4	5	6
4.00PM TO 4.15PM	272	304	3	3	0	1
4.15PM TO 4.30PM	285	225	2	2	2	1
4.30PM TO 4.45PM	284	241	1	2	3	2
4.45PM TO 5.00PM	299	199	2	1	4	2
5.00PM TO 5.15PM	287	210	2	2	2	1
5.15PM TO 5.30PM	298	251	3	3	3	4
5.30PM TO 5.45PM	335	253	1	2	1	3
5.45PM TO 6.00PM	305	241	1	2	1	1

	1	2	3	4	5	6
4:00-5:00pm	1140	969	8	8	9	6
4:15-5:15pm	1155	875	7	7	11	6
4:30-5:30pm	1168	901	8	8	12	9
4:45-5:45pm	1219	913	8	8	10	10
5:00-6:00pm	1225	955	7	9	7	9

Lyle Marshall Partners
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INTERSECTION: CHURCH ST/BACHELL AVE

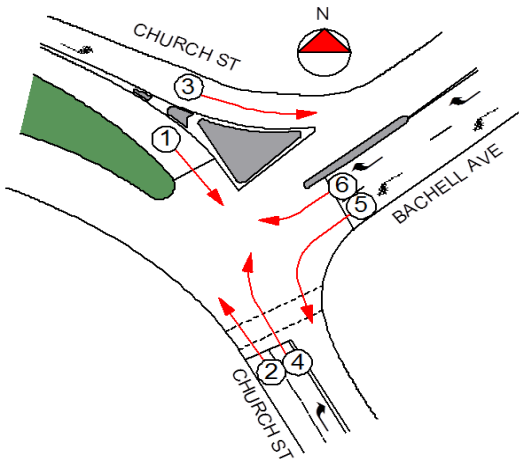
TRAFFIC VOLUME COUNT

DAY: . ..... DATE: .....WEATHER.....OBSERVER.....

07/12/22

Fine

MC



Time AM	MOVEMENT NUMBER						Heavy Vehicles					
	1	2	3	4	5	6	1	2	3	4	5	6
8:00AM TO 8.15AM	27	12	43	13	24	43	2	2	5	1	1	6
8:15AM TO 8:30AM	40	26	77	20	25	56	2	3	5	1	1	6
8:30AM TO 8:45AM	39	63	48	30	22	28	1	2	4	2	0	4
8:45AM TO 9:00AM	49	39	53	39	29	36	2	1	4	2	1	5

	1	2	3	4	5	6
8:00-9:00am	155	140	221	102	100	163

Lyle Marshall Partners
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INTERSECTION: CHURCH ST/BACHELL AVE

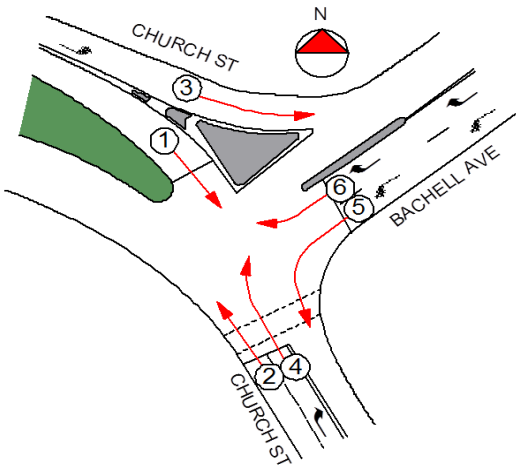
TRAFFIC VOLUME COUNT

DAY: . ..... DATE: .....WEATHER.....OBSERVER.....

05/12/22

Fine

MC



Time AM	Light Vehicles						Heavy Vehicles					
	1	2	3	4	5	6	1	2	3	4	5	6
4.45PM TO 5.00PM	43	50	49	12	27	106	3	2	1	3	2	2
5.00PM TO 5.15PM	43	48	40	7	35	113	1	0	4	1	2	1
5.15PM TO 5.30PM	56	46	39	13	31	110	0	1	3	0	2	4
5.30PM TO 5.45PM	48	19	34	19	27	89	1	0	2	2	1	3

	1	2	3	4	5	6
4:45-5:45pm	190	163	162	51	120	418

Lyle Marshall Partners
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INTERSECTION: CHURCH ST/RAILWAY ST BRIDGE

TRAFFIC VOLUME COUNT

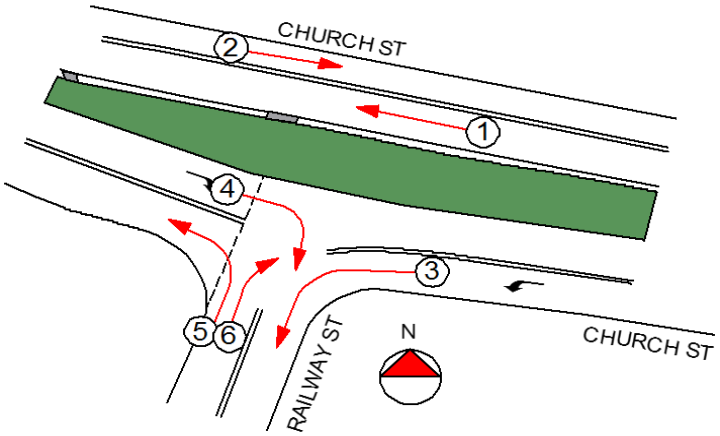
DAY: . ..... DATE: .....WEATHER.....OBSERVER.....

18/11/22

Fine

PF (at grade)

HF (on bridge)



				4	3	1	2
Time	**MOVEMENT NUMBER**						
AM	**1**	**2**	**3**	**4**	**5**	**6**
7:00AM TO 7.15AM	33	18	37	56	42	88
7:15AM TO 7.30AM	41	19	42	37	49	77
7:30AM TO 7.45AM	39	35	65	50	51	131
7:45AM TO 8.00AM	42	33	76	52	55	129
8:00AM TO 8.15AM	46	30	87	60	61	113
8:15AM TO 8:30AM	32	33	52	43	49	118
8:30AM TO 8:45AM	35	51	91	66	47	145
8:45AM TO 9:00AM	53	47	85	68	50	121

	1	**2**	**3**	**4**	**5**	**6**
7-8:00am	155	105	220	195	197	425
7:15-8:15am	168	117	270	199	216	450
7:30-8:30am	159	131	280	205	216	491
7:45-8:45am	155	147	306	221	212	505
8:00-9:00am	166	161	315	237	207	497

Lyle Marshall Partners
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INTERSECTION: CHURCH ST/RAILWAY ST BRIDGE

TRAFFIC VOLUME COUNT

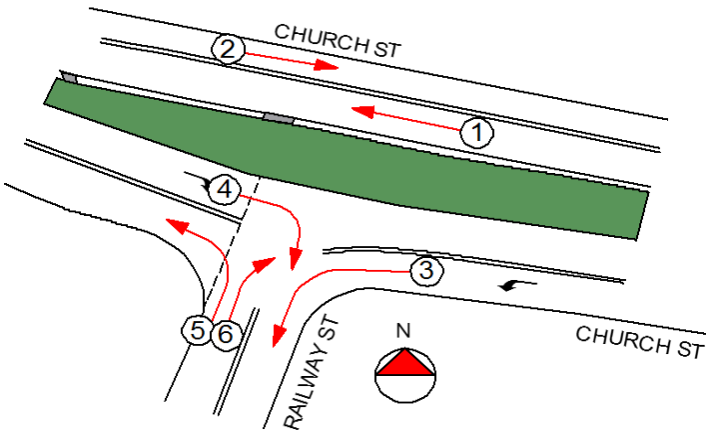
DAY: . ..... DATE: .....WEATHER.....OBSERVER.....

18/11/22

Fine

PF (at grade)

HF (on bridge)



Time AM	MOVEMENT NUMBER					
	1	2	3	4	5	6
4.00PM TO 4.15PM	68	31	111	64	107	74
4.15PM TO 4.30PM	62	30	128	53	87	73
4.30PM TO 4.45PM	59	29	131	51	85	72
4.45PM TO 5.00PM	70	33	166	59	90	73
5.00PM TO 5.15PM	88	36	148	47	88	100
5.15PM TO 5.30PM	84	42	165	51	78	66
5.30PM TO 5.45PM	77	39	171	47	95	40
5.45PM TO 6.00PM	69	40	120	52	97	77

	1	2	3	4	5	6
4:00-5:00pm	259	123	536	227	369	292
4:15-5:15pm	279	128	573	210	350	318
4:30-5:30pm	301	140	610	208	341	311
4:45-5:45pm	319	150	650	204	351	279
5:00-6:00pm	318	157	604	197	358	283

Lyle Marshall & Associates
PHONE (02) 9436 0086

INTERSECTION: CHURCH ST/SWETE ST

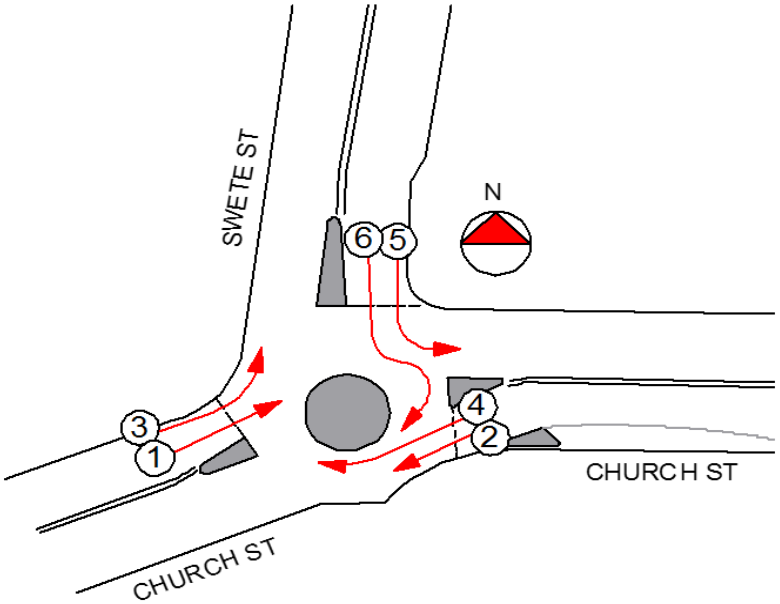
TRAFFIC VOLUME COUNT

DAY: . ..... DATE: .....WEATHER.....OBSERVER.....

07/12/22

Fine

HP



Time AM	MOVEMENT NUMBER					
	1	2	3	4	5	6
8:00AM TO 8.15AM	13	35	65	18	16	36
8:15AM TO 8:30AM	24	35	42	31	27	41
8:30AM TO 8:45AM	74	41	86	45	25	45
8:45AM TO 9:00AM	92	51	112	54	24	54

	1	2	3	4	5	6
8:00-9:00am	203	162	305	148	92	176

Lyle Marshall & Associates
PHONE (02) 9436 0086

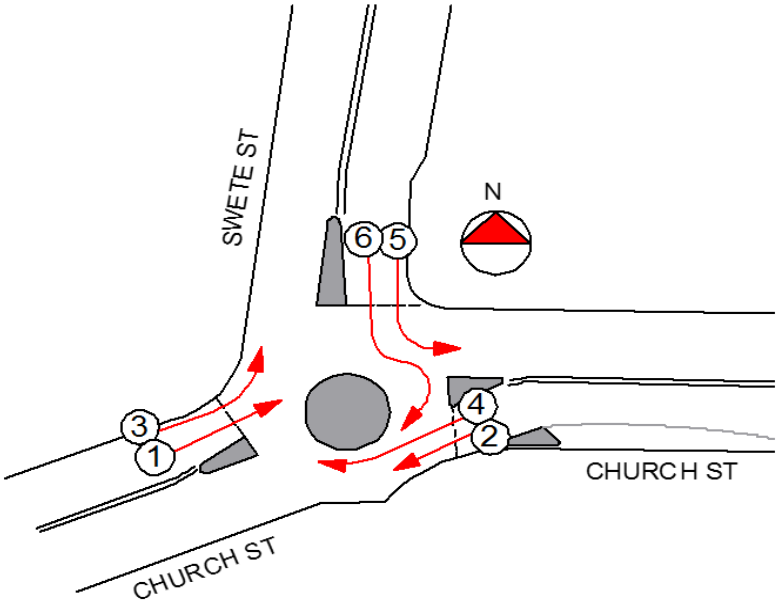
INTERSECTION: CHURCH ST/SWETE ST

TRAFFkC VOLUME COUNT

DAY: . ..... DATE: .....WEATHER.....OBSERVER.....

05/12/22

Fkne
HP



Tkme AM	MOVEMENT NUMBER					
	1	2	3	4	5	6
4.45PM TO 5.00PM	45	54	33	21	24	32
5.00PM TO 5.15PM	40	67	41	20	17	30
5.15PM TO 5.30PM	33	51	29	45	26	45
5.30PM TO 5.45PM	49	49	43	61	20	61

	1	2	3	4	5	6
4:45-5:45pm	167	221	146	147	87	168

APPENDIX C

APPENDIX C
EXISTING SIDRA ANALYSIS

INTERSECTION SUMMARY

Site: 2785 [Existing AM: Church St/Railway St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 7:45-8:45am
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 150 seconds (Site User-Given Phase Times)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Travel Speed (Average)	km/h	15.0	15.0	km/h
Travel Distance (Total)	veh-km/h	2812.1	3374.5	pers-km/h
Travel Time (Total)	veh-h/h	187.9	225.5	pers-h/h
Desired Speed	km/h	60.0		
Speed Efficiency		0.25		
Travel Time Index		1.66		
Congestion Coefficient		4.01		
Demand Flows (Total)	veh/h	2294	2753	pers/h
Arrival Flows (Total)	veh/h	2294		
Percent Heavy Vehicles (Demand)	%	0.0		
Percent Heavy Vehicles (Arrivals)	%	0.0		
Degree of Saturation		1.186		
Practical Spare Capacity	%	-24.1		
Effective Intersection Capacity	veh/h	1934		
Control Delay (Total)	veh-h/h	140.14	168.17	pers-h/h
Control Delay (Average)	sec	219.9	219.9	sec
Control Delay (Worst Lane by MC)	sec	403.4		
Control Delay (Worst Movement by MC)	sec	415.8	415.8	sec
Geometric Delay (Average)	sec	1.1		
Stop-Line Delay (Average)	sec	218.9		
Idling Time (Average)	sec	206.3		
Intersection Level of Service (LOS)		LOS F		
95% Back of Queue - Veh (Worst Lane)	veh	226.3		
95% Back of Queue - Dist (Worst Lane)	m	1583.8		
Ave. Que Storage Ratio (Worst Lane)		1.29		
Effective Stops (Total)	veh/h	3645	4374	pers/h
Effective Stop Rate		1.59	1.59	
Proportion Queued		0.82	0.82	
Performance Index		371.7	371.7	
Cost (Total)	$/h	6411.36	6411.36	$/h
Fuel Consumption (Total)	L/h	399.1		
Carbon Dioxide (Total)	kg/h	938.0		
Hydrocarbons (Total)	kg/h	0.094		
Carbon Monoxide (Total)	kg/h	0.83		
NOx (Total)	kg/h	0.224		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.

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

Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 0.0 %

Number of Iterations: 2 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Main (Timing-Capacity) Iterations: 5.3% 0.0% 0.0%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Demand Flows (Total)	veh/y	1,101,120	1,321,344	pers/y
Delay (Total)	veh-h/y	67,268	80,722	pers-h/y
Effective Stops (Total)	veh/y	1,749,490	2,099,388	pers/y

Travel Distance (Total)	veh-km/y	1,349,787	1,619,745	pers-km/y
Travel Time (Total)	veh-h/y	90,187	108,225	pers-h/y
Cost (Total)	$/y	3,077,453	3,077,453	$/y
Fuel Consumption (Total)	L/y	191,591		
Carbon Dioxide (Total)	kg/y	450,238		
Hydrocarbons (Total)	kg/y	45		
Carbon Monoxide (Total)	kg/y	399		
NOx (Total)	kg/y	107		

1 Hours per Year: 480 (Site)

MOVEMENT SUMMARY

Site: 2785 [Existing AM: Church St/Railway St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 7:45-8:45am
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 150 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Railway St E															
5	T1	All MCs	689	0.0	689	0.0	0.284	15.6	LOS B	12.0	83.9	0.52	0.46	0.52	49.8
6	R2	All MCs	135	0.0	135	0.0	* 0.577	80.5	LOS F	9.8	68.3	1.00	0.78	1.00	25.4
Approach			824	0.0	824	0.0	0.577	26.2	LOS B	12.0	83.9	0.60	0.51	0.60	44.0
North: Church St															
7	L2	All MCs	213	0.0	213	0.0	0.270	36.5	LOS C	9.9	69.4	0.69	0.76	0.69	37.1
9	R2	All MCs	48	0.0	48	0.0	0.040	42.8	LOS D	2.3	16.2	0.71	0.70	0.71	38.0
Approach			261	0.0	261	0.0	0.270	37.7	LOS C	9.9	69.4	0.69	0.75	0.69	36.7
West: Railway St W															
10	L2	All MCs	44	0.0	44	0.0	* 1.186	415.8	LOS F	12.5	87.8	1.00	1.54	3.28	8.9
11	T1	All MCs	1165	0.0	1165	0.0	* 1.186	390.4	LOS F	226.3	1583.8	1.00	2.54	2.97	9.7
Approach			1209	0.0	1209	0.0	1.186	391.3	LOS F	226.3	1583.8	1.00	2.50	2.98	9.7
All Vehicles			2294	0.0	2294	0.0	1.186	219.9	LOS F	226.3	1583.8	0.82	1.59	1.87	15.0

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

* Critical Movement (Signal Timing)

INTERSECTION SUMMARY

Site: 2785 [Existing PM: Church St/Railway St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

PM Peak Hour: 5:00-6:00pm
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 150 seconds (Site User-Given Phase Times)

Intersection Performance - Hourly Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Travel Speed (Average)	km/h	34.2	34.2 km/h
Travel Distance (Total)	veh-km/h	2834.3	3401.2 pers-km/h
Travel Time (Total)	veh-h/h	82.9	99.5 pers-h/h
Desired Speed	km/h	60.0	
Speed Efficiency		0.57	
Travel Time Index		5.22	
Congestion Coefficient		1.76	
Demand Flows (Total)	veh/h	2348	2818 pers/h
Arrival Flows (Total)	veh/h	2348	
Percent Heavy Vehicles (Demand)	%	0.0	
Percent Heavy Vehicles (Arrivals)	%	0.0	
Degree of Saturation		0.974	
Practical Spare Capacity	%	-7.6	
Effective Intersection Capacity	veh/h	2411	
Control Delay (Total)	veh-h/h	35.24	42.28 pers-h/h
Control Delay (Average)	sec	54.0	54.0 sec
Control Delay (Worst Lane by MC)	sec	84.7	
Control Delay (Worst Movement by MC)	sec	94.2	94.2 sec
Geometric Delay (Average)	sec	1.5	
Stop-Line Delay (Average)	sec	52.5	
Idling Time (Average)	sec	45.2	
Intersection Level of Service (LOS)		LOS D	
95% Back of Queue - Veh (Worst Lane)	veh	88.9	
95% Back of Queue - Dist (Worst Lane)	m	622.2	
Ave. Que Storage Ratio (Worst Lane)		0.51	
Effective Stops (Total)	veh/h	2023	2428 pers/h
Effective Stop Rate		0.86	0.86
Proportion Queued		0.81	0.81
Performance Index		179.1	179.1
Cost (Total)	$/h	2950.53	2950.53 $/h
Fuel Consumption (Total)	L/h	252.7	
Carbon Dioxide (Total)	kg/h	593.9	
Hydrocarbons (Total)	kg/h	0.053	
Carbon Monoxide (Total)	kg/h	0.66	
NOx (Total)	kg/h	0.159	

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.

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

Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 0.0 %

Number of Iterations: 2 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Main (Timing-Capacity) Iterations: 5.8% 0.0% 0.0%

Intersection Performance - Annual Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Demand Flows (Total)	veh/y	1,127,040	1,352,448 pers/y
Delay (Total)	veh-h/y	16,913	20,296 pers-h/y
Effective Stops (Total)	veh/y	971,208	1,165,450 pers/y

Travel Distance (Total)	veh-km/y	1,360,481	1,632,578	pers-km/y
Travel Time (Total)	veh-h/y	39,811	47,773	pers-h/y
Cost (Total)	$/y	1,416,254	1,416,254	$/y
Fuel Consumption (Total)	L/y	121,300		
Carbon Dioxide (Total)	kg/y	285,054		
Hydrocarbons (Total)	kg/y	25		
Carbon Monoxide (Total)	kg/y	318		
NOx (Total)	kg/y	76		

1 Hours per Year: 480 (Site)

MOVEMENT SUMMARY

Site: 2785 [Existing PM: Church St/Railway St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

PM Peak Hour: 5:00-6:00pm
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 150 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Railway St E															
5	T1	All MCs	753	0.0	753	0.0	0.310	15.9	LOS B	13.4	93.5	0.54	0.47	0.54	49.6
6	R2	All MCs	195	0.0	195	0.0	* 0.833	84.7	LOS F	14.8	103.5	1.00	0.89	1.17	24.7
Approach			948	0.0	948	0.0	0.833	30.1	LOS C	14.8	103.5	0.63	0.56	0.67	42.2
North: Church St															
7	L2	All MCs	339	0.0	339	0.0	0.450	51.8	LOS D	17.3	121.2	0.76	0.80	0.76	36.1
9	R2	All MCs	76	0.0	76	0.0	0.063	55.5	LOS D	3.7	25.8	0.72	0.72	0.72	37.9
Approach			415	0.0	415	0.0	0.450	52.5	LOS D	17.3	121.2	0.75	0.79	0.75	32.2
West: Railway St W															
10	L2	All MCs	27	0.0	27	0.0	* 0.974	94.2	LOS F	3.3	22.9	1.00	0.96	1.96	28.7
11	T1	All MCs	958	0.0	958	0.0	* 0.974	77.3	LOS F	88.9	622.2	1.00	1.19	1.30	29.6
Approach			985	0.0	985	0.0	0.974	77.7	LOS F	88.9	622.2	1.00	1.19	1.32	29.6
All Vehicles			2348	0.0	2348	0.0	0.974	54.0	LOS D	88.9	622.2	0.81	0.86	0.95	34.2

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

* Critical Movement (Signal Timing)

INTERSECTION SUMMARY

Site: 101 [Existing AM: Railway St/Arthur St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 7:45-8:45am
Site Category: (None)
Stop (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Travel Speed (Average)	km/h	37.6	37.6	km/h
Travel Distance (Total)	veh-km/h	1956.6	2348.0	pers-km/h
Travel Time (Total)	veh-h/h	52.0	62.4	pers-h/h
Desired Speed	km/h	60.0		
Speed Efficiency		0.63		
Travel Time Index		5.86		
Congestion Coefficient		1.59		
Demand Flows (Total)	veh/h	2395	2874	pers/h
Arrival Flows (Total)	veh/h	2395		
Percent Heavy Vehicles (Demand)	%	0.0		
Percent Heavy Vehicles (Arrivals)	%	0.0		
Degree of Saturation		2.000		
Practical Spare Capacity	%	-60.0		
Effective Intersection Capacity	veh/h	1198		
Control Delay (Total)	veh-h/h	17.20	20.64	pers-h/h
Control Delay (Average)	sec	25.9	25.9	sec
Control Delay (Worst Lane by MC)	sec	2388.2		
Control Delay (Worst Movement by MC)	sec	2388.2	2388.2	sec
Geometric Delay (Average)	sec	5.4		
Stop-Line Delay (Average)	sec	20.4		
Idling Time (Average)	sec	19.8		
Intersection Level of Service (LOS)		NA		
95% Back of Queue - Veh (Worst Lane)	veh	9.8		
95% Back of Queue - Dist (Worst Lane)	m	68.8		
Ave. Que Storage Ratio (Worst Lane)		0.05		
Effective Stops (Total)	veh/h	1397	1676	pers/h
Effective Stop Rate		0.58	0.58	
Proportion Queued		0.01	0.01	
Performance Index		68.4	68.4	
Cost (Total)	$/h	1927.78	1927.78	$/h
Fuel Consumption (Total)	L/h	180.8		
Carbon Dioxide (Total)	kg/h	424.9		
Hydrocarbons (Total)	kg/h	0.037		
Carbon Monoxide (Total)	kg/h	0.46		
NOx (Total)	kg/h	0.127		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 0.0 %
Number of Iterations: 3 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 99.7% 0.0% 0.0%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Demand Flows (Total)	veh/y	1,149,600	1,379,520	pers/y

Delay (Total)	veh-h/y	8,257	9,908	pers-h/y
Effective Stops (Total)	veh/y	670,442	804,531	pers/y
Travel Distance (Total)	veh-km/y	939,182	1,127,018	pers-km/y
Travel Time (Total)	veh-h/y	24,951	29,941	pers-h/y
Cost (Total)	$/y	925,332	925,332	$/y
Fuel Consumption (Total)	L/y	86,795		
Carbon Dioxide (Total)	kg/y	203,969		
Hydrocarbons (Total)	kg/y	18		
Carbon Monoxide (Total)	kg/y	221		
NOx (Total)	kg/y	61		

1 Hours per Year: 480 (Site)

MOVEMENT SUMMARY

Site: 101 [Existing AM: Railway St/Arthur St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 7:45-8:45am
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Arthur St E															
4	L2	All MCs	819	0.0	819	0.0	0.441	5.7	LOS A	0.0	0.0	0.00	0.57	0.00	51.2
5	T1	All MCs	12	0.0	12	0.0	2.000	2388.2	LOS F	9.8	68.8	1.00	1.40	2.97	1.5
Approach			831	0.0	831	0.0	2.000	40.1	LOS C	9.8	68.8	0.01	0.59	0.04	32.1
NorthWest: Arthur St W															
11	T1	All MCs	11	0.0	11	0.0	1.403	1036.1	LOS F	8.5	59.8	1.00	1.49	3.37	3.0
12	R2	All MCs	6	0.0	6	0.0	1.403	1320.8	LOS F	8.5	59.8	1.00	1.49	3.37	2.5
Approach			17	0.0	17	0.0	1.403	1136.6	LOS F	8.5	59.8	1.00	1.49	3.37	2.8
SouthWest: Railway St															
1	L2	All MCs	10	0.0	10	0.0	0.833	6.0	LOS A	0.0	0.0	0.00	0.57	0.00	50.2
3	R2	All MCs	1537	0.0	1537	0.0	0.833	6.0	LOS A	0.0	0.0	0.00	0.57	0.00	50.2
Approach			1547	0.0	1547	0.0	0.833	6.0	NA	0.0	0.0	0.00	0.57	0.00	50.2
All Vehicles			2395	0.0	2395	0.0	2.000	25.9	NA	9.8	68.8	0.01	0.58	0.04	37.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

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

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

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

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

INTERSECTION SUMMARY

Site: 101 [Existing PM: Railway St/Arthur St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 7:45-8:45am
Site Category: (None)
Stop (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Travel Speed (Average)	km/h	49.7	49.7	km/h
Travel Distance (Total)	veh-km/h	1773.2	2127.9	pers-km/h
Travel Time (Total)	veh-h/h	35.7	42.8	pers-h/h
Desired Speed	km/h	60.0		
Speed Efficiency		0.83		
Travel Time Index		8.09		
Congestion Coefficient		1.21		
Demand Flows (Total)	veh/h	2171	2605	pers/h
Arrival Flows (Total)	veh/h	2171		
Percent Heavy Vehicles (Demand)	%	0.0		
Percent Heavy Vehicles (Arrivals)	%	0.0		
Degree of Saturation		0.662		
Practical Spare Capacity	%	45.2		
Effective Intersection Capacity	veh/h	3278		
Control Delay (Total)	veh-h/h	4.41	5.29	pers-h/h
Control Delay (Average)	sec	7.3	7.3	sec
Control Delay (Worst Lane by MC)	sec	144.0		
Control Delay (Worst Movement by MC)	sec	207.6	207.6	sec
Geometric Delay (Average)	sec	5.5		
Stop-Line Delay (Average)	sec	1.8		
Idling Time (Average)	sec	1.5		
Intersection Level of Service (LOS)		NA		
95% Back of Queue - Veh (Worst Lane)	veh	1.5		
95% Back of Queue - Dist (Worst Lane)	m	10.6		
Ave. Que Storage Ratio (Worst Lane)		0.01		
Effective Stops (Total)	veh/h	1262	1515	pers/h
Effective Stop Rate		0.58	0.58	
Proportion Queued		0.01	0.01	
Performance Index		42.4	42.4	
Cost (Total)	$/h	1384.38	1384.38	$/h
Fuel Consumption (Total)	L/h	151.9		
Carbon Dioxide (Total)	kg/h	356.9		
Hydrocarbons (Total)	kg/h	0.031		
Carbon Monoxide (Total)	kg/h	0.41		
NOx (Total)	kg/h	0.114		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.

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

Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 0.0 %

Number of Iterations: 3 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 98.1% 0.0% 0.0%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Demand Flows (Total)	veh/y	1,042,080	1,250,496	pers/y

Delay (Total)	veh-h/y	2,116	2,539	pers-h/y
Effective Stops (Total)	veh/y	605,850	727,020	pers/y
Travel Distance (Total)	veh-km/y	851,146	1,021,375	pers-km/y
Travel Time (Total)	veh-h/y	17,139	20,566	pers-h/y
Cost (Total)	$/y	664,502	664,502	$/y
Fuel Consumption (Total)	L/y	72,905		
Carbon Dioxide (Total)	kg/y	171,326		
Hydrocarbons (Total)	kg/y	15		
Carbon Monoxide (Total)	kg/y	198		
NOx (Total)	kg/y	55		

1 Hours per Year: 480 (Site)

MOVEMENT SUMMARY

Site: 101 [Existing PM: Railway St/Arthur St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 7:45-8:45am
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Arthur St E															
4	L2	All MCs	913	0.0	913	0.0	0.492	5.7	LOS A	0.0	0.0	0.00	0.57	0.00	51.2
5	T1	All MCs	8	0.0	8	0.0	0.192	92.7	LOS F	0.5	3.7	0.97	0.99	1.00	23.4
Approach			921	0.0	921	0.0	0.492	6.5	LOS A	0.5	3.7	0.01	0.58	0.01	50.5
NorthWest: Arthur St W															
11	T1	All MCs	10	0.0	10	0.0	0.551	80.4	LOS F	1.5	10.6	0.99	1.04	1.18	17.7
12	R2	All MCs	10	0.0	10	0.0	0.551	207.6	LOS F	1.5	10.6	0.99	1.04	1.18	15.1
Approach			20	0.0	20	0.0	0.551	144.0	LOS F	1.5	10.6	0.99	1.04	1.18	16.5
SouthWest: Railway St															
1	L2	All MCs	11	0.0	11	0.0	0.662	5.7	LOS A	0.0	0.0	0.00	0.58	0.00	50.9
3	R2	All MCs	1219	0.0	1219	0.0	0.662	5.7	LOS A	0.0	0.0	0.00	0.58	0.00	50.9
Approach			1230	0.0	1230	0.0	0.662	5.7	NA	0.0	0.0	0.00	0.58	0.00	50.9
All Vehicles			2171	0.0	2171	0.0	0.662	7.3	NA	1.5	10.6	0.01	0.58	0.01	49.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

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

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

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

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

INTERSECTION SUMMARY

Site: 101 [Existing AM: Church St/Swete St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 7:30-8:30am
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Travel Speed (Average)	km/h	46.4	46.4	km/h
Travel Distance (Total)	veh-km/h	1101.7	1322.1	pers-km/h
Travel Time (Total)	veh-h/h	23.7	28.5	pers-h/h
Desired Speed	km/h	52.4		
Speed Efficiency		0.89		
Travel Time Index		8.73		
Congestion Coefficient		1.13		
Demand Flows (Total)	veh/h	1086	1303	pers/h
Arrival Flows (Total)	veh/h	1086		
Percent Heavy Vehicles (Demand)	%	0.0		
Percent Heavy Vehicles (Arrivals)	%	0.0		
Degree of Saturation		0.429		
Practical Spare Capacity	%	98.0		
Effective Intersection Capacity	veh/h	2530		
Control Delay (Total)	veh-h/h	1.91	2.29	pers-h/h
Control Delay (Average)	sec	6.3	6.3	sec
Control Delay (Worst Lane by MC)	sec	7.2		
Control Delay (Worst Movement by MC)	sec	8.6	8.6	sec
Geometric Delay (Average)	sec	5.2		
Stop-Line Delay (Average)	sec	1.2		
Idling Time (Average)	sec	0.0		
Intersection Level of Service (LOS)		LOS A		
95% Back of Queue - Veh (Worst Lane)	veh	3.2		
95% Back of Queue - Dist (Worst Lane)	m	22.2		
Ave. Que Storage Ratio (Worst Lane)		0.02		
Effective Stops (Total)	veh/h	614	737	pers/h
Effective Stop Rate		0.57	0.57	
Proportion Queued		0.45	0.45	
Performance Index		31.5	31.5	
Cost (Total)	$/h	886.75	886.75	$/h
Fuel Consumption (Total)	L/h	85.6		
Carbon Dioxide (Total)	kg/h	201.2		
Hydrocarbons (Total)	kg/h	0.015		
Carbon Monoxide (Total)	kg/h	0.18		
NOx (Total)	kg/h	0.055		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.

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

Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 0.9 %

Number of Iterations: 4 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 0.0% 1.1% 0.7%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Demand Flows (Total)	veh/y	521,280	625,536	pers/y
Delay (Total)	veh-h/y	915	1,098	pers-h/y

Effective Stops (Total)	veh/y	294,870	353,844	pers/y
Travel Distance (Total)	veh-km/y	528,838	634,605	pers-km/y
Travel Time (Total)	veh-h/y	11,391	13,669	pers-h/y
Cost (Total)	$/y	425,639	425,639	$/y
Fuel Consumption (Total)	L/y	41,090		
Carbon Dioxide (Total)	kg/y	96,562		
Hydrocarbons (Total)	kg/y	7		
Carbon Monoxide (Total)	kg/y	89		
NOx (Total)	kg/y	26		

1 Hours per Year: 480 (Site)

MOVEMENT SUMMARY

Site: 101 [Existing AM: Church St/Swete St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 7:30-8:30am
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Church St E															
5	T1	All MCs	162	0.0	162	0.0	0.281	5.9	LOS A	1.8	12.3	0.43	0.59	0.43	48.1
6	R2	All MCs	148	0.0	148	0.0	0.281	8.6	LOS A	1.8	12.3	0.43	0.59	0.43	47.6
Approach			310	0.0	310	0.0	0.281	7.2	LOS A	1.8	12.3	0.43	0.59	0.43	47.8
North: Swete St															
7	L2	All MCs	92	0.0	92	0.0	0.254	5.9	LOS A	1.5	10.8	0.45	0.61	0.45	47.2
9	R2	All MCs	176	0.0	176	0.0	0.254	7.8	LOS A	1.5	10.8	0.45	0.61	0.45	44.1
Approach			268	0.0	268	0.0	0.254	7.1	LOS A	1.5	10.8	0.45	0.61	0.45	45.1
West: Church St W															
10	L2	All MCs	305	0.0	305	0.0	0.429	5.7	LOS A	3.2	22.2	0.46	0.53	0.46	44.9
11	T1	All MCs	203	0.0	203	0.0	0.429	4.9	LOS A	3.2	22.2	0.46	0.53	0.46	48.5
Approach			508	0.0	508	0.0	0.429	5.4	LOS A	3.2	22.2	0.46	0.53	0.46	46.3
All Vehicles			1086	0.0	1086	0.0	0.429	6.3	LOS A	3.2	22.2	0.45	0.57	0.45	46.4

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

INTERSECTION SUMMARY

Site: 101 [Existing PM: Church St/Swete St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 5:00-6:00pm
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Travel Speed (Average)	km/h	46.9	46.9 km/h
Travel Distance (Total)	veh-km/h	950.2	1140.3 pers-km/h
Travel Time (Total)	veh-h/h	20.3	24.3 pers-h/h
Desired Speed	km/h	52.9	
Speed Efficiency		0.89	
Travel Time Index		8.72	
Congestion Coefficient		1.13	
Demand Flows (Total)	veh/h	936	1123 pers/h
Arrival Flows (Total)	veh/h	936	
Percent Heavy Vehicles (Demand)	%	0.0	
Percent Heavy Vehicles (Arrivals)	%	0.0	
Degree of Saturation		0.324	
Practical Spare Capacity	%	162.1	
Effective Intersection Capacity	veh/h	2886	
Control Delay (Total)	veh-h/h	1.64	1.97 pers-h/h
Control Delay (Average)	sec	6.3	6.3 sec
Control Delay (Worst Lane by MC)	sec	7.0	
Control Delay (Worst Movement by MC)	sec	8.6	8.6 sec
Geometric Delay (Average)	sec	5.3	
Stop-Line Delay (Average)	sec	1.0	
Idling Time (Average)	sec	0.0	
Intersection Level of Service (LOS)		LOS A	
95% Back of Queue - Veh (Worst Lane)	veh	2.1	
95% Back of Queue - Dist (Worst Lane)	m	14.7	
Ave. Que Storage Ratio (Worst Lane)		0.01	
Effective Stops (Total)	veh/h	527	632 pers/h
Effective Stop Rate		0.56	0.56
Proportion Queued		0.41	0.41
Performance Index		26.5	26.5
Cost (Total)	$/h	758.32	758.32 $/h
Fuel Consumption (Total)	L/h	73.5	
Carbon Dioxide (Total)	kg/h	172.6	
Hydrocarbons (Total)	kg/h	0.013	
Carbon Monoxide (Total)	kg/h	0.16	
NOx (Total)	kg/h	0.047	

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.

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

Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 0.8 %

Number of Iterations: 3 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 100.0% 0.0% 0.8%

Intersection Performance - Annual Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Demand Flows (Total)	veh/y	449,280	539,136 pers/y
Delay (Total)	veh-h/y	787	945 pers-h/y

Effective Stops (Total)	veh/y	253,000	303,600	pers/y
Travel Distance (Total)	veh-km/y	456,118	547,342	pers-km/y
Travel Time (Total)	veh-h/y	9,732	11,679	pers-h/y
Cost (Total)	$/y	363,995	363,995	$/y
Fuel Consumption (Total)	L/y	35,264		
Carbon Dioxide (Total)	kg/y	82,870		
Hydrocarbons (Total)	kg/y	6		
Carbon Monoxide (Total)	kg/y	77		
NOx (Total)	kg/y	23		

1 Hours per Year: 480 (Site)

MOVEMENT SUMMARY

Site: 101 [Existing PM: Church St/Swete St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 5:00-6:00pm
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Church St E															
5	T1	All MCs	221	0.0	221	0.0	0.324	5.9	LOS A	2.1	14.7	0.43	0.58	0.43	48.2
6	R2	All MCs	147	0.0	147	0.0	0.324	8.6	LOS A	2.1	14.7	0.43	0.58	0.43	47.7
Approach			368	0.0	368	0.0	0.324	7.0	LOS A	2.1	14.7	0.43	0.58	0.43	48.0
North: Swete St															
7	L2	All MCs	87	0.0	87	0.0	0.230	5.6	LOS A	1.3	9.4	0.40	0.59	0.40	47.3
9	R2	All MCs	168	0.0	168	0.0	0.230	7.5	LOS A	1.3	9.4	0.40	0.59	0.40	44.2
Approach			255	0.0	255	0.0	0.230	6.9	LOS A	1.3	9.4	0.40	0.59	0.40	45.2
West: Church St W															
10	L2	All MCs	146	0.0	146	0.0	0.271	5.5	LOS A	1.7	11.8	0.39	0.52	0.39	45.1
11	T1	All MCs	167	0.0	167	0.0	0.271	4.7	LOS A	1.7	11.8	0.39	0.52	0.39	48.7
Approach			313	0.0	313	0.0	0.271	5.1	LOS A	1.7	11.8	0.39	0.52	0.39	47.0
All Vehicles			936	0.0	936	0.0	0.324	6.3	LOS A	2.1	14.7	0.41	0.56	0.41	46.9

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

INTERSECTION SUMMARY

Site: 101 [Existing AM: Church St/Bachell Ave, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 7:30-8:30am
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 40 seconds (Site Optimum Cycle Time - Minimum Delay)

Intersection Performance - Hourly Values						
Performance Measure	**Vehicles:**	**All MCs**	**Pedestrians**		**Persons**	
Travel Speed (Average)	km/h	48.3	2.4	km/h	47.5	km/h
Travel Distance (Total)	veh-km/h	944.1	1.0	ped-km/h	1133.9	pers-km/h
Travel Time (Total)	veh-h/h	19.6	0.4	ped-h/h	23.9	pers-h/h
Desired Speed	km/h	60.0				
Speed Efficiency		0.80				
Travel Time Index		7.83				
Congestion Coefficient		1.24				
Demand Flows (Total)	veh/h	929	50	ped/h	1165	pers/h
Arrival Flows (Total)	veh/h	929				
Percent Heavy Vehicles (Demand)	%	0.1				
Percent Heavy Vehicles (Arrivals)	%	0.1				
Degree of Saturation		0.595	0.028			
Practical Spare Capacity	%	51.3				
Effective Intersection Capacity	veh/h	1561				
Control Delay (Total)	veh-h/h	3.37	0.20	ped-h/h	4.24	pers-h/h
Control Delay (Average)	sec	13.1	14.5	sec	13.1	sec
Control Delay (Worst Lane by MC)	sec	20.6				
Control Delay (Worst Movement by MC)	sec	20.6	14.5	sec	20.6	sec
Geometric Delay (Average)	sec	3.5				
Stop-Line Delay (Average)	sec	9.5				
Idling Time (Average)	sec	6.5				
Intersection Level of Service (LOS)		LOS A	LOS B			
95% Back of Queue - Veh (Worst Lane)	veh	4.0				
95% Back of Queue - Dist (Worst Lane)	m	28.0				
Ave. Que Storage Ratio (Worst Lane)		0.03				
Effective Stops (Total)	veh/h	655	43	ped/h	829	pers/h
Effective Stop Rate		0.71	0.85		0.71	
Proportion Queued		0.71	0.85		0.71	
Performance Index		38.7	0.7		39.3	
Cost (Total)	$/h	748.28	10.20	$/h	758.49	$/h
Fuel Consumption (Total)	L/h	78.7				
Carbon Dioxide (Total)	kg/h	184.9				
Hydrocarbons (Total)	kg/h	0.016				
Carbon Monoxide (Total)	kg/h	0.22				
NOx (Total)	kg/h	0.061				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 0.0 %
Number of Iterations: 2 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Main (Timing-Capacity) Iterations: 4.2% 0.0% 0.0%

Intersection Performance - Annual Values						
Performance Measure	**Vehicles:**	**All MCs**	**Pedestrians**		**Persons**	
Demand Flows (Total)	veh/y	445,920	24,000	ped/y	559,104	pers/y

Delay (Total)	veh-h/y	1,617	97	ped-h/y	2,037	pers-h/y
Effective Stops (Total)	veh/y	314,516	20,443	ped/y	397,862	pers/y
Travel Distance (Total)	veh-km/y	453,176	480	ped-km/y	544,292	pers-km/y
Travel Time (Total)	veh-h/y	9,385	199	ped-h/y	11,461	pers-h/y
Cost (Total)	$/y	359,176	4,898	$/y	364,074	$/y
Fuel Consumption (Total)	L/y	37,759				
Carbon Dioxide (Total)	kg/y	88,748				
Hydrocarbons (Total)	kg/y	8				
Carbon Monoxide (Total)	kg/y	105				
NOx (Total)	kg/y	29				

1 Hours per Year: 480 (Site)

MOVEMENT SUMMARY

Site: 101 [Existing AM: Church St/Bachell Ave, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 7:30-8:30am
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 40 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Church St E															
5	T1	All MCs	140	0.1	140	0.1	0.320	6.7	LOS A	2.5	17.6	0.69	0.58	0.69	51.9
6	R2	All MCs	102	0.1	102	0.1	* 0.320	15.3	LOS B	2.5	17.6	0.78	0.69	0.78	48.3
Approach			242	0.1	242	0.1	0.320	10.3	LOS A	2.5	17.6	0.72	0.62	0.72	50.3
North: Bachell Ave															
7	L2	All MCs	100	0.1	100	0.1	0.103	10.7	LOS A	1.0	7.0	0.53	0.69	0.53	49.2
9	R2	All MCs	163	0.1	163	0.1	* 0.390	20.6	LOS B	2.9	20.1	0.89	0.78	0.89	43.4
Approach			263	0.1	263	0.1	0.390	16.9	LOS B	2.9	20.1	0.75	0.74	0.75	45.4
West: Church St W															
10	L2	All MCs	221	0.0	221	0.0	0.185	7.0	LOS A	0.9	6.5	0.39	0.65	0.39	51.9
11	T1	All MCs	203	0.0	203	0.0	* 0.595	18.0	LOS B	4.0	28.0	0.97	0.81	1.03	46.3
Approach			424	0.0	424	0.0	0.595	12.2	LOS A	4.0	28.0	0.67	0.73	0.70	49.1
All Vehicles			929	0.1	929	0.1	0.595	13.1	LOS A	4.0	28.0	0.71	0.71	0.72	48.3

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

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
East: Church St E												
P2	Full	50	50	14.5	LOS B	0.0	0.0	0.85	0.85	29.9	20.0	0.67
All Pedestrians		50	50	14.5	LOS B	0.0	0.0	0.85	0.85	29.9	20.0	0.67

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.

INTERSECTION SUMMARY

Site: 101 [Existing PM: Church St/Bachell Ave, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

PM Peak Hour: 5:00-6:00pm
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 50 seconds (Site Optimum Cycle Time - Minimum Delay)

Intersection Performance - Hourly Values					
Performance Measure	**Vehicles:**	**All MCs**	**Pedestrians**		**Persons**
Travel Speed (Average)	km/h	46.2	2.4	km/h	45.6 km/h
Travel Distance (Total)	veh-km/h	1121.4	1.0	ped-km/h	1346.6 pers-km/h
Travel Time (Total)	veh-h/h	24.2	0.4	ped-h/h	29.5 pers-h/h
Desired Speed	km/h	60.0			
Speed Efficiency		0.77			
Travel Time Index		7.45			
Congestion Coefficient		1.30			
Demand Flows (Total)	veh/h	1104	50	ped/h	1375 pers/h
Arrival Flows (Total)	veh/h	1104			
Percent Heavy Vehicles (Demand)	%	0.0			
Percent Heavy Vehicles (Arrivals)	%	0.0			
Degree of Saturation		0.625	0.019		
Practical Spare Capacity	%	43.9			
Effective Intersection Capacity	veh/h	1766			
Control Delay (Total)	veh-h/h	5.00	0.21	ped-h/h	6.21 pers-h/h
Control Delay (Average)	sec	16.3	15.2	sec	16.3 sec
Control Delay (Worst Lane by MC)	sec	22.9			
Control Delay (Worst Movement by MC)	sec	22.9	15.2	sec	22.9 sec
Geometric Delay (Average)	sec	3.8			
Stop-Line Delay (Average)	sec	12.5			
Idling Time (Average)	sec	9.3			
Intersection Level of Service (LOS)		LOS B	LOS B		
95% Back of Queue - Veh (Worst Lane)	veh	8.7			
95% Back of Queue - Dist (Worst Lane)	m	61.0			
Ave. Que Storage Ratio (Worst Lane)		0.04			
Effective Stops (Total)	veh/h	816	39	ped/h	1018 pers/h
Effective Stop Rate		0.74	0.78		0.74
Proportion Queued		0.74	0.78		0.74
Performance Index		53.7	0.6		54.3
Cost (Total)	$/h	922.34	10.46	$/h	932.81 $/h
Fuel Consumption (Total)	L/h	95.0			
Carbon Dioxide (Total)	kg/h	223.2			
Hydrocarbons (Total)	kg/h	0.019			
Carbon Monoxide (Total)	kg/h	0.26			
NOx (Total)	kg/h	0.069			

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 0.0 %
Number of Iterations: 2 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Main (Timing-Capacity) Iterations: 4.0% 0.0% 0.0%

Intersection Performance - Annual Values					
Performance Measure	**Vehicles:**	**All MCs**	**Pedestrians**		**Persons**
Demand Flows (Total)	veh/y	529,920	24,000	ped/y	659,904 pers/y

Delay (Total)	veh-h/y	2,398	102	ped-h/y	2,979	pers-h/y
Effective Stops (Total)	veh/y	391,515	18,759	ped/y	488,577	pers/y
Travel Distance (Total)	veh-km/y	538,250	480	ped-km/y	646,380	pers-km/y
Travel Time (Total)	veh-h/y	11,639	204	ped-h/y	14,171	pers-h/y
Cost (Total)	$/y	442,724	5,023	$/y	447,747	$/y
Fuel Consumption (Total)	L/y	45,578				
Carbon Dioxide (Total)	kg/y	107,113				
Hydrocarbons (Total)	kg/y	9				
Carbon Monoxide (Total)	kg/y	126				
NOx (Total)	kg/y	33				

1 Hours per Year: 480 (Site)

MOVEMENT SUMMARY

Site: 101 [Existing PM: Church St/Bachell Ave, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

PM Peak Hour: 5:00-6:00pm
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 50 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Church St E															
5	T1	All MCs	163	0.0	163	0.0	0.299	11.1	LOS A	3.1	21.7	0.75	0.61	0.75	49.2
6	R2	All MCs	51	0.0	51	0.0	* 0.299	20.9	LOS B	3.1	21.7	0.79	0.65	0.79	46.6
Approach			214	0.0	214	0.0	0.299	13.5	LOS A	3.1	21.7	0.76	0.62	0.76	48.6
North: Bachell Ave															
7	L2	All MCs	120	0.0	120	0.0	0.108	10.1	LOS A	1.3	8.8	0.45	0.68	0.45	49.6
9	R2	All MCs	418	0.0	418	0.0	* 0.625	20.2	LOS B	8.7	61.0	0.88	0.83	0.88	43.6
Approach			538	0.0	538	0.0	0.625	18.0	LOS B	8.7	61.0	0.78	0.79	0.78	44.8
West: Church St W															
10	L2	All MCs	162	0.0	162	0.0	0.126	6.7	LOS A	0.6	4.5	0.30	0.63	0.30	52.2
11	T1	All MCs	190	0.0	190	0.0	* 0.609	22.9	LOS B	4.7	32.8	0.98	0.82	1.04	43.6
Approach			352	0.0	352	0.0	0.609	15.4	LOS B	4.7	32.8	0.67	0.73	0.70	47.2
All Vehicles			1104	0.0	1104	0.0	0.625	16.3	LOS B	8.7	61.0	0.74	0.74	0.75	46.2

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

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
East: Church St E												
P2	Full	50	50	15.2	LOS B	0.1	0.1	0.78	0.78	30.6	20.0	0.65
All Pedestrians		50	50	15.2	LOS B	0.1	0.1	0.78	0.78	30.6	20.0	0.65

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.

INTERSECTION SUMMARY

Site: 101 [Existing AM: Church St/Railway St Bridge, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 8:00-9:00am
Site Category: (None)
Give-Way (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Travel Speed (Average)	km/h	45.0	45.0	km/h
Travel Distance (Total)	veh-km/h	1227.4	1472.8	pers-km/h
Travel Time (Total)	veh-h/h	27.3	32.7	pers-h/h
Desired Speed	km/h	50.0		
Speed Efficiency		0.90		
Travel Time Index		8.89		
Congestion Coefficient		1.11		
Demand Flows (Total)	veh/h	1212	1454	pers/h
Arrival Flows (Total)	veh/h	1212		
Percent Heavy Vehicles (Demand)	%	0.0		
Percent Heavy Vehicles (Arrivals)	%	0.0		
Degree of Saturation		0.408		
Practical Spare Capacity	%	96.1		
Effective Intersection Capacity	veh/h	2970		
Control Delay (Total)	veh-h/h	2.00	2.40	pers-h/h
Control Delay (Average)	sec	5.9	5.9	sec
Control Delay (Worst Lane by MC)	sec	12.7		
Control Delay (Worst Movement by MC)	sec	12.7	12.7	sec
Geometric Delay (Average)	sec	4.5		
Stop-Line Delay (Average)	sec	1.4		
Idling Time (Average)	sec	0.7		
Intersection Level of Service (LOS)		NA		
95% Back of Queue - Veh (Worst Lane)	veh	1.7		
95% Back of Queue - Dist (Worst Lane)	m	11.8		
Ave. Que Storage Ratio (Worst Lane)		0.01		
Effective Stops (Total)	veh/h	739	887	pers/h
Effective Stop Rate		0.61	0.61	
Proportion Queued		0.12	0.12	
Performance Index		31.3	31.3	
Cost (Total)	$/h	1004.30	1004.30	$/h
Fuel Consumption (Total)	L/h	91.7		
Carbon Dioxide (Total)	kg/h	215.4		
Hydrocarbons (Total)	kg/h	0.015		
Carbon Monoxide (Total)	kg/h	0.17		
NOx (Total)	kg/h	0.054		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.

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

Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 0.0 %

Number of Iterations: 3 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 74.5% 0.0% 0.0%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Demand Flows (Total)	veh/y	581,760	698,112	pers/y

Delay (Total)	veh-h/y	961	1,153	pers-h/y
Effective Stops (Total)	veh/y	354,848	425,817	pers/y
Travel Distance (Total)	veh-km/y	589,129	706,955	pers-km/y
Travel Time (Total)	veh-h/y	13,088	15,706	pers-h/y
Cost (Total)	$/y	482,064	482,064	$/y
Fuel Consumption (Total)	L/y	44,000		
Carbon Dioxide (Total)	kg/y	103,399		
Hydrocarbons (Total)	kg/y	7		
Carbon Monoxide (Total)	kg/y	82		
NOx (Total)	kg/y	26		

1 Hours per Year: 480 (Site)

MOVEMENT SUMMARY

Site: 101 [Existing AM: Church St/Railway St Bridge, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 8:00-9:00am
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Railway Street Bridge															
1	L2	All MCs	207	0.0	207	0.0	0.379	4.7	LOS A	0.0	0.0	0.00	0.55	0.00	45.8
3	R2	All MCs	497	0.0	497	0.0	0.379	4.7	LOS A	0.0	0.0	0.00	0.55	0.00	45.6
Approach			704	0.0	704	0.0	0.379	4.7	NA	0.0	0.0	0.00	0.55	0.00	45.7
East: Church St E															
4	L2	All MCs	315	0.0	315	0.0	0.170	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	45.9
Approach			315	0.0	315	0.0	0.170	4.6	NA	0.0	0.0	0.00	0.53	0.00	45.9
West: Church St W															
12	R2	All MCs	193	0.0	193	0.0	0.408	12.7	LOS A	1.7	11.8	0.74	0.97	1.00	41.5
Approach			193	0.0	193	0.0	0.408	12.7	LOS A	1.7	11.8	0.74	0.97	1.00	41.5
All Vehicles			1212	0.0	1212	0.0	0.408	5.9	NA	1.7	11.8	0.12	0.61	0.16	45.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

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

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

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

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

INTERSECTION SUMMARY

Site: 101 [Existing PM: Church St/Railway St Bridge, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 4:45-5:45pm
Site Category: (None)
Give-Way (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Travel Speed (Average)	km/h	44.7	44.7	km/h
Travel Distance (Total)	veh-km/h	1512.8	1815.4	pers-km/h
Travel Time (Total)	veh-h/h	33.9	40.6	pers-h/h
Desired Speed	km/h	50.0		
Speed Efficiency		0.89		
Travel Time Index		8.82		
Congestion Coefficient		1.12		
Demand Flows (Total)	veh/h	1492	1790	pers/h
Arrival Flows (Total)	veh/h	1492		
Percent Heavy Vehicles (Demand)	%	0.0		
Percent Heavy Vehicles (Arrivals)	%	0.0		
Degree of Saturation		0.584		
Practical Spare Capacity	%	37.0		
Effective Intersection Capacity	veh/h	2554		
Control Delay (Total)	veh-h/h	2.74	3.29	pers-h/h
Control Delay (Average)	sec	6.6	6.6	sec
Control Delay (Worst Lane by MC)	sec	18.3		
Control Delay (Worst Movement by MC)	sec	18.3	18.3	sec
Geometric Delay (Average)	sec	4.5		
Stop-Line Delay (Average)	sec	2.1		
Idling Time (Average)	sec	1.2		
Intersection Level of Service (LOS)		NA		
95% Back of Queue - Veh (Worst Lane)	veh	2.7		
95% Back of Queue - Dist (Worst Lane)	m	18.6		
Ave. Que Storage Ratio (Worst Lane)		0.01		
Effective Stops (Total)	veh/h	916	1099	pers/h
Effective Stop Rate		0.61	0.61	
Proportion Queued		0.12	0.12	
Performance Index		39.2	39.2	
Cost (Total)	$/h	1245.16	1245.16	$/h
Fuel Consumption (Total)	L/h	113.0		
Carbon Dioxide (Total)	kg/h	265.6		
Hydrocarbons (Total)	kg/h	0.019		
Carbon Monoxide (Total)	kg/h	0.21		
NOx (Total)	kg/h	0.066		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.

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

Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 0.0 %

Number of Iterations: 3 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 80.5% 0.0% 0.0%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Demand Flows (Total)	veh/y	716,160	859,392	pers/y

Delay (Total)	veh-h/y	1,316	1,580	pers-h/y
Effective Stops (Total)	veh/y	439,576	527,491	pers/y
Travel Distance (Total)	veh-km/y	726,151	871,381	pers-km/y
Travel Time (Total)	veh-h/y	16,250	19,500	pers-h/y
Cost (Total)	$/y	597,678	597,678	$/y
Fuel Consumption (Total)	L/y	54,245		
Carbon Dioxide (Total)	kg/y	127,476		
Hydrocarbons (Total)	kg/y	9		
Carbon Monoxide (Total)	kg/y	101		
NOx (Total)	kg/y	32		

1 Hours per Year: 480 (Site)

MOVEMENT SUMMARY

Site: 101 [Existing PM: Church St/Railway St Bridge, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 4:45-5:45pm
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Railway Street Bridge															
1	L2	All MCs	351	0.0	351	0.0	0.339	4.7	LOS A	0.0	0.0	0.00	0.54	0.00	45.8
3	R2	All MCs	279	0.0	279	0.0	0.339	4.7	LOS A	0.0	0.0	0.00	0.54	0.00	45.6
Approach			630	0.0	630	0.0	0.339	4.7	NA	0.0	0.0	0.00	0.54	0.00	45.7
East: Church St E															
4	L2	All MCs	650	0.0	650	0.0	0.350	4.7	LOS A	0.0	0.0	0.00	0.53	0.00	45.8
Approach			650	0.0	650	0.0	0.350	4.7	NA	0.0	0.0	0.00	0.53	0.00	45.8
West: Church St W															
12	R2	All MCs	212	0.0	212	0.0	0.584	18.3	LOS B	2.7	18.6	0.86	1.10	1.40	39.0
Approach			212	0.0	212	0.0	0.584	18.3	LOS B	2.7	18.6	0.86	1.10	1.40	39.0
All Vehicles			1492	0.0	1492	0.0	0.584	6.6	NA	2.7	18.6	0.12	0.61	0.20	44.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

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

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

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

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

APPENDIX C-

FUTURE SIDRA

INTERSECTION SUMMARY

Site: 2785 [Future AM: Church St/Railway St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 7:45-8:45am
Site Category: (None)
Signals - Actuated Isolated Cycle Time = 150 seconds (Site User-Given Phase Times)

Intersection Performance - Hourly Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Travel Speed (Average)	km/h	15.0	15.0 km/h
Travel Distance (Total)	veh-km/h	2845.1	3414.2 pers-km/h
Travel Time (Total)	veh-h/h	189.2	227.0 pers-h/h
Desired Speed	km/h	60.0	
Speed Efficiency		0.25	
Travel Time Index		1.67	
Congestion Coefficient		3.99	
Demand Flows (Total)	veh/h	2336	2804 pers/h
Arrival Flows (Total)	veh/h	2336	
Percent Heavy Vehicles (Demand)	%	0.0	
Percent Heavy Vehicles (Arrivals)	%	0.0	
Degree of Saturation		1.186	
Practical Spare Capacity	%	-24.1	
Effective Intersection Capacity	veh/h	1970	
Control Delay (Total)	veh-h/h	140.81	168.97 pers-h/h
Control Delay (Average)	sec	217.0	217.0 sec
Control Delay (Worst Lane by MC)	sec	398.2	
Control Delay (Worst Movement by MC)	sec	410.6	410.6 sec
Geometric Delay (Average)	sec	1.2	
Stop-Line Delay (Average)	sec	215.7	
Idling Time (Average)	sec	203.2	
Intersection Level of Service (LOS)		LOS F	
95% Back of Queue - Veh (Worst Lane)	veh	223.8	
95% Back of Queue - Dist (Worst Lane)	m	1566.7	
Ave. Que Storage Ratio (Worst Lane)		1.28	
Effective Stops (Total)	veh/h	3644	4373 pers/h
Effective Stop Rate		1.56	1.56
Proportion Queued		0.82	0.82
Performance Index		374.5	374.5
Cost (Total)	$/h	6449.48	6449.48 $/h
Fuel Consumption (Total)	L/h	402.4	
Carbon Dioxide (Total)	kg/h	945.6	
Hydrocarbons (Total)	kg/h	0.095	
Carbon Monoxide (Total)	kg/h	0.84	
NOx (Total)	kg/h	0.226	

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.

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

Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 0.0 %

Number of Iterations: 2 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Main (Timing-Capacity) Iterations: 5.0% 0.0% 0.0%

Intersection Performance - Annual Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Demand Flows (Total)	veh/y	1,121,510	1,345,813 pers/y
Delay (Total)	veh-h/y	67,587	81,105 pers-h/y
Effective Stops (Total)	veh/y	1,749,230	2,099,077 pers/y

Travel Distance (Total)	veh-km/y	1,365,671	1,638,806	pers-km/y
Travel Time (Total)	veh-h/y	90,802	108,963	pers-h/y
Cost (Total)	$/y	3,095,752	3,095,752	$/y
Fuel Consumption (Total)	L/y	193,150		
Carbon Dioxide (Total)	kg/y	453,903		
Hydrocarbons (Total)	kg/y	45		
Carbon Monoxide (Total)	kg/y	404		
NOx (Total)	kg/y	108		

1 Hours per Year: 480 (Site)

MOVEMENT SUMMARY

Site: 2785 [Future AM: Church St/Railway St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 7:45-8:45am
Site Category: (None)
Signals - Actuated Isolated Cycle Time = 150 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Railway St E															
5	T1	All MCs	648	0.0	648	0.0	0.267	16.0	LOS B	11.1	78.0	0.50	0.44	0.50	49.6
6	R2	All MCs	197	0.0	197	0.0	* 0.842	84.7	LOS F	14.5	101.6	1.00	0.79	1.00	24.7
Approach			845	0.0	845	0.0	0.842	32.0	LOS C	14.5	101.6	0.62	0.52	0.62	41.4
North: Church St															
7	L2	All MCs	235	0.0	235	0.0	0.301	40.9	LOS C	11.1	77.6	0.68	0.76	0.68	36.5
9	R2	All MCs	48	0.0	48	0.0	0.040	46.6	LOS D	2.3	16.2	0.69	0.70	0.69	37.7
Approach			283	0.0	283	0.0	0.301	41.8	LOS C	11.1	77.6	0.68	0.75	0.68	35.3
West: Railway St W															
10	L2	All MCs	44	0.0	44	0.0	* 1.186	410.6	LOS F	12.4	86.6	1.00	1.46	2.94	9.0
11	T1	All MCs	1165	0.0	1165	0.0	* 1.186	386.2	LOS F	223.8	1566.7	1.00	2.51	2.94	9.8
Approach			1209	0.0	1209	0.0	1.186	387.1	LOS F	223.8	1566.7	1.00	2.47	2.94	9.8
All Vehicles			2336	0.0	2336	0.0	1.186	217.0	LOS F	223.8	1566.7	0.82	1.56	1.83	15.0

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

* Critical Movement (Signal Timing)

INTERSECTION SUMMARY

Site: 2785 [Future PM: Church St/Railway St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

PM Peak Hour: 5:00-6:00pm
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 150 seconds (Site User-Given Phase Times)

Intersection Performance - Hourly Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Travel Speed (Average)	km/h	33.6	33.6 km/h
Travel Distance (Total)	veh-km/h	2904.5	3485.3 pers-km/h
Travel Time (Total)	veh-h/h	86.4	103.7 pers-h/h
Desired Speed	km/h	60.0	
Speed Efficiency		0.56	
Travel Time Index		5.11	
Congestion Coefficient		1.79	
Demand Flows (Total)	veh/h	2417	2900 pers/h
Arrival Flows (Total)	veh/h	2417	
Percent Heavy Vehicles (Demand)	%	0.0	
Percent Heavy Vehicles (Arrivals)	%	0.0	
Degree of Saturation		0.974	
Practical Spare Capacity	%	-7.6	
Effective Intersection Capacity	veh/h	2482	
Control Delay (Total)	veh-h/h	37.49	44.99 pers-h/h
Control Delay (Average)	sec	55.8	55.8 sec
Control Delay (Worst Lane by MC)	sec	93.7	
Control Delay (Worst Movement by MC)	sec	94.2	94.2 sec
Geometric Delay (Average)	sec	1.6	
Stop-Line Delay (Average)	sec	54.2	
Idling Time (Average)	sec	46.1	
Intersection Level of Service (LOS)		LOS D	
95% Back of Queue - Veh (Worst Lane)	veh	88.9	
95% Back of Queue - Dist (Worst Lane)	m	622.2	
Ave. Que Storage Ratio (Worst Lane)		0.51	
Effective Stops (Total)	veh/h	2110	2533 pers/h
Effective Stop Rate		0.87	0.87
Proportion Queued		0.81	0.81
Performance Index		186.8	186.8
Cost (Total)	$/h	3053.98	3053.98 $/h
Fuel Consumption (Total)	L/h	260.7	
Carbon Dioxide (Total)	kg/h	612.6	
Hydrocarbons (Total)	kg/h	0.055	
Carbon Monoxide (Total)	kg/h	0.68	
NOx (Total)	kg/h	0.164	

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.

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

Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 0.0 %

Number of Iterations: 2 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Main (Timing-Capacity) Iterations: 5.8% 0.0% 0.0%

Intersection Performance - Annual Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Demand Flows (Total)	veh/y	1,160,160	1,392,192 pers/y
Delay (Total)	veh-h/y	17,996	21,596 pers-h/y
Effective Stops (Total)	veh/y	1,013,021	1,215,626 pers/y

Travel Distance (Total)	veh-km/y	1,394,139	1,672,966	pers-km/y
Travel Time (Total)	veh-h/y	41,479	49,774	pers-h/y
Cost (Total)	$/y	1,465,911	1,465,911	$/y
Fuel Consumption (Total)	L/y	125,130		
Carbon Dioxide (Total)	kg/y	294,055		
Hydrocarbons (Total)	kg/y	26		
Carbon Monoxide (Total)	kg/y	327		
NOx (Total)	kg/y	79		

1 Hours per Year: 480 (Site)

MOVEMENT SUMMARY

Site: 2785 [Future PM: Church St/Railway St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

PM Peak Hour: 5:00-6:00pm
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 150 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Railway St E															
5	T1	All MCs	753	0.0	753	0.0	0.310	15.9	LOS B	13.4	93.5	0.54	0.47	0.54	49.6
6	R2	All MCs	219	0.0	219	0.0	* 0.936	93.7	LOS F	17.9	125.0	1.00	1.00	1.41	23.3
Approach			972	0.0	972	0.0	0.936	33.4	LOS C	17.9	125.0	0.64	0.59	0.73	40.8
North: Church St															
7	L2	All MCs	384	0.0	384	0.0	0.510	55.9	LOS D	20.3	141.9	0.79	0.81	0.79	35.7
9	R2	All MCs	76	0.0	76	0.0	0.063	58.5	LOS E	3.7	25.8	0.72	0.72	0.72	37.9
Approach			460	0.0	460	0.0	0.510	56.3	LOS D	20.3	141.9	0.78	0.80	0.78	31.1
West: Railway St W															
10	L2	All MCs	27	0.0	27	0.0	* 0.974	94.2	LOS F	3.3	22.9	1.00	0.96	1.96	28.7
11	T1	All MCs	958	0.0	958	0.0	* 0.974	77.3	LOS F	88.9	622.2	1.00	1.19	1.30	29.6
Approach			985	0.0	985	0.0	0.974	77.7	LOS F	88.9	622.2	1.00	1.19	1.32	29.6
All Vehicles			2417	0.0	2417	0.0	0.974	55.8	LOS D	88.9	622.2	0.81	0.87	0.98	33.6

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

* Critical Movement (Signal Timing)

INTERSECTION SUMMARY

Site: 101 [Future AM: Railway St/Arthur St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 7:45-8:45am
Site Category: (None)
Stop (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Travel Speed (Average)	km/h	38.0	38.0	km/h
Travel Distance (Total)	veh-km/h	2024.3	2429.2	pers-km/h
Travel Time (Total)	veh-h/h	53.3	64.0	pers-h/h
Desired Speed	km/h	60.0		
Speed Efficiency		0.63		
Travel Time Index		5.92		
Congestion Coefficient		1.58		
Demand Flows (Total)	veh/h	2478	2974	pers/h
Arrival Flows (Total)	veh/h	2478		
Percent Heavy Vehicles (Demand)	%	0.0		
Percent Heavy Vehicles (Arrivals)	%	0.0		
Degree of Saturation		2.000		
Practical Spare Capacity	%	-60.0		
Effective Intersection Capacity	veh/h	1239		
Control Delay (Total)	veh-h/h	17.30	20.76	pers-h/h
Control Delay (Average)	sec	25.1	25.1	sec
Control Delay (Worst Lane by MC)	sec	2306.9		
Control Delay (Worst Movement by MC)	sec	2306.9	2306.9	sec
Geometric Delay (Average)	sec	5.4		
Stop-Line Delay (Average)	sec	19.7		
Idling Time (Average)	sec	19.1		
Intersection Level of Service (LOS)		NA		
95% Back of Queue - Veh (Worst Lane)	veh	9.8		
95% Back of Queue - Dist (Worst Lane)	m	68.5		
Ave. Que Storage Ratio (Worst Lane)		0.05		
Effective Stops (Total)	veh/h	1443	1732	pers/h
Effective Stop Rate		0.58	0.58	
Proportion Queued		0.01	0.01	
Performance Index		70.3	70.3	
Cost (Total)	$/h	1978.93	1978.93	$/h
Fuel Consumption (Total)	L/h	186.3		
Carbon Dioxide (Total)	kg/h	437.7		
Hydrocarbons (Total)	kg/h	0.038		
Carbon Monoxide (Total)	kg/h	0.47		
NOx (Total)	kg/h	0.131		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.

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

Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 0.0 %

Number of Iterations: 3 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 99.7% 0.0% 0.0%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Demand Flows (Total)	veh/y	1,189,440	1,427,328	pers/y

Delay (Total)	veh-h/y	8,305	9,966	pers-h/y
Effective Stops (Total)	veh/y	692,873	831,448	pers/y
Travel Distance (Total)	veh-km/y	971,670	1,166,004	pers-km/y
Travel Time (Total)	veh-h/y	25,590	30,708	pers-h/y
Cost (Total)	$/y	949,887	949,887	$/y
Fuel Consumption (Total)	L/y	89,408		
Carbon Dioxide (Total)	kg/y	210,109		
Hydrocarbons (Total)	kg/y	18		
Carbon Monoxide (Total)	kg/y	227		
NOx (Total)	kg/y	63		

1 Hours per Year: 480 (Site)

MOVEMENT SUMMARY

Site: 101 [Future AM: Railway St/Arthur St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 7:45-8:45am
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Arthur St E															
4	L2	All MCs	881	0.0	881	0.0	0.474	5.7	LOS A	0.0	0.0	0.00	0.57	0.00	51.2
5	T1	All MCs	12	0.0	12	0.0	2.000	2306.9	LOS F	9.8	68.5	1.00	1.40	2.99	1.5
Approach			893	0.0	893	0.0	2.000	36.6	LOS C	9.8	68.5	0.01	0.59	0.04	33.3
NorthWest: Arthur St W															
11	T1	All MCs	11	0.0	11	0.0	1.460	1122.3	LOS F	9.1	63.4	1.00	1.51	3.49	2.9
12	R2	All MCs	6	0.0	6	0.0	1.460	1291.7	LOS F	9.1	63.4	1.00	1.51	3.49	2.4
Approach			17	0.0	17	0.0	1.460	1182.1	LOS F	9.1	63.4	1.00	1.51	3.49	2.7
SouthWest: Railway St															
1	L2	All MCs	10	0.0	10	0.0	0.844	6.1	LOS A	0.0	0.0	0.00	0.57	0.00	50.1
3	R2	All MCs	1558	0.0	1558	0.0	0.844	6.0	LOS A	0.0	0.0	0.00	0.57	0.00	50.1
Approach			1568	0.0	1568	0.0	0.844	6.0	NA	0.0	0.0	0.00	0.57	0.00	50.1
All Vehicles			2478	0.0	2478	0.0	2.000	25.1	NA	9.8	68.5	0.01	0.58	0.04	38.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

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

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

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

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

INTERSECTION SUMMARY

Site: 101 [Future PM: Railway St/Arthur St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 7:45-8:45am
Site Category: (None)
Stop (Two-Way)

Intersection Performance - Hourly Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Travel Speed (Average)	km/h	49.0	49.0 km/h
Travel Distance (Total)	veh-km/h	1827.0	2192.4 pers-km/h
Travel Time (Total)	veh-h/h	37.2	44.7 pers-h/h
Desired Speed	km/h	60.0	
Speed Efficiency		0.82	
Travel Time Index		7.97	
Congestion Coefficient		1.22	
Demand Flows (Total)	veh/h	2237	2684 pers/h
Arrival Flows (Total)	veh/h	2237	
Percent Heavy Vehicles (Demand)	%	0.0	
Percent Heavy Vehicles (Arrivals)	%	0.0	
Degree of Saturation		0.698	
Practical Spare Capacity	%	14.7	
Effective Intersection Capacity	veh/h	3206	
Control Delay (Total)	veh-h/h	4.99	5.98 pers-h/h
Control Delay (Average)	sec	8.0	8.0 sec
Control Delay (Worst Lane by MC)	sec	216.9	
Control Delay (Worst Movement by MC)	sec	298.3	298.3 sec
Geometric Delay (Average)	sec	5.5	
Stop-Line Delay (Average)	sec	2.5	
Idling Time (Average)	sec	2.2	
Intersection Level of Service (LOS)		NA	
95% Back of Queue - Veh (Worst Lane)	veh	2.0	
95% Back of Queue - Dist (Worst Lane)	m	13.7	
Ave. Que Storage Ratio (Worst Lane)		0.01	
Effective Stops (Total)	veh/h	1300	1560 pers/h
Effective Stop Rate		0.58	0.58
Proportion Queued		0.01	0.01
Performance Index		44.5	44.5
Cost (Total)	$/h	1440.87	1440.87 $/h
Fuel Consumption (Total)	L/h	156.9	
Carbon Dioxide (Total)	kg/h	368.7	
Hydrocarbons (Total)	kg/h	0.032	
Carbon Monoxide (Total)	kg/h	0.42	
NOx (Total)	kg/h	0.118	

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 0.0 %
Number of Iterations: 3 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 98.5% 0.0% 0.0%

Intersection Performance - Annual Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Demand Flows (Total)	veh/y	1,073,760	1,288,512 pers/y

Delay (Total)	veh-h/y	2,394	2,872	pers-h/y
Effective Stops (Total)	veh/y	624,062	748,875	pers/y
Travel Distance (Total)	veh-km/y	876,967	1,052,361	pers-km/y
Travel Time (Total)	veh-h/y	17,879	21,455	pers-h/y
Cost (Total)	$/y	691,615	691,615	$/y
Fuel Consumption (Total)	L/y	75,317		
Carbon Dioxide (Total)	kg/y	176,996		
Hydrocarbons (Total)	kg/y	15		
Carbon Monoxide (Total)	kg/y	204		
NOx (Total)	kg/y	57		

1 Hours per Year: 480 (Site)

MOVEMENT SUMMARY

Site: 101 [Future PM: Railway St/Arthur St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 7:45-8:45am
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Arthur St E															
4	L2	All MCs	937	0.0	937	0.0	0.505	5.7	LOS A	0.0	0.0	0.00	0.57	0.00	51.2
5	T1	All MCs	8	0.0	8	0.0	0.240	119.0	LOS F	0.7	4.6	0.98	1.00	1.02	20.0
Approach			945	0.0	945	0.0	0.505	6.7	LOS A	0.7	4.6	0.01	0.58	0.01	50.3
NorthWest: Arthur St W															
11	T1	All MCs	10	0.0	10	0.0	0.698	135.6	LOS F	2.0	13.7	0.99	1.06	1.28	13.1
12	R2	All MCs	10	0.0	10	0.0	0.698	298.3	LOS F	2.0	13.7	0.99	1.06	1.28	11.0
Approach			20	0.0	20	0.0	0.698	216.9	LOS F	2.0	13.7	0.99	1.06	1.28	12.0
SouthWest: Railway St															
1	L2	All MCs	8	0.0	8	0.0	0.685	5.7	LOS A	0.0	0.0	0.00	0.58	0.00	50.9
3	R2	All MCs	1264	0.0	1264	0.0	0.685	5.7	LOS A	0.0	0.0	0.00	0.58	0.00	50.8
Approach			1272	0.0	1272	0.0	0.685	5.7	NA	0.0	0.0	0.00	0.58	0.00	50.8
All Vehicles			2237	0.0	2237	0.0	0.698	8.0	NA	2.0	13.7	0.01	0.58	0.02	49.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

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

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

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

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

INTERSECTION SUMMARY

Site: 101 [Future AM: Church St/Swete St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 7:30-8:30am
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Travel Speed (Average)	km/h	46.7	46.7 km/h
Travel Distance (Total)	veh-km/h	1295.2	1554.2 pers-km/h
Travel Time (Total)	veh-h/h	27.8	33.3 pers-h/h
Desired Speed	km/h	52.7	
Speed Efficiency		0.88	
Travel Time Index		8.72	
Congestion Coefficient		1.13	
Demand Flows (Total)	veh/h	1277	1532 pers/h
Arrival Flows (Total)	veh/h	1277	
Percent Heavy Vehicles (Demand)	%	0.0	
Percent Heavy Vehicles (Arrivals)	%	0.0	
Degree of Saturation		0.532	
Practical Spare Capacity	%	59.7	
Effective Intersection Capacity	veh/h	2400	
Control Delay (Total)	veh-h/h	2.20	2.64 pers-h/h
Control Delay (Average)	sec	6.2	6.2 sec
Control Delay (Worst Lane by MC)	sec	8.4	
Control Delay (Worst Movement by MC)	sec	9.1	9.1 sec
Geometric Delay (Average)	sec	4.9	
Stop-Line Delay (Average)	sec	1.3	
Idling Time (Average)	sec	0.1	
Intersection Level of Service (LOS)		LOS A	
95% Back of Queue - Veh (Worst Lane)	veh	4.7	
95% Back of Queue - Dist (Worst Lane)	m	32.8	
Ave. Que Storage Ratio (Worst Lane)		0.03	
Effective Stops (Total)	veh/h	708	850 pers/h
Effective Stop Rate		0.55	0.55
Proportion Queued		0.48	0.48
Performance Index		37.8	37.8
Cost (Total)	$/h	1040.02	1040.02 $/h
Fuel Consumption (Total)	L/h	101.4	
Carbon Dioxide (Total)	kg/h	238.3	
Hydrocarbons (Total)	kg/h	0.018	
Carbon Monoxide (Total)	kg/h	0.22	
NOx (Total)	kg/h	0.066	

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.

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

Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 1.2 %

Number of Iterations: 5 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 1.9% 1.2% 0.6%

Intersection Performance - Annual Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Demand Flows (Total)	veh/y	612,960	735,552 pers/y
Delay (Total)	veh-h/y	1,056	1,267 pers-h/y

Effective Stops (Total)	veh/y	340,024	408,029	pers/y
Travel Distance (Total)	veh-km/y	621,692	746,030	pers-km/y
Travel Time (Total)	veh-h/y	13,325	15,990	pers-h/y
Cost (Total)	$/y	499,211	499,211	$/y
Fuel Consumption (Total)	L/y	48,672		
Carbon Dioxide (Total)	kg/y	114,379		
Hydrocarbons (Total)	kg/y	9		
Carbon Monoxide (Total)	kg/y	107		
NOx (Total)	kg/y	32		

1 Hours per Year: 480 (Site)

MOVEMENT SUMMARY

Site: 101 [Future AM: Church St/Swete St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 7:30-8:30am
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Church St E															
5	T1	All MCs	217	0.0	217	0.0	0.296	6.0	LOS A	1.9	13.5	0.45	0.58	0.45	48.2
6	R2	All MCs	106	0.0	106	0.0	0.296	8.6	LOS A	1.9	13.5	0.45	0.58	0.45	47.7
Approach			323	0.0	323	0.0	0.296	6.8	LOS A	1.9	13.5	0.45	0.58	0.45	48.1
North: Swete St															
7	L2	All MCs	94	0.0	94	0.0	0.305	7.2	LOS A	1.9	13.2	0.61	0.67	0.61	46.5
9	R2	All MCs	179	0.0	179	0.0	0.305	9.1	LOS A	1.9	13.2	0.61	0.67	0.61	43.6
Approach			273	0.0	273	0.0	0.305	8.4	LOS A	1.9	13.2	0.61	0.67	0.61	44.6
West: Church St W															
10	L2	All MCs	305	0.0	305	0.0	0.532	5.5	LOS A	4.7	32.8	0.44	0.50	0.44	45.0
11	T1	All MCs	376	0.0	376	0.0	0.532	4.7	LOS A	4.7	32.8	0.44	0.50	0.44	48.6
Approach			681	0.0	681	0.0	0.532	5.0	LOS A	4.7	32.8	0.44	0.50	0.44	46.9
All Vehicles			1277	0.0	1277	0.0	0.532	6.2	LOS A	4.7	32.8	0.48	0.55	0.48	46.7

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

INTERSECTION SUMMARY

Site: 101 [Future PM: Church St/Swete St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 5:00-6:00pm
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Travel Speed (Average)	km/h	47.2	47.2 km/h
Travel Distance (Total)	veh-km/h	1175.0	1410.0 pers-km/h
Travel Time (Total)	veh-h/h	24.9	29.8 pers-h/h
Desired Speed	km/h	53.2	
Speed Efficiency		0.89	
Travel Time Index		8.75	
Congestion Coefficient		1.13	
Demand Flows (Total)	veh/h	1158	1390 pers/h
Arrival Flows (Total)	veh/h	1158	
Percent Heavy Vehicles (Demand)	%	0.0	
Percent Heavy Vehicles (Arrivals)	%	0.0	
Degree of Saturation		0.444	
Practical Spare Capacity	%	91.5	
Effective Intersection Capacity	veh/h	2609	
Control Delay (Total)	veh-h/h	1.96	2.35 pers-h/h
Control Delay (Average)	sec	6.1	6.1 sec
Control Delay (Worst Lane by MC)	sec	7.4	
Control Delay (Worst Movement by MC)	sec	8.7	8.7 sec
Geometric Delay (Average)	sec	5.0	
Stop-Line Delay (Average)	sec	1.1	
Idling Time (Average)	sec	0.0	
Intersection Level of Service (LOS)		LOS A	
95% Back of Queue - Veh (Worst Lane)	veh	3.3	
95% Back of Queue - Dist (Worst Lane)	m	23.3	
Ave. Que Storage Ratio (Worst Lane)		0.02	
Effective Stops (Total)	veh/h	634	761 pers/h
Effective Stop Rate		0.55	0.55
Proportion Queued		0.43	0.43
Performance Index		32.8	32.8
Cost (Total)	$/h	930.75	930.75 $/h
Fuel Consumption (Total)	L/h	90.4	
Carbon Dioxide (Total)	kg/h	212.4	
Hydrocarbons (Total)	kg/h	0.016	
Carbon Monoxide (Total)	kg/h	0.20	
NOx (Total)	kg/h	0.058	

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.

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

Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 0.8 %

Number of Iterations: 4 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 0.0% 1.0% 0.6%

Intersection Performance - Annual Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Demand Flows (Total)	veh/y	555,840	667,008 pers/y
Delay (Total)	veh-h/y	939	1,127 pers-h/y

Effective Stops (Total)	veh/y	304,267	365,120	pers/y
Travel Distance (Total)	veh-km/y	564,004	676,805	pers-km/y
Travel Time (Total)	veh-h/y	11,938	14,326	pers-h/y
Cost (Total)	$/y	446,759	446,759	$/y
Fuel Consumption (Total)	L/y	43,379		
Carbon Dioxide (Total)	kg/y	101,941		
Hydrocarbons (Total)	kg/y	8		
Carbon Monoxide (Total)	kg/y	97		
NOx (Total)	kg/y	28		

1 Hours per Year: 480 (Site)

MOVEMENT SUMMARY

Site: 101 [Future PM: Church St/Swete St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 5:00-6:00pm
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Church St E															
5	T1	All MCs	421	0.0	421	0.0	0.444	6.0	LOS A	3.3	23.3	0.49	0.56	0.49	48.3
6	R2	All MCs	90	0.0	90	0.0	0.444	8.7	LOS A	3.3	23.3	0.49	0.56	0.49	47.8
Approach			511	0.0	511	0.0	0.444	6.5	LOS A	3.3	23.3	0.49	0.56	0.49	48.2
North: Swete St															
7	L2	All MCs	91	0.0	91	0.0	0.255	6.2	LOS A	1.5	10.4	0.48	0.62	0.48	47.1
9	R2	All MCs	168	0.0	168	0.0	0.255	8.1	LOS A	1.5	10.4	0.48	0.62	0.48	44.1
Approach			259	0.0	259	0.0	0.255	7.4	LOS A	1.5	10.4	0.48	0.62	0.48	45.1
West: Church St W															
10	L2	All MCs	146	0.0	146	0.0	0.306	5.1	LOS A	2.1	14.4	0.32	0.48	0.32	45.3
11	T1	All MCs	242	0.0	242	0.0	0.306	4.3	LOS A	2.1	14.4	0.32	0.48	0.32	48.9
Approach			388	0.0	388	0.0	0.306	4.6	LOS A	2.1	14.4	0.32	0.48	0.32	47.5
All Vehicles			1158	0.0	1158	0.0	0.444	6.1	LOS A	3.3	23.3	0.43	0.55	0.43	47.2

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

INTERSECTION SUMMARY

Site: 101 [Future AM: Church St/Bachell Ave, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 7:30-8:30am
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 40 seconds (Site Optimum Cycle Time - Minimum Delay)

Intersection Performance - Hourly Values					
Performance Measure	**Vehicles:**	**All MCs**	**Pedestrians**	**Persons**	
Travel Speed (Average)	km/h	48.6	2.4 km/h	47.9	km/h
Travel Distance (Total)	veh-km/h	1195.3	1.0 ped-km/h	1435.3	pers-km/h
Travel Time (Total)	veh-h/h	24.6	0.4 ped-h/h	29.9	pers-h/h
Desired Speed	km/h	60.0			
Speed Efficiency		0.81			
Travel Time Index		7.88			
Congestion Coefficient		1.24			
Demand Flows (Total)	veh/h	1175	50 ped/h	1460	pers/h
Arrival Flows (Total)	veh/h	1175			
Percent Heavy Vehicles (Demand)	%	0.0			
Percent Heavy Vehicles (Arrivals)	%	0.0			
Degree of Saturation		0.479	0.028		
Practical Spare Capacity	%	88.0			
Effective Intersection Capacity	veh/h	2455			
Control Delay (Total)	veh-h/h	4.03	0.20 ped-h/h	5.04	pers-h/h
Control Delay (Average)	sec	12.4	14.5 sec	12.4	sec
Control Delay (Worst Lane by MC)	sec	21.0			
Control Delay (Worst Movement by MC)	sec	21.0	14.5 sec	21.0	sec
Geometric Delay (Average)	sec	4.2			
Stop-Line Delay (Average)	sec	8.2			
Idling Time (Average)	sec	5.4			
Intersection Level of Service (LOS)		LOS A	LOS B		
95% Back of Queue - Veh (Worst Lane)	veh	3.6			
95% Back of Queue - Dist (Worst Lane)	m	25.3			
Ave. Que Storage Ratio (Worst Lane)		0.03			
Effective Stops (Total)	veh/h	832	43 ped/h	1041	pers/h
Effective Stop Rate		0.71	0.85	0.71	
Proportion Queued		0.69	0.85	0.69	
Performance Index		37.7	0.7	38.4	
Cost (Total)	$/h	942.19	10.20 $/h	952.39	$/h
Fuel Consumption (Total)	L/h	99.1			
Carbon Dioxide (Total)	kg/h	233.0			
Hydrocarbons (Total)	kg/h	0.020			
Carbon Monoxide (Total)	kg/h	0.28			
NOx (Total)	kg/h	0.071			

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 0.0 %
Number of Iterations: 2 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Main (Timing-Capacity) Iterations: 6.2% 0.0% 0.0%

Intersection Performance - Annual Values					
Performance Measure	**Vehicles:**	**All MCs**	**Pedestrians**	**Persons**	
Demand Flows (Total)	veh/y	564,000	24,000 ped/y	700,800	pers/y

Delay (Total)	veh-h/y	1,935	97	ped-h/y	2,418	pers-h/y
Effective Stops (Total)	veh/y	399,207	20,443	ped/y	499,491	pers/y
Travel Distance (Total)	veh-km/y	573,736	480	ped-km/y	688,964	pers-km/y
Travel Time (Total)	veh-h/y	11,814	199	ped-h/y	14,376	pers-h/y
Cost (Total)	$/y	452,251	4,898	$/y	457,149	$/y
Fuel Consumption (Total)	L/y	47,590				
Carbon Dioxide (Total)	kg/y	111,837				
Hydrocarbons (Total)	kg/y	10				
Carbon Monoxide (Total)	kg/y	132				
NOx (Total)	kg/y	34				

1 Hours per Year: 480 (Site)

MOVEMENT SUMMARY

Site: 101 [Future AM: Church St/Bachell Ave, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 7:30-8:30am
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 40 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Church St E															
5	T1	All MCs	140	0.0	140	0.0	0.411	6.8	LOS A	3.2	22.3	0.69	0.58	0.69	52.0
6	R2	All MCs	164	0.0	164	0.0	* 0.411	15.0	LOS B	3.2	22.3	0.83	0.74	0.83	47.6
Approach			304	0.0	304	0.0	0.411	11.2	LOS A	3.2	22.3	0.76	0.67	0.76	49.5
North: Bachell Ave															
7	L2	All MCs	122	0.0	122	0.0	0.125	10.8	LOS A	1.2	8.6	0.53	0.70	0.53	49.1
9	R2	All MCs	200	0.0	200	0.0	* 0.479	21.0	LOS B	3.6	25.3	0.91	0.79	0.91	43.2
Approach			322	0.0	322	0.0	0.479	17.1	LOS B	3.6	25.3	0.77	0.76	0.77	45.3
West: Church St W															
10	L2	All MCs	394	0.0	394	0.0	0.343	7.4	LOS A	2.1	14.6	0.47	0.69	0.47	51.6
11	T1	All MCs	155	0.0	155	0.0	* 0.454	17.1	LOS B	2.9	20.4	0.94	0.75	0.94	46.8
Approach			549	0.0	549	0.0	0.454	10.2	LOS A	2.9	20.4	0.60	0.70	0.60	50.2
All Vehicles			1175	0.0	1175	0.0	0.479	12.4	LOS A	3.6	25.3	0.69	0.71	0.69	48.6

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

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
East: Church St E												
P2	Full	50	50	14.5	LOS B	0.0	0.0	0.85	0.85	29.9	20.0	0.67
All Pedestrians		50	50	14.5	LOS B	0.0	0.0	0.85	0.85	29.9	20.0	0.67

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.

INTERSECTION SUMMARY

Site: 101 [Future PM: Church St/Bachell Ave, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

PM Peak Hour: 5:00-6:00pm
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 60 seconds (Site Optimum Cycle Time - Minimum Delay)

Intersection Performance - Hourly Values						
Performance Measure	**Vehicles:**	**All MCs**	**Pedestrians**		**Persons**	
Travel Speed (Average)	km/h	44.1	2.6	km/h	43.7	km/h
Travel Distance (Total)	veh-km/h	1481.4	1.0	ped-km/h	1778.6	pers-km/h
Travel Time (Total)	veh-h/h	33.6	0.4	ped-h/h	40.7	pers-h/h
Desired Speed	km/h	60.0				
Speed Efficiency		0.74				
Travel Time Index		7.06				
Congestion Coefficient		1.36				
Demand Flows (Total)	veh/h	1458	50	ped/h	1800	pers/h
Arrival Flows (Total)	veh/h	1458				
Percent Heavy Vehicles (Demand)	%	0.0				
Percent Heavy Vehicles (Arrivals)	%	0.0				
Degree of Saturation		0.754	0.012			
Practical Spare Capacity	%	19.4				
Effective Intersection Capacity	veh/h	1934				
Control Delay (Total)	veh-h/h	8.05	0.18	ped-h/h	9.84	pers-h/h
Control Delay (Average)	sec	19.9	12.7	sec	19.7	sec
Control Delay (Worst Lane by MC)	sec	30.4				
Control Delay (Worst Movement by MC)	sec	30.4	12.7	sec	30.4	sec
Geometric Delay (Average)	sec	4.2				
Stop-Line Delay (Average)	sec	15.7				
Idling Time (Average)	sec	11.4				
Intersection Level of Service (LOS)		LOS B	LOS B			
95% Back of Queue - Veh (Worst Lane)	veh	16.3				
95% Back of Queue - Dist (Worst Lane)	m	114.0				
Ave. Que Storage Ratio (Worst Lane)		0.05				
Effective Stops (Total)	veh/h	1146	33	ped/h	1407	pers/h
Effective Stop Rate		0.79	0.65		0.78	
Proportion Queued		0.74	0.65		0.73	
Performance Index		59.4	0.6		60.0	
Cost (Total)	$/h	1256.03	9.60	$/h	1265.62	$/h
Fuel Consumption (Total)	L/h	127.6				
Carbon Dioxide (Total)	kg/h	299.8				
Hydrocarbons (Total)	kg/h	0.026				
Carbon Monoxide (Total)	kg/h	0.35				
NOx (Total)	kg/h	0.091				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 0.0 %
Number of Iterations: 2 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Main (Timing-Capacity) Iterations: 6.0% 3.5% 0.0%

Intersection Performance - Annual Values						
Performance Measure	**Vehicles:**	**All MCs**	**Pedestrians**		**Persons**	
Demand Flows (Total)	veh/y	699,840	24,000	ped/y	863,808	pers/y

Delay (Total)	veh-h/y	3,864	85	ped-h/y	4,721	pers-h/y
Effective Stops (Total)	veh/y	549,853	15,633	ped/y	675,456	pers/y
Travel Distance (Total)	veh-km/y	711,053	480	ped-km/y	853,744	pers-km/y
Travel Time (Total)	veh-h/y	16,109	187	ped-h/y	19,518	pers-h/y
Cost (Total)	$/y	602,893	4,606	$/y	607,499	$/y
Fuel Consumption (Total)	L/y	61,235				
Carbon Dioxide (Total)	kg/y	143,903				
Hydrocarbons (Total)	kg/y	13				
Carbon Monoxide (Total)	kg/y	168				
NOx (Total)	kg/y	44				

1 Hours per Year: 480 (Site)

MOVEMENT SUMMARY

Site: 101 [Future PM: Church St/Bachell Ave, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

PM Peak Hour: 5:00-6:00pm
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 60 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Church St E															
5	T1	All MCs	163	0.0	163	0.0	0.442	17.2	LOS B	4.7	32.8	0.84	0.67	0.84	45.0
6	R2	All MCs	75	0.0	75	0.0	* 0.442	29.3	LOS C	4.7	32.8	0.91	0.73	0.91	42.1
Approach			238	0.0	238	0.0	0.442	21.0	LOS B	4.7	32.8	0.86	0.69	0.86	44.1
North: Bachell Ave															
7	L2	All MCs	165	0.0	165	0.0	0.133	11.3	LOS A	1.8	12.3	0.39	0.67	0.39	50.1
9	R2	All MCs	623	0.0	623	0.0	* 0.754	23.7	LOS B	16.3	114.0	0.88	0.88	0.95	42.8
Approach			788	0.0	788	0.0	0.754	21.1	LOS B	16.3	114.0	0.78	0.84	0.83	43.2
West: Church St W															
10	L2	All MCs	242	0.0	242	0.0	0.186	6.5	LOS A	1.0	7.1	0.27	0.62	0.27	52.3
11	T1	All MCs	190	0.0	190	0.0	* 0.731	30.4	LOS C	6.0	41.7	1.00	0.90	1.20	40.0
Approach			432	0.0	432	0.0	0.731	17.0	LOS B	6.0	41.7	0.59	0.74	0.68	46.1
All Vehicles			1458	0.0	1458	0.0	0.754	19.9	LOS B	16.3	114.0	0.74	0.79	0.79	44.1

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

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
East: Church St E												
P2	Full	50	50	12.7	LOS B	0.1	0.1	0.65	0.65	28.1	20.0	0.71
All Pedestrians		50	50	12.7	LOS B	0.1	0.1	0.65	0.65	28.1	20.0	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.

INTERSECTION SUMMARY

Site: 101 [Future AM: Church St/Railway St Bridge, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 8:00-9:00am
Site Category: (None)
Give-Way (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Travel Speed (Average)	km/h	44.8	44.8	km/h
Travel Distance (Total)	veh-km/h	1356.9	1628.3	pers-km/h
Travel Time (Total)	veh-h/h	30.3	36.3	pers-h/h
Desired Speed	km/h	50.0		
Speed Efficiency		0.90		
Travel Time Index		8.84		
Congestion Coefficient		1.12		
Demand Flows (Total)	veh/h	1340	1608	pers/h
Arrival Flows (Total)	veh/h	1340		
Percent Heavy Vehicles (Demand)	%	0.0		
Percent Heavy Vehicles (Arrivals)	%	0.0		
Degree of Saturation		0.496		
Practical Spare Capacity	%	61.4		
Effective Intersection Capacity	veh/h	2704		
Control Delay (Total)	veh-h/h	2.35	2.82	pers-h/h
Control Delay (Average)	sec	6.3	6.3	sec
Control Delay (Worst Lane by MC)	sec	15.9		
Control Delay (Worst Movement by MC)	sec	15.9	15.9	sec
Geometric Delay (Average)	sec	4.5		
Stop-Line Delay (Average)	sec	1.8		
Idling Time (Average)	sec	1.0		
Intersection Level of Service (LOS)		NA		
95% Back of Queue - Veh (Worst Lane)	veh	2.1		
95% Back of Queue - Dist (Worst Lane)	m	14.7		
Ave. Que Storage Ratio (Worst Lane)		0.01		
Effective Stops (Total)	veh/h	822	986	pers/h
Effective Stop Rate		0.61	0.61	
Proportion Queued		0.12	0.12	
Performance Index		34.9	34.9	
Cost (Total)	$/h	1114.86	1114.86	$/h
Fuel Consumption (Total)	L/h	101.5		
Carbon Dioxide (Total)	kg/h	238.5		
Hydrocarbons (Total)	kg/h	0.017		
Carbon Monoxide (Total)	kg/h	0.19		
NOx (Total)	kg/h	0.060		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.

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

Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 0.0 %

Number of Iterations: 3 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 79.0% 0.0% 0.0%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Demand Flows (Total)	veh/y	643,200	771,840	pers/y

Delay (Total)	veh-h/y	1,126	1,352	pers-h/y
Effective Stops (Total)	veh/y	394,556	473,467	pers/y
Travel Distance (Total)	veh-km/y	651,329	781,595	pers-km/y
Travel Time (Total)	veh-h/y	14,538	17,446	pers-h/y
Cost (Total)	$/y	535,131	535,131	$/y
Fuel Consumption (Total)	L/y	48,718		
Carbon Dioxide (Total)	kg/y	114,487		
Hydrocarbons (Total)	kg/y	8		
Carbon Monoxide (Total)	kg/y	91		
NOx (Total)	kg/y	29		

1 Hours per Year: 480 (Site)

MOVEMENT SUMMARY

Site: 101 [Future AM: Church St/Railway St Bridge, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 8:00-9:00am
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Railway Street Bridge															
1	L2	All MCs	207	0.0	207	0.0	0.422	4.7	LOS A	0.0	0.0	0.00	0.55	0.00	45.8
3	R2	All MCs	577	0.0	577	0.0	0.422	4.7	LOS A	0.0	0.0	0.00	0.55	0.00	45.6
Approach			784	0.0	784	0.0	0.422	4.7	NA	0.0	0.0	0.00	0.55	0.00	45.6
East: Church St E															
4	L2	All MCs	363	0.0	363	0.0	0.195	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	45.9
Approach			363	0.0	363	0.0	0.195	4.6	NA	0.0	0.0	0.00	0.53	0.00	45.9
West: Church St W															
12	R2	All MCs	193	0.0	193	0.0	0.496	15.9	LOS B	2.1	14.7	0.82	1.04	1.20	40.0
Approach			193	0.0	193	0.0	0.496	15.9	LOS B	2.1	14.7	0.82	1.04	1.20	40.0
All Vehicles			1340	0.0	1340	0.0	0.496	6.3	NA	2.1	14.7	0.12	0.61	0.17	44.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

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

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

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

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

INTERSECTION SUMMARY

Site: 101 [Future PM: Church St/Railway St Bridge, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 4:45-5:45pm
Site Category: (None)
Give-Way (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Travel Speed (Average)	km/h	44.4	44.4	km/h
Travel Distance (Total)	veh-km/h	1596.0	1915.2	pers-km/h
Travel Time (Total)	veh-h/h	35.9	43.1	pers-h/h
Desired Speed	km/h	50.0		
Speed Efficiency		0.89		
Travel Time Index		8.76		
Congestion Coefficient		1.13		
Demand Flows (Total)	veh/h	1574	1889	pers/h
Arrival Flows (Total)	veh/h	1574		
Percent Heavy Vehicles (Demand)	%	0.0		
Percent Heavy Vehicles (Arrivals)	%	0.0		
Degree of Saturation		0.670		
Practical Spare Capacity	%	19.4		
Effective Intersection Capacity	veh/h	2348		
Control Delay (Total)	veh-h/h	3.11	3.73	pers-h/h
Control Delay (Average)	sec	7.1	7.1	sec
Control Delay (Worst Lane by MC)	sec	22.7		
Control Delay (Worst Movement by MC)	sec	22.7	22.7	sec
Geometric Delay (Average)	sec	4.5		
Stop-Line Delay (Average)	sec	2.6		
Idling Time (Average)	sec	1.6		
Intersection Level of Service (LOS)		NA		
95% Back of Queue - Veh (Worst Lane)	veh	3.2		
95% Back of Queue - Dist (Worst Lane)	m	22.4		
Ave. Que Storage Ratio (Worst Lane)		0.02		
Effective Stops (Total)	veh/h	975	1170	pers/h
Effective Stop Rate		0.62	0.62	
Proportion Queued		0.12	0.12	
Performance Index		41.7	41.7	
Cost (Total)	$/h	1320.68	1320.68	$/h
Fuel Consumption (Total)	L/h	119.5		
Carbon Dioxide (Total)	kg/h	280.8		
Hydrocarbons (Total)	kg/h	0.020		
Carbon Monoxide (Total)	kg/h	0.22		
NOx (Total)	kg/h	0.070		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.

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

Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 0.0 %

Number of Iterations: 3 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 83.0% 0.0% 0.0%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Demand Flows (Total)	veh/y	755,520	906,624	pers/y

Delay (Total)	veh-h/y	1,492	1,791	pers-h/y
Effective Stops (Total)	veh/y	468,045	561,654	pers/y
Travel Distance (Total)	veh-km/y	766,060	919,272	pers-km/y
Travel Time (Total)	veh-h/y	17,249	20,699	pers-h/y
Cost (Total)	$/y	633,927	633,927	$/y
Fuel Consumption (Total)	L/y	57,351		
Carbon Dioxide (Total)	kg/y	134,775		
Hydrocarbons (Total)	kg/y	10		
Carbon Monoxide (Total)	kg/y	107		
NOx (Total)	kg/y	34		

1 Hours per Year: 480 (Site)

MOVEMENT SUMMARY

Site: 101 [Future PM: Church St/Railway St Bridge, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 4:45-5:45pm
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Railway Street Bridge															
1	L2	All MCs	351	0.0	351	0.0	0.354	4.7	LOS A	0.0	0.0	0.00	0.54	0.00	45.8
3	R2	All MCs	306	0.0	306	0.0	0.354	4.7	LOS A	0.0	0.0	0.00	0.54	0.00	45.6
Approach			657	0.0	657	0.0	0.354	4.7	NA	0.0	0.0	0.00	0.54	0.00	45.7
East: Church St E															
4	L2	All MCs	705	0.0	705	0.0	0.380	4.7	LOS A	0.0	0.0	0.00	0.53	0.00	45.8
Approach			705	0.0	705	0.0	0.380	4.7	NA	0.0	0.0	0.00	0.53	0.00	45.8
West: Church St W															
12	R2	All MCs	212	0.0	212	0.0	0.670	22.7	LOS B	3.2	22.4	0.90	1.17	1.64	37.3
Approach			212	0.0	212	0.0	0.670	22.7	LOS B	3.2	22.4	0.90	1.17	1.64	37.3
All Vehicles			1574	0.0	1574	0.0	0.670	7.1	NA	3.2	22.4	0.12	0.62	0.22	44.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

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

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

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

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

INTERSECTION SUMMARY

Site: 101 [DEV-BACHELL AVE-DRIVEWAY-AM2 (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

New Site
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Travel Speed (Average)	km/h	52.8	52.8	km/h
Travel Distance (Total)	veh-km/h	1095.1	1314.1	pers-km/h
Travel Time (Total)	veh-h/h	20.7	24.9	pers-h/h
Desired Speed	km/h	60.0		
Speed Efficiency		0.88		
Travel Time Index		8.68		
Congestion Coefficient		1.14		
Demand Flows (Total)	veh/h	1058	1269	pers/h
Arrival Flows (Total)	veh/h	1058		
Percent Heavy Vehicles (Demand)	%	0.0		
Percent Heavy Vehicles (Arrivals)	%	0.0		
Degree of Saturation		0.388		
Practical Spare Capacity	%	118.9		
Effective Intersection Capacity	veh/h	2724		
Control Delay (Total)	veh-h/h	1.79	2.15	pers-h/h
Control Delay (Average)	sec	6.1	6.1	sec
Control Delay (Worst Lane by MC)	sec	8.8		
Control Delay (Worst Movement by MC)	sec	11.9	11.9	sec
Geometric Delay (Average)	sec	5.4		
Stop-Line Delay (Average)	sec	0.7		
Idling Time (Average)	sec	0.0		
Intersection Level of Service (LOS)		LOS A		
95% Back of Queue - Veh (Worst Lane)	veh	3.0		
95% Back of Queue - Dist (Worst Lane)	m	21.1		
Ave. Que Storage Ratio (Worst Lane)		0.02		
Effective Stops (Total)	veh/h	557	669	pers/h
Effective Stop Rate		0.53	0.53	
Proportion Queued		0.27	0.27	
Performance Index		29.5	29.5	
Cost (Total)	$/h	946.48	946.48	$/h
Fuel Consumption (Total)	L/h	85.3		
Carbon Dioxide (Total)	kg/h	200.5		
Hydrocarbons (Total)	kg/h	0.017		
Carbon Monoxide (Total)	kg/h	0.24		
NOx (Total)	kg/h	0.060		

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 1.3 %
Number of Iterations: 4 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 0.0% 1.7% 0.9%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Demand Flows (Total)	veh/y	507,790	609,347	pers/y
Delay (Total)	veh-h/y	860	1,032	pers-h/y

Effective Stops (Total)	veh/y	267,480	320,976	pers/y
Travel Distance (Total)	veh-km/y	525,637	630,764	pers-km/y
Travel Time (Total)	veh-h/y	9,946	11,935	pers-h/y
Cost (Total)	$/y	454,312	454,312	$/y
Fuel Consumption (Total)	L/y	40,957		
Carbon Dioxide (Total)	kg/y	96,248		
Hydrocarbons (Total)	kg/y	8		
Carbon Monoxide (Total)	kg/y	114		
NOx (Total)	kg/y	29		

1 Hours per Year: 480 (Site)

MOVEMENT SUMMARY

Site: 101 [DEV-BACHELL AVE-DRIVEWAY-AM2 (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: SITE DRIVEWAY															
1	L2	All MCs	83	0.0	83	0.0	0.090	5.2	LOS A	0.5	3.4	0.46	0.56	0.46	53.0
2	T1	All MCs	1	0.0	1	0.0	0.090	5.4	LOS A	0.5	3.4	0.46	0.56	0.46	53.4
3	R2	All MCs	13	0.0	13	0.0	0.090	10.0	LOS B	0.5	3.4	0.46	0.56	0.46	52.5
Approach			97	0.0	97	0.0	0.090	5.8	LOS A	0.5	3.4	0.46	0.56	0.46	53.0
East: BACHELL AVENUE															
4	L2	All MCs	41	0.0	41	0.0	0.293	5.6	LOS A	1.7	12.1	0.50	0.53	0.50	52.7
5	T1	All MCs	277	0.0	277	0.0	0.293	5.8	LOS A	1.7	12.1	0.50	0.53	0.50	53.0
6	R2	All MCs	1	0.0	1	0.0	0.293	10.5	LOS B	1.7	12.1	0.50	0.53	0.50	52.2
Approach			319	0.0	319	0.0	0.293	5.8	LOS A	1.7	12.1	0.50	0.53	0.50	53.0
North: RAWSON STREET															
7	L2	All MCs	1	0.0	1	0.0	0.004	7.1	LOS A	0.0	0.1	0.61	0.56	0.61	51.2
8	T1	All MCs	1	0.0	1	0.0	0.004	7.3	LOS A	0.0	0.1	0.61	0.56	0.61	51.6
9	R2	All MCs	1	0.0	1	0.0	0.004	11.9	LOS B	0.0	0.1	0.61	0.56	0.61	50.8
Approach			3	0.0	3	0.0	0.004	8.8	LOS A	0.0	0.1	0.61	0.56	0.61	51.2
West: BACHELL AVENUE															
10	L2	All MCs	1	0.0	1	0.0	0.388	3.9	LOS A	3.0	21.1	0.12	0.52	0.12	52.8
11	T1	All MCs	340	0.0	340	0.0	0.388	4.1	LOS A	3.0	21.1	0.12	0.52	0.12	53.2
12	R2	All MCs	298	0.0	298	0.0	0.388	8.7	LOS A	3.0	21.1	0.12	0.52	0.12	52.3
Approach			639	0.0	639	0.0	0.388	6.3	LOS A	3.0	21.1	0.12	0.52	0.12	52.8
All Vehicles			1058	0.0	1058	0.0	0.388	6.1	LOS A	3.0	21.1	0.27	0.53	0.27	52.8

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

INTERSECTION SUMMARY

Site: 101 [DEV-BACHELL AVE-DRIVEWAY-PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

New Site
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Travel Speed (Average)	km/h	52.7	52.7	km/h
Travel Distance (Total)	veh-km/h	1305.4	1566.5	pers-km/h
Travel Time (Total)	veh-h/h	24.8	29.7	pers-h/h
Desired Speed	km/h	60.0		
Speed Efficiency		0.88		
Travel Time Index		8.66		
Congestion Coefficient		1.14		
Demand Flows (Total)	veh/h	1267	1521	pers/h
Arrival Flows (Total)	veh/h	1267		
Percent Heavy Vehicles (Demand)	%	0.0		
Percent Heavy Vehicles (Arrivals)	%	0.0		
Degree of Saturation		0.443		
Practical Spare Capacity	%	92.0		
Effective Intersection Capacity	veh/h	2862		
Control Delay (Total)	veh-h/h	2.13	2.56	pers-h/h
Control Delay (Average)	sec	6.1	6.1	sec
Control Delay (Worst Lane by MC)	sec	8.5		
Control Delay (Worst Movement by MC)	sec	12.5	12.5	sec
Geometric Delay (Average)	sec	4.6		
Stop-Line Delay (Average)	sec	1.4		
Idling Time (Average)	sec	0.2		
Intersection Level of Service (LOS)		LOS A		
95% Back of Queue - Veh (Worst Lane)	veh	3.3		
95% Back of Queue - Dist (Worst Lane)	m	22.8		
Ave. Que Storage Ratio (Worst Lane)		0.02		
Effective Stops (Total)	veh/h	655	786	pers/h
Effective Stop Rate		0.52	0.52	
Proportion Queued		0.44	0.44	
Performance Index		36.5	36.5	
Cost (Total)	$/h	1132.21	1132.21	$/h
Fuel Consumption (Total)	L/h	102.5		
Carbon Dioxide (Total)	kg/h	240.9		
Hydrocarbons (Total)	kg/h	0.020		
Carbon Monoxide (Total)	kg/h	0.29		
NOx (Total)	kg/h	0.073		

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 1.8 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 3.0% 1.7% 0.9%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Demand Flows (Total)	veh/y	608,337	730,004	pers/y
Delay (Total)	veh-h/y	1,024	1,228	pers-h/y

Effective Stops (Total)	veh/y	314,381	377,257	pers/y
Travel Distance (Total)	veh-km/y	626,604	751,924	pers-km/y
Travel Time (Total)	veh-h/y	11,881	14,257	pers-h/y
Cost (Total)	$/y	543,463	543,463	$/y
Fuel Consumption (Total)	L/y	49,212		
Carbon Dioxide (Total)	kg/y	115,647		
Hydrocarbons (Total)	kg/y	10		
Carbon Monoxide (Total)	kg/y	138		
NOx (Total)	kg/y	35		

1 Hours per Year: 480 (Site)

MOVEMENT SUMMARY

Site: 101 [DEV-BACHELL AVE-DRIVEWAY-PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: SITE DRIVEWAY															
1	L2	All MCs	271	0.0	271	0.0	0.379	7.7	LOS A	2.5	17.8	0.74	0.69	0.74	51.4
2	T1	All MCs	1	0.0	1	0.0	0.379	7.8	LOS A	2.5	17.8	0.74	0.69	0.74	51.8
3	R2	All MCs	54	0.0	54	0.0	0.379	12.5	LOS B	2.5	17.8	0.74	0.69	0.74	50.9
Approach			325	0.0	325	0.0	0.379	8.5	LOS A	2.5	17.8	0.74	0.69	0.74	51.4
East: BACHELL AVENUE															
4	L2	All MCs	28	0.0	28	0.0	0.443	4.6	LOS A	3.3	22.8	0.39	0.44	0.39	53.1
5	T1	All MCs	566	0.0	566	0.0	0.443	4.8	LOS A	3.3	22.8	0.39	0.44	0.39	53.5
6	R2	All MCs	1	0.0	1	0.0	0.443	9.5	LOS A	3.3	22.8	0.39	0.44	0.39	52.6
Approach			596	0.0	596	0.0	0.443	4.8	LOS A	3.3	22.8	0.39	0.44	0.39	53.5
North: RAWSON STREET															
7	L2	All MCs	1	0.0	1	0.0	0.003	5.6	LOS A	0.0	0.1	0.48	0.52	0.48	52.1
8	T1	All MCs	1	0.0	1	0.0	0.003	5.7	LOS A	0.0	0.1	0.48	0.52	0.48	52.4
9	R2	All MCs	1	0.0	1	0.0	0.003	10.4	LOS B	0.0	0.1	0.48	0.52	0.48	51.6
Approach			3	0.0	3	0.0	0.003	7.2	LOS A	0.0	0.1	0.48	0.52	0.48	52.0
West: BACHELL AVENUE															
10	L2	All MCs	1	0.0	1	0.0	0.240	4.1	LOS A	1.6	11.5	0.24	0.48	0.24	52.8
11	T1	All MCs	224	0.0	224	0.0	0.240	4.3	LOS A	1.6	11.5	0.24	0.48	0.24	53.1
12	R2	All MCs	118	0.0	118	0.0	0.240	8.9	LOS A	1.6	11.5	0.24	0.48	0.24	52.3
Approach			343	0.0	343	0.0	0.240	5.9	LOS A	1.6	11.5	0.24	0.48	0.24	52.8
All Vehicles			1267	0.0	1267	0.0	0.443	6.1	LOS A	3.3	22.8	0.44	0.52	0.44	52.7

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

APPENDIX C

EXISTING PLUS
BACKGROUND TRAFFIC
GROWTH 2032

INTERSECTION SUMMARY

Site: 2785 [EX+BTG 2032 AM: Church St/Railway St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 7:45-8:45am
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 150 seconds (Site User-Given Phase Times)
Design Life Analysis (Final Year): Results for 10 years

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Travel Speed (Average)	km/h	8.5	8.5	km/h
Travel Distance (Total)	veh-km/h	3374.5	4049.4	pers-km/h
Travel Time (Total)	veh-h/h	395.6	474.8	pers-h/h
Desired Speed	km/h	60.0		
Speed Efficiency		0.14		
Travel Time Index		0.47		
Congestion Coefficient		7.03		
Demand Flows (Total)	veh/h	2753	3303	pers/h
Arrival Flows (Total)	veh/h	2753		
Percent Heavy Vehicles (Demand)	%	0.0		
Percent Heavy Vehicles (Arrivals)	%	0.0		
Degree of Saturation		1.423		
Practical Spare Capacity	%	-36.8		
Effective Intersection Capacity	veh/h	1934		
Control Delay (Total)	veh-h/h	338.34	406.01	pers-h/h
Control Delay (Average)	sec	442.5	442.5	sec
Control Delay (Worst Lane by MC)	sec	827.2		
Control Delay (Worst Movement by MC)	sec	839.5	839.5	sec
Geometric Delay (Average)	sec	1.1		
Stop-Line Delay (Average)	sec	441.4		
Idling Time (Average)	sec	420.3		
Intersection Level of Service (LOS)		LOS F[11]		
95% Back of Queue - Veh (Worst Lane)	veh	407.9		
95% Back of Queue - Dist (Worst Lane)	m	2855.2		
Ave. Que Storage Ratio (Worst Lane)		2.33		
Effective Stops (Total)	veh/h	6211	7454	pers/h
Effective Stop Rate		2.26	2.26	
Proportion Queued		0.83	0.83	
Performance Index		714.3	714.3	
Cost (Total)	$/h	13197.84	13197.84	$/h
Fuel Consumption (Total)	L/h	706.1		
Carbon Dioxide (Total)	kg/h	1659.4		
Hydrocarbons (Total)	kg/h	0.176		
Carbon Monoxide (Total)	kg/h	1.28		
NOx (Total)	kg/h	0.359		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 0.0 %
Number of Iterations: 2 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Main (Timing-Capacity) Iterations: 6.4% 0.0% 0.0%

11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.

Intersection Performance - Annual Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**

Demand Flows (Total)	veh/y	1,321,344	1,585,613	pers/y
Delay (Total)	veh-h/y	162,404	194,885	pers-h/y
Effective Stops (Total)	veh/y	2,981,447	3,577,736	pers/y
Travel Distance (Total)	veh-km/y	1,619,745	1,943,694	pers-km/y
Travel Time (Total)	veh-h/y	189,908	227,889	pers-h/y
Cost (Total)	$/y	6,334,963	6,334,963	$/y
Fuel Consumption (Total)	L/y	338,932		
Carbon Dioxide (Total)	kg/y	796,490		
Hydrocarbons (Total)	kg/y	85		
Carbon Monoxide (Total)	kg/y	613		
NOx (Total)	kg/y	172		

1 Hours per Year: 480 (Site)

MOVEMENT SUMMARY

Site: 2785 [EX+BTG 2032 AM: Church St/Railway St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 7:45-8:45am
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 150 seconds (Site User-Given Phase Times)
Design Life Analysis (Final Year): Results for 10 years

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Railway St E															
5	T1	All MCs	827	0.0	827	0.0	0.340	16.3	LOS B	15.0	105.1	0.55	0.48	0.55	49.4
6	R2	All MCs	162	0.0	162	0.0	* 0.692	81.5	LOS F[11]	11.9	83.1	1.00	0.81	1.04	25.2
Approach			989	0.0	989	0.0	0.692	27.0	LOS B	15.0	105.1	0.62	0.54	0.63	43.7
North: Church St															
7	L2	All MCs	256	0.0	256	0.0	0.331	42.6	LOS D	12.3	85.9	0.71	0.78	0.71	36.8
9	R2	All MCs	58	0.0	58	0.0	0.047	48.1	LOS D	2.8	19.4	0.71	0.71	0.71	38.0
Approach			313	0.0	313	0.0	0.331	43.6	LOS D	12.3	85.9	0.71	0.76	0.71	34.8
West: Railway St W															
10	L2	All MCs	53	0.0	53	0.0	* 1.423	839.5	LOS F[11]	23.5	164.8	1.00	1.88	4.75	4.9
11	T1	All MCs	1398	0.0	1398	0.0	* 1.423	810.7	LOS F[11]	407.9	2855.2	1.00	3.82	4.61	5.1
Approach			1451	0.0	1451	0.0	1.423	811.8	LOS F[11]	407.9	2855.2	1.00	3.75	4.61	5.1
All Vehicles			2753	0.0	2753	0.0	1.423	442.5	LOS F[11]	407.9	2855.2	0.83	2.26	2.74	8.5

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

11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.
* Critical Movement (Signal Timing)

INTERSECTION SUMMARY

Site: 2785 [EX+BTG 2032 PM: Church St/Railway St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

PM Peak Hour: 5:00-6:00pm
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 150 seconds (Site User-Given Phase Times)
Design Life Analysis (Final Year): Results for 10 years

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Travel Speed (Average)	km/h	17.3	17.3	km/h
Travel Distance (Total)	veh-km/h	3401.2	4081.4	pers-km/h
Travel Time (Total)	veh-h/h	196.6	235.9	pers-h/h
Desired Speed	km/h	60.0		
Speed Efficiency		0.29		
Travel Time Index		2.09		
Congestion Coefficient		3.47		
Demand Flows (Total)	veh/h	2818	3381	pers/h
Arrival Flows (Total)	veh/h	2818		
Percent Heavy Vehicles (Demand)	%	0.0		
Percent Heavy Vehicles (Arrivals)	%	0.0		
Degree of Saturation		1.169		
Practical Spare Capacity	%	-23.0		
Effective Intersection Capacity	veh/h	2411		
Control Delay (Total)	veh-h/h	138.67	166.41	pers-h/h
Control Delay (Average)	sec	177.2	177.2	sec
Control Delay (Worst Lane by MC)	sec	363.3		
Control Delay (Worst Movement by MC)	sec	377.2	377.2	sec
Geometric Delay (Average)	sec	1.5		
Stop-Line Delay (Average)	sec	175.7		
Idling Time (Average)	sec	162.3		
Intersection Level of Service (LOS)		LOS F[11]		
95% Back of Queue - Veh (Worst Lane)	veh	213.2		
95% Back of Queue - Dist (Worst Lane)	m	1492.6		
Ave. Que Storage Ratio (Worst Lane)		1.22		
Effective Stops (Total)	veh/h	3955	4746	pers/h
Effective Stop Rate		1.40	1.40	
Proportion Queued		0.82	0.82	
Performance Index		391.5	391.5	
Cost (Total)	$/h	6680.86	6680.86	$/h
Fuel Consumption (Total)	L/h	437.9		
Carbon Dioxide (Total)	kg/h	1029.1		
Hydrocarbons (Total)	kg/h	0.101		
Carbon Monoxide (Total)	kg/h	0.95		
NOx (Total)	kg/h	0.251		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 0.0 %
Number of Iterations: 2 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Main (Timing-Capacity) Iterations: 6.9% 0.0% 0.0%

11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.

Intersection Performance - Annual Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**

Demand Flows (Total)	veh/y	1,352,448	1,622,938	pers/y
Delay (Total)	veh-h/y	66,563	79,875	pers-h/y
Effective Stops (Total)	veh/y	1,898,428	2,278,114	pers/y
Travel Distance (Total)	veh-km/y	1,632,578	1,959,093	pers-km/y
Travel Time (Total)	veh-h/y	94,369	113,243	pers-h/y
Cost (Total)	$/y	3,206,811	3,206,811	$/y
Fuel Consumption (Total)	L/y	210,207		
Carbon Dioxide (Total)	kg/y	493,985		
Hydrocarbons (Total)	kg/y	48		
Carbon Monoxide (Total)	kg/y	458		
NOx (Total)	kg/y	121		

1 Hours per Year: 480 (Site)

MOVEMENT SUMMARY

Site: 2785 [EX+BTG 2032 PM: Church St/Railway St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

PM Peak Hour: 5:00-6:00pm
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 150 seconds (Site User-Given Phase Times)
Design Life Analysis (Final Year): Results for 10 years

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Railway St E															
5	T1	All MCs	904	0.0	904	0.0	0.372	16.7	LOS B	16.8	117.6	0.56	0.50	0.56	49.2
6	R2	All MCs	234	0.0	234	0.0	* 1.000	124.6	LOS F[11]	22.7	158.7	1.00	1.14	1.71	19.5
Approach			1138	0.0	1138	0.0	1.000	38.9	LOS C	22.7	158.7	0.65	0.63	0.80	38.9
North: Church St															
7	L2	All MCs	407	0.0	407	0.0	0.546	58.1	LOS E[11]	21.9	153.4	0.80	0.82	0.80	35.4
9	R2	All MCs	91	0.0	91	0.0	0.075	60.2	LOS E[11]	4.4	31.1	0.72	0.72	0.72	37.8
Approach			498	0.0	498	0.0	0.546	58.5	LOS E[11]	21.9	153.4	0.79	0.80	0.79	30.6
West: Railway St W															
10	L2	All MCs	32	0.0	32	0.0	* 1.169	377.2	LOS F[11]	9.6	67.1	1.00	1.50	3.19	9.4
11	T1	All MCs	1150	0.0	1150	0.0	* 1.169	359.8	LOS F[11]	213.2	1492.6	1.00	2.43	2.83	10.4
Approach			1182	0.0	1182	0.0	1.169	360.3	LOS F[11]	213.2	1492.6	1.00	2.40	2.84	10.4
All Vehicles			2818	0.0	2818	0.0	1.169	177.2	LOS F[11]	213.2	1492.6	0.82	1.40	1.65	17.3

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

11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.
* Critical Movement (Signal Timing)

INTERSECTION SUMMARY

Site: 101 [EX+BTG 2032 AM: Railway St/Arthur St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 7:45-8:45am
Site Category: (None)
Stop (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Travel Speed (Average)	km/h	25.5	25.5	km/h
Travel Distance (Total)	veh-km/h	2348.0	2817.5	pers-km/h
Travel Time (Total)	veh-h/h	92.2	110.7	pers-h/h
Desired Speed	km/h	60.0		
Speed Efficiency		0.42		
Travel Time Index		3.60		
Congestion Coefficient		2.36		
Demand Flows (Total)	veh/h	2874	3449	pers/h
Arrival Flows (Total)	veh/h	2874		
Percent Heavy Vehicles (Demand)	%	0.0		
Percent Heavy Vehicles (Arrivals)	%	0.0		
Degree of Saturation		3.400		
Practical Spare Capacity	%	-76.5		
Effective Intersection Capacity	veh/h	845		
Control Delay (Total)	veh-h/h	44.73	53.68	pers-h/h
Control Delay (Average)	sec	56.0	56.0	sec
Control Delay (Worst Lane by MC)	sec	4590.4		
Control Delay (Worst Movement by MC)	sec	4690.3	4690.3	sec
Geometric Delay (Average)	sec	4.3		
Stop-Line Delay (Average)	sec	51.8		
Idling Time (Average)	sec	46.0		
Intersection Level of Service (LOS)		NA		
95% Back of Queue - Veh (Worst Lane)	veh	19.9		
95% Back of Queue - Dist (Worst Lane)	m	139.6		
Ave. Que Storage Ratio (Worst Lane)		0.11		
Effective Stops (Total)	veh/h	1496	1796	pers/h
Effective Stop Rate		0.52	0.52	
Proportion Queued		0.01	0.01	
Performance Index		113.2	113.2	
Cost (Total)	$/h	3218.94	3218.94	$/h
Fuel Consumption (Total)	L/h	228.1		
Carbon Dioxide (Total)	kg/h	536.0		
Hydrocarbons (Total)	kg/h	0.045		
Carbon Monoxide (Total)	kg/h	0.38		
NOx (Total)	kg/h	0.122		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.

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

Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 0.0 %

Number of Iterations: 3 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 99.7% 0.0% 0.0%

Intersection Performance - Annual Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**

Demand Flows (Total)	veh/y	1,379,520	1,655,424	pers/y
Delay (Total)	veh-h/y	21,472	25,766	pers-h/y
Effective Stops (Total)	veh/y	718,313	861,975	pers/y
Travel Distance (Total)	veh-km/y	1,127,018	1,352,422	pers-km/y
Travel Time (Total)	veh-h/y	44,275	53,130	pers-h/y
Cost (Total)	$/y	1,545,093	1,545,093	$/y
Fuel Consumption (Total)	L/y	109,473		
Carbon Dioxide (Total)	kg/y	257,261		
Hydrocarbons (Total)	kg/y	22		
Carbon Monoxide (Total)	kg/y	185		
NOx (Total)	kg/y	59		

1 Hours per Year: 480 (Site)

MOVEMENT SUMMARY

Site: 101 [EX+BTG 2032 AM: Railway St/Arthur St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 7:45-8:45am
Site Category: (None)
Stop (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Arthur St E															
4	L2	All MCs	983	0.0	983	0.0	0.529	5.7	LOS A	0.0	0.0	0.00	0.57	0.00	51.1
5	T1	All MCs	14	0.0	14	0.0	2.400	2726.0	LOS F[11]	12.4	86.9	1.00	1.50	3.64	1.3
Approach			997	0.0	997	0.0	2.400	45.0	LOS D	12.4	86.9	0.01	0.59	0.05	30.4
NorthWest: Arthur St W															
11	T1	All MCs	13	0.0	13	0.0	3.400	4690.3	LOS F[11]	19.9	139.6	1.00	1.59	4.10	0.8
12	R2	All MCs	7	0.0	7	0.0	3.400	4407.1	LOS F[11]	19.9	139.6	1.00	1.59	4.10	0.6
Approach			20	0.0	20	0.0	3.400	4590.4	LOS F[11]	19.9	139.6	1.00	1.59	4.10	0.7
SouthWest: Railway St															
1	L2	All MCs	12	0.0	12	0.0	1.000	12.1	LOS A	0.0	0.0	0.00	0.47	0.00	38.7
3	R2	All MCs	1844	0.0	1844	0.0	1.000	12.1	LOS A	0.0	0.0	0.00	0.47	0.00	38.7
Approach			1856	0.0	1856	0.0	1.000	12.1	NA	0.0	0.0	0.00	0.47	0.00	38.7
All Vehicles			2874	0.0	2874	0.0	3.400	56.0	NA	19.9	139.6	0.01	0.52	0.05	25.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

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

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

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

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

11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.

INTERSECTION SUMMARY

Site: 101 [EX+BTG 2032 PM: Railway St/Arthur St Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 7:45-8:45am
Site Category: (None)
Stop (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Travel Speed (Average)	km/h	34.8	34.8	km/h
Travel Distance (Total)	veh-km/h	2127.9	2553.4	pers-km/h
Travel Time (Total)	veh-h/h	61.1	73.4	pers-h/h
Desired Speed	km/h	60.0		
Speed Efficiency		0.58		
Travel Time Index		5.33		
Congestion Coefficient		1.72		
Demand Flows (Total)	veh/h	2605	3126	pers/h
Arrival Flows (Total)	veh/h	2605		
Percent Heavy Vehicles (Demand)	%	0.0		
Percent Heavy Vehicles (Arrivals)	%	0.0		
Degree of Saturation		2.282		
Practical Spare Capacity	%	-64.9		
Effective Intersection Capacity	veh/h	1142		
Control Delay (Total)	veh-h/h	23.44	28.13	pers-h/h
Control Delay (Average)	sec	32.4	32.4	sec
Control Delay (Worst Lane by MC)	sec	2516.3		
Control Delay (Worst Movement by MC)	sec	2594.9	2594.9	sec
Geometric Delay (Average)	sec	5.4		
Stop-Line Delay (Average)	sec	26.9		
Idling Time (Average)	sec	26.3		
Intersection Level of Service (LOS)		NA		
95% Back of Queue - Veh (Worst Lane)	veh	19.0		
95% Back of Queue - Dist (Worst Lane)	m	133.2		
Ave. Que Storage Ratio (Worst Lane)		0.11		
Effective Stops (Total)	veh/h	1529	1835	pers/h
Effective Stop Rate		0.59	0.59	
Proportion Queued		0.01	0.01	
Performance Index		84.2	84.2	
Cost (Total)	$/h	2246.35	2246.35	$/h
Fuel Consumption (Total)	L/h	202.9		
Carbon Dioxide (Total)	kg/h	476.8		
Hydrocarbons (Total)	kg/h	0.043		
Carbon Monoxide (Total)	kg/h	0.51		
NOx (Total)	kg/h	0.141		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.

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

Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 0.0 %

Number of Iterations: 3 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 99.5% 0.0% 0.0%

Intersection Performance - Annual Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**

Demand Flows (Total)	veh/y	1,250,496	1,500,595	pers/y
Delay (Total)	veh-h/y	11,250	13,500	pers-h/y
Effective Stops (Total)	veh/y	733,944	880,732	pers/y
Travel Distance (Total)	veh-km/y	1,021,376	1,225,651	pers-km/y
Travel Time (Total)	veh-h/y	29,351	35,221	pers-h/y
Cost (Total)	$/y	1,078,248	1,078,248	$/y
Fuel Consumption (Total)	L/y	97,386		
Carbon Dioxide (Total)	kg/y	228,858		
Hydrocarbons (Total)	kg/y	20		
Carbon Monoxide (Total)	kg/y	246		
NOx (Total)	kg/y	68		

1 Hours per Year: 480 (Site)

MOVEMENT SUMMARY

Site: 101 [EX+BTG 2032 PM: Railway St/Arthur St Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 7:45-8:45am
Site Category: (None)
Stop (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Arthur St E															
4	L2	All MCs	1096	0.0	1096	0.0	0.590	5.8	LOS A	0.0	0.0	0.00	0.57	0.00	51.1
5	T1	All MCs	10	0.0	10	0.0	1.052	929.6	LOS F[11]	3.7	25.7	1.00	1.15	1.73	3.7
Approach			1105	0.0	1105	0.0	1.052	13.8	LOS A	3.7	25.7	0.01	0.58	0.02	44.8
NorthWest: Arthur St W															
11	T1	All MCs	12	0.0	12	0.0	2.282	2437.6	LOS F[11]	19.0	133.2	1.00	1.81	4.95	1.4
12	R2	All MCs	12	0.0	12	0.0	2.282	2594.9	LOS F[11]	19.0	133.2	1.00	1.81	4.95	1.1
Approach			24	0.0	24	0.0	2.282	2516.3	LOS F[11]	19.0	133.2	1.00	1.81	4.95	1.3
SouthWest: Railway St															
1	L2	All MCs	13	0.0	13	0.0	0.795	5.9	LOS A	0.0	0.0	0.00	0.57	0.00	50.5
3	R2	All MCs	1463	0.0	1463	0.0	0.795	5.9	LOS A	0.0	0.0	0.00	0.57	0.00	50.4
Approach			1476	0.0	1476	0.0	0.795	5.9	NA	0.0	0.0	0.00	0.57	0.00	50.4
All Vehicles			2605	0.0	2605	0.0	2.282	32.4	NA	19.0	133.2	0.01	0.59	0.05	34.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

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

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

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

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

11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.

INTERSECTION SUMMARY

Site: 101 [EX+BTG 2032 AM: Church St/Swete St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 7:30-8:30am
Site Category: (None)
Roundabout
Design Life Analysis (Final Year): Results for 10 years

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Travel Speed (Average)	km/h	46.2	46.2	km/h
Travel Distance (Total)	veh-km/h	1322.1	1586.5	pers-km/h
Travel Time (Total)	veh-h/h	28.6	34.3	pers-h/h
Desired Speed	km/h	52.4		
Speed Efficiency		0.88		
Travel Time Index		8.68		
Congestion Coefficient		1.13		
Demand Flows (Total)	veh/h	1303	1564	pers/h
Arrival Flows (Total)	veh/h	1303		
Percent Heavy Vehicles (Demand)	%	0.0		
Percent Heavy Vehicles (Arrivals)	%	0.0		
Degree of Saturation		0.530		
Practical Spare Capacity	%	60.3		
Effective Intersection Capacity	veh/h	2457		
Control Delay (Total)	veh-h/h	2.42	2.91	pers-h/h
Control Delay (Average)	sec	6.7	6.7	sec
Control Delay (Worst Lane by MC)	sec	7.5		
Control Delay (Worst Movement by MC)	sec	8.9	8.9	sec
Geometric Delay (Average)	sec	5.2		
Stop-Line Delay (Average)	sec	1.5		
Idling Time (Average)	sec	0.0		
Intersection Level of Service (LOS)		LOS A		
95% Back of Queue - Veh (Worst Lane)	veh	4.4		
95% Back of Queue - Dist (Worst Lane)	m	31.0		
Ave. Que Storage Ratio (Worst Lane)		0.02		
Effective Stops (Total)	veh/h	763	915	pers/h
Effective Stop Rate		0.59	0.59	
Proportion Queued		0.54	0.54	
Performance Index		38.9	38.9	
Cost (Total)	$/h	1068.78	1068.78	$/h
Fuel Consumption (Total)	L/h	103.2		
Carbon Dioxide (Total)	kg/h	242.6		
Hydrocarbons (Total)	kg/h	0.019		
Carbon Monoxide (Total)	kg/h	0.22		
NOx (Total)	kg/h	0.066		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.

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

Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 1.3 %

Number of Iterations: 4 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 0.0% 1.6% 1.0%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Demand Flows (Total)	veh/y	625,536	750,643	pers/y

Delay (Total)	veh-h/y	1,163	1,396	pers-h/y
Effective Stops (Total)	veh/y	366,107	439,329	pers/y
Travel Distance (Total)	veh-km/y	634,605	761,526	pers-km/y
Travel Time (Total)	veh-h/y	13,728	16,474	pers-h/y
Cost (Total)	$/y	513,013	513,013	$/y
Fuel Consumption (Total)	L/y	49,546		
Carbon Dioxide (Total)	kg/y	116,434		
Hydrocarbons (Total)	kg/y	9		
Carbon Monoxide (Total)	kg/y	107		
NOx (Total)	kg/y	32		

1 Hours per Year: 480 (Site)

MOVEMENT SUMMARY

Site: 101 [EX+BTG 2032 AM: Church St/Swete St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 7:30-8:30am
Site Category: (None)
Roundabout
Design Life Analysis (Final Year): Results for 10 years

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Church St E															
5	T1	All MCs	194	0.0	194	0.0	0.349	6.3	LOS A	2.3	16.4	0.50	0.61	0.50	47.9
6	R2	All MCs	178	0.0	178	0.0	0.349	8.9	LOS A	2.3	16.4	0.50	0.61	0.50	47.4
Approach			372	0.0	372	0.0	0.349	7.5	LOS A	2.3	16.4	0.50	0.61	0.50	47.7
North: Swete St															
7	L2	All MCs	110	0.0	110	0.0	0.317	6.3	LOS A	2.1	14.4	0.53	0.62	0.53	47.0
9	R2	All MCs	211	0.0	211	0.0	0.317	8.2	LOS A	2.1	14.4	0.53	0.62	0.53	44.0
Approach			322	0.0	322	0.0	0.317	7.5	LOS A	2.1	14.4	0.53	0.62	0.53	45.0
West: Church St W															
10	L2	All MCs	366	0.0	366	0.0	0.530	6.1	LOS A	4.4	31.0	0.56	0.55	0.56	44.7
11	T1	All MCs	244	0.0	244	0.0	0.530	5.3	LOS A	4.4	31.0	0.56	0.55	0.56	48.2
Approach			610	0.0	610	0.0	0.530	5.8	LOS A	4.4	31.0	0.56	0.55	0.56	46.0
All Vehicles			1303	0.0	1303	0.0	0.530	6.7	LOS A	4.4	31.0	0.54	0.59	0.54	46.2

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

INTERSECTION SUMMARY

Site: 101 [EX+BTG 2032 PM: Church St/Swete St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 5:00-6:00pm
Site Category: (None)
Roundabout
Design Life Analysis (Final Year): Results for 10 years

Intersection Performance - Hourly Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Travel Speed (Average)	km/h	46.7	46.7 km/h
Travel Distance (Total)	veh-km/h	1140.3	1368.4 pers-km/h
Travel Time (Total)	veh-h/h	24.4	29.3 pers-h/h
Desired Speed	km/h	52.9	
Speed Efficiency		0.88	
Travel Time Index		8.69	
Congestion Coefficient		1.13	
Demand Flows (Total)	veh/h	1123	1348 pers/h
Arrival Flows (Total)	veh/h	1123	
Percent Heavy Vehicles (Demand)	%	0.0	
Percent Heavy Vehicles (Arrivals)	%	0.0	
Degree of Saturation		0.404	
Practical Spare Capacity	%	110.5	
Effective Intersection Capacity	veh/h	2781	
Control Delay (Total)	veh-h/h	2.06	2.48 pers-h/h
Control Delay (Average)	sec	6.6	6.6 sec
Control Delay (Worst Lane by MC)	sec	7.3	
Control Delay (Worst Movement by MC)	sec	8.9	8.9 sec
Geometric Delay (Average)	sec	5.3	
Stop-Line Delay (Average)	sec	1.3	
Idling Time (Average)	sec	0.0	
Intersection Level of Service (LOS)		LOS A	
95% Back of Queue - Veh (Worst Lane)	veh	2.8	
95% Back of Queue - Dist (Worst Lane)	m	19.9	
Ave. Que Storage Ratio (Worst Lane)		0.02	
Effective Stops (Total)	veh/h	649	779 pers/h
Effective Stop Rate		0.58	0.58
Proportion Queued		0.48	0.48
Performance Index		32.5	32.5
Cost (Total)	$/h	913.50	913.50 $/h
Fuel Consumption (Total)	L/h	88.5	
Carbon Dioxide (Total)	kg/h	208.1	
Hydrocarbons (Total)	kg/h	0.016	
Carbon Monoxide (Total)	kg/h	0.19	
NOx (Total)	kg/h	0.057	

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.

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

Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 0.9 %

Number of Iterations: 4 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 0.0% 1.1% 0.7%

Intersection Performance - Annual Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Demand Flows (Total)	veh/y	539,136	646,963 pers/y

Delay (Total)	veh-h/y	991	1,189	pers-h/y
Effective Stops (Total)	veh/y	311,565	373,878	pers/y
Travel Distance (Total)	veh-km/y	547,342	656,810	pers-km/y
Travel Time (Total)	veh-h/y	11,722	14,067	pers-h/y
Cost (Total)	$/y	438,482	438,482	$/y
Fuel Consumption (Total)	L/y	42,504		
Carbon Dioxide (Total)	kg/y	99,884		
Hydrocarbons (Total)	kg/y	8		
Carbon Monoxide (Total)	kg/y	93		
NOx (Total)	kg/y	27		

1 Hours per Year: 480 (Site)

MOVEMENT SUMMARY

Site: 101 [EX+BTG 2032 PM: Church St/Swete St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 5:00-6:00pm
Site Category: (None)
Roundabout
Design Life Analysis (Final Year): Results for 10 years

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Church St E															
5	T1	All MCs	265	0.0	265	0.0	0.404	6.3	LOS A	2.8	19.9	0.51	0.60	0.51	48.0
6	R2	All MCs	176	0.0	176	0.0	0.404	8.9	LOS A	2.8	19.9	0.51	0.60	0.51	47.5
Approach			442	0.0	442	0.0	0.404	7.3	LOS A	2.8	19.9	0.51	0.60	0.51	47.8
North: Swete St															
7	L2	All MCs	104	0.0	104	0.0	0.287	5.9	LOS A	1.8	12.5	0.46	0.61	0.46	47.2
9	R2	All MCs	202	0.0	202	0.0	0.287	7.8	LOS A	1.8	12.5	0.46	0.61	0.46	44.1
Approach			306	0.0	306	0.0	0.287	7.2	LOS A	1.8	12.5	0.46	0.61	0.46	45.1
West: Church St W															
10	L2	All MCs	175	0.0	175	0.0	0.337	5.8	LOS A	2.3	15.8	0.46	0.53	0.46	45.0
11	T1	All MCs	200	0.0	200	0.0	0.337	5.0	LOS A	2.3	15.8	0.46	0.53	0.46	48.5
Approach			376	0.0	376	0.0	0.337	5.4	LOS A	2.3	15.8	0.46	0.53	0.46	46.8
All Vehicles			1123	0.0	1123	0.0	0.404	6.6	LOS A	2.8	19.9	0.48	0.58	0.48	46.7

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

INTERSECTION SUMMARY

Site: 101 [EX+BTG 2032 AM: Church St/Bachell Ave, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 7:30-8:30am
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 50 seconds (Site Practical Cycle Time)
Design Life Analysis (Final Year): Results for 10 years

Intersection Performance - Hourly Values						
Performance Measure	**Vehicles:**	**All MCs**	**Pedestrians**		**Persons**	
Travel Speed (Average)	km/h	47.8	2.1	km/h	46.9	km/h
Travel Distance (Total)	veh-km/h	1132.9	1.2	ped-km/h	1360.7	pers-km/h
Travel Time (Total)	veh-h/h	23.7	0.6	ped-h/h	29.0	pers-h/h
Desired Speed	km/h	60.0				
Speed Efficiency		0.80				
Travel Time Index		7.74				
Congestion Coefficient		1.26				
Demand Flows (Total)	veh/h	1115	60	ped/h	1398	pers/h
Arrival Flows (Total)	veh/h	1115				
Percent Heavy Vehicles (Demand)	%	0.1				
Percent Heavy Vehicles (Arrivals)	%	0.1				
Degree of Saturation		0.446	0.042			
Practical Spare Capacity	%	101.7				
Effective Intersection Capacity	veh/h	2498				
Control Delay (Total)	veh-h/h	4.29	0.32	ped-h/h	5.47	pers-h/h
Control Delay (Average)	sec	13.9	19.4	sec	14.1	sec
Control Delay (Worst Lane by MC)	sec	23.7				
Control Delay (Worst Movement by MC)	sec	23.7	19.4	sec	23.7	sec
Geometric Delay (Average)	sec	3.5				
Stop-Line Delay (Average)	sec	10.4				
Idling Time (Average)	sec	7.5				
Intersection Level of Service (LOS)		LOS A	LOS B			
95% Back of Queue - Veh (Worst Lane)	veh	5.1				
95% Back of Queue - Dist (Worst Lane)	m	35.6				
Ave. Que Storage Ratio (Worst Lane)		0.04				
Effective Stops (Total)	veh/h	768	53	ped/h	975	pers/h
Effective Stop Rate		0.69	0.88		0.70	
Proportion Queued		0.68	0.88		0.68	
Performance Index		49.8	0.9		50.7	
Cost (Total)	$/h	903.91	14.27	$/h	918.17	$/h
Fuel Consumption (Total)	L/h	93.9				
Carbon Dioxide (Total)	kg/h	220.7				
Hydrocarbons (Total)	kg/h	0.019				
Carbon Monoxide (Total)	kg/h	0.26				
NOx (Total)	kg/h	0.072				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.

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

Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 0.0 %

Number of Iterations: 2 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Main (Timing-Capacity) Iterations: 5.5% 4.0% 0.0%

Intersection Performance - Annual Values						
Performance Measure	**Vehicles:**	**All MCs**	**Pedestrians**		**Persons**	
Demand Flows (Total)	veh/y	535,104	28,800	ped/y	670,925	pers/y

Delay (Total)	veh-h/y	2,060	155	ped-h/y	2,627	pers-h/y
Effective Stops (Total)	veh/y	368,713	25,408	ped/y	467,863	pers/y
Travel Distance (Total)	veh-km/y	543,812	576	ped-km/y	653,150	pers-km/y
Travel Time (Total)	veh-h/y	11,377	278	ped-h/y	13,930	pers-h/y
Cost (Total)	$/y	433,875	6,847	$/y	440,722	$/y
Fuel Consumption (Total)	L/y	45,075				
Carbon Dioxide (Total)	kg/y	105,943				
Hydrocarbons (Total)	kg/y	9				
Carbon Monoxide (Total)	kg/y	125				
NOx (Total)	kg/y	34				

1 Hours per Year: 480 (Site)

MOVEMENT SUMMARY

Site: 101 [EX+BTG 2032 AM: Church St/Bachell Ave, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 7:30-8:30am
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 50 seconds (Site Practical Cycle Time)
Design Life Analysis (Final Year): Results for 10 years

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Church St E															
5	T1	All MCs	168	0.1	168	0.1	0.356	7.2	LOS A	3.6	25.2	0.66	0.57	0.66	51.3
6	R2	All MCs	122	0.1	122	0.1	* 0.356	17.3	LOS B	3.6	25.2	0.76	0.69	0.76	47.4
Approach			290	0.1	290	0.1	0.356	11.5	LOS A	3.6	25.2	0.70	0.62	0.70	49.6
North: Bachell Ave															
7	L2	All MCs	120	0.1	120	0.1	0.135	13.4	LOS A	1.6	11.5	0.58	0.71	0.58	47.5
9	R2	All MCs	196	0.1	196	0.1	* 0.439	23.7	LOS B	4.2	29.8	0.90	0.79	0.90	41.8
Approach			316	0.1	316	0.1	0.439	19.8	LOS B	4.2	29.8	0.78	0.76	0.78	43.8
West: Church St W															
10	L2	All MCs	265	0.0	265	0.0	0.216	6.9	LOS A	1.3	9.0	0.35	0.65	0.35	52.0
11	T1	All MCs	244	0.0	244	0.0	* 0.446	16.6	LOS B	5.1	35.6	0.87	0.72	0.87	47.2
Approach			509	0.0	509	0.0	0.446	11.5	LOS A	5.1	35.6	0.60	0.68	0.60	49.6
All Vehicles			1115	0.1	1115	0.1	0.446	13.9	LOS A	5.1	35.6	0.68	0.69	0.68	47.8

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

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
East: Church St E												
P2	Full	50	60	19.4	LOS B	0.1	0.1	0.88	0.88	34.8	20.0	0.57
All Pedestrians		50	60	19.4	LOS B	0.1	0.1	0.88	0.88	34.8	20.0	0.57

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.

INTERSECTION SUMMARY

Site: 101 [EX+BTG 2032 PM: Church St/Bachell Ave, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

PM Peak Hour: 5:00-6:00pm
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 50 seconds (Site Practical Cycle Time)
Design Life Analysis (Final Year): Results for 10 years

Intersection Performance - Hourly Values

Performance Measure	Vehicles:	All MCs	Pedestrians	Persons
Travel Speed (Average)	km/h	45.3	2.4 km/h	44.7 km/h
Travel Distance (Total)	veh-km/h	1345.6	1.2 ped-km/h	1615.9 pers-km/h
Travel Time (Total)	veh-h/h	29.7	0.5 ped-h/h	36.2 pers-h/h
Desired Speed	km/h	60.0		
Speed Efficiency		0.76		
Travel Time Index		7.28		
Congestion Coefficient		1.32		
Demand Flows (Total)	veh/h	1325	60 ped/h	1650 pers/h
Arrival Flows (Total)	veh/h	1325		
Percent Heavy Vehicles (Demand)	%	0.0		
Percent Heavy Vehicles (Arrivals)	%	0.0		
Degree of Saturation		0.750	0.023	
Practical Spare Capacity	%	20.0		
Effective Intersection Capacity	veh/h	1766		
Control Delay (Total)	veh-h/h	6.60	0.25 ped-h/h	8.17 pers-h/h
Control Delay (Average)	sec	17.9	15.2 sec	17.8 sec
Control Delay (Worst Lane by MC)	sec	24.7		
Control Delay (Worst Movement by MC)	sec	24.7	15.2 sec	24.7 sec
Geometric Delay (Average)	sec	3.8		
Stop-Line Delay (Average)	sec	14.2		
Idling Time (Average)	sec	10.5		
Intersection Level of Service (LOS)		LOS B	LOS B	
95% Back of Queue - Veh (Worst Lane)	veh	12.0		
95% Back of Queue - Dist (Worst Lane)	m	84.0		
Ave. Que Storage Ratio (Worst Lane)		0.05		
Effective Stops (Total)	veh/h	1043	47 ped/h	1299 pers/h
Effective Stop Rate		0.79	0.78	0.79
Proportion Queued		0.77	0.78	0.77
Performance Index		68.1	0.8	68.9
Cost (Total)	$/h	1127.78	12.56 $/h	1140.34 $/h
Fuel Consumption (Total)	L/h	115.4		
Carbon Dioxide (Total)	kg/h	271.1		
Hydrocarbons (Total)	kg/h	0.024		
Carbon Monoxide (Total)	kg/h	0.32		
NOx (Total)	kg/h	0.084		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 0.0 %
Number of Iterations: 2 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Main (Timing-Capacity) Iterations: 4.7% 0.0% 0.0%

Intersection Performance - Annual Values

Performance Measure	Vehicles:	All MCs	Pedestrians	Persons
Demand Flows (Total)	veh/y	635,904	28,800 ped/y	791,885 pers/y

Delay (Total)	veh-h/y	3,168	122	ped-h/y	3,923	pers-h/y
Effective Stops (Total)	veh/y	500,787	22,520	ped/y	623,464	pers/y
Travel Distance (Total)	veh-km/y	645,900	576	ped-km/y	775,656	pers-km/y
Travel Time (Total)	veh-h/y	14,258	245	ped-h/y	17,354	pers-h/y
Cost (Total)	$/y	541,335	6,029	$/y	547,364	$/y
Fuel Consumption (Total)	L/y	55,377				
Carbon Dioxide (Total)	kg/y	130,141				
Hydrocarbons (Total)	kg/y	11				
Carbon Monoxide (Total)	kg/y	152				
NOx (Total)	kg/y	40				

1 Hours per Year: 480 (Site)

MOVEMENT SUMMARY

Site: 101 [EX+BTG 2032 PM: Church St/Bachell Ave, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

PM Peak Hour: 5:00-6:00pm
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 50 seconds (Site Practical Cycle Time)
Design Life Analysis (Final Year): Results for 10 years

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Church St E															
5	T1	All MCs	196	0.0	196	0.0	0.369	11.7	LOS A	3.9	27.2	0.78	0.62	0.78	48.7
6	R2	All MCs	61	0.0	61	0.0	* 0.369	22.8	LOS B	3.9	27.2	0.83	0.68	0.83	46.0
Approach			257	0.0	257	0.0	0.369	14.3	LOS A	3.9	27.2	0.79	0.64	0.79	48.0
North: Bachell Ave															
7	L2	All MCs	144	0.0	144	0.0	0.129	10.2	LOS A	1.5	10.7	0.46	0.69	0.46	49.5
9	R2	All MCs	502	0.0	502	0.0	* 0.750	23.3	LOS B	12.0	84.0	0.94	0.90	1.06	42.1
Approach			646	0.0	646	0.0	0.750	20.4	LOS B	12.0	84.0	0.83	0.85	0.92	43.5
West: Church St W															
10	L2	All MCs	194	0.0	194	0.0	0.152	6.7	LOS A	0.8	5.5	0.31	0.63	0.31	52.1
11	T1	All MCs	228	0.0	228	0.0	* 0.731	24.7	LOS B	6.0	41.7	1.00	0.90	1.21	42.7
Approach			422	0.0	422	0.0	0.731	16.4	LOS B	6.0	41.7	0.68	0.78	0.79	46.6
All Vehicles			1325	0.0	1325	0.0	0.750	17.9	LOS B	12.0	84.0	0.77	0.79	0.86	45.3

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

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
East: Church St E												
P2	Full	50	60	15.2	LOS B	0.1	0.1	0.78	0.78	30.6	20.0	0.65
All Pedestrians		50	60	15.2	LOS B	0.1	0.1	0.78	0.78	30.6	20.0	0.65

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.

INTERSECTION SUMMARY

Site: 101 [EX+BTG 2032 AM: Church St/Railway St Bridge, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 8:00-9:00am
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Travel Speed (Average)	km/h	44.3	44.3	km/h
Travel Distance (Total)	veh-km/h	1472.8	1767.4	pers-km/h
Travel Time (Total)	veh-h/h	33.2	39.9	pers-h/h
Desired Speed	km/h	50.0		
Speed Efficiency		0.89		
Travel Time Index		8.74		
Congestion Coefficient		1.13		
Demand Flows (Total)	veh/h	1454	1745	pers/h
Arrival Flows (Total)	veh/h	1454		
Percent Heavy Vehicles (Demand)	%	0.0		
Percent Heavy Vehicles (Arrivals)	%	0.0		
Degree of Saturation		0.652		
Practical Spare Capacity	%	22.8		
Effective Intersection Capacity	veh/h	2232		
Control Delay (Total)	veh-h/h	2.89	3.47	pers-h/h
Control Delay (Average)	sec	7.2	7.2	sec
Control Delay (Worst Lane by MC)	sec	20.1		
Control Delay (Worst Movement by MC)	sec	20.1	20.1	sec
Geometric Delay (Average)	sec	4.5		
Stop-Line Delay (Average)	sec	2.6		
Idling Time (Average)	sec	1.5		
Intersection Level of Service (LOS)		NA		
95% Back of Queue - Veh (Worst Lane)	veh	3.2		
95% Back of Queue - Dist (Worst Lane)	m	22.2		
Ave. Que Storage Ratio (Worst Lane)		0.02		
Effective Stops (Total)	veh/h	930	1116	pers/h
Effective Stop Rate		0.64	0.64	
Proportion Queued		0.14	0.14	
Performance Index		38.8	38.8	
Cost (Total)	$/h	1221.39	1221.39	$/h
Fuel Consumption (Total)	L/h	110.7		
Carbon Dioxide (Total)	kg/h	260.1		
Hydrocarbons (Total)	kg/h	0.018		
Carbon Monoxide (Total)	kg/h	0.21		
NOx (Total)	kg/h	0.065		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 0.0 %
Number of Iterations: 3 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 80.9% 0.0% 0.0%

Intersection Performance - Annual Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**

Demand Flows (Total)	veh/y	698,112	837,735	pers/y
Delay (Total)	veh-h/y	1,387	1,664	pers-h/y
Effective Stops (Total)	veh/y	446,348	535,617	pers/y
Travel Distance (Total)	veh-km/y	706,955	848,346	pers-km/y
Travel Time (Total)	veh-h/y	15,946	19,136	pers-h/y
Cost (Total)	$/y	586,269	586,269	$/y
Fuel Consumption (Total)	L/y	53,119		
Carbon Dioxide (Total)	kg/y	124,830		
Hydrocarbons (Total)	kg/y	9		
Carbon Monoxide (Total)	kg/y	99		
NOx (Total)	kg/y	31		

1 Hours per Year: 480 (Site)

MOVEMENT SUMMARY

Site: 101 [EX+BTG 2032 AM: Church St/Railway St Bridge, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 8:00-9:00am
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Railway Street Bridge															
1	L2	All MCs	248	0.0	248	0.0	0.455	4.7	LOS A	0.0	0.0	0.00	0.55	0.00	45.7
3	R2	All MCs	596	0.0	596	0.0	0.455	4.7	LOS A	0.0	0.0	0.00	0.55	0.00	45.5
Approach			845	0.0	845	0.0	0.455	4.7	NA	0.0	0.0	0.00	0.55	0.00	45.6
East: Church St E															
4	L2	All MCs	378	0.0	378	0.0	0.204	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	45.9
Approach			378	0.0	378	0.0	0.204	4.6	NA	0.0	0.0	0.00	0.53	0.00	45.9
West: Church St W															
12	R2	All MCs	232	0.0	232	0.0	0.652	20.1	LOS B	3.2	22.2	0.88	1.16	1.58	38.3
Approach			232	0.0	232	0.0	0.652	20.1	LOS B	3.2	22.2	0.88	1.16	1.58	38.3
All Vehicles			1454	0.0	1454	0.0	0.652	7.2	NA	3.2	22.2	0.14	0.64	0.25	44.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

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

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

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

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

INTERSECTION SUMMARY

Site: 101 [EX+BTG 2032 PM: Church St/Railway St Bridge, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 4:45-5:45pm
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Travel Speed (Average)	km/h	37.6	37.6	km/h
Travel Distance (Total)	veh-km/h	1815.4	2178.5	pers-km/h
Travel Time (Total)	veh-h/h	48.3	58.0	pers-h/h
Desired Speed	km/h	50.0		
Speed Efficiency		0.75		
Travel Time Index		7.24		
Congestion Coefficient		1.33		
Demand Flows (Total)	veh/h	1790	2148	pers/h
Arrival Flows (Total)	veh/h	1790		
Percent Heavy Vehicles (Demand)	%	0.0		
Percent Heavy Vehicles (Arrivals)	%	0.0		
Degree of Saturation		1.025		
Practical Spare Capacity	%	-22.0		
Effective Intersection Capacity	veh/h	1746		
Control Delay (Total)	veh-h/h	10.98	13.18	pers-h/h
Control Delay (Average)	sec	22.1	22.1	sec
Control Delay (Worst Lane by MC)	sec	127.0		
Control Delay (Worst Movement by MC)	sec	127.0	127.0	sec
Geometric Delay (Average)	sec	4.5		
Stop-Line Delay (Average)	sec	17.5		
Idling Time (Average)	sec	12.6		
Intersection Level of Service (LOS)		NA		
95% Back of Queue - Veh (Worst Lane)	veh	19.9		
95% Back of Queue - Dist (Worst Lane)	m	139.5		
Ave. Que Storage Ratio (Worst Lane)		0.11		
Effective Stops (Total)	veh/h	1567	1881	pers/h
Effective Stop Rate		0.88	0.88	
Proportion Queued		0.14	0.14	
Performance Index		64.0	64.0	
Cost (Total)	$/h	1744.14	1744.14	$/h
Fuel Consumption (Total)	L/h	145.9		
Carbon Dioxide (Total)	kg/h	342.8		
Hydrocarbons (Total)	kg/h	0.026		
Carbon Monoxide (Total)	kg/h	0.27		
NOx (Total)	kg/h	0.083		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.

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

Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 0.0 %

Number of Iterations: 3 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 86.6% 0.0% 0.0%

Intersection Performance - Annual Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**

Demand Flows (Total)	veh/y	859,392	1,031,271	pers/y
Delay (Total)	veh-h/y	5,273	6,327	pers-h/y
Effective Stops (Total)	veh/y	752,242	902,690	pers/y
Travel Distance (Total)	veh-km/y	871,381	1,045,657	pers-km/y
Travel Time (Total)	veh-h/y	23,201	27,841	pers-h/y
Cost (Total)	$/y	837,185	837,185	$/y
Fuel Consumption (Total)	L/y	70,023		
Carbon Dioxide (Total)	kg/y	164,553		
Hydrocarbons (Total)	kg/y	12		
Carbon Monoxide (Total)	kg/y	128		
NOx (Total)	kg/y	40		

1 Hours per Year: 480 (Site)

MOVEMENT SUMMARY

Site: 101 [EX+BTG 2032 PM: Church St/Railway St Bridge, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 4:45-5:45pm
Site Category: (None)
Give-Way (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Railway Street Bridge															
1	L2	All MCs	421	0.0	421	0.0	0.407	4.7	LOS A	0.0	0.0	0.00	0.54	0.00	45.8
3	R2	All MCs	335	0.0	335	0.0	0.407	4.7	LOS A	0.0	0.0	0.00	0.54	0.00	45.6
Approach			756	0.0	756	0.0	0.407	4.7	NA	0.0	0.0	0.00	0.54	0.00	45.7
East: Church St E															
4	L2	All MCs	780	0.0	780	0.0	0.420	4.7	LOS A	0.0	0.0	0.00	0.53	0.00	45.8
Approach			780	0.0	780	0.0	0.420	4.7	NA	0.0	0.0	0.00	0.53	0.00	45.8
West: Church St W															
12	R2	All MCs	254	0.0	254	0.0	1.025	127.0	LOS F[11]	19.9	139.5	1.00	2.94	7.88	18.0
Approach			254	0.0	254	0.0	1.025	127.0	LOS F[11]	19.9	139.5	1.00	2.94	7.88	18.0
All Vehicles			1790	0.0	1790	0.0	1.025	22.1	NA	19.9	139.5	0.14	0.88	1.12	37.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

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

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

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

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

11 Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.

APPENDIX D

LEGEND

- Off - Road Routes
- Proposed Routes
- On - Road Routes
- Railway Line
- Waterways
- Parks

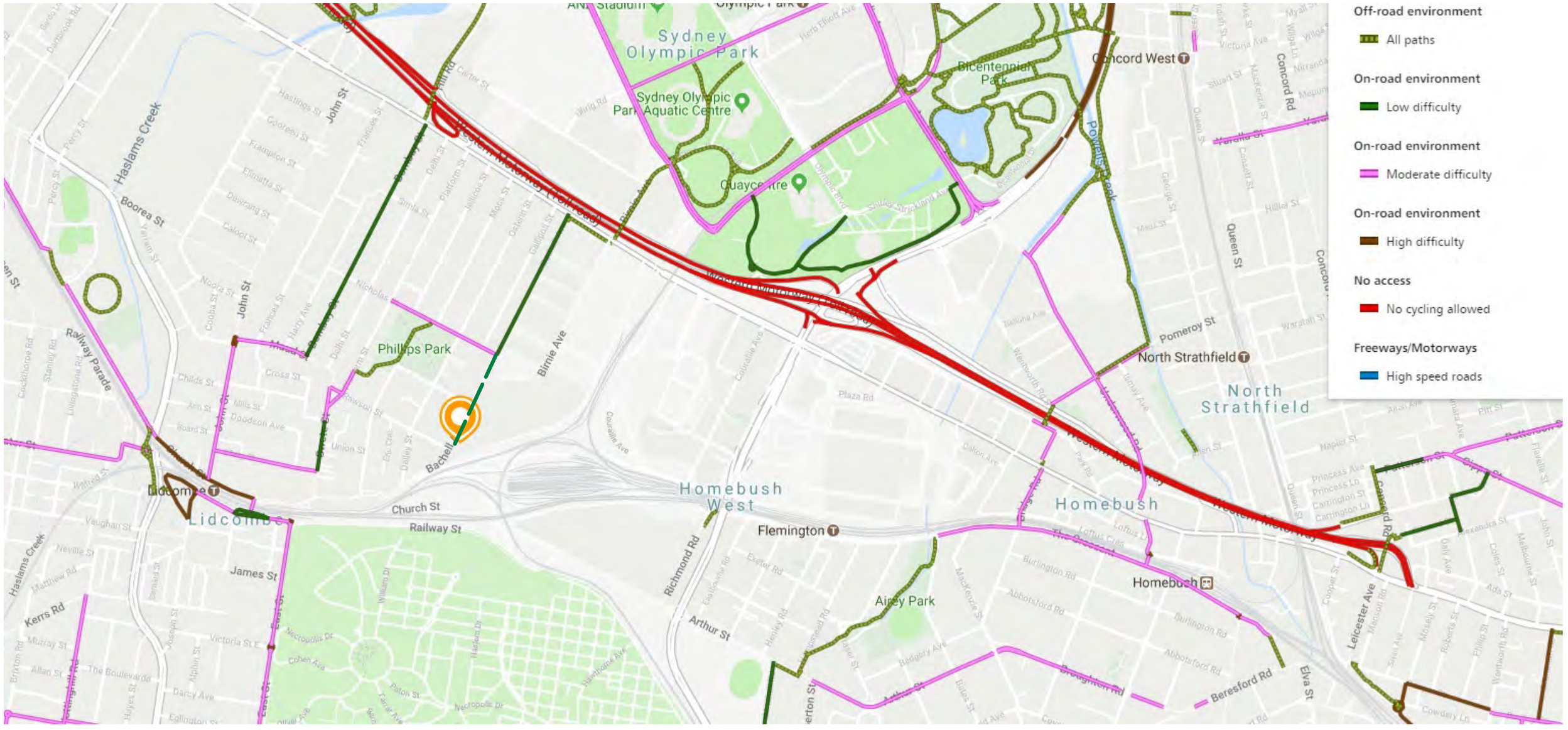
N

Scale 1:30000@A3

Auburn LGA Cycling Routes

AUBURN CITY COUNCIL
MANY CULTURES ONE COMMUNITY

Map projection: UTM
Coordinate System:
GDA/MGA 1994 Zone 56
File Name: Cycle Routes
Date: 14/12/2009



SOURCE TRANSPORT FOR NSW CYCLEPATH FINDER

POSSIBLE FUTURE ON ROAD CONNECTION IN BACHELL AVENUE

EXISTING AND FUTURE BICYCLE PATHS

APPENDIX E

RAAD PROPERTY ACQUISITION NO 10 PTY LTD

BUSINESS DEVELOPMENT

AT
2 BACHELL AVENUE LIDCOMBE

SUPPLEMENTARY REPORT TECHNICAL PAPER No 2
ON
HOURLY TRAFFIC GENERATION PROFILES OF ACOUSTIC ASSESSMENT

Prepared by:

Lyle Marshall & Partners Pty Ltd
Consulting Engineers, Architects,
Transportation and Environmental Planners

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ARTARMON NSW 2064

Phone: (02) 9436-0086
Email: lyle@lylemarshall.com.au

Job No.: 1194-22
Report No.: 19/23 **OCTOBER 2023**

CONTENTS

LIST OF FIGURES

APPENDICES

1.0 INTRODUCTION

1.1 Background

The aim of the study is to create a traffic generation profile for each use by hour for the proposed facility for the purpose of creating a profile of the total traffic generation for the purposes of acoustic modelling.

1.2 Scope of Report

Using survey data from actual count data and RMS survey data and analysis create a traffic generation profile for each use for each hour of the day during weekdays and for weekends.

Calculate average speed taken from 5 day and 7 day count data. Assign speed and distance to main development site intersection in Bachell Avenue.

2.0 TRAFFIC GENERATION PROFILES

The usage profiles are based on the results of trip generation surveys undertaken on behalf of TfNSW. The total traffic generation for each use is created based upon survey data and then an hourly profile is created in excel for each use per hour based upon the opening hours of each facility.

2.1 Opening Hours for Each Facility

The opening hours for each use is listed in Table 2.1

Table 2.1a

	Mon, Tues, Wed, Friday Hours		
Use	Employees	Opening	Employees
Specliazed Retail	8-9am	9am-7pm	7pm-8pm
Office	8-9am	9am-5pm	5pm-7pm
Restaurant	10-11am	11am-12 midnight	
Café	7-8am	9am-2pm	2pm-3pm
Food and Drinks	10am-11am	11am-12 midnight	
Self Storage	4-5am	5am-4pm	4pm-9pm
Medical	6am-7am	7am-9pm	9pm-10pm
Gym	24hours	24hours	
childcare centre	6am-7am	7am-7pm	
Light Industry	4-5am	5am-4pm	4pm-9pm
High Technology	8-9am	9am-5pm	5pm-7pm

(2.1 Continued)

Table 2.1b

	Thursday		
Use	Employees	Opening	Employees
Specliazed Retail	8-9am	9am-7pm	7pm-8pm
Office	8-9am	9am-5pm	5pm-7pm
Restaurant	10-11am	11am-12 midnight	
Café	7-8am	9am-2pm	2pm-3pm
Food and Drinks	10am-11am	11am-12 midnight	
Self Storage	4-5am	5am-4pm	4pm-9pm
Medical	6am-7am	7am-9pm	9pm-10pm
Gym	24hours	24hours	
childcare centre	6am-7am	7am-7pm	
Light Industry	4-5am	5am-4pm	4pm-9pm
High Technology	8-9am	9am-5pm	5pm-7pm

Table 2.1c

	Saturday/Sunday		
	Employees	Opening	Employees
Specliazed Retail	8-9am	9am-5pm	5pm-6pm
Office			
Restaurant	10-11am	11am-12 midnight	
Café	7-8am	9am-2pm	2pm-3pm
Food and Drinks	10am-11am	11am-12 midnight	
Self Storage			
Medical	6am-7am	7am-4pm	4pm-5pm
Gym	24hours	24hours	
childcare centre			
Light Industry			
High Technology			

Note: Some uses are closed on weekends.

2.2 Profile Analysis

A traffic profile has been developed which considers the offset peak traffic generations of the differing uses of the site. The traffic generation profile for weekdays is shown in Figure 1a below with the detailed sources presented in thereafter.

The profile has been developed using the raw survey result data provided in the following documents, many of which underpin the rates of traffic generation expressed in RMS TDT 2013/04a or RTA Guide to Traffic Generating Developments 2002.

Data has been sourced from the following sources:-

- Roads and Traffic Authority Trip Generation and Parking Generation Surveys (Office Blocks) – Data Report – GTA Consultants 30/04/10.
- Traffic Authority of New South Wales – Land Use Traffic Generation – Data and Analysis 15 – Restaurants – Travers Morgan Pty. Ltd. August 1981
- o Traffic Authority of New South Wales – Land Use Traffic Generation – Data and Analysis 24– Gymnasiums
- o Traffic Surveys carried out by Carcount for Lyle Marshall & Partners of the Lounge Hound Dog Daycare centre at Annandale in 2023.

  Roads and Maritime Services Trip Generation Surveys – Child Care Centres – Data Report – TEF Consulting August 2015.

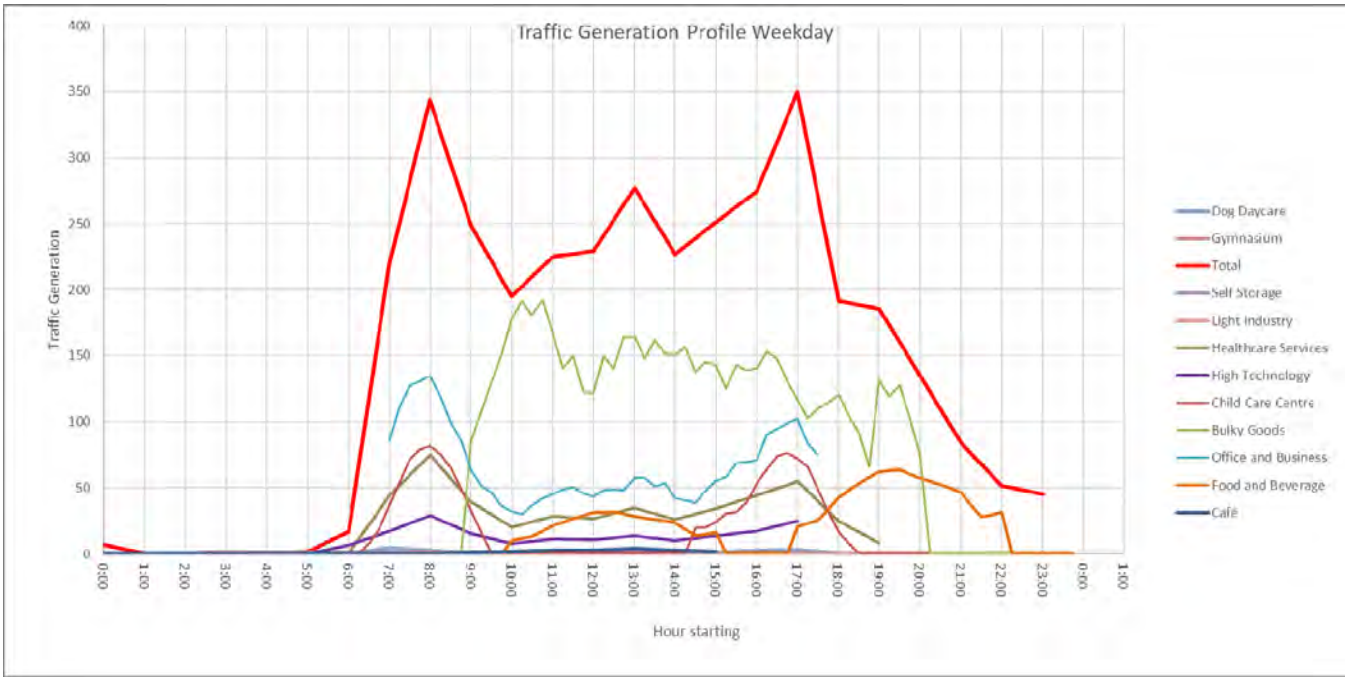


Figure 1a Weekday Traffic Generation Profile

The weekend profile is shown in Figure 1b

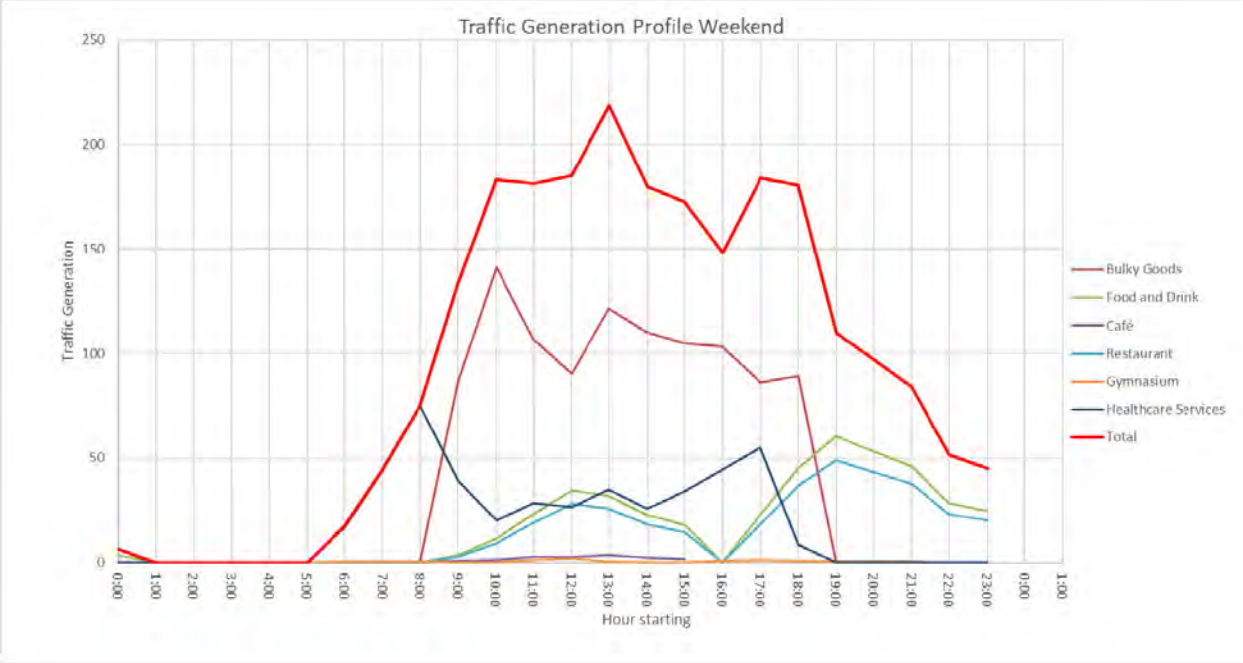


Figure 1a Weekend Traffic Generation Profile

Volumes have been assigned from the development to Bachell Avenue and these are shown in **Figure 2.**

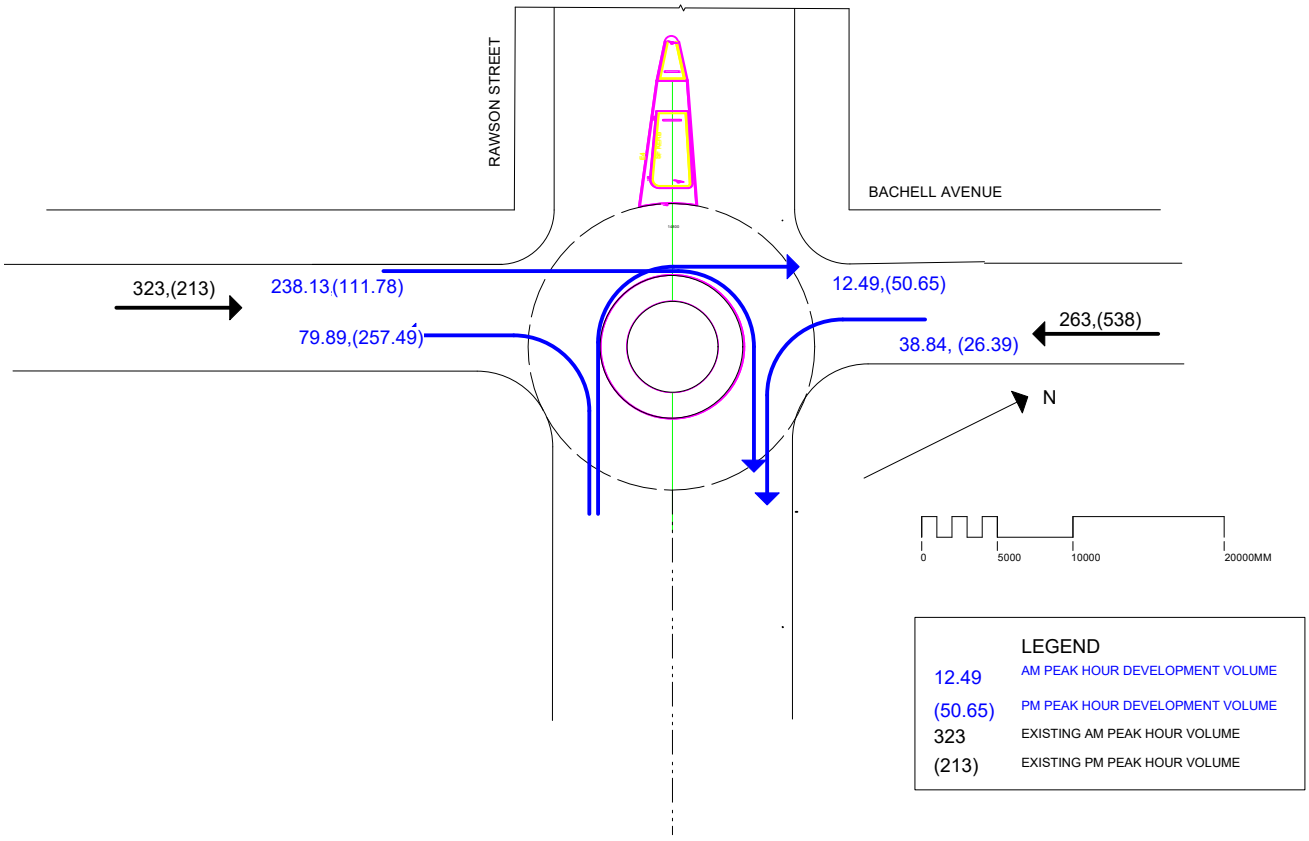
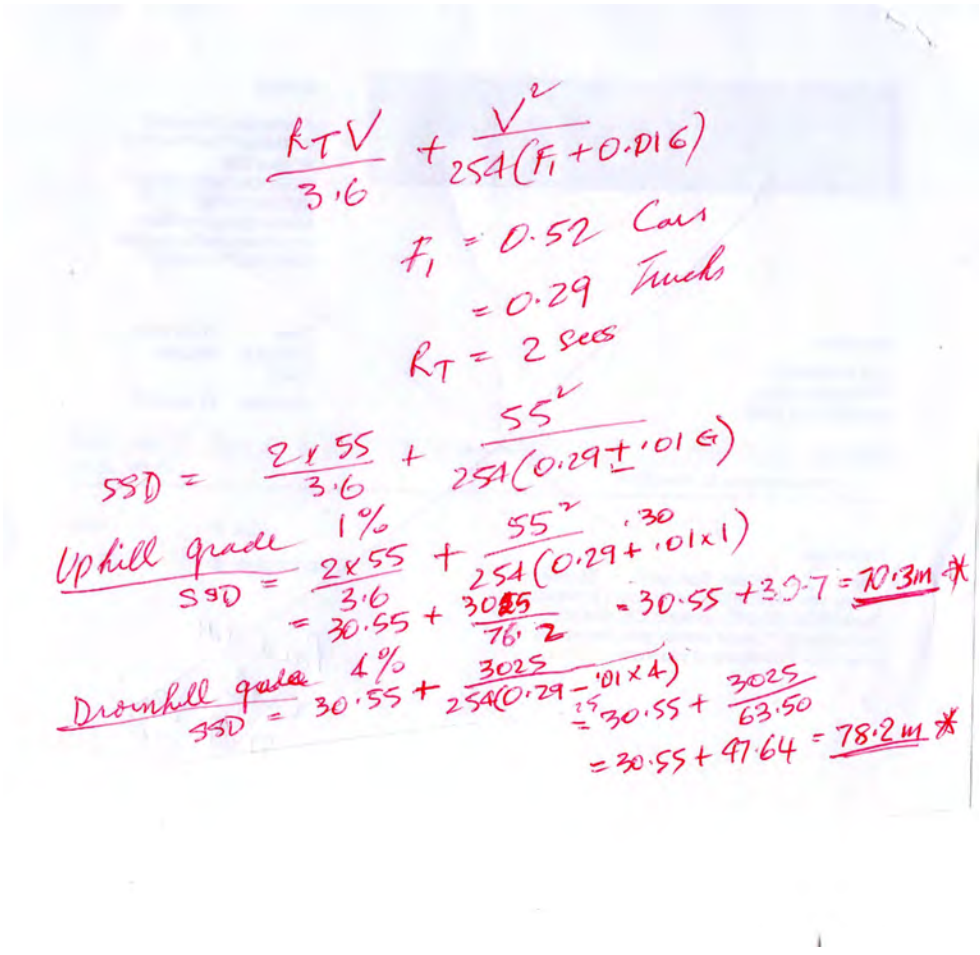


Figure 2
FUTURE DEVELOPMENT PEAK HOUR VOLUMES AT SITE DRIVEWAY AND BACHELL AVENUE/RAWSON STREET INTERSECTION

2.3 Speed Analysis

The equation for the calculation of speed from AUSTROADS Road Design Guide Part 4a.



This calculation determines the safe stopping distance from the roundabout intersection point. From this point we can determine the average speed between this point and the intersection in both directions. The downhill grade is south of the intersection point. The uphill grade is north of the intersection point. The grades are taken from the survey data.

Please refer to the attached **Figure 3** for the location of SSD in each direction.

In summary for position of 70.3 metres north of the intersection the average speed taken from combined 7 day average is 25.55 Km/hr. At 78.2 metres south of the intersection the average speed is also 25.55Km/hour. South of this it is taken as 51.1Km./hour.

Speed is taken from the Matrix Classification speed surveys dated 24/6/2023. The Summary Data is included in Appendix B of this report.

Northbound

Weekday Average speed direction combined = 50.8Km/hour Northbound

7 Day average combined = 51.5km/hour Northbound

Southbound

Weekday Average speed direction combined = 48.8Km/hour Northbound

7 Day average combined = 49.9Km/hour Northbound

Combined

Weekday Average speed direction combined = 50.2Km/hour Northbound

7 Day average combined = 51.1km/hour Northbound

The highest 85% percentile speed recorded was 55Km/hour. Signposted speed is 60Km/hour

SSD 78200AVERAGE SPEED OVER THIS DISTANCE 51.1Km/hr

SSD 78200AVERAGE SPEED OVER THIS DISTANCE 51.1/2=25.55kM/HR

SSD 70300 AVERAGE SPEED OVER THIS DISTANCE 51.1/2=25.55kM/HR

SSD 78200AVERAGE SPEED OVER THIS DISTANCE 51.1Km/hr

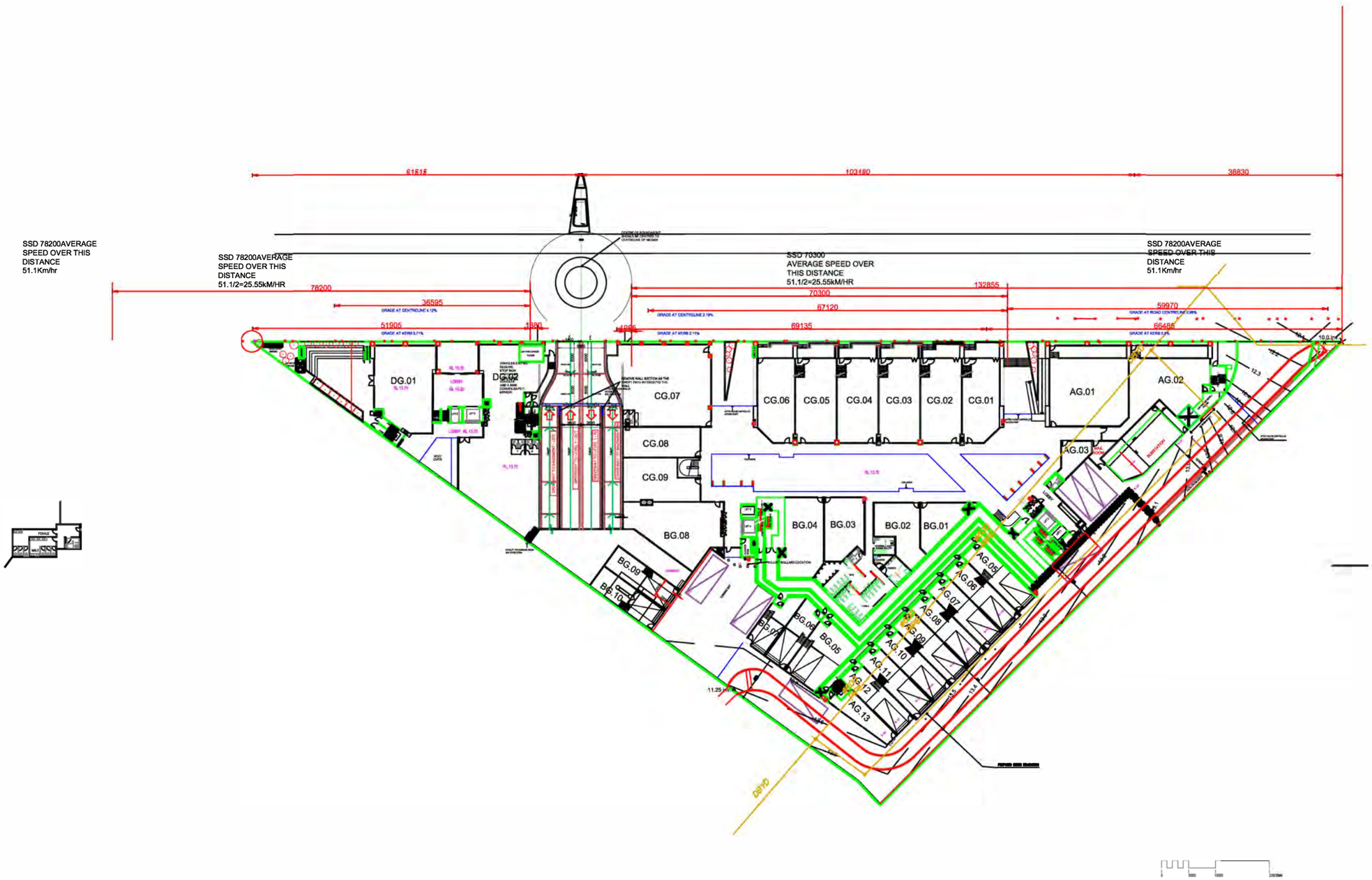


FIGURE 3

GROUND LEVEL
SSD SPEED
SCALE 1:800 (A3)
DATE:12.10.2023

APPENDICES

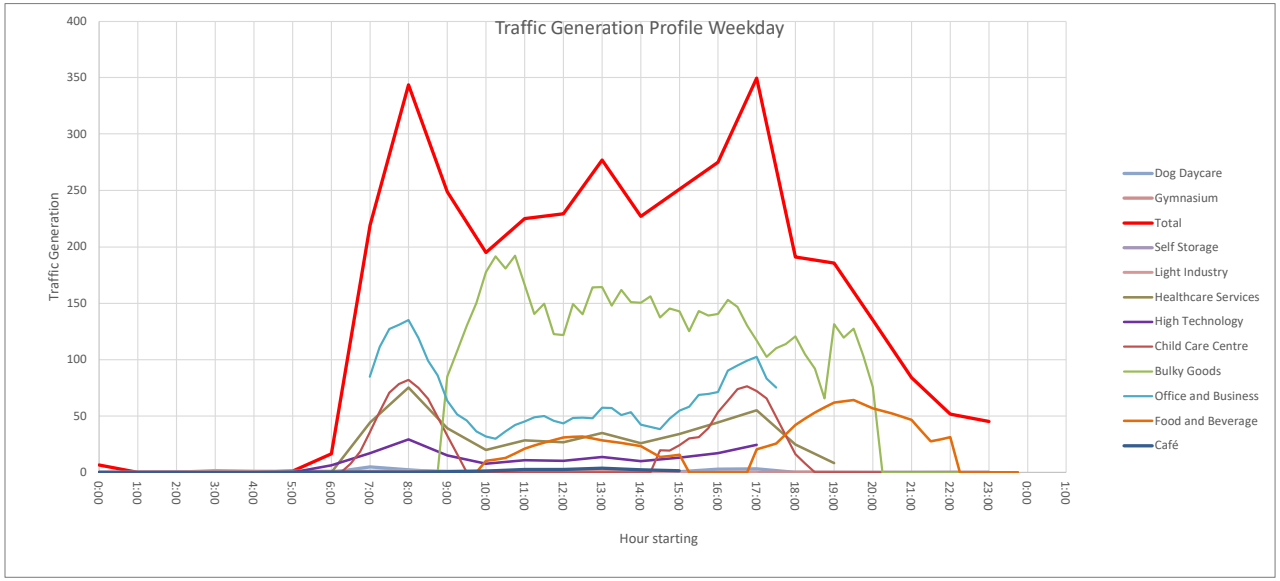
APPENDIX A

Weekday Profile	Number of Trips	42.4		Number of Trips	97.9		Number of Trips	70.9		Number of Trips	8		Office and Business trips	191.7		Restaurant	57.7		Dog Daycare			
	Child care centre			Bulky Goods			Food and Drink			Café												
1 hour starting	Profile	Traffic Gen		1 hour startir	Profile	Traffic gen	1 hour sta	Profile	Traffic gen	1 hour sta	Profile	Traffic gen	1 hour start	Profile	Traffic Gen	1 hour star	Profile	Traffic Gen	1 hour star	Profile		
0:00		0		0:00		0	0:00	5%	4	0:00		0	0:00		0	0:00	5%	2.885	0:00			
1:00		0		1:00		0	1:00		0	1:00		0	1:00		0	1:00		0	1:00			
2:00		0		2:00		0	2:00		0	2:00		0	2:00		0	2:00		0	2:00			
3:00		0		3:00		0	3:00		0	3:00		0	3:00		0	3:00		0	3:00			
4:00		0		4:00		0	4:00		0	4:00		0	4:00		0	4:00		0	4:00			
5:00		0		5:00		0	5:00		0	5:00	5%	0.4	5:00		0	5:00		0	5:00			
6:00	20%	8.48		6:00		0	6:00		0	6:00	5%	0.4	6:00		0	6:00		0	6:00			
7:00	70%	29.68		7:00		0	7:00		0	7:00	5%	0.4	7:00	63%	120.77	7:00		0	7:00	33.3%		
8:00	100%	42.4		8:00		0	8:00		0	8:00	6%	0.5	8:00	100%	191.70	8:00		0	8:00	18.0%		
9:00	83%	35.086		9:00	62%	60	9:00	5%	4	9:00	10%	1	9:00	47%	90.10	9:00	5%	2.885	9:00	0.0%		
10:00		0		10:00	100%	98	10:00	16%	11	10:00	16%	1	10:00	24%	46.01	10:00	16%	9.232	10:00			
11:00		0		11:00	76%	74	11:00	33%	23	11:00	33%	3	11:00	34%	65.18	11:00	33%	19.041	11:00			
12:00		0		12:00	64%	63	12:00	49%	35	12:00	35%	3	12:00	32%	61.34	12:00	49%	28.273	12:00			
13:00		0		13:00	86%	84	13:00	45%	32	13:00	45%	4	13:00	42%	80.51	13:00	45%	25.965	13:00			
14:00	24%	10.176		14:00	78%	76	14:00	32%	23	14:00	30%	2	14:00	31%	59.43	14:00	32%	18.464	14:00			
15:00	38%	16.112		15:00	74%	72	15:00	25%	18	15:00	20%	2	15:00	41%	78.60	15:00	25%	14.425	15:00	5.1%		
16:00	82%	34.556		16:00	73%	71	16:00		0	16:00			16:00	53%	101.60	16:00		0	16:00	20.5%		
17:00	67%	28.408		17:00	61%	60	17:00	32%	23	17:00			17:00	70%	134.19	17:00	32%	18.464	17:00	23.1%		
18:00	20%	8.48		18:00	63%	62	18:00	64%	45	18:00			18:00	6%	11.50	18:00	64%	36.928	18:00			
19:00		0		19:00	68%	67	19:00	85%	60	19:00			19:00			19:00	85%	49.045	19:00			
20:00		0		20:00	39%	38	20:00	75%	53	20:00			20:00			20:00	75%	43.275	20:00			
21:00		0		21:00		0	21:00	65%	46	21:00			21:00			21:00	65%	37.505	21:00			
22:00		0		22:00		0	22:00	40%	28	22:00			22:00			22:00	40%	23.08	22:00			
23:00		0		23:00		0	23:00	35%	25	23:00			23:00			23:00	35%	20.195	23:00			

14		Gymnasium	7.9		Self Storage	4.8		Light Industry	17		Healthcare Services	83.55		High Technology	32.4
Traffic Gen	1 hour star	Profile	Traffic Gen	1 hour start	Profile	Traffic Gen	1 hour starting		Traffic Gen	1 hour st	Profile	Traffic Gen	1 hour st	Profile	Traffic Gen
0	0:00	1%	0.09	0:00		0	0:00		0	0:00		0	0:00		0
0	1:00			1:00		0	1:00		0	1:00		0	1:00		0
0	2:00			2:00		0	2:00		0	2:00		0	2:00		0
0	3:00			3:00		0	3:00		0	3:00		0	3:00		0
0	4:00			4:00	1.2%	0.059	4:00	1.0%	0.2	4:00		0	4:00		0
0	5:00	4%	0.32	5:00	3.0%	0.146	5:00	2.9%	0.5	5:00		0	5:00		0
0	6:00	6%	0.51	6:00	5.9%	0.282	6:00	2.9%	0.5	6:00	20%	0	6:00	20%	6
4.67	7:00	6%	0.51	7:00	6.5%	0.313	7:00	10.1%	1.7	7:00	53%	44.28	7:00	53%	17
2.51	8:00	6%	0.51	8:00	6.2%	0.299	8:00	7.7%	1.3	8:00	90%	75.20	8:00	90%	29
0.00	9:00		0	9:00	7.2%	0.345	9:00	7.3%	1.2	9:00	47%	39.27	9:00	47%	15
0.00	10:00		0	10:00	6.0%	0.288	10:00	7.7%	1.3	10:00	24%	20.05	10:00	24%	8
0.00	11:00	1%	0.09	11:00	7.3%	0.350	11:00	7.5%	1.3	11:00	34%	28.41	11:00	34%	11
0.00	12:00	5%	0.38	12:00	8.7%	0.417	12:00	9.9%	1.7	12:00	32%	26.74	12:00	32%	10
0.00	13:00	5%	0.38	13:00	6.2%	0.297	13:00	7.9%	1.3	13:00	42%	35.09	13:00	42%	14
0.00	14:00		0	14:00	7.1%	0.339	14:00	8.1%	1.4	14:00	31%	25.90	14:00	31%	10
0.72	15:00		0	15:00	9.0%	0.430	15:00	8.7%	1.5	15:00	41%	34.26	15:00	41%	13
2.87	16:00	15%	1	16:00	7.4%	0.355	16:00	7.5%	1.3	16:00	53%	44.28	16:00	53%	17
3.23	17:00	15%	1.19	17:00	6.8%	0.326	17:00	9.0%	1.5	17:00	66%	55.14	17:00	76%	25
0.00	18:00	25%	1.98	18:00	3.8%	0.182	18:00	1.2%	0.2	18:00	30%	24.94	18:00		
0	19:00	20%	1.58	19:00	1.3%	0.060	19:00	0.0%	0	19:00	10%	8.36	19:00		
0	20:00	6%	0.47	20:00	0.8%	0.040	20:00	0.0%	0	20:00	10%		20:00		
0	21:00	5%	0.40	21:00	2.3%	0.108	21:00	0.0%	0	21:00			21:00		
0	22:00	3%	0.24	22:00			22:00			22:00			22:00		
0	23:00	2%	0.16	23:00			23:00			23:00			23:00		

Weekday Profile

1 hour starting	Total
0:00	7
1:00	0
2:00	0
3:00	0
4:00	0
5:00	1
6:00	17
7:00	220
8:00	344
9:00	249
10:00	195
11:00	225
12:00	229
13:00	277
14:00	227
15:00	251
16:00	275
17:00	350
18:00	191
19:00	186
20:00	135
21:00	84
22:00	52
23:00	45



Weekend Profile	Number of Trips	0		Number of Trips	141.375		Number of Trips	70.9		Number of Trips	8		Office and Business	0		Restaurant	57.7		Dog Daycare	0		Gymnasium	
	Child care centre			Bulky Goods			Food and Drink			Café														
1 hour starting	Profile	Traffic Gen		1 hour	Profile	Traffic gen	1 hour star	Profile	Traffic gen	1 hour star	Profile	Traffic gen	1 hour st	Profile	Traffic gen	1 hour st	Profile	Traffic Gen	1 hour st	Profile	Traffic Gen	1 hour s	Profile	
0:00		0		0:00		0	0:00	5%	4	0:00		0	0:00		0	0:00	5%	2.885	0:00		0	0:00	1%	
1:00		0		1:00		0	1:00		0	1:00		0	1:00		0	1:00			1:00		0	1:00		
2:00		0		2:00		0	2:00		0	2:00		0	2:00		0	2:00			2:00		0	2:00		
3:00		0		3:00		0	3:00		0	3:00		0	3:00		0	3:00			3:00		0	3:00		
4:00		0		4:00		0	4:00		0	4:00		0	4:00		0	4:00			4:00		0	4:00		
5:00		0		5:00		0	5:00		0	5:00	5%	0.0	5:00		0	5:00			5:00		0	5:00	4%	
6:00	17%	0		6:00		0	6:00		0	6:00	5%	0.0	6:00		0	6:00		0	6:00		0	6:00	6%	
7:00	74%	0		7:00		0	7:00		0	7:00	5%	0.0	7:00	63%	0.0	7:00		0	7:00	33.3%	0.00	7:00	6%	
8:00	100%	0		8:00		0	8:00		0	8:00	6%	0.0	8:00	100%	0.0	8:00		0	8:00	18.0%	0.00	8:00	6%	
9:00	83%	0		9:00	62%	87	9:00	5%	4	9:00	10%	0.8	9:00	47%	0.0	9:00	5%	2.885	9:00	0.0%	0.00	9:00		
10:00		0		10:00	100%	141	10:00	16%	11	10:00	16%	1.3	10:00	24%	0.0	10:00	16%	9.232	10:00		0.00	10:00		
11:00		0		11:00	76%	107	11:00	33%	23	11:00	33%	2.6	11:00	34%	0.0	11:00	33%	19.041	11:00		0.00	11:00	15%	
12:00		0		12:00	64%	90	12:00	49%	35	12:00	35%	2.8	12:00	32%	0.0	12:00	49%	28.273	12:00		0.00	12:00	25%	
13:00		0		13:00	86%	122	13:00	45%	32	13:00	45%	3.6	13:00	42%	0.0	13:00	45%	25.965	13:00		0.00	13:00	5%	
14:00	24%	0		14:00	78%	110	14:00	32%	23	14:00	30%	2.4	14:00	31%	0.0	14:00	32%	18.464	14:00		0.00	14:00		
15:00	38%	0		15:00	74%	105	15:00	25%	18	15:00	20%	1.6	15:00	41%	0.0	15:00	25%	14.425	15:00	5.1%	0.00	15:00		
16:00	82%	0		16:00	73%	103	16:00		0	16:00			16:00	53%	0.0	16:00		0	16:00	20.5%	0.00	16:00	10%	
17:00	67%	0		17:00	61%	86	17:00	32%	23	17:00			17:00	76%	0.0	17:00	32%	18.464	17:00	23.1%	0.00	17:00	15%	
18:00	20%	0		18:00	63%	89	18:00	64%	45	18:00			18:00			18:00	64%	36.928	18:00		0.00	18:00	10%	
19:00		0		19:00		0	19:00	85%	60	19:00			19:00			19:00	85%	49.045	19:00		0	19:00	6%	
20:00		0		20:00		0	20:00	75%	53	20:00			20:00			20:00	75%	43.275	20:00		0	20:00	6%	
21:00		0		21:00		0	21:00	65%	46	21:00			21:00			21:00	65%	37.505	21:00		0	21:00	5%	
22:00		0		22:00		0	22:00	40%	28	22:00			22:00			22:00	40%	23.08	22:00		0	22:00	3%	
23:00		0		23:00		0	23:00	35%	25	23:00			23:00			23:00	35%	20.195	23:00		0	23:00	2%	

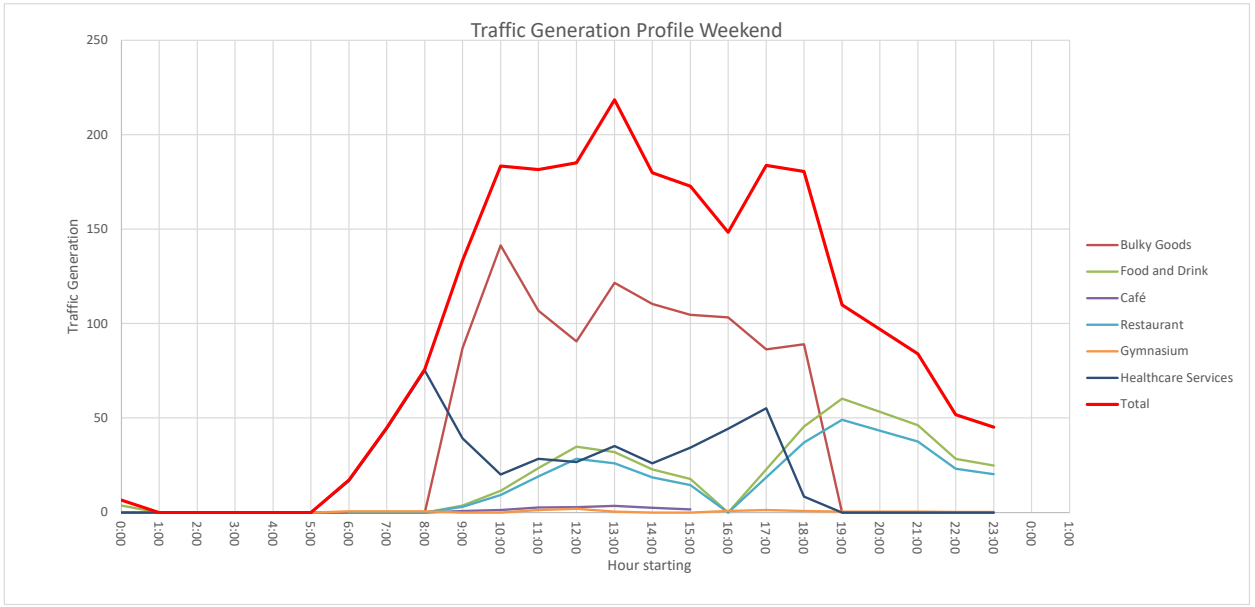
Note Weekend trip rate is higher at 3.9/100m2 GFA

7.9		Self Storage	0		Light Industry	0		Healthcare Services	83.55		High Technology	0

Traffic Gen	1 hour sta	Profile	Traffic Gen	1 hour starting		Traffic Gen	1 hour s	Profile	Traffic Gen	1 hour s	Profile	Traffic G
0	0:00		0	0:00		0	0:00		0	0:00		0
0	1:00		0	1:00		0	1:00		0	1:00		0
0	2:00		0	2:00		0	2:00		0	2:00		0
0	3:00		0	3:00		0	3:00		0	3:00		0
0	4:00	1.2%	0.00	4:00	1.0%	0.0	4:00		0	4:00		0
0	5:00	3.0%	0.00	5:00	2.9%	0.0	5:00		0	5:00		0
0.51	6:00	5.9%	0.00	6:00	2.9%	0.0	6:00	20%	16.71	6:00		0
0.51	7:00	6.5%	0.00	7:00	10.1%	0.0	7:00	53%	44.28	7:00	20%	0
0.51	8:00	6.2%	0.00	8:00	7.7%	0.0	8:00	90%	75.20	8:00	53%	0
0	9:00	7.2%	0.00	9:00	7.3%	0.0	9:00	47%	39.27	9:00	90%	0
0	10:00	6.0%	0.00	10:00	7.7%	0.0	10:00	24%	20.05	10:00	47%	0
1.19	11:00	7.3%	0.00	11:00	7.5%	0.0	11:00	34%	28.41	11:00	24%	0
1.98	12:00	8.7%	0.00	12:00	9.9%	0.0	12:00	32%	26.74	12:00	34%	0
0.38	13:00	6.2%	0.00	13:00	7.9%	0.0	13:00	42%	35.09	13:00	32%	0
0	14:00	7.1%	0.00	14:00	8.1%	0.0	14:00	31%	25.90	14:00	42%	0
0	15:00	9.0%	0.00	15:00	8.7%	0.0	15:00	41%	34.26	15:00	31%	0
1	16:00	7.4%	0.00	16:00	7.5%	0.0	16:00	53%	44.28	16:00	41%	0
1.19	17:00	6.8%	0.00	17:00	9.0%	0.0	17:00	66%	55.14	17:00	53%	0
0.79	18:00	3.8%	0.00	18:00	1.2%	0.0	18:00	10%	8.36	18:00	76%	
0.47	19:00	1.3%	0.00	19:00	0.0%	0	19:00		0	19:00		
0.47	20:00	0.8%	0.00	20:00	0.0%	0	20:00		0	20:00		
0.40	21:00	2.3%	0.00	21:00	0.0%	0	21:00		0	21:00		
0	22:00			22:00			22:00		0	22:00		
0	23:00			23:00			23:00		0	23:00		

Weekend Profile

1 hour starting	Total
0:00	6
1:00	0
2:00	0
3:00	0
4:00	0
5:00	0
6:00	17
7:00	45
8:00	76
9:00	133
10:00	183
11:00	181
12:00	185
13:00	219
14:00	180
15:00	173
16:00	148
17:00	184
18:00	181
19:00	110
20:00	97
21:00	84
22:00	52
23:00	45



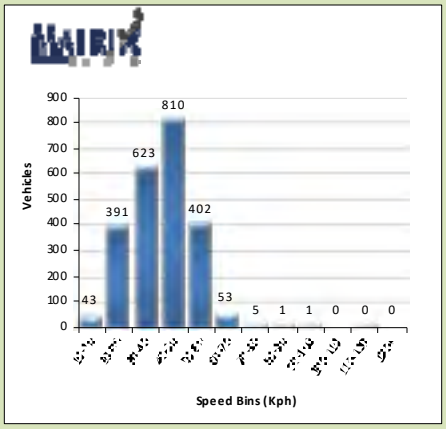
APPENDIX B

Job No	AUNSW7198
Client	LYLE MARSHALL & PARTNERS PTY LTD
Site	Bachell Ave
Location	15 meters north of Rawson St
Site No	ATC 1
Start Date	24-Jun-23
Day	7 Day Ave
Direction	Combined
Description	Speed Summary

Select Site

ATC 1 - Bachell Ave (15 meters north of Rawson St)

Select Day 7 Day Ave **Select Direction** Combined



Bin Summary	
10-20	1.8%
20-30	16.8%
30-40	26.7%
40-50	34.8%
50-60	17.3%
60-70	2.3%
70-80	0.2%
80-90	0.0%
90-100	0.0%
100-110	0.0%
110-120	0.0%
120+	0.0%
40.9	**51.1**

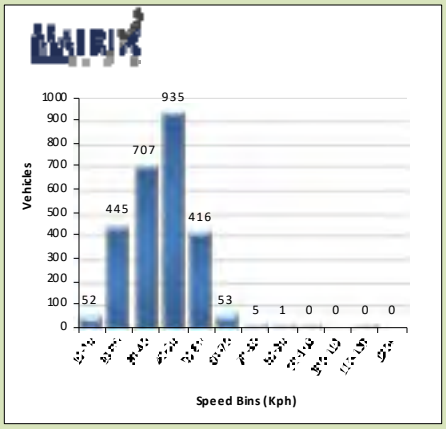
Hour	Vehicle Speed Bins (kph)												Speed	
Starting	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100-110	110-120	120+	Ave	85%ile
0:00	0	2	4	9	6	2	0	0	0	0	0	0	45.9	55.9
1:00	1	2	3	12	8	1	0	0	0	0	0	0	46.6	55.2
2:00	0	2	3	10	10	5	0	0	0	0	0	0	49.2	59.5
3:00	0	2	3	7	6	3	0	0	0	0	0	0	47.5	57.1
4:00	2	4	7	14	10	2	1	0	0	0	0	0	44.2	55.1
5:00	2	7	16	28	16	3	0	0	0	0	0	0	43.4	54.2
6:00	3	23	38	69	31	4	0	0	0	0	0	0	42.3	52.1
7:00	2	24	31	48	24	1	0	0	0	0	0	0	41.0	51.4
8:00	4	32	48	66	31	3	0	0	0	0	0	0	41.0	51.5
9:00	5	25	43	47	20	3	0	0	0	0	0	0	39.5	49.3
10:00	4	29	37	36	14	2	0	0	0	0	0	0	38.6	47.8
11:00	3	31	34	34	17	3	0	0	0	0	0	0	38.1	48.3
12:00	3	35	44	46	22	2	0	0	0	0	0	0	38.8	48.6
13:00	2	28	50	49	27	3	0	0	0	0	0	0	40.0	50.6
14:00	3	29	48	50	26	3	0	0	0	0	0	0	39.7	50.7
15:00	3	33	59	58	23	3	0	0	0	0	0	0	39.2	50.0
16:00	2	25	47	58	28	2	0	0	0	0	0	0	41.0	51.3
17:00	1	17	48	58	21	3	0	0	0	0	0	0	41.2	50.8
18:00	1	14	23	36	16	2	0	0	0	0	0	0	41.8	51.7
19:00	0	9	12	18	10	1	0	0	0	0	0	0	41.1	51.3
20:00	0	5	9	17	11	1	0	0	0	0	0	0	43.8	53.5
21:00	1	6	7	16	9	0	0	0	0	0	0	0	42.7	52.8
22:00	0	3	6	12	8	1	0	0	0	0	0	0	44.9	54.8
23:00	0	4	5	12	7	1	0	0	0	0	0	0	44.5	53.4
Total	43	391	623	810	402	53	5	1	1	0	0	0	40.9	51.1

Job No	AUNSW7198
Client	LYLE MARSHALL & PARTNERS PTY LTD
Site	Bachell Ave
Location	15 meters north of Rawson St
Site No	ATC 1
Start Date	24-Jun-23
Day	Weekday Ave
Direction	Combined
Description	Speed Summary

Select Site

ATC 1 - Bachell Ave (15 meters north of Rawson St)

Select Day Weekday Ave **Select Direction** Combined

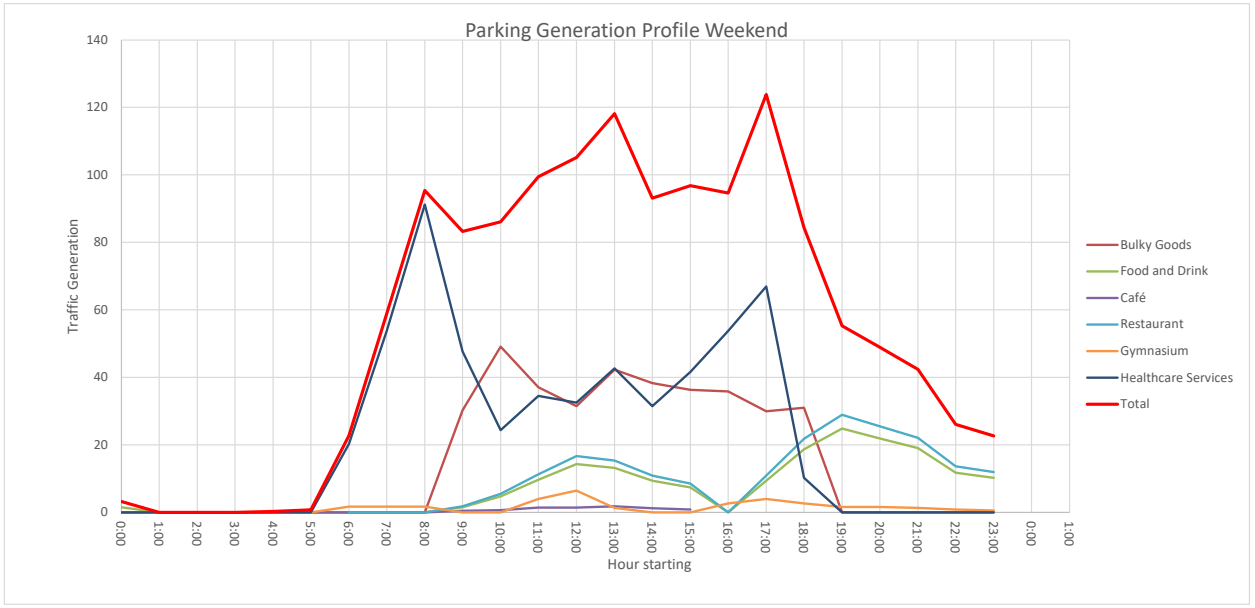


Bin Summary	
10-20	2.0%
20-30	17.0%
30-40	27.0%
40-50	35.8%
50-60	15.9%
60-70	2.0%
70-80	0.2%
80-90	0.0%
90-100	0.0%
100-110	0.0%
110-120	0.0%
120+	0.0%
40.3	**50.2**

Hour	Vehicle Speed Bins (kph)												Speed	
Starting	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100-110	110-120	120+	Ave	85%ile
0:00	0	2	3	8	6	2	0	0	0	0	0	0	46.2	56.6
1:00	1	2	3	11	8	2	0	0	0	0	0	0	46.3	55.2
2:00	1	2	3	10	12	6	0	0	0	0	0	0	49.5	60.5
3:00	0	2	3	9	7	3	0	0	0	0	0	0	48.5	57.5
4:00	2	5	8	16	11	2	0	0	0	0	0	0	43.5	54.7
5:00	3	8	20	36	18	4	0	0	0	0	0	0	43.0	53.2
6:00	5	30	49	89	37	4	0	0	0	0	0	0	41.1	51.1
7:00	2	32	39	61	28	1	0	0	0	0	0	0	40.3	50.6
8:00	5	40	63	85	37	3	0	0	0	0	0	0	40.1	50.4
9:00	7	31	53	57	22	2	0	0	0	0	0	0	38.3	47.4
10:00	5	36	44	41	11	1	0	0	0	0	0	0	36.8	45.6
11:00	4	34	32	36	12	2	0	0	0	0	0	0	36.8	46.5
12:00	3	40	51	46	19	2	0	0	0	0	0	0	37.5	47.0
13:00	2	29	51	52	21	1	0	0	0	0	0	0	39.2	49.1
14:00	3	25	41	53	26	3	0	0	0	0	0	0	40.3	50.9
15:00	3	34	64	68	23	2	0	0	0	0	0	0	39.3	49.1
16:00	3	28	58	69	32	2	0	0	0	0	0	0	40.7	50.7
17:00	1	21	59	72	23	4	0	0	0	0	0	0	41.0	50.0
18:00	1	13	25	39	15	2	0	0	0	0	0	0	41.5	51.3
19:00	0	10	11	18	11	1	0	0	0	0	0	0	41.3	51.3
20:00	0	6	10	17	10	1	0	0	0	0	0	0	43.2	53.2
21:00	1	6	7	16	9	1	0	0	0	0	0	0	42.8	53.2
22:00	0	3	6	13	9	1	0	0	0	0	0	0	45.4	54.6
23:00	0	4	3	13	7	1	0	0	0	0	0	0	45.0	54.3
Total	52	445	707	935	416	53	5	1	0	0	0	0	40.3	50.2

Weekend Profile

1 hour starting	Total
0:00	3
1:00	0
2:00	0
3:00	0
4:00	0
5:00	1
6:00	23
7:00	59
8:00	95
9:00	83
10:00	86
11:00	99
12:00	105
13:00	118
14:00	93
15:00	97
16:00	95
17:00	124
18:00	84
19:00	55
20:00	49
21:00	42
22:00	26
23:00	23



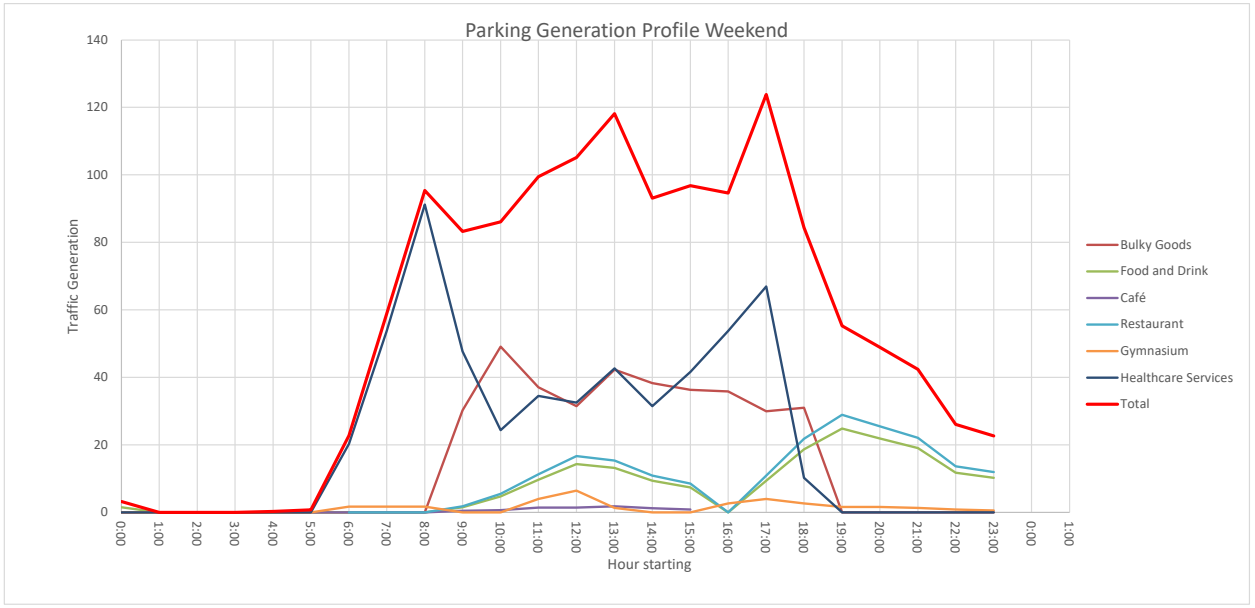
GFA/UNIT		106			3432			1167			159			6041			1359							
Parking Rate		0.25			0.0143			0.025			0.025			0.025			0.025							
Parking No		27			49			29			4.0			151.025			33.975							
	Number			Number of			Number			Number			Office and											
Weekend Profile	of Trips	0		Trips	49		of Trips	29		of Trips	4.0		Business	0		Restaurant	34.0							
	Child care centre			Bulky Goods			Food and Drink			Café														
1 hour starting	Profile	Parking		1 hour	Profile	Parking	1 hour star	Profile	Parking	1 hour star	Profile	Parking	1 hour st	Profile	Parking		1 hour st	Profile	Parking					
0:00		0		0:00		0	0:00	5%	1	0:00		0	0:00		0		0:00	5%	1.6988					
1:00		0		1:00		0	1:00		0	1:00		0	1:00		0		1:00							
2:00		0		2:00		0	2:00		0	2:00		0	2:00		0		2:00							
3:00		0		3:00		0	3:00		0	3:00		0	3:00		0		3:00							
4:00		0		4:00		0	4:00		0	4:00		0	4:00		0		4:00							
5:00		0		5:00		0	5:00		0	5:00	5%	0.0	5:00		0		5:00							
6:00	17%	0		6:00		0	6:00		0	6:00	5%	0.0	6:00		0		6:00		0					
7:00	74%	0		7:00		0	7:00		0	7:00	5%	0.0	7:00	63%	0.0		7:00		0					
8:00	100%	0		8:00		0	8:00		0	8:00	6%	0.0	8:00	100%	0.0		8:00		0					
9:00	83%	0		9:00	62%	30	9:00	5%	1	9:00	10%	0.4	9:00	47%	0.0		9:00	5%	1.6988					
10:00		0		10:00	100%	49	10:00	16%	5	10:00	16%	0.6	10:00	24%	0.0		10:00	16%	5.436					
11:00		0		11:00	76%	37	11:00	33%	10	11:00	33%	1.3	11:00	34%	0.0		11:00	33%	11.212					
12:00		0		12:00	64%	31	12:00	49%	14	12:00	35%	1.4	12:00	32%	0.0		12:00	49%	16.648					
13:00		0		13:00	86%	42	13:00	45%	13	13:00	45%	1.8	13:00	42%	0.0		13:00	45%	15.289					
14:00	24%	0		14:00	78%	38	14:00	32%	9	14:00	30%	1.2	14:00	31%	0.0		14:00	32%	10.872					
15:00	38%	0		15:00	74%	36	15:00	25%	7	15:00	20%	0.8	15:00	41%	0.0		15:00	25%	8.4938					
16:00	82%	0		16:00	73%	36	16:00		0	16:00			16:00	53%	0.0		16:00		0					
17:00	67%	0		17:00	61%	30	17:00	32%	9	17:00			17:00	76%	0.0		17:00	32%	10.872					
18:00	20%	0		18:00	63%	31	18:00	64%	19	18:00			18:00				18:00	64%	21.744					
19:00		0		19:00		0	19:00	85%	25	19:00			19:00				19:00	85%	28.879					
20:00		0		20:00		0	20:00	75%	22	20:00			20:00				20:00	75%	25.481					
21:00		0		21:00		0	21:00	65%	19	21:00			21:00				21:00	65%	22.084					
22:00		0		22:00		0	22:00	40%	12	22:00			22:00				22:00	40%	13.59					
23:00		0		23:00		0	23:00	35%	10	23:00			23:00				23:00	35%	11.891					

Note Weekend trip rate is higher at 3.9/100m2 GFA
Refer to TDT2013/04a

		303			863			392			1813			2535			7112					
		0.01			0.03			0.003			0.013			0.04			0.013					
		3.03			25.89			1.18			23.569			101.4			92.456					
	Dog Daycare	3		Gymnasium	26		Self Storage	1		Light Industry	24		Healthcare Services	101		High Technology	0				
1 hour st	Profile	Parking	1 hour s	Profile	Parking	1 hour sta	Profile	Parking	1 hour starting		Parking	1 hour s	Profile	Parking	1 hour s	Profile	Parking					
0:00		0	0:00	1%	0	0:00		0	0:00		0	0:00		0	0:00		0					
1:00		0	1:00		0	1:00		0	1:00		0	1:00		0	1:00		0					
2:00		0	2:00		0	2:00		0	2:00		0	2:00		0	2:00		0					
3:00		0	3:00		0	3:00		0	3:00		0	3:00		0	3:00		0					
4:00		0	4:00		0	4:00	1.2%	0.01	4:00	1.0%	0.2	4:00		0	4:00		0					
5:00		0	5:00	4%	0	5:00	3.0%	0.04	5:00	2.9%	0.7	5:00		0	5:00		0					
6:00		0	6:00	6%	1.66	6:00	5.9%	0.07	6:00	2.9%	0.7	6:00	20%	20.28	6:00		0					
7:00	33.3%	1.01	7:00	6%	1.66	7:00	6.5%	0.08	7:00	10.1%	2.4	7:00	53%	53.74	7:00	20%	0					
8:00	18.0%	0.54	8:00	6%	1.66	8:00	6.2%	0.07	8:00	7.7%	1.8	8:00	90%	91.26	8:00	53%	0					
9:00	0.0%	0.00	9:00		0	9:00	7.2%	0.08	9:00	7.3%	1.7	9:00	47%	47.66	9:00	90%	0					
10:00		0.00	10:00		0	10:00	6.0%	0.07	10:00	7.7%	1.8	10:00	24%	24.34	10:00	47%	0					
11:00		0.00	11:00	15%	3.88	11:00	7.3%	0.09	11:00	7.5%	1.8	11:00	34%	34.48	11:00	24%	0					
12:00		0.00	12:00	25%	6.47	12:00	8.7%	0.10	12:00	9.9%	2.3	12:00	32%	32.45	12:00	34%	0					
13:00		0.00	13:00	5%	1.24	13:00	6.2%	0.07	13:00	7.9%	1.9	13:00	42%	42.59	13:00	32%	0					
14:00		0.00	14:00		0	14:00	7.1%	0.08	14:00	8.1%	1.9	14:00	31%	31.43	14:00	42%	0					
15:00	5.1%	0.16	15:00		0	15:00	9.0%	0.11	15:00	8.7%	2.1	15:00	41%	41.57	15:00	31%	0					
16:00	20.5%	0.62	16:00	10%	3	16:00	7.4%	0.09	16:00	7.5%	1.8	16:00	53%	53.74	16:00	41%	0					
17:00	23.1%	0.70	17:00	15%	3.88	17:00	6.8%	0.08	17:00	9.0%	2.1	17:00	66%	66.92	17:00	53%	0					
18:00		0.00	18:00	10%	2.59	18:00	3.8%	0.04	18:00	1.2%	0.3	18:00	10%	10.14	18:00	76%						
19:00		0	19:00	6%	1.55	19:00	1.3%	0.01	19:00	0.0%	0	19:00		0	19:00							
20:00		0	20:00	6%	1.55	20:00	0.8%	0.01	20:00	0.0%	0	20:00		0	20:00							
21:00		0	21:00	5%	1.29	21:00	2.3%	0.03	21:00	0.0%	0	21:00		0	21:00							
22:00		0	22:00	3%	1	22:00			22:00			22:00		0	22:00							
23:00		0	23:00	2%	1	23:00			23:00			23:00		0	23:00							

Weekend Profile

1 hour starting	Total
0:00	3
1:00	0
2:00	0
3:00	0
4:00	0
5:00	1
6:00	23
7:00	59
8:00	95
9:00	83
10:00	86
11:00	99
12:00	105
13:00	118
14:00	93
15:00	97
16:00	95
17:00	124
18:00	84
19:00	55
20:00	49
21:00	42
22:00	26
23:00	23



GFA/UNIT		106			3432			1167			159			6041			1359							
Parking Rate		0.25			0.0143			0.025			0.025			0.025			0.025							
Parking No		27			49			29			4.0			151.025			33.975							
	Number			Number of			Number			Number			Office and											
Weekend Profile	of Trips	0		Trips	49		of Trips	29		of Trips	4.0		Business	0		Restaurant	34.0							
	Child care centre			Bulky Goods			Food and Drink			Café														
1 hour starting	Profile	Parking		1 hour	Profile	Parking	1 hour star	Profile	Parking	1 hour star	Profile	Parking	1 hour st	Profile	Parking		1 hour st	Profile	Parking					
0:00		0		0:00		0	0:00	5%	1	0:00		0	0:00		0		0:00	5%	1.6988					
1:00		0		1:00		0	1:00		0	1:00		0	1:00		0		1:00							
2:00		0		2:00		0	2:00		0	2:00		0	2:00		0		2:00							
3:00		0		3:00		0	3:00		0	3:00		0	3:00		0		3:00							
4:00		0		4:00		0	4:00		0	4:00		0	4:00		0		4:00							
5:00		0		5:00		0	5:00		0	5:00	5%	0.0	5:00		0		5:00							
6:00	17%	0		6:00		0	6:00		0	6:00	5%	0.0	6:00		0		6:00		0					
7:00	74%	0		7:00		0	7:00		0	7:00	5%	0.0	7:00	63%	0.0		7:00		0					
8:00	100%	0		8:00		0	8:00		0	8:00	6%	0.0	8:00	100%	0.0		8:00		0					
9:00	83%	0		9:00	62%	30	9:00	5%	1	9:00	10%	0.4	9:00	47%	0.0		9:00	5%	1.6988					
10:00		0		10:00	100%	49	10:00	16%	5	10:00	16%	0.6	10:00	24%	0.0		10:00	16%	5.436					
11:00		0		11:00	76%	37	11:00	33%	10	11:00	33%	1.3	11:00	34%	0.0		11:00	33%	11.212					
12:00		0		12:00	64%	31	12:00	49%	14	12:00	35%	1.4	12:00	32%	0.0		12:00	49%	16.648					
13:00		0		13:00	86%	42	13:00	45%	13	13:00	45%	1.8	13:00	42%	0.0		13:00	45%	15.289					
14:00	24%	0		14:00	78%	38	14:00	32%	9	14:00	30%	1.2	14:00	31%	0.0		14:00	32%	10.872					
15:00	38%	0		15:00	74%	36	15:00	25%	7	15:00	20%	0.8	15:00	41%	0.0		15:00	25%	8.4938					
16:00	82%	0		16:00	73%	36	16:00		0	16:00			16:00	53%	0.0		16:00		0					
17:00	67%	0		17:00	61%	30	17:00	32%	9	17:00			17:00	76%	0.0		17:00	32%	10.872					
18:00	20%	0		18:00	63%	31	18:00	64%	19	18:00			18:00				18:00	64%	21.744					
19:00		0		19:00		0	19:00	85%	25	19:00			19:00				19:00	85%	28.879					
20:00		0		20:00		0	20:00	75%	22	20:00			20:00				20:00	75%	25.481					
21:00		0		21:00		0	21:00	65%	19	21:00			21:00				21:00	65%	22.084					
22:00		0		22:00		0	22:00	40%	12	22:00			22:00				22:00	40%	13.59					
23:00		0		23:00		0	23:00	35%	10	23:00			23:00				23:00	35%	11.891					

Note Weekend trip rate is higher at 3.9/100m2 GFA
Refer to TDT2013/04a

		303			863			392			1813			2535			7112					
		0.01			0.03			0.003			0.013			0.04			0.013					
		3.03			25.89			1.18			23.569			101.4			92.456					
	Dog Daycare	3		Gymnasium	26		Self Storage	1		Light Industry	24		Healthcare Services	101		High Technology	0				
1 hour st	Profile	Parking	1 hour s	Profile	Parking	1 hour sta	Profile	Parking	1 hour starting		Parking	1 hour s	Profile	Parking	1 hour s	Profile	Parking					
0:00		0	0:00	1%	0	0:00		0	0:00		0	0:00		0	0:00		0					
1:00		0	1:00		0	1:00		0	1:00		0	1:00		0	1:00		0					
2:00		0	2:00		0	2:00		0	2:00		0	2:00		0	2:00		0					
3:00		0	3:00		0	3:00		0	3:00		0	3:00		0	3:00		0					
4:00		0	4:00		0	4:00	1.2%	0.01	4:00	1.0%	0.2	4:00		0	4:00		0					
5:00		0	5:00	4%	0	5:00	3.0%	0.04	5:00	2.9%	0.7	5:00		0	5:00		0					
6:00		0	6:00	6%	1.66	6:00	5.9%	0.07	6:00	2.9%	0.7	6:00	20%	20.28	6:00		0					
7:00	33.3%	1.01	7:00	6%	1.66	7:00	6.5%	0.08	7:00	10.1%	2.4	7:00	53%	53.74	7:00	20%	0					
8:00	18.0%	0.54	8:00	6%	1.66	8:00	6.2%	0.07	8:00	7.7%	1.8	8:00	90%	91.26	8:00	53%	0					
9:00	0.0%	0.00	9:00		0	9:00	7.2%	0.08	9:00	7.3%	1.7	9:00	47%	47.66	9:00	90%	0					
10:00		0.00	10:00		0	10:00	6.0%	0.07	10:00	7.7%	1.8	10:00	24%	24.34	10:00	47%	0					
11:00		0.00	11:00	15%	3.88	11:00	7.3%	0.09	11:00	7.5%	1.8	11:00	34%	34.48	11:00	24%	0					
12:00		0.00	12:00	25%	6.47	12:00	8.7%	0.10	12:00	9.9%	2.3	12:00	32%	32.45	12:00	34%	0					
13:00		0.00	13:00	5%	1.24	13:00	6.2%	0.07	13:00	7.9%	1.9	13:00	42%	42.59	13:00	32%	0					
14:00		0.00	14:00		0	14:00	7.1%	0.08	14:00	8.1%	1.9	14:00	31%	31.43	14:00	42%	0					
15:00	5.1%	0.16	15:00		0	15:00	9.0%	0.11	15:00	8.7%	2.1	15:00	41%	41.57	15:00	31%	0					
16:00	20.5%	0.62	16:00	10%	3	16:00	7.4%	0.09	16:00	7.5%	1.8	16:00	53%	53.74	16:00	41%	0					
17:00	23.1%	0.70	17:00	15%	3.88	17:00	6.8%	0.08	17:00	9.0%	2.1	17:00	66%	66.92	17:00	53%	0					
18:00		0.00	18:00	10%	2.59	18:00	3.8%	0.04	18:00	1.2%	0.3	18:00	10%	10.14	18:00	76%						
19:00		0	19:00	6%	1.55	19:00	1.3%	0.01	19:00	0.0%	0	19:00		0	19:00							
20:00		0	20:00	6%	1.55	20:00	0.8%	0.01	20:00	0.0%	0	20:00		0	20:00							
21:00		0	21:00	5%	1.29	21:00	2.3%	0.03	21:00	0.0%	0	21:00		0	21:00							
22:00		0	22:00	3%	1	22:00			22:00			22:00		0	22:00							
23:00		0	23:00	2%	1	23:00			23:00			23:00		0	23:00							

APPENDIX F

CAR PARKING :	192
ACCESSIBLE CAR PARKING :	2
B99 LOADING BAYS :	1
MOTORBIKES :	10
BICYCLE SPACES :	0

DRAFT

No.	Date	Issue Notes

SURVEY BY: STRATASURV SURVEYORS
LAND, ENGINEERING & CONSTRUCTION SURVEYORS
PHONE: 9712 7111
EMAIL: ssurveyors@astratsurv.com.au

DATUM: A.H.D

LYLE MARSHALL & PARTNERS PTY. LTD.
CONSULTING ENGINEERS, TRANSPORTATION, ENVIRONMENTAL PLANNERS & ARCHITECTS
ABN 84 095 235 957
NOMINATED ARCHITECT : ERICA MARSHALL-EVANS : NO. 6513
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phone: (02) 9436 0086
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email: lyle@lylemarshall.com.au
web: www.lylemarshallandassociates.info
The Association of Consulting Engineers Australia

Client: **RAAD ACQUISITION No 10 PTY LTD**

2 BACHELL AVENUE LIDCOMBE

BASEMENT B2 GENERAL LAYOUT

SCALE	PASSED	DATE FIRST ISSUED
1:500(A3)	EME	16.09.2024

DESIGN		Sheet No. 1 of 10	Drawing No. 1194-1-22
DRAWN	EM		
CHECK	CHK		

VEHICLE PROFIL

DRAFT

No.	Date	Issue Notes

SURVEY BY: STRATASURV SURVEYORS
LAND, ENGINEERING & CONSTRUCTION SURVEYORS
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DATUM: A.H.D

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Member Australian Institute of Architects
The Association of Consulting Engineers Australia

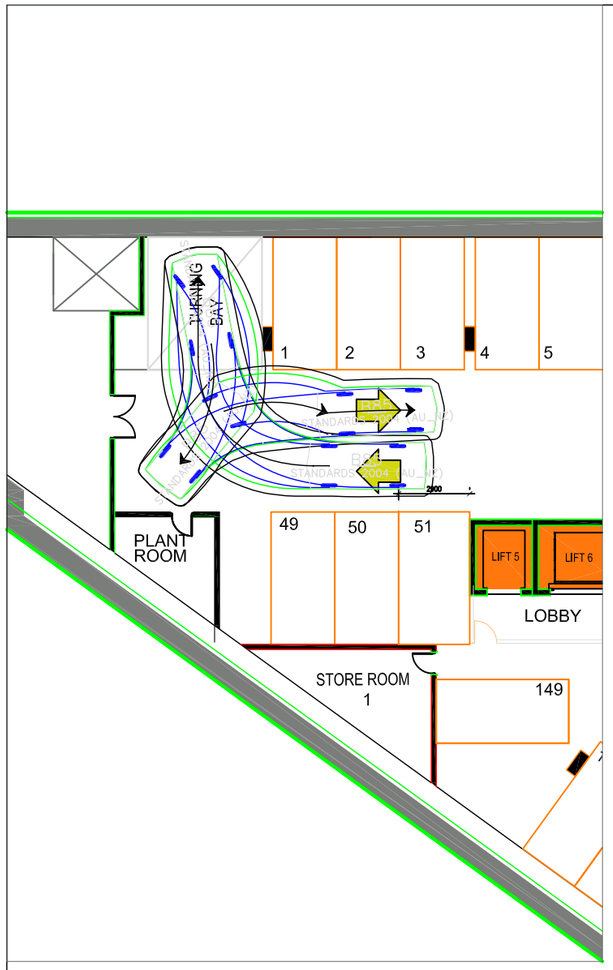
Client: **RAAD ACQUISITION No 10 PTY LTD**

2 BACHELL AVENUE LIDCOMBE

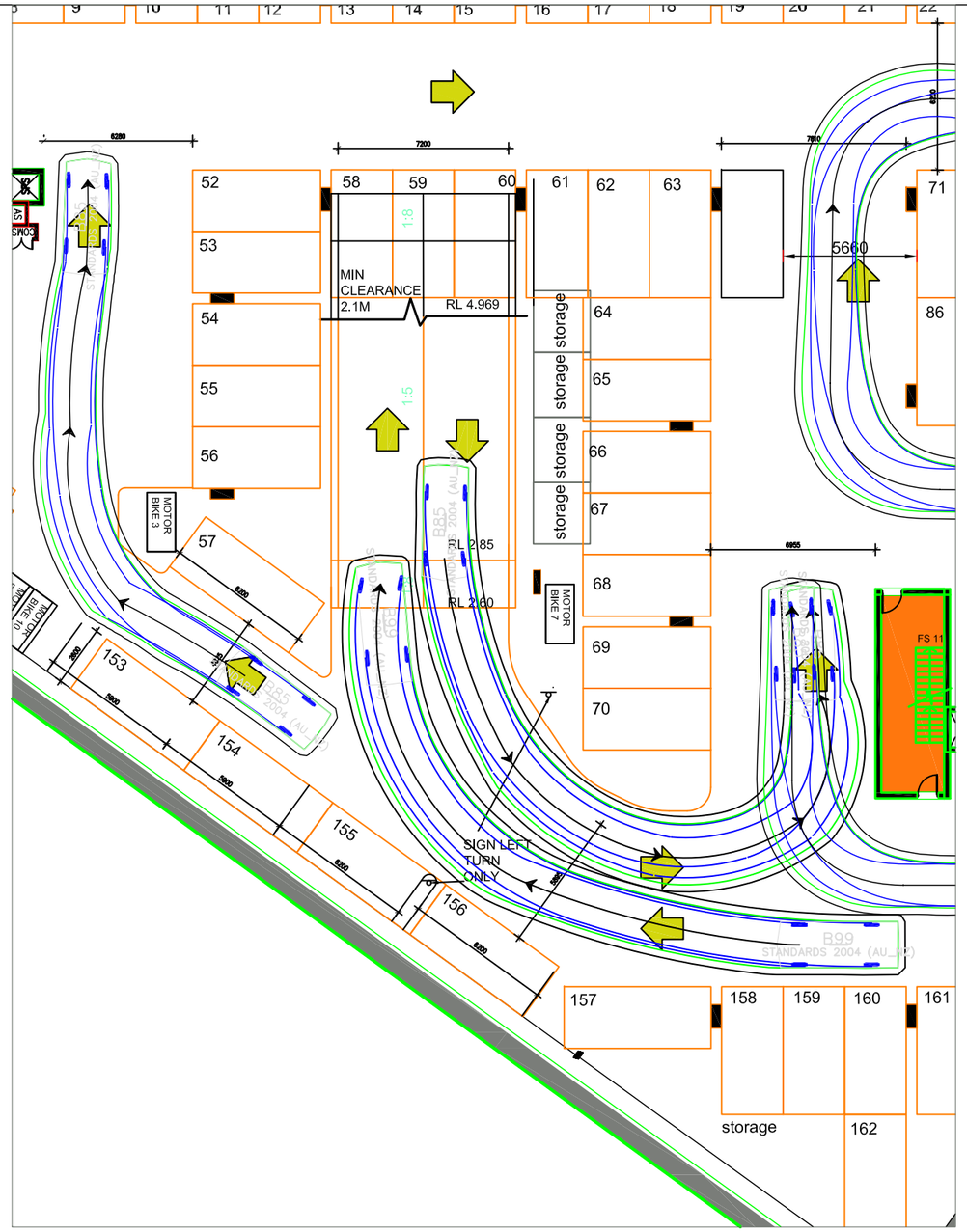
BASEMENT B2 SWEPT PATH ANALYSIS

SCALE	PASSED	DATE FIRST ISSUED
1:500(A3)	EME	16.09.2024

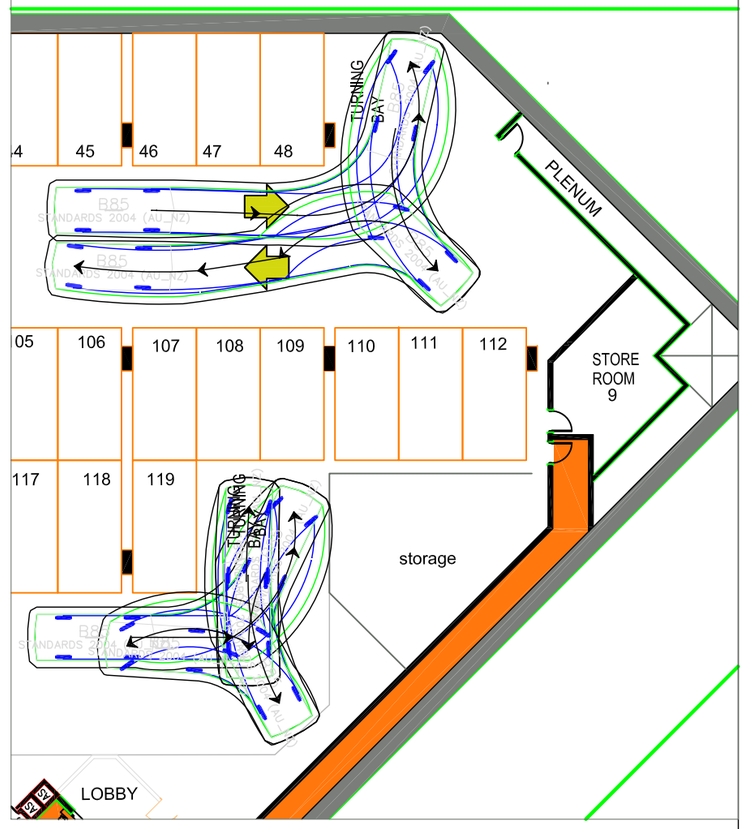
DESIGN		Sheet No. 2 of 10	Drawing No. 1194-1-22
DRAWN	EM		
CHECK	CHK		



B85 VEHICLE ENTERING AND EXITING SOUTH-WESTERN TURNING BAY

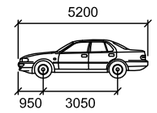


B85 AND B99 VEHICLE ENTERING AND EXITING RAMP AND AISLE



B85 VEHICLE ENTERING AND EXITING NORTHERN AND CENTRAL TURNING BAYS

VEHICLE PROFILE



B99

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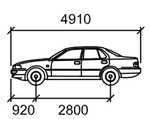
Lock to Lock Time	:	6.0
Steering Angle	:	33.9



B85

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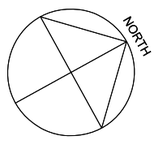
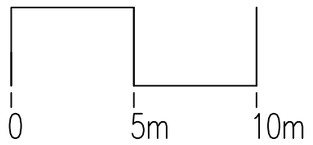
Steering Angle	:	34.1





DRAFT

No.	Date	Issue Notes

SURVEY BY: STRATASURV SURVEYORS
LAND, ENGINEERING & CONSTRUCTION SURVEYORS
PHONE: 9712 7111
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DATUM: A.H.D

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The Association of Consulting Engineers Australia

Client: **RAAD ACQUISITION No 10 PTY LTD**

2 BACHELL AVENUE LIDCOMBE
BASEMENT B2 SWEPT PATH ANALSYIS B99 AND B85

SCALE	PASSED	DATE FIRST ISSUED
1:250(A3)	EME	16.09.2024

DESIGN		Sheet No.	Drawing No.
DRAWN	EM	3 of 10	1194-1-22
CHECK	CHK		

No.	Date	Issue Notes

SURVEY BY:
STRATASURV SURVEYORS
LAND, ENGINEERING & CONSTRUCTION SURVEYORS
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DATUM: A.H.D

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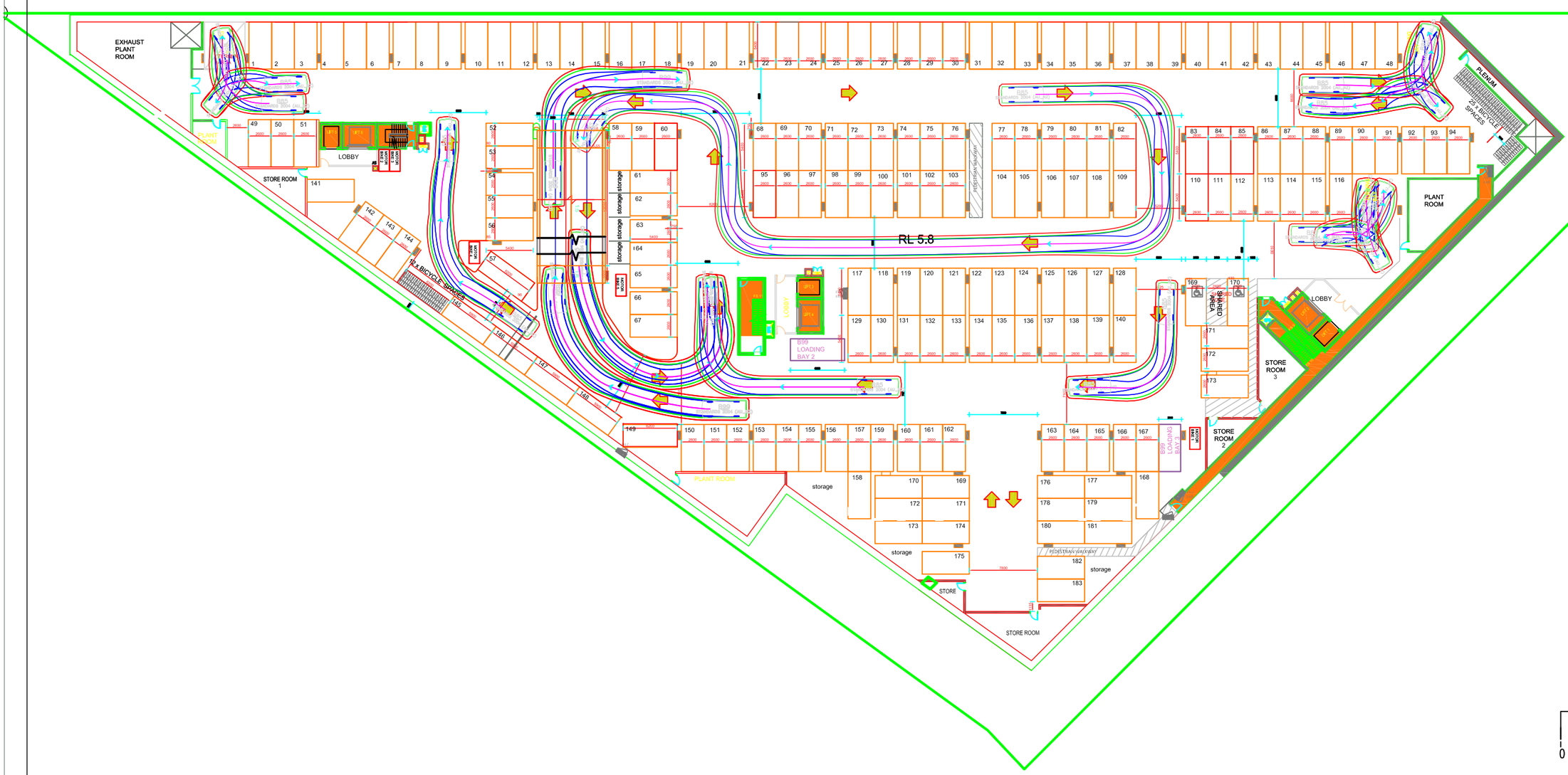
Client:
RAAD ACQUISITION No 10 PTY LTD

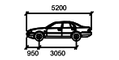
2 BACHELL AVENUE LIDCOMBE
BASEMENT B1 GENERAL LAYOUT PLAN

SCALE	PASSED	DATE FIRST ISSUED
1:200(A3)	EME	16.09.2024

DESIGN		Sheet No. 4 of 10	Drawing No. 1194-1-22
DRAWN	EM		
CHECK	CHK		



VEHICLE PROFILE



B99

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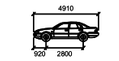
Steering Angle	: 33.9



B85

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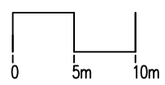
Steering Angle	: 34.1



DRAFT

No.	Date	Issue Notes

SURVEY BY: STRATASURV SURVEYORS
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DATUM: A.H.D

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CONSULTING ENGINEERS, TRANSPORTATION, ENVIRONMENTAL PLANNERS & ARCHITECTS
ABN 84 095 235 957
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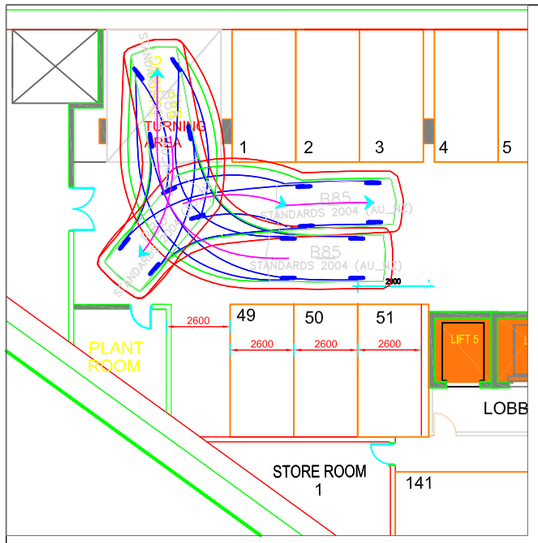
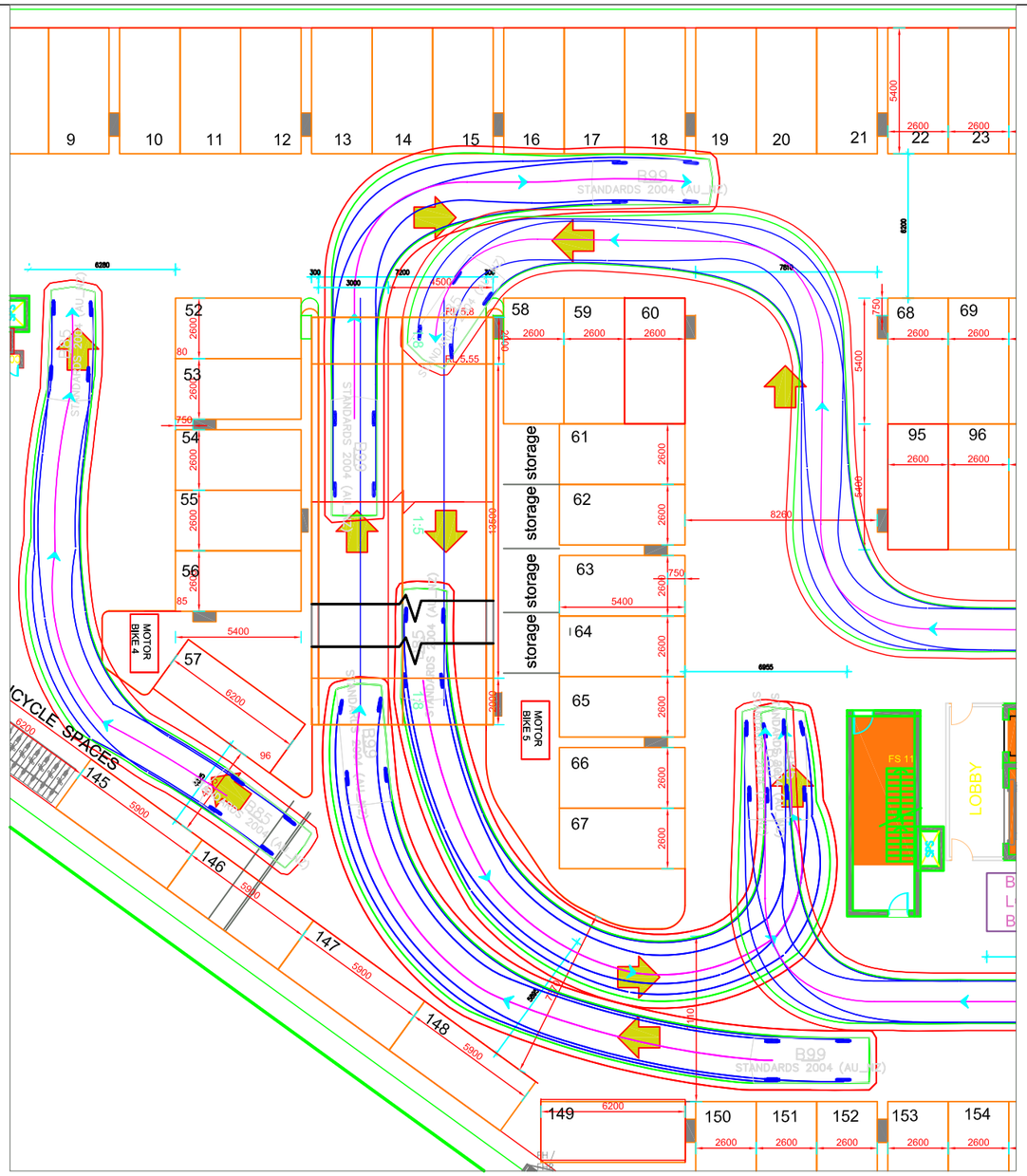
2 BACHELL AVENUE LIDCOMBE
BASEMENT B1 SWEPT PATHS

SCALE	PASSED	DATE FIRST ISSUED
1:500(A3)	EME	16.09.2024

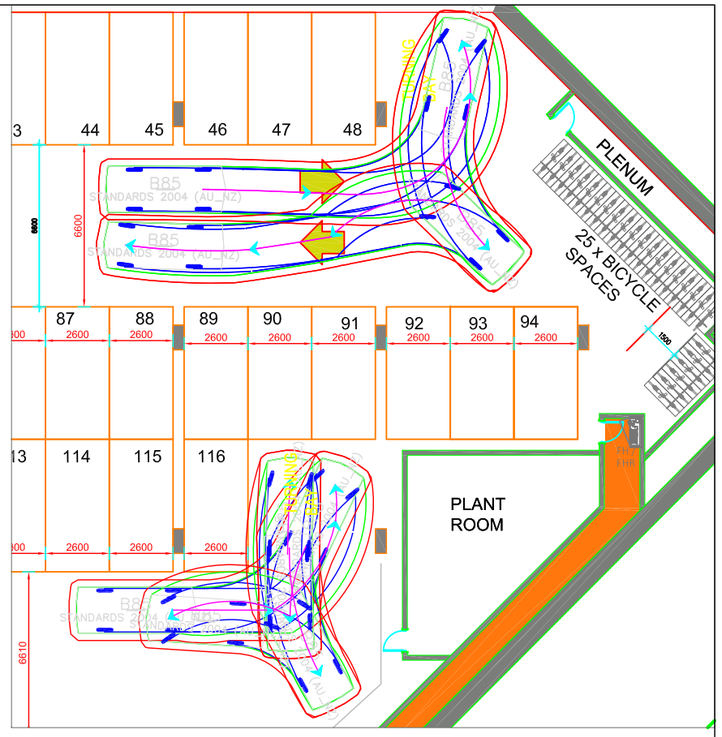
		Sheet No.	Drawing No.
DESIGN		5 of 10	1194-1-22
DRAWN	EM		
CHECK	CHK		



B85 VEHICLE ENTERING AND EXITING SOUTH-WESTERN TURNING BAY

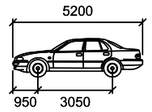


B85 AND B99 VEHICLE ENTERUNG AND EXITING RAMP AND AISLE



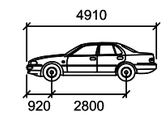
B85 VEHICLE ENTERING AND EXITING NORTHERN AND CENTRAL TURNING BAYS

VEHICLE PROFILE



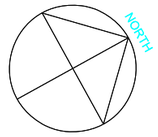
B99

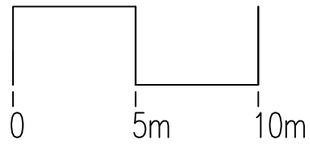
		mm
Width	:	1940
Track	:	1840
Lock to Lock Time	:	6.0
Steering Angle	:	33.9



B85

		mm
Width	:	1870
Track	:	1770
Lock to Lock Time	:	6.0
Steering Angle	:	34.1





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No.	Date	Issue Notes

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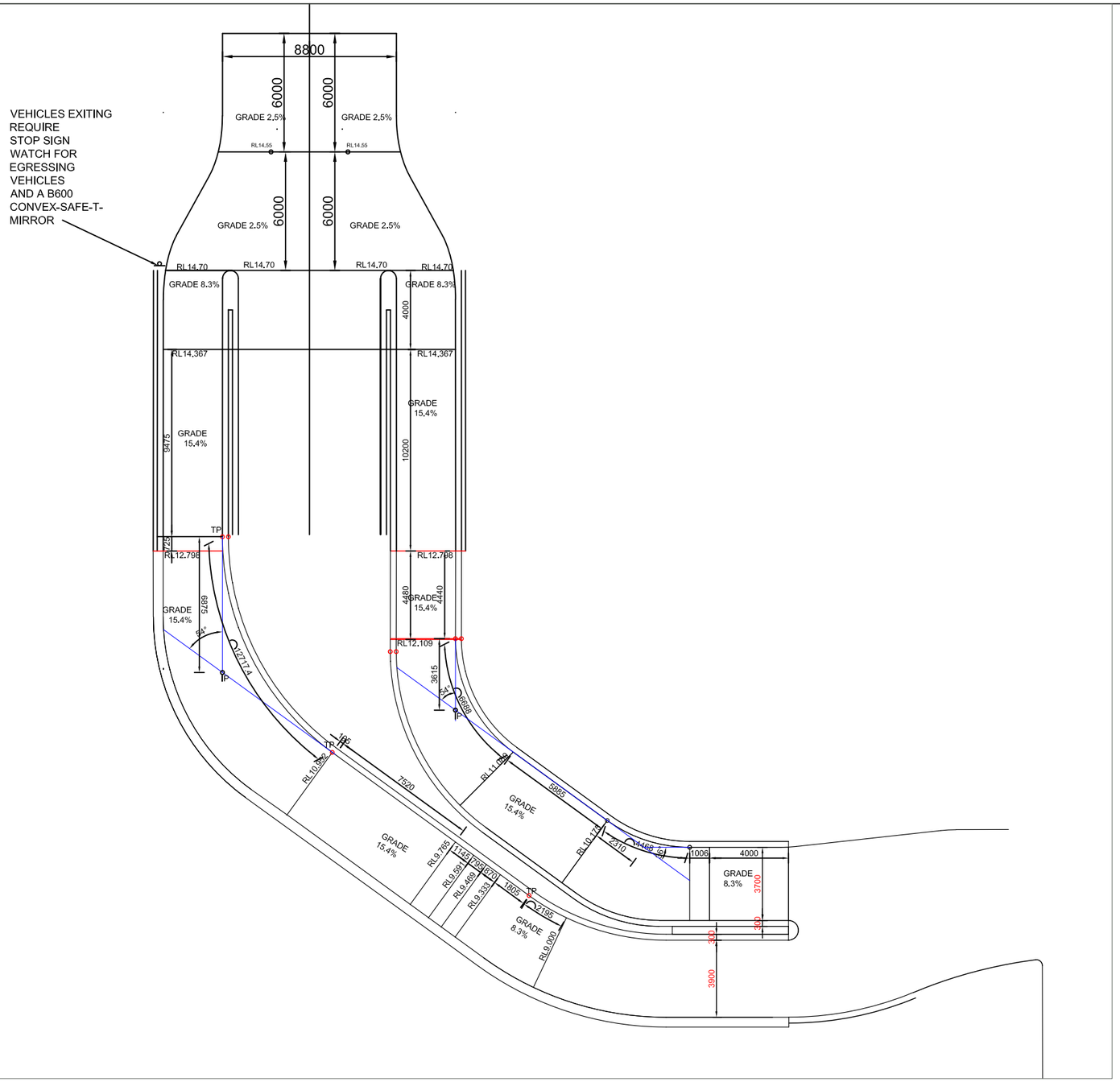
2 BACHELL AVENUE LIDCOMBE
BASEMENT B1 SWEPT PATHS-DETAIL

SCALE	PASSED	DATE FIRST ISSUED
1:250(A3)	EME	16.09.2024

DESIGN		Sheet No.	Drawing No.
DRAWN	EM	6 of 10	1194-1-22
CHECK	CHK		



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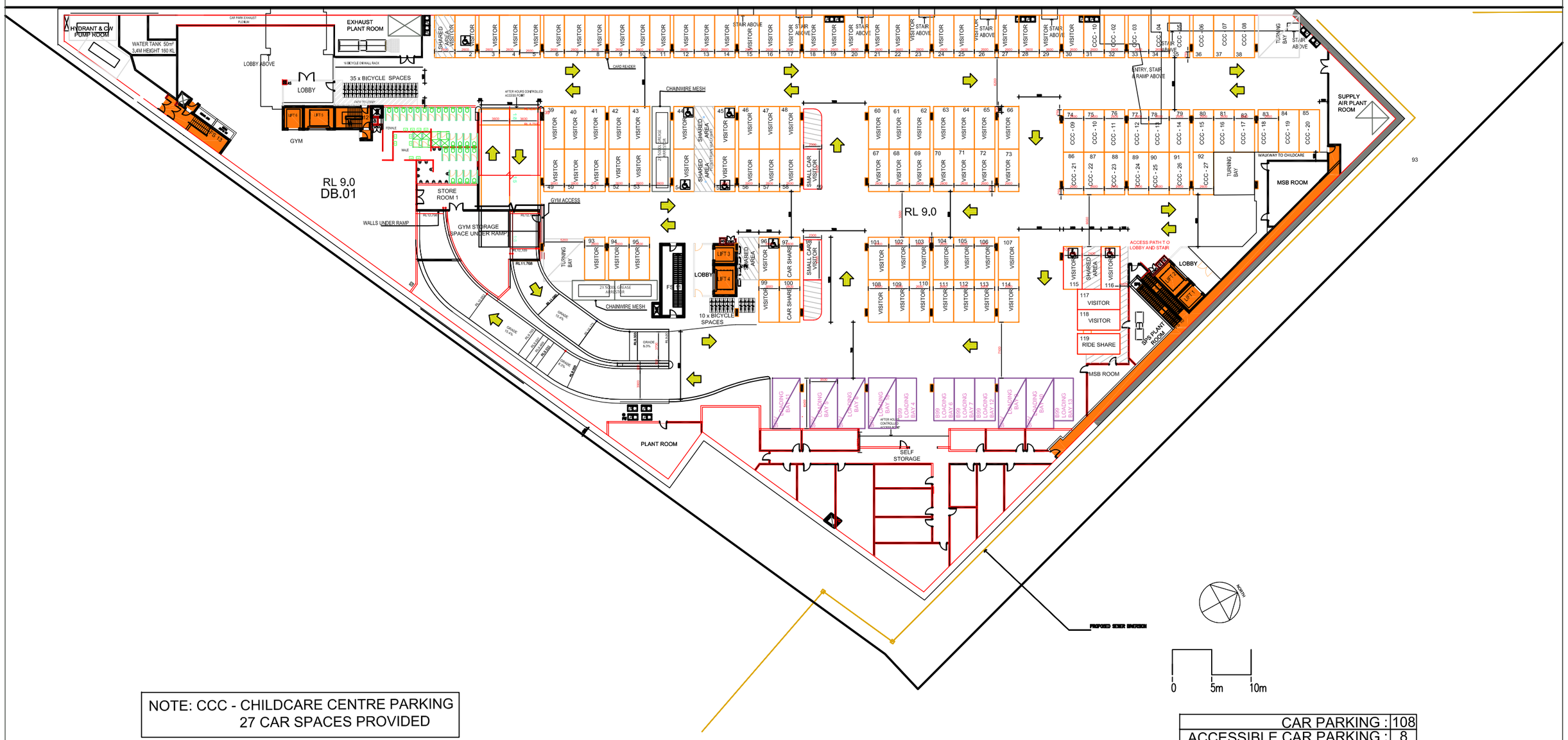
2 BACHELL AVENUE LIDCOMBE

LOWER GROUND- GEOMETRIC RAMP LAYOUT

SCALE	PASSED	DATE FIRST ISSUED
1:500(A3)	EME	26.09.2024

DESIGN		Sheet No.	Drawing No.
DRAWN	EM	7A of	1194-1-22
CHECK	CHK		



NOTE: CCC - CHILDCARE CENTRE PARKING
27 CAR SPACES PROVIDED

CAR PARKING :	108
ACCESSIBLE CAR PARKING :	8
SRV LOADING BAYS :	6
B99 LOADING BAYS :	5
RIDE SHARE SPACE :	1
CAR SHARE SPACES :	2
BICYCLE SPACES :	45

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No.	Date	Issue Notes

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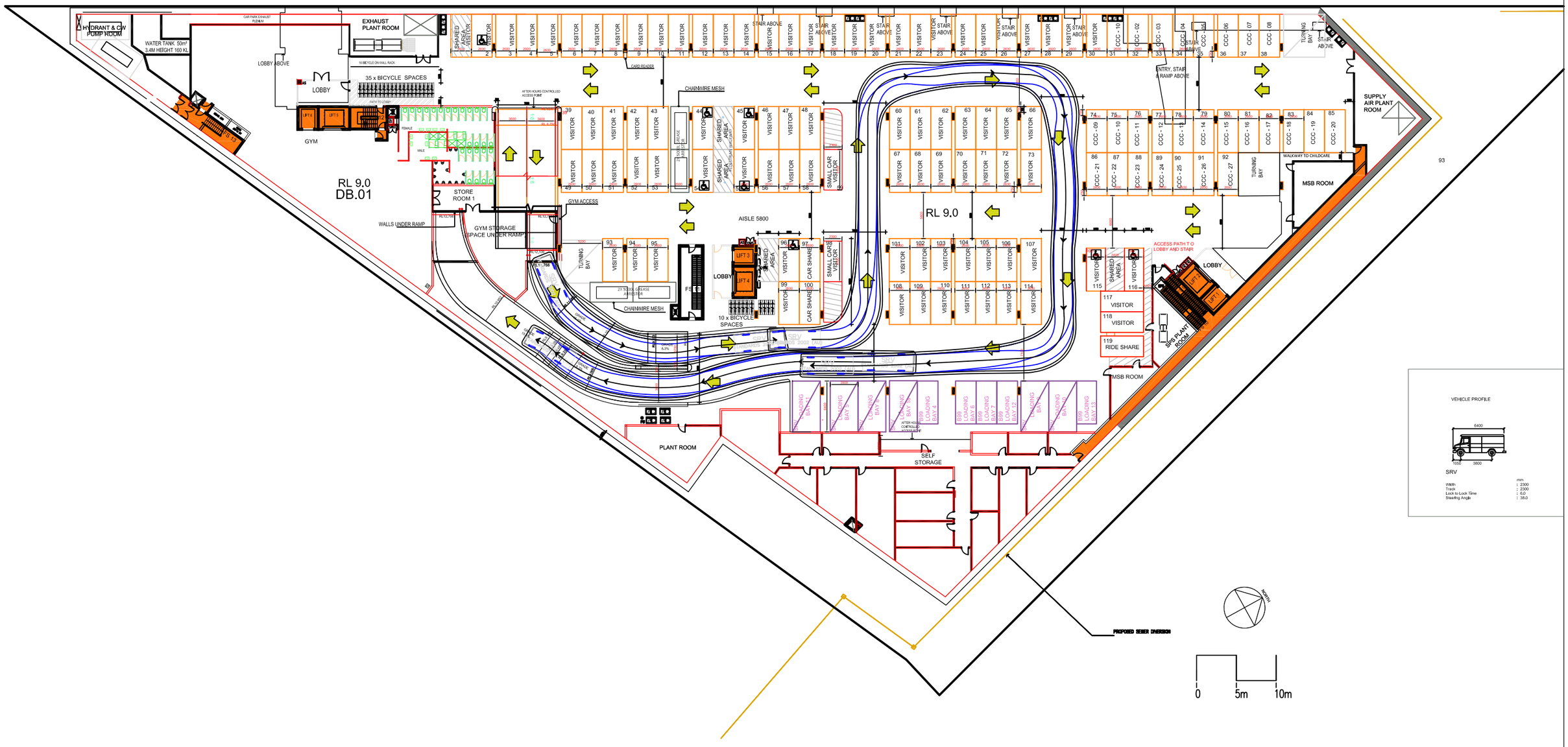
2 BACHELL AVENUE LIDCOMBE
LOWER GROUND GENERAL LAYOUT

SCALE	PASSED	DATE FIRST ISSUED
1:500(A3)	EME	26.09.2024

DESIGN		Sheet No. 7 of	Drawing No. 1194-1-22
DRAWN	EM		
CHECK	CHK		



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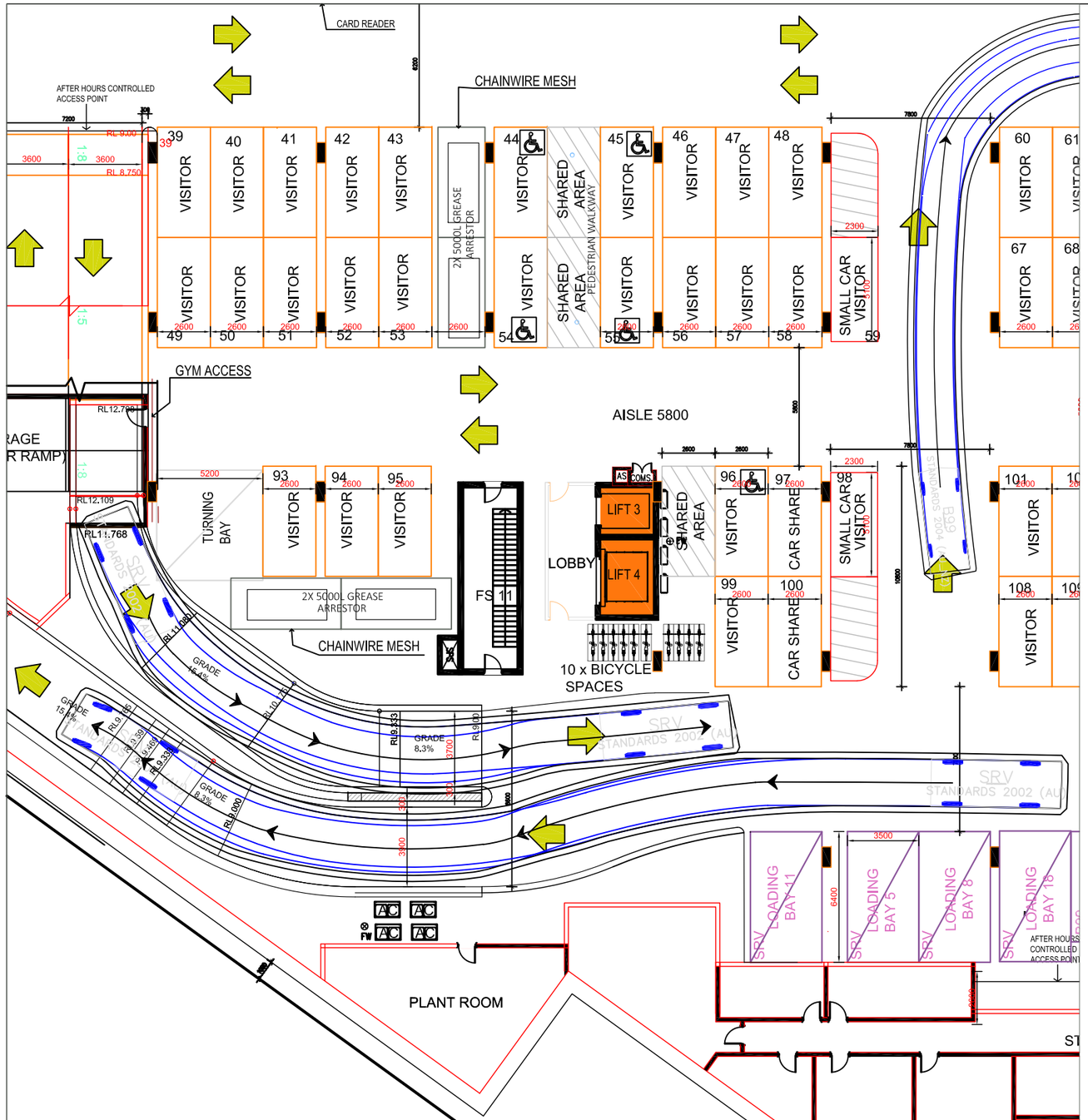
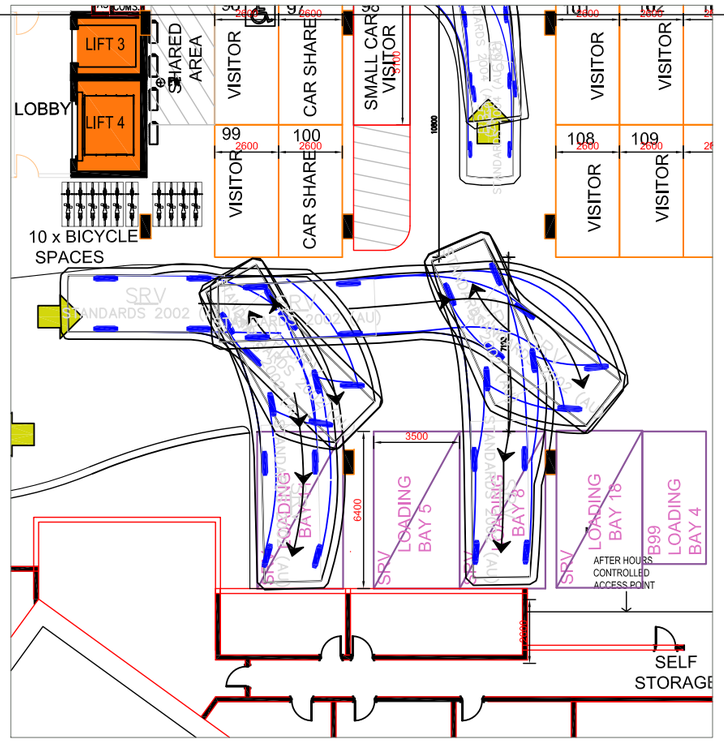
2 BACHELL AVENUE LIDCOMBE
LOWER GROUND PLAN AND SWEPT PATHS FOR SRV VEHICLES

SCALE	PASSED	DATE FIRST ISSUED
1:500(A3)	EME	26.09.2024

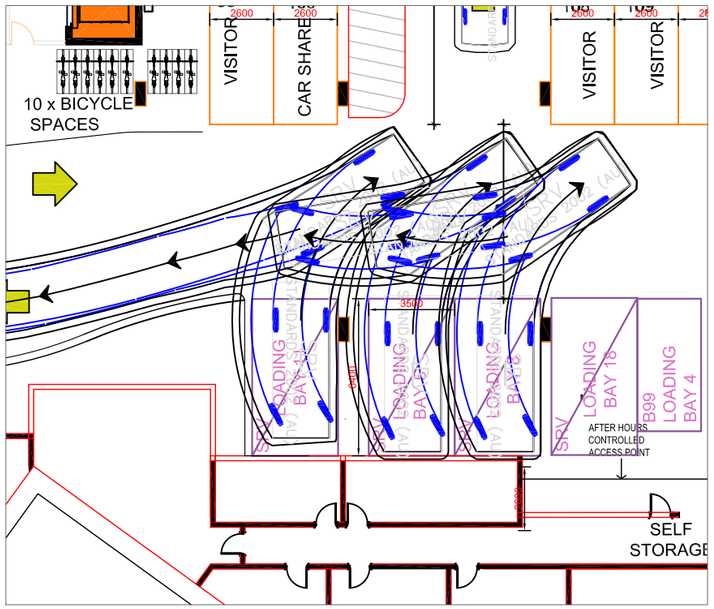
DESIGN		Sheet No. 8 of	Drawing No. 1194-1-22
DRAWN	EM		
CHECK	CHK		



SRV VEHICLE ENTERING AND EXITING RAMP

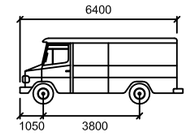


SRV VEHICLE ENTERING LOADING BAYS



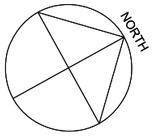
SRV VEHICLE EXITING LOADING BAYS

VEHICLE PROFILE



SRV

	mm
Width	: 2300
Track	: 2300
Lock to Lock Time	: 6.0
Steering Angle	: 38.0



0 5m 10m

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No.	Date	Issue Notes

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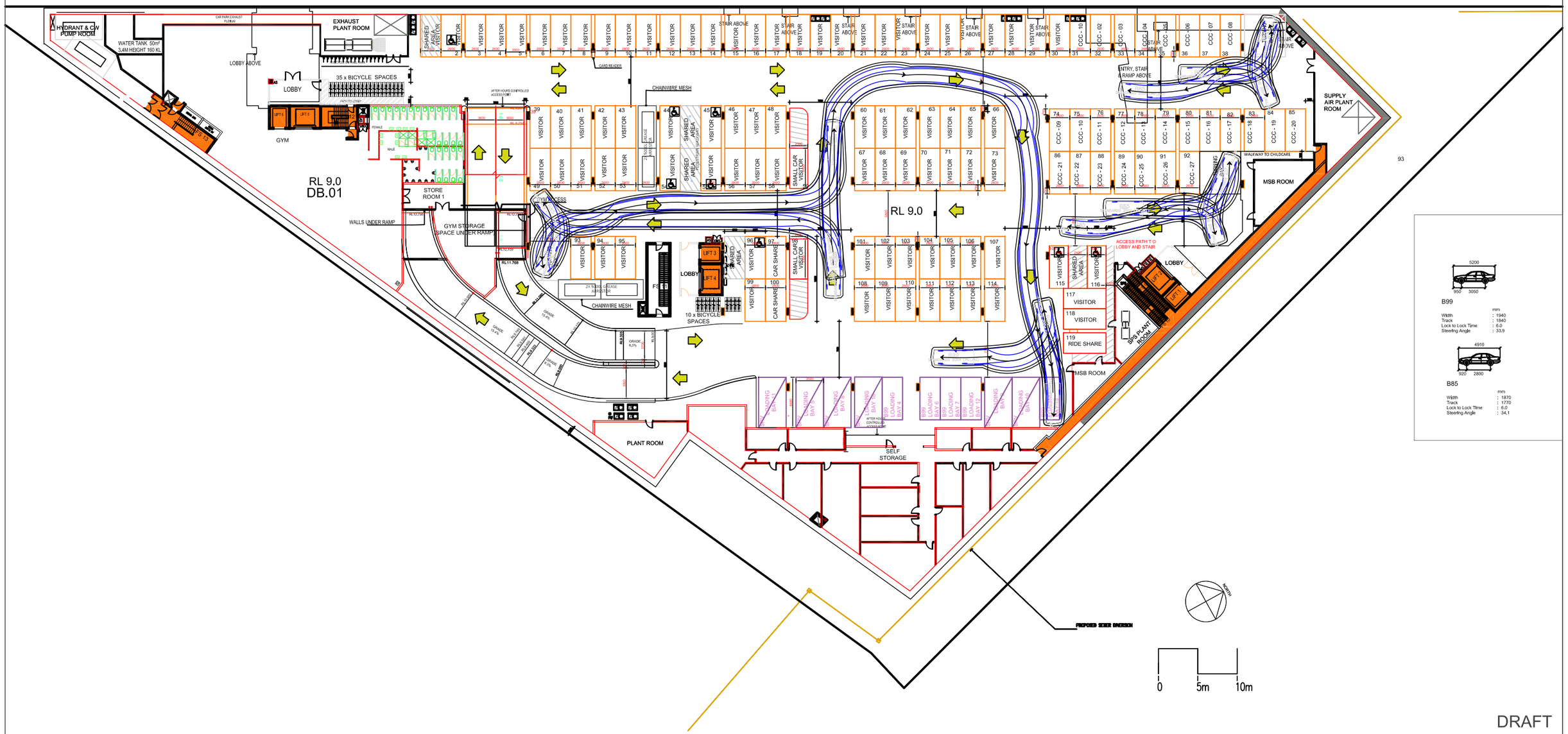
2 BACHELL AVENUE LIDCOMBE

LOWER GROUND PLAN-SWEPT PATH ANALYSIS SHOWING SRV VEHICLES

SCALE	PASSED	DATE FIRST ISSUED
1:250(A3)	EME	26.09.2024

DESIGN		Sheet No.	Drawing No.
DRAWN	EM	9 of	1194-1-22
CHECK	CHK		



B99

	mm
Width	: 1940
Track	: 1840
Lock to Lock Time	: 6.0
Steering Angle	: 33.9

B85

	mm
Width	: 1870
Track	: 1770
Lock to Lock Time	: 6.0
Steering Angle	: 34.1

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No.	Date	Issue Notes

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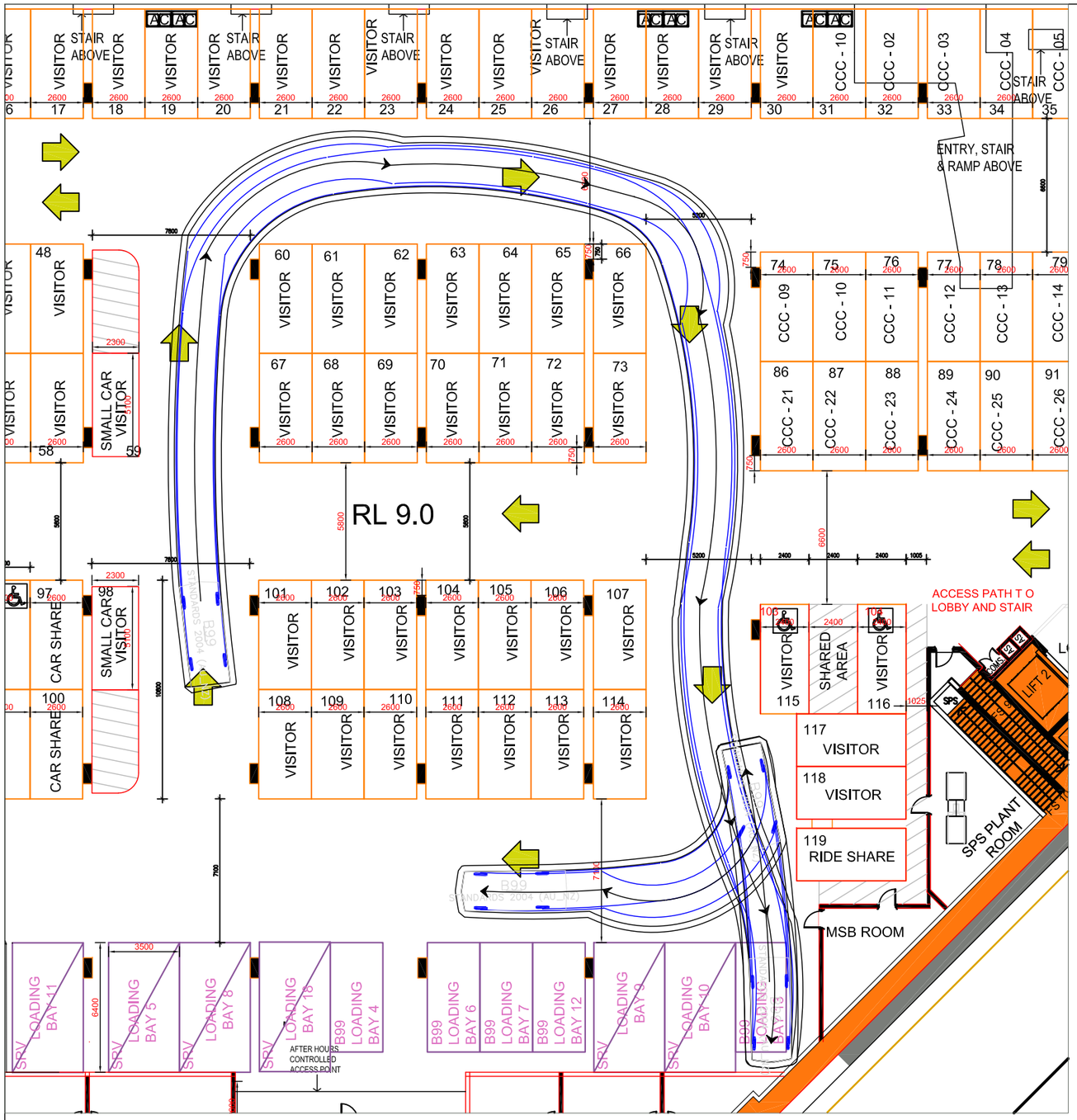
2 BACHELL AVENUE LIDCOMBE

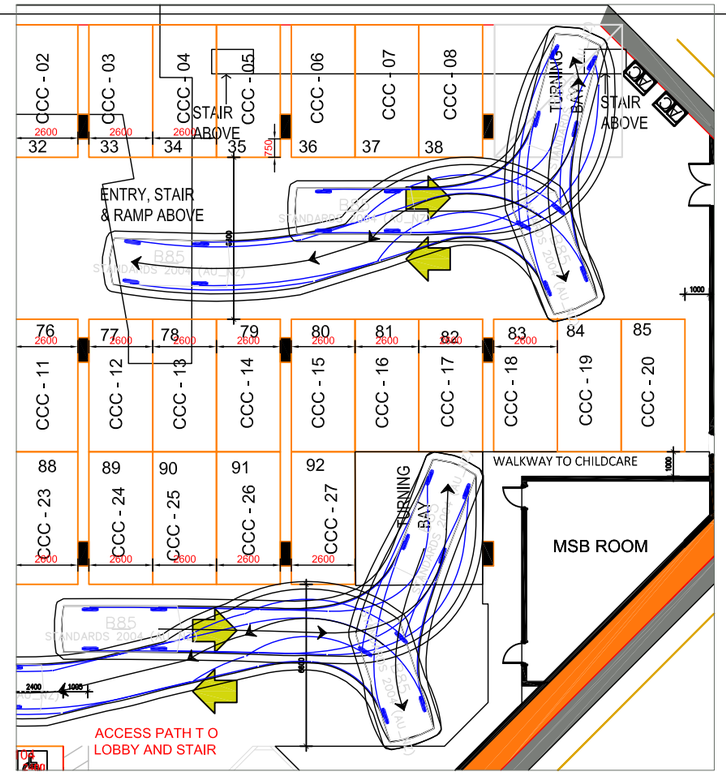
LOWER GROUND PLAN AND SWEPT PATHS FOR B85 AND B99 VEHICLES

SCALE	PASSED	DATE FIRST ISSUED
1:500(A3)	EME	16.09.2024

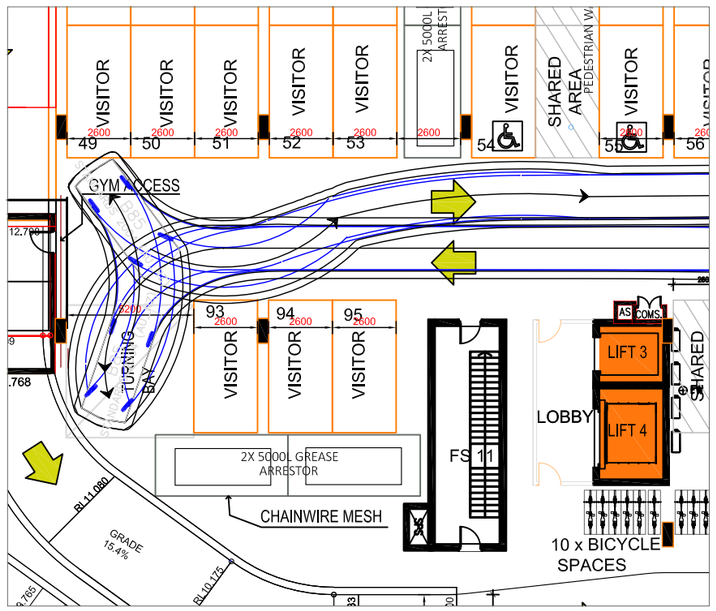
DESIGN		Sheet No. 10 of	Drawing No. 1194-1-22
DRAWN	EM		
CHECK	CHK		



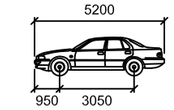
B99 CIRCULATING AND AND ENER AND EXIT B99 LOADING BAY 13



B85 TURNING IN END BAYS NORTHERN SIDE

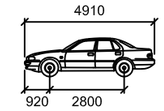


B85 TURNING IN END BAY SOUTHERN SIDE



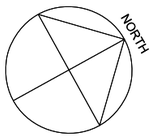
B99

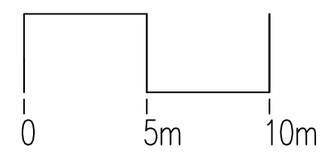
	mm
Width	: 1940
Track	: 1840
Lock to Lock Time	: 6.0
Steering Angle	: 33.9



B85

	mm
Width	: 1870
Track	: 1770
Lock to Lock Time	: 6.0
Steering Angle	: 34.1





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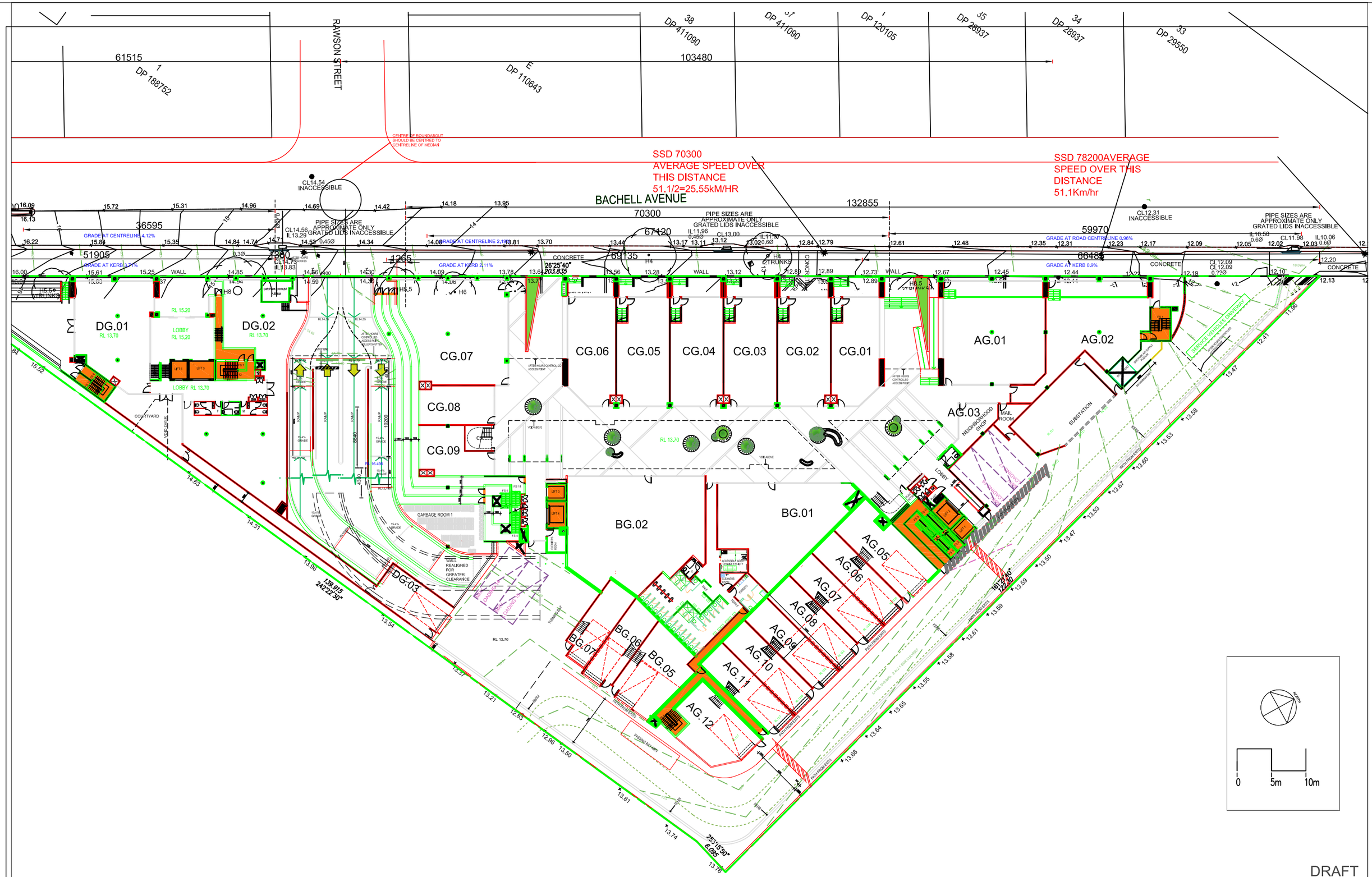
2 BACHELL AVENUE LIDCOMBE

LOWER GROUND PLAN-SWEPT PATH ANALYSIS SHOWING B99 AND B85 VEHICLES

SCALE	PASSED	DATE FIRST ISSUED
1:250(A3)	EME	16.09.2024

		Sheet No.	Drawing No.
DESIGN		11 of	1194-1-22
DRAWN	EM		
CHECK	CHK		



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2 BACHELL AVENUE LIDCOMBE
GROUND FLOOR PLAN

SCALE	PASSED	DATE FIRST ISSUED
1:500(A3)	EME	23.09.2024

DESIGN		Sheet No.	Drawing No.
DRAWN	EM	of 12	1194-1-22
CHECK	CHK		

SSD 70300
AVERAGE SPEED OVER
THIS DISTANCE
51.1/2=25.55kM/HR

SSD 78200AVERAGE
SPEED OVER THIS
DISTANCE
51.1Km/hr

BACHELL AVENUE

DG.01 DG.02 DG.03

CG.01 CG.02 CG.03 CG.04 CG.05 CG.06 CG.07 CG.08 CG.09

BG.01 BG.02 BG.03 BG.04 BG.05 BG.06 BG.07

AG.01 AG.02 AG.03 AG.04 AG.05 AG.06 AG.07 AG.08 AG.09 AG.10 AG.11 AG.12

VEHICLE PROFILE

SRV

	mm
Width	2300
Track	2300
Lock to Lock Time	6.0
Steering Angle	38.0

0 5m 10m

DRAFT

No.	Date	Issue Notes

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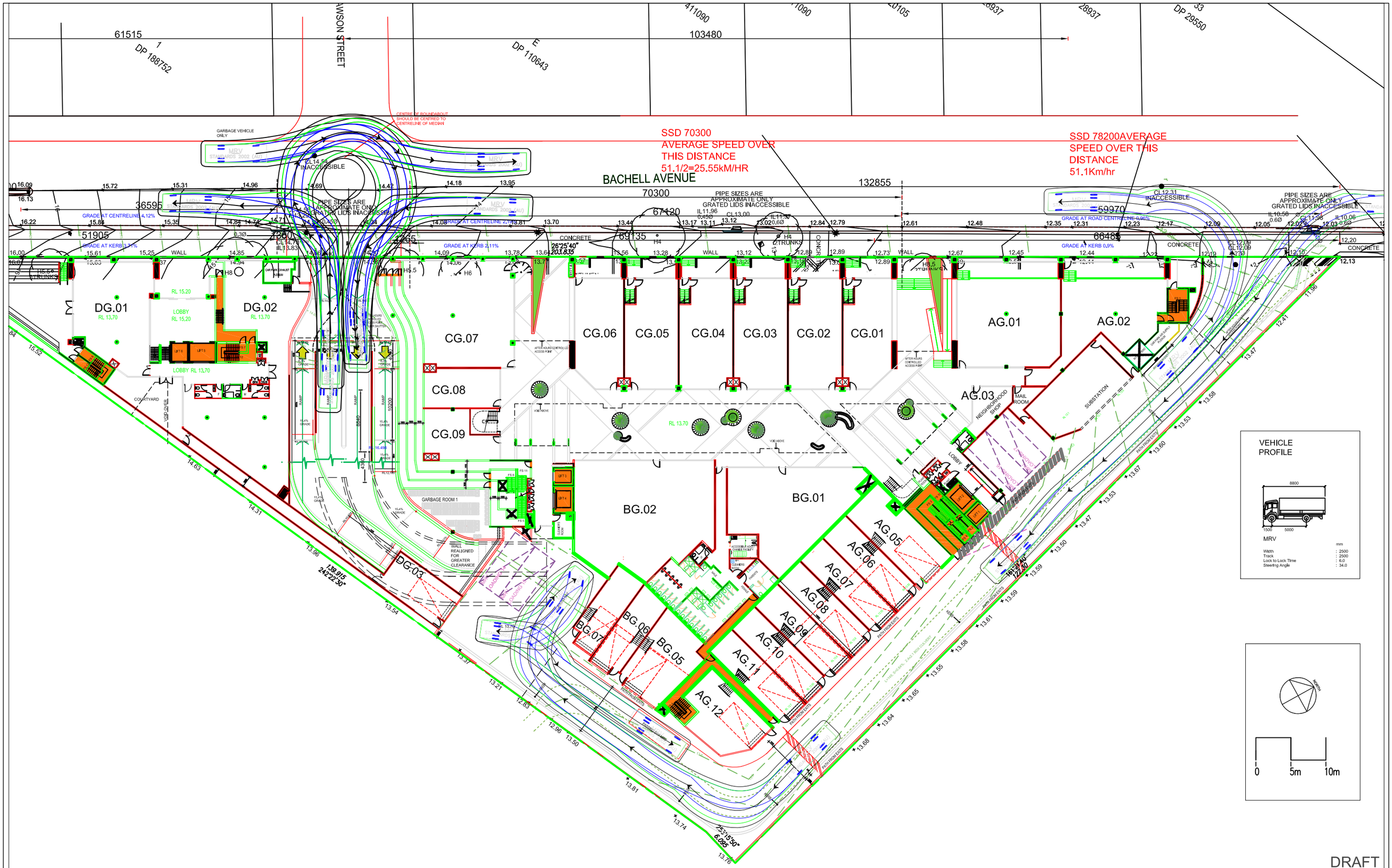
2 BACHELL AVENUE LIDCOMBE
GROUND FLOOR PLAN-SRV SWEPT PATHS

SCALE	PASSED	DATE FIRST ISSUED
1:500(A3)	EME	23.09.2024

		Sheet No.	Drawing No.
DESIGN		13 of	1194-1-22
DRAWN	EM		
CHECK	CHK		



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No.	Date	Issue Notes

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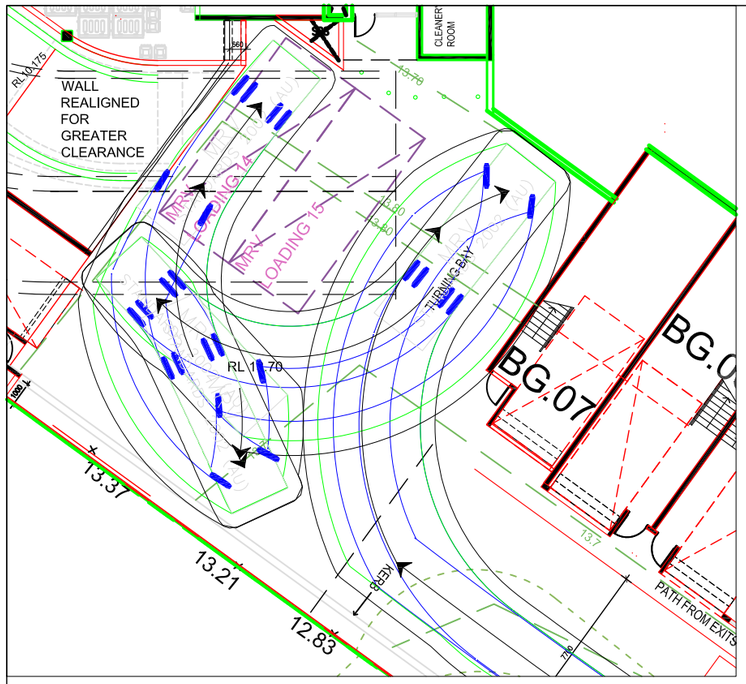
Client: RAAD ACQUISITION No 10 PTY LTD

2 BACHELL AVENUE LIDCOMBE

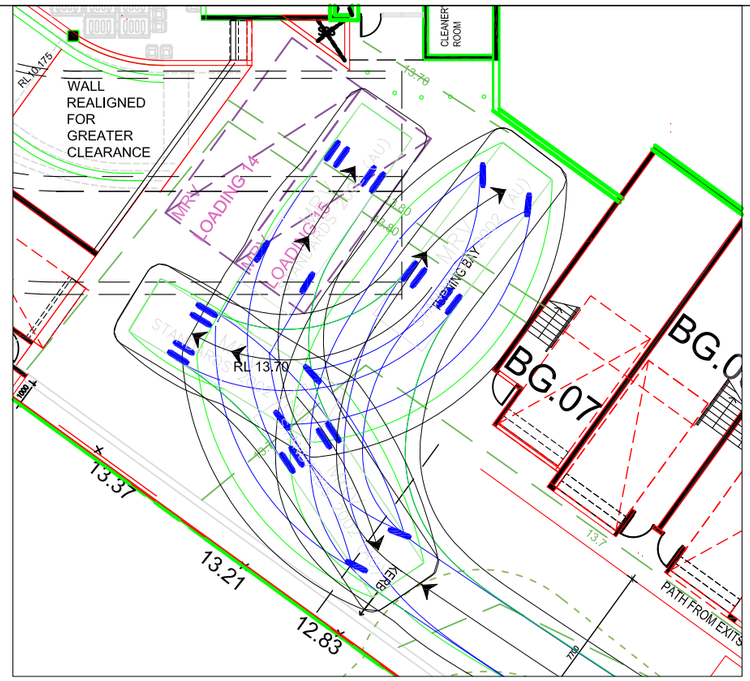
GROUND FLOOR PLAN-MRV SWEPT PATHS

SCALE	PASSED	DATE FIRST ISSUED
1:500(A3)	EME	23.09.2024

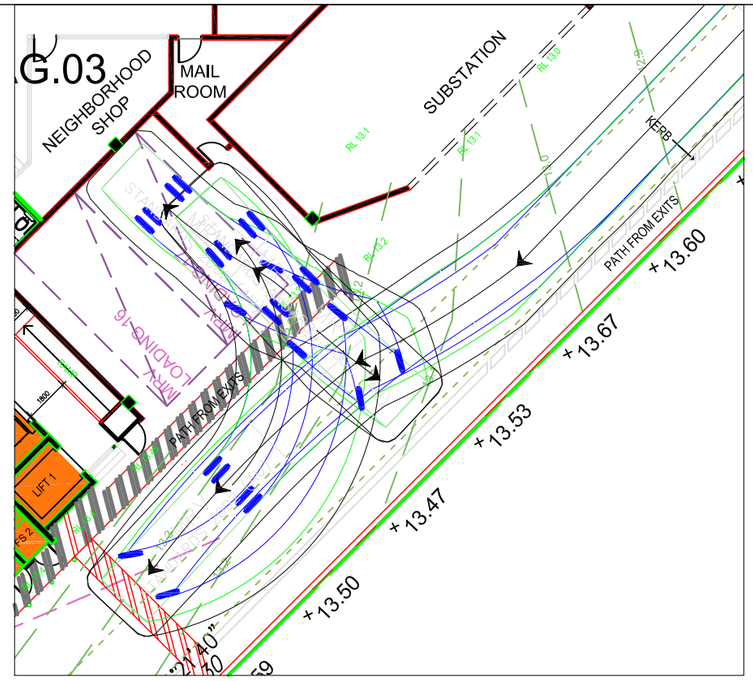
DESIGN		Sheet No.	Drawing No.
DRAWN	EM	14 of	1194-1-22
CHECK	CHK		



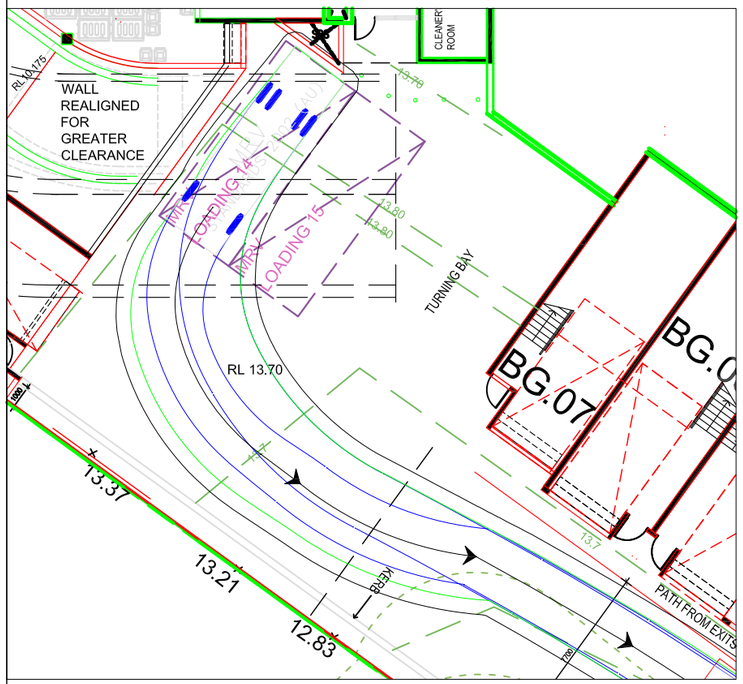
MRV SWEPT PATH
ENTERING SPACE 14



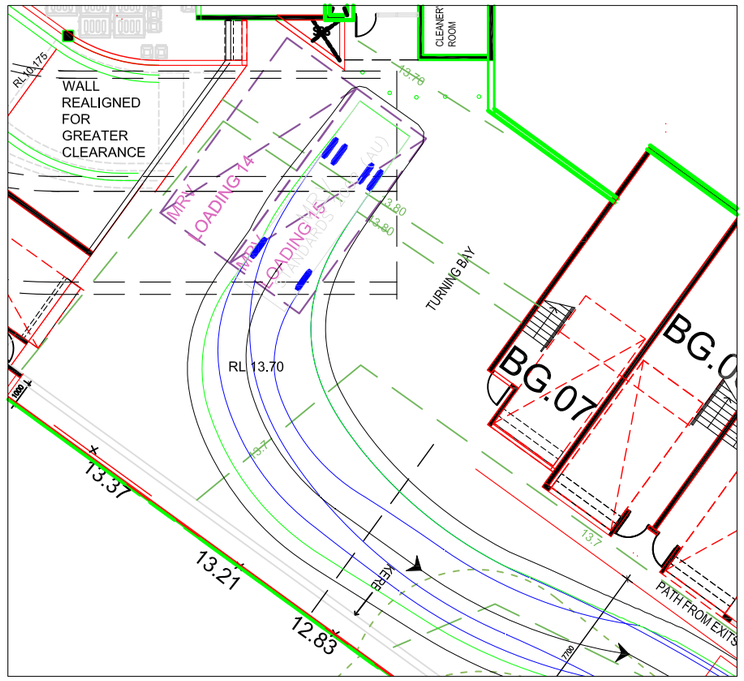
MRV SWEPT PATH
ENTERING SPACE 15



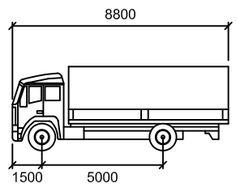
MRV SWEPT PATH
ENTERING SPACE 17



MRV SWEPT PATH EXITING
SPACE 14

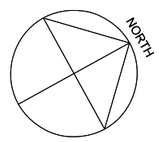


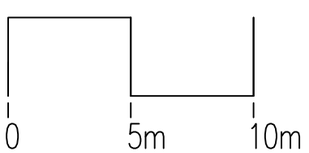
MRV SWEPT PATH EXITING
SPACE 15



MRV

	mm
Width	: 2500
Track	: 2500
Lock to Lock Time	: 6.0
Steering Angle	: 34.0





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No.	Date	Issue Notes

SURVEY BY: STRATASURV SURVEYORS
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DATUM: A.H.D

LYLE MARSHALL & PARTNERS PTY. LTD.
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The Association of Consulting Engineers Australia

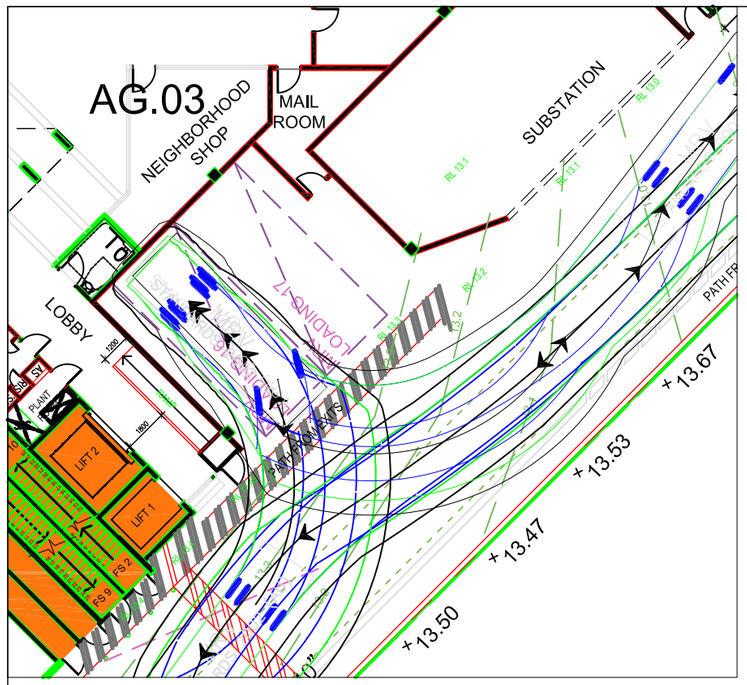
Client:
RAAD ACQUISITION No 10 PTY LTD

2 BACHELL AVENUE LIDCOMBE

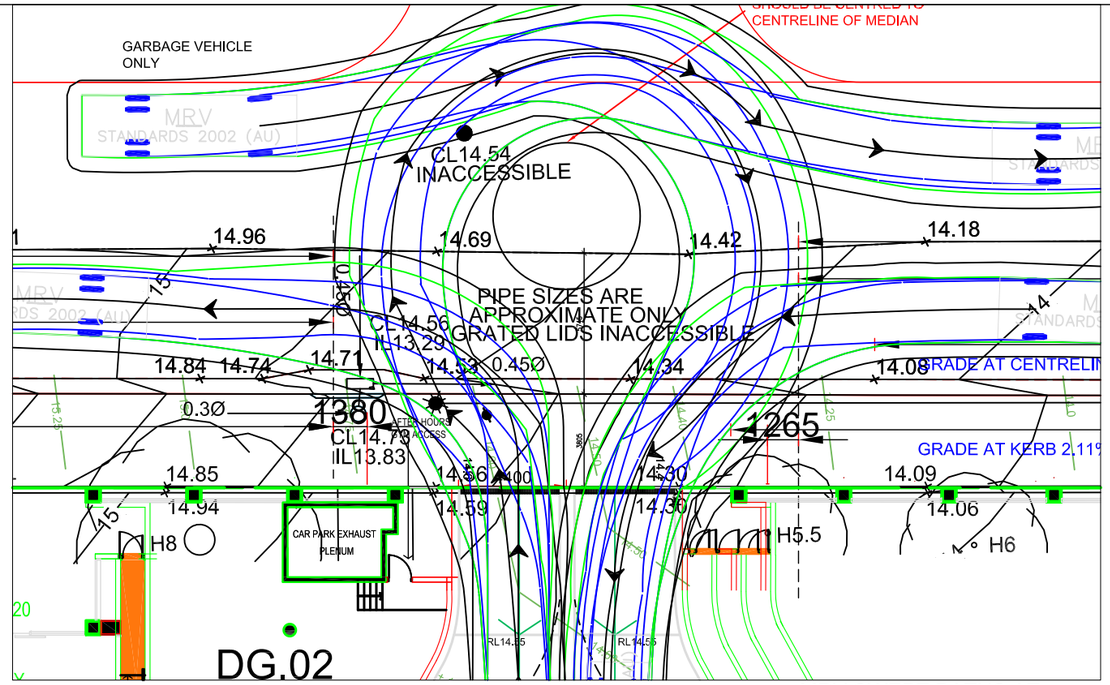
GROUND FLOOR PLAN-MRV SWEPT PATHS LOADING SPACES

SCALE	PASSED	DATE FIRST ISSUED
1:500(A3)	EME	23.09.2024

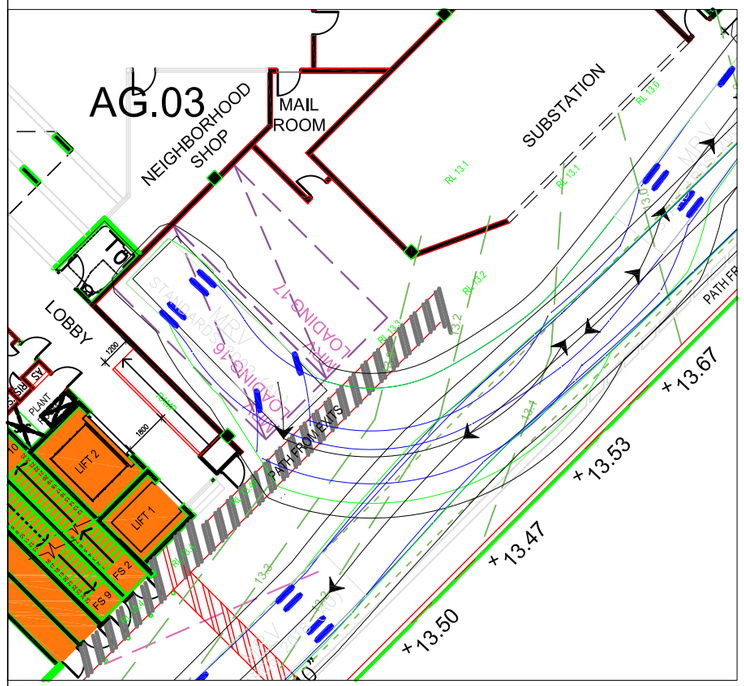
DESIGN		Sheet No.	Drawing No.
DRAWN	EM	15 of	1194-1-22
CHECK	CHK		



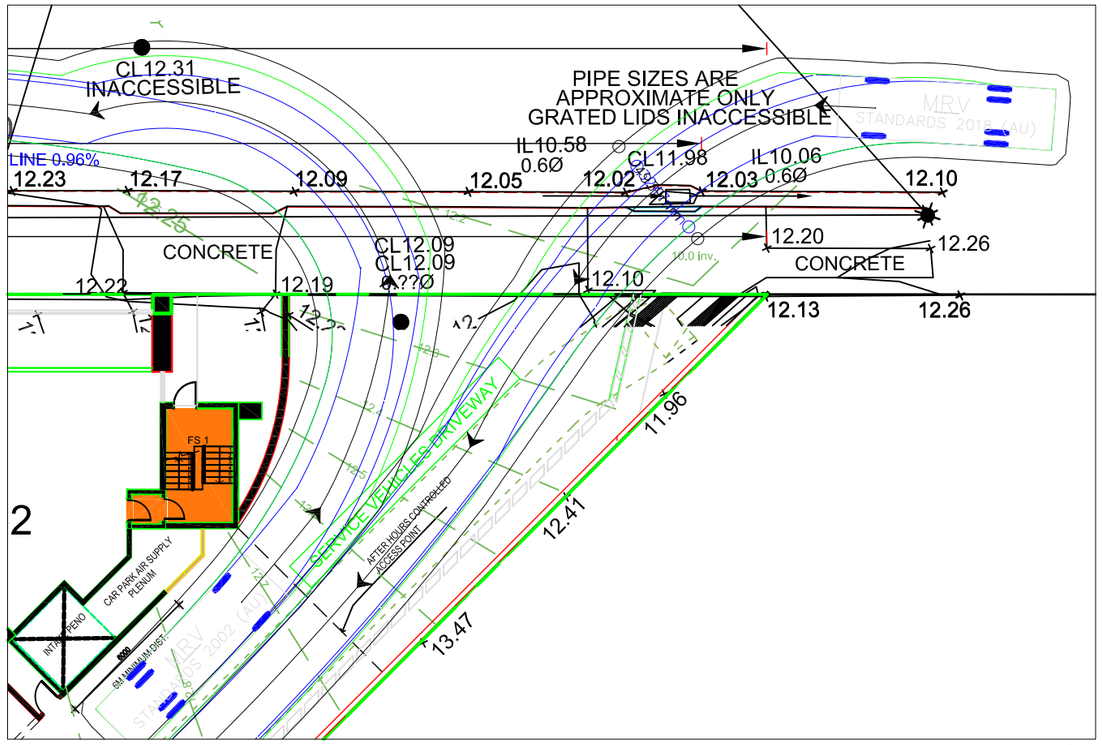
MRV SWEPT PATH
ENTERING SPACE 16



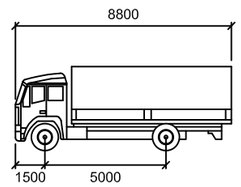
MRV SWEPT PATHS AT
ROUNDABOUT



MRV SWEPT PATH EXITING
SPACE 16

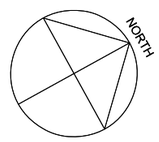


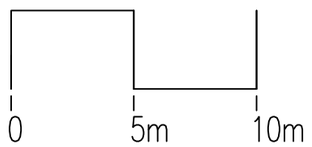
MRV SWEPT PATH EXITING
AND EXITING DRIVEWAY



MRV

	mm
Width	: 2500
Track	: 2500
Lock to Lock Time	: 6.0
Steering Angle	: 34.0





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No.	Date	Issue Notes

SURVEY BY: STRATASURV SURVEYORS
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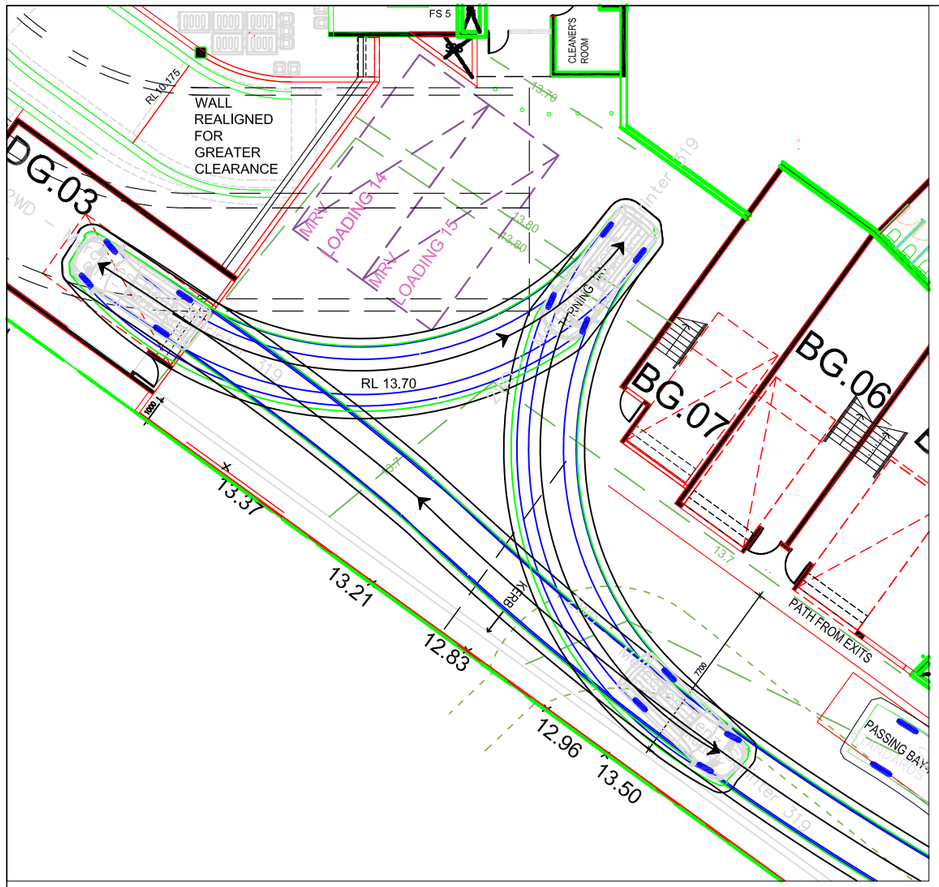
Client:
RAAD ACQUISITION No 10 PTY LTD

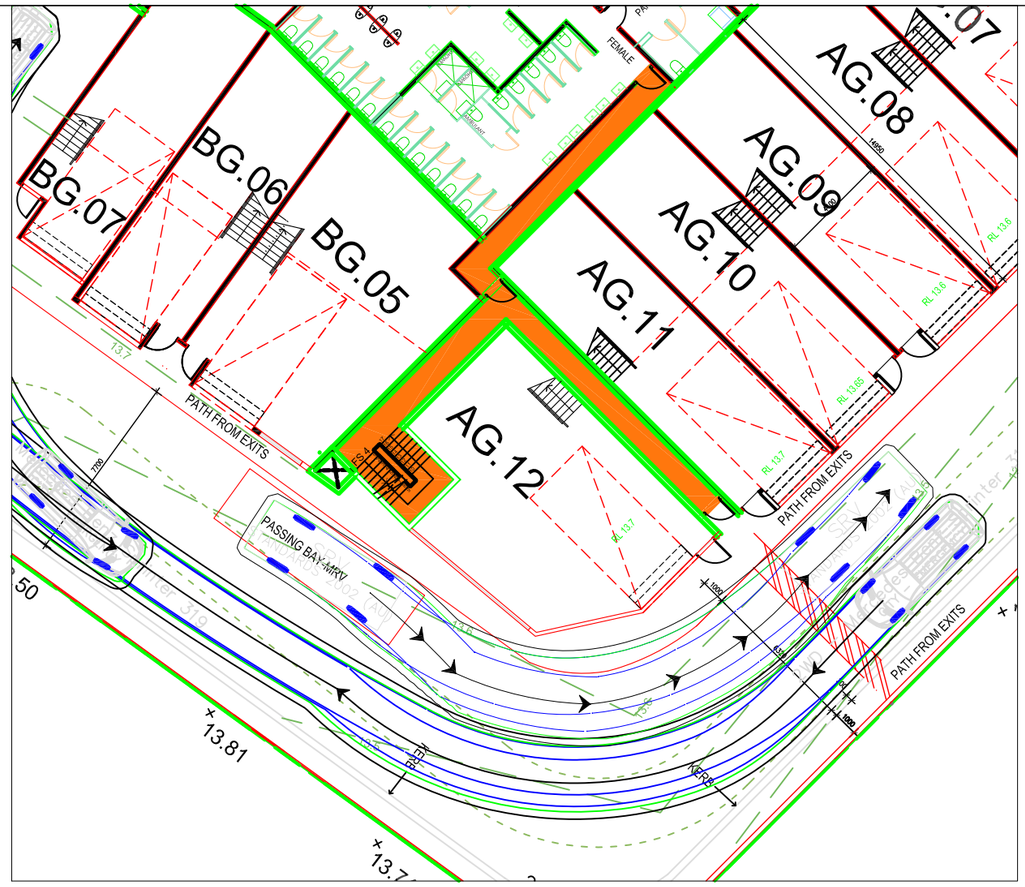
2 BACHELL AVENUE LIDCOMBE
GROUND FLOOR PLAN-MRV SWEPT PATHS

SCALE	PASSED	DATE FIRST ISSUED
1:500(A3)	EME	23.09.2024

DESIGN		Sheet No.	Drawing No.
DRAWN	EM	16 of	1194-1-22
CHECK	CHK		

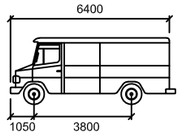


AMBULANCE BAY SWEPT PATH



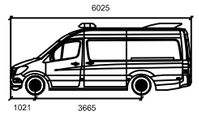
AMBULANCE VEHICLE AND SRV VEHICLE PASSING

VEHICLE PROFILE



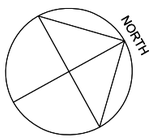
SRV

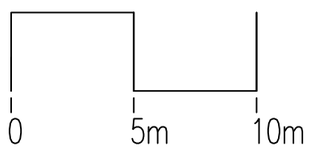
	mm
Width	: 2300
Track	: 2300
Lock to Lock Time	: 6.0
Steering Angle	: 38.0



2WD - Mercedes Benz Sprinter 319

	mm
Width	: 2020
Track	: 1951
Lock to Lock Time	: 6.0
Steering Angle	: 15.0





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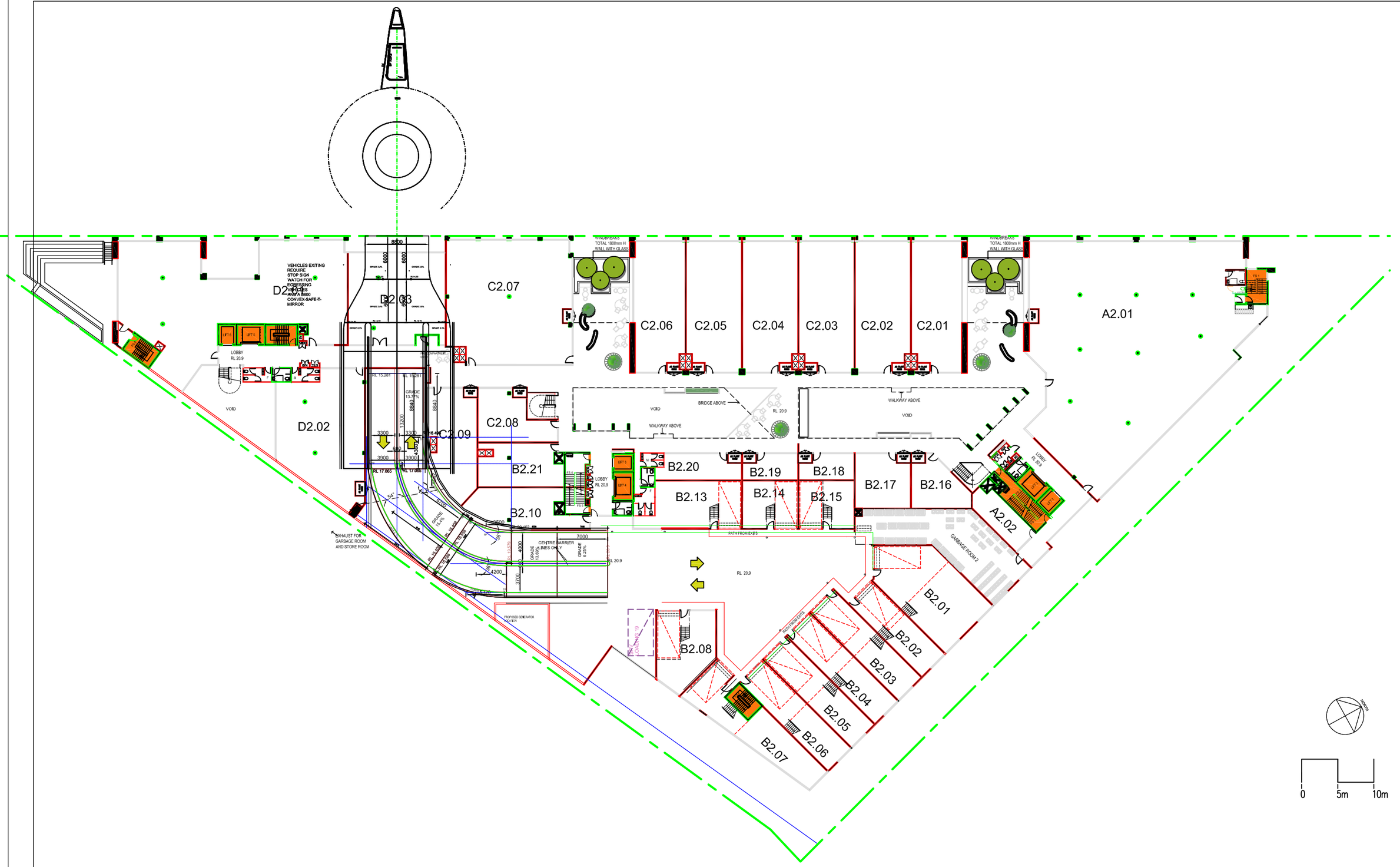
Client: **RAAD ACQUISITION No 10 PTY LTD**

2 BACHELL AVENUE LIDCOMBE

GROUND FLOOR PLAN-AMBULANCE BAY & SRV SWEPT PATHS

SCALE	PASSED	DATE FIRST ISSUED
1:500(A3)	EME	23.09.2024

DESIGN		Sheet No.	Drawing No.
DRAWN	EM	17 of	1194-1-22
CHECK	CHK		



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No.	Date	Issue Notes

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LAND, ENGINEERING & CONSTRUCTION SURVEYORS
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EMAIL: surveyors@stratasurv.com.au

DATUM: A.H.D

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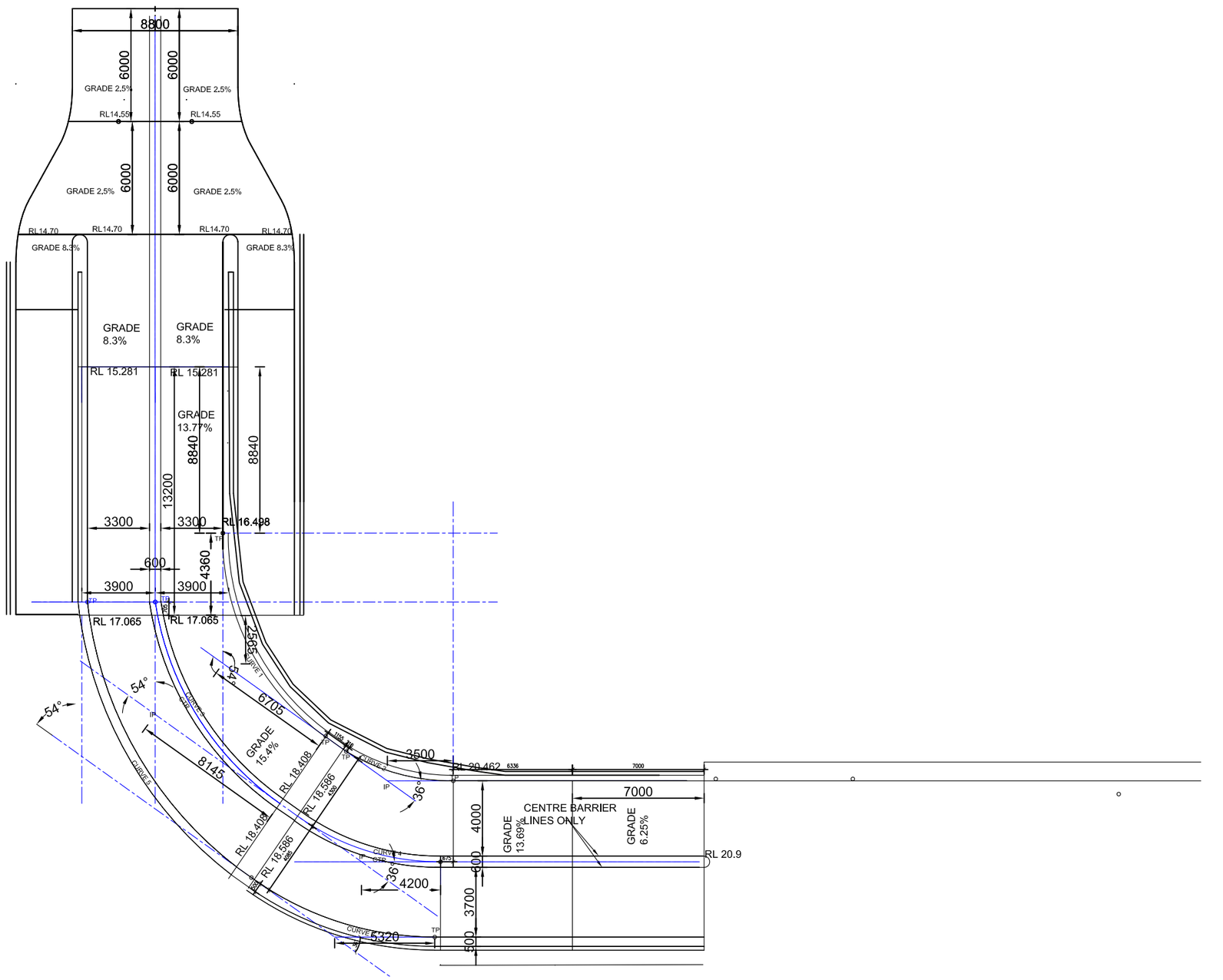
RAAD ACQUISITION No 10 PTY LTD

2 BACHELL AVENUE LIDCOMBE
LEVEL 2 MRV PATHS GARBAGE VEHICLE SWEPT PATH

SCALE	PASSED	DATE FIRST ISSUED
1:500(A3)	EME	25.09.2024

		Sheet No.	Drawing No.
DESIGN		of 18	1194-1-22
DRAWN	EM		
CHECK	CHK		



REFER TO DRAWING NO 1194-22-SHEET 23 FOR LONGITUDINAL SECTION THROUGH INSIDE EDGE OF RAMP

DRAFT

No.	Date	Issue Notes

SURVEY BY: STRATA SURV SURVEYORS
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DATUM: A.H.D

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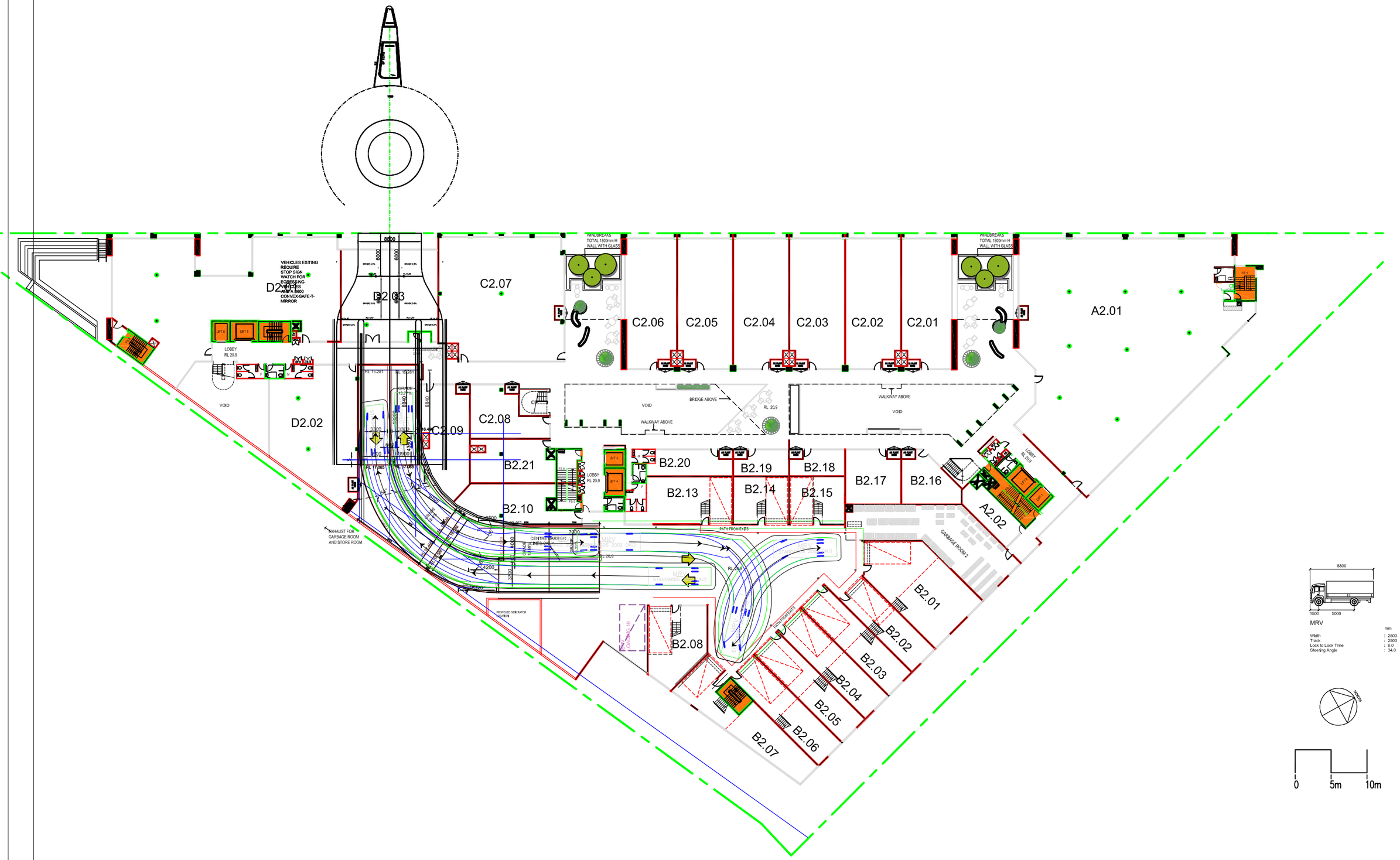
Client: **RAAD ACQUISITION No 10 PTY LTD**

2 BACHELL AVENUE LIDCOMBE
LEVEL 2 GENERAL RAMP LAYOUT

SCALE	PASSED	DATE FIRST ISSUED
1:250(A3)	EME	26.09.2024

DESIGN		Sheet No.	Drawing No.
DRAWN	EM	19 of	1194-1-22
CHECK	CHK		



DRAFT

No.	Date	Issue Notes

SURVEY BY: STRATASURV SURVEYORS
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DATUM: A.H.D

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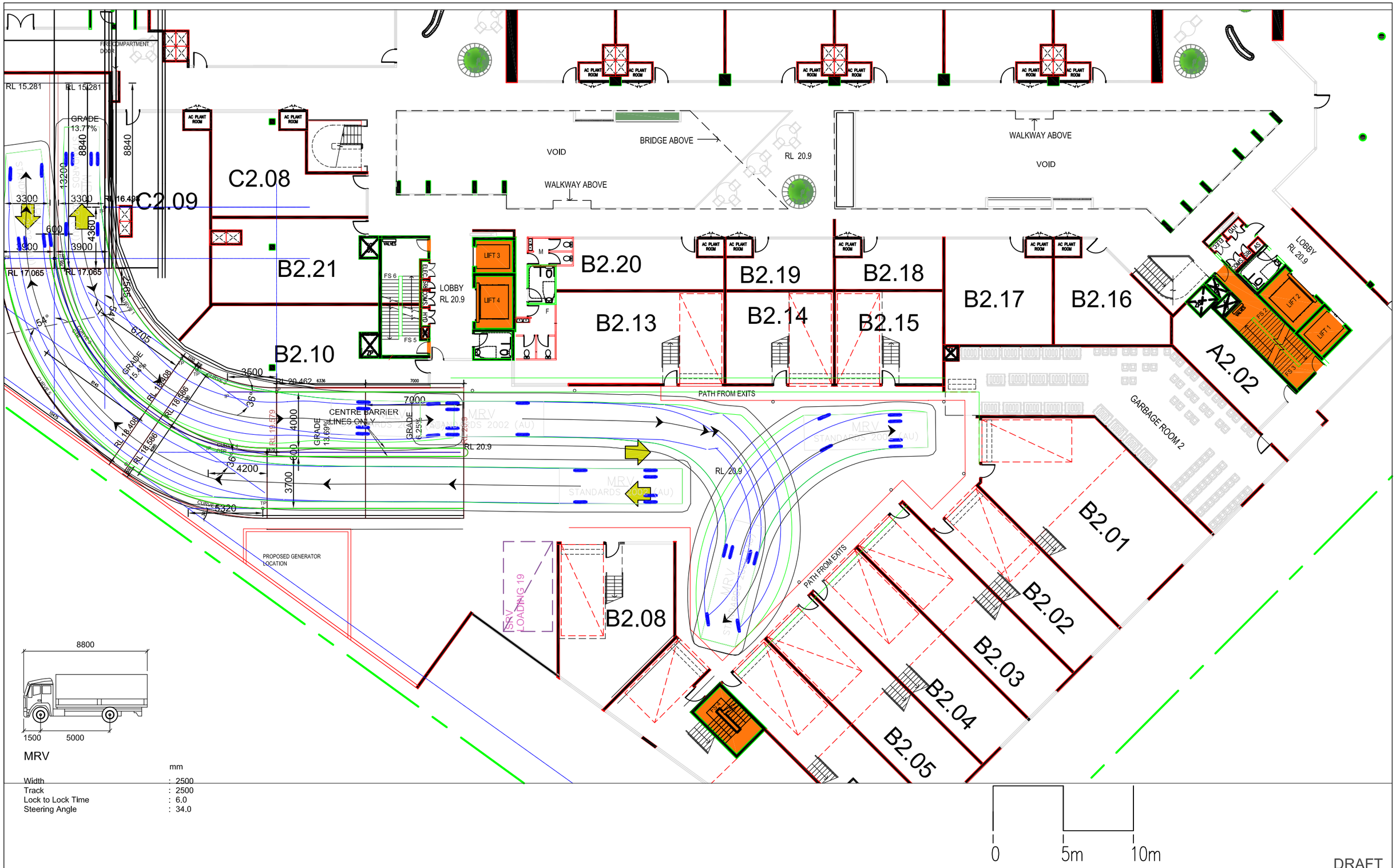
Client:
RAAD ACQUISITION No 10 PTY LTD

2 BACHELL AVENUE LIDCOMBE
LEVEL 2 MRV PATHS GARBAGE VEHICLE SWEPT PATH

SCALE	PASSED	DATE FIRST ISSUED
1:500(A3)	EME	25.09.2024

DESIGN		Sheet No.	Drawing No.
DRAWN	EM	20 of	1194-1-22
CHECK	CHK		



MRV

	mm
Width	: 2500
Track	: 2500
Lock to Lock Time	: 6.0
Steering Angle	: 34.0

DRAFT

No.	Date	Issue Notes

SURVEY BY: STRATASURV SURVEORS
LAND, ENGINEERING & CONSTRUCTION SURVEYORS
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DATUM: A.H.D

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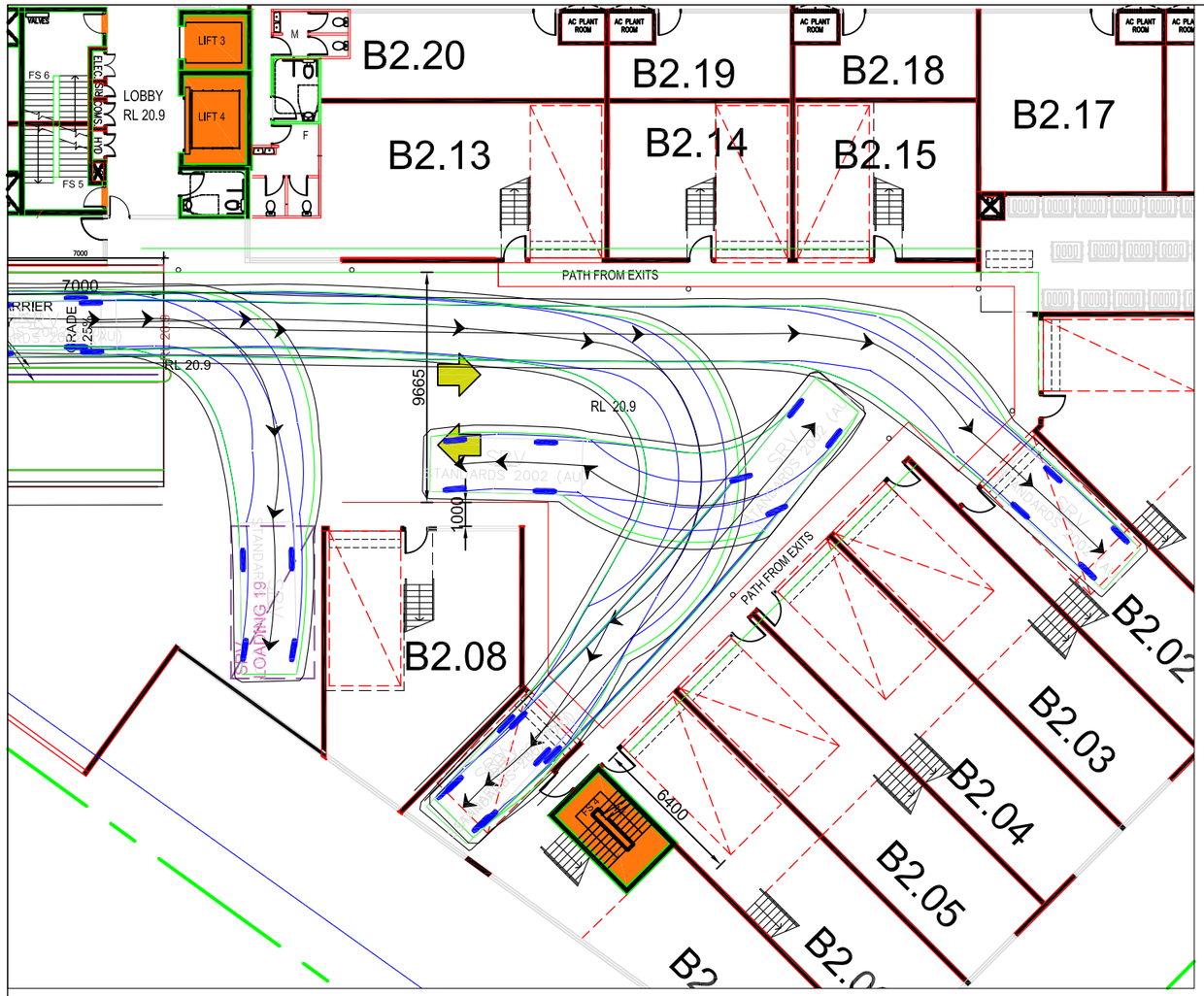
Client:
RAAD ACQUISITION No 10 PTY LTD

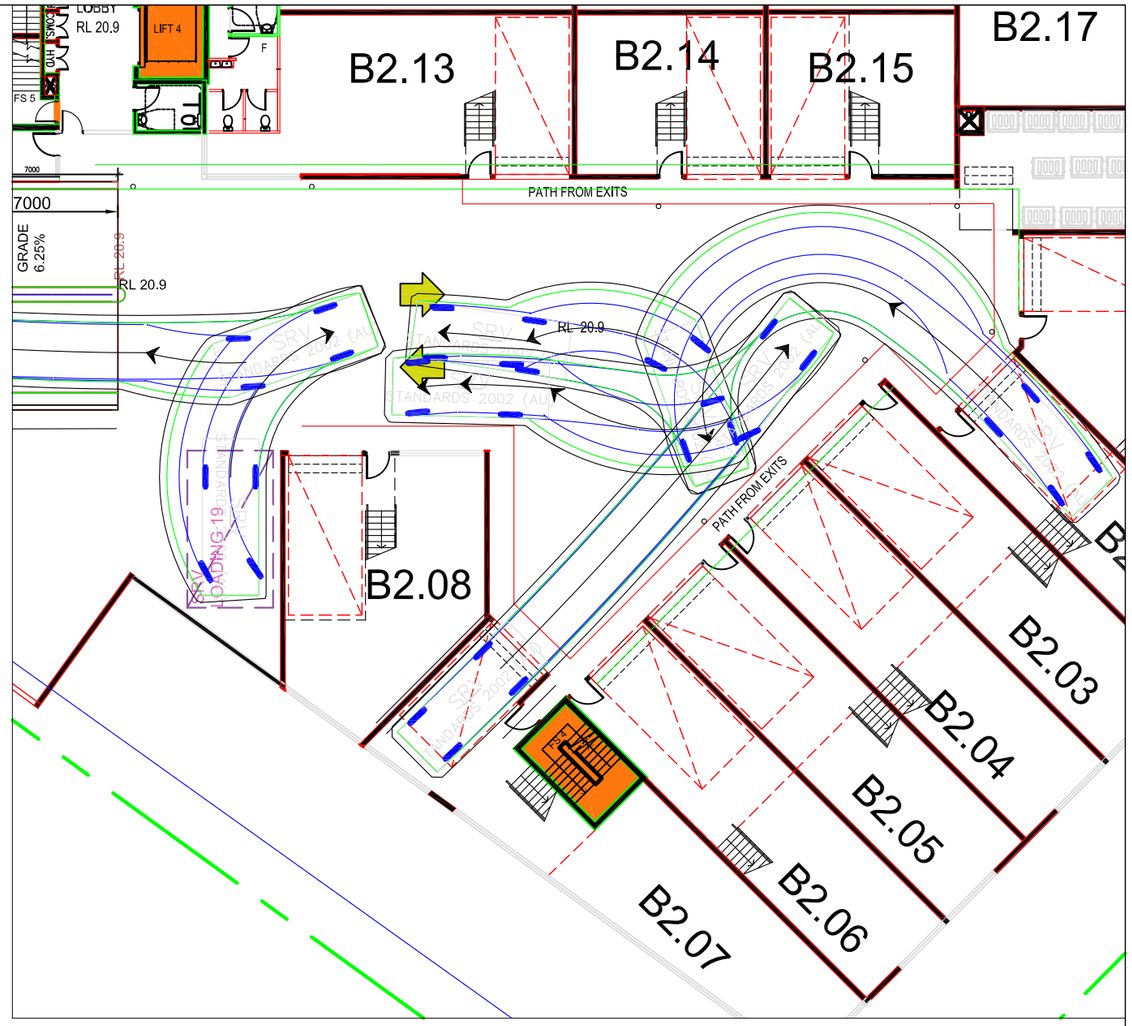
2 BACHELL AVENUE LIDCOMBE
LEVEL 2 MRV-GARBAGE VEHICLE ACCESS SWEPT PATHS

SCALE	PASSED	DATE FIRST ISSUED
1:250(A3)	EME	16.09.2024

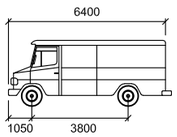
DESIGN		Sheet No.	Drawing No.
DRAWN	EM	21 of 10	1194-1-22
CHECK	CHK		



SRV SWEPT PATHS
ENTERING INTO
LOADING SPACE 19,
B2.02 AND B2.07

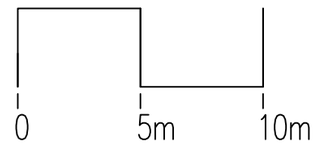


SRV SWEPT PATHS
EXITING FROM
LOADING SPACE 19,
B2.02 AND B2.07



SRV

	mm
Width	: 2300
Track	: 2300
Lock to Lock Time	: 6.0
Steering Angle	: 38.0



DRAFT

No.	Date	Issue Notes

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DATUM: A.H.D

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Client:
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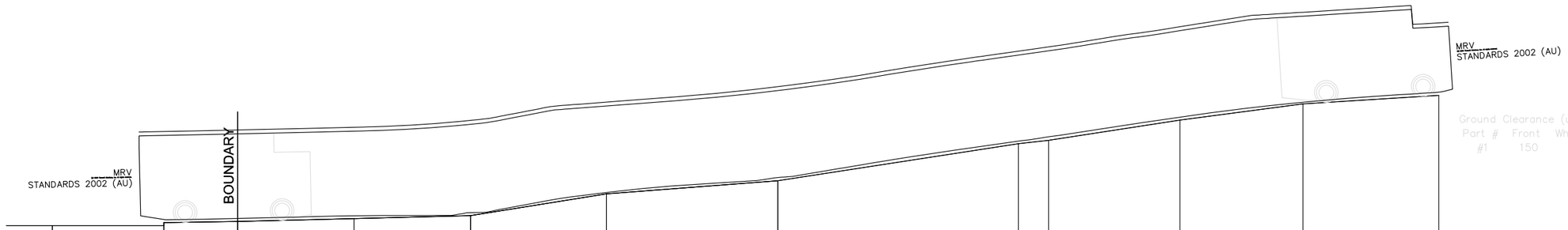
2 BACHELL AVENUE LIDCOMBE
LEVEL 2 SRV- SWEPT PATHS

SCALE	PASSED	DATE FIRST ISSUED
1:250(A3)	EME	16.09.2024

DESIGN		Sheet No.	Drawing No.
DRAWN	EM	of 22	1194-1-22
CHECK	CHK	0	



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DATUM RL 10.00				GRADE 2.5%	GRADE 8.3%	GRADE 13.7%	GRADE 15.4%		GRADE 15.4%	GRADE 13.69%	GRADE 6.25%	
DESIGN SURFACE	14.34	14.4	14.55	14.70	15.281	16.498	18.408	18.586	19.628	20.462	20.900	
EXISTING SURFACE	14.34	14.4										
CHAINAGE	-5.745	0.00	3.805	9.805	15.805	22.805	31.645	44.048	45.203	51.972	58.308	65.062

LONGITUDINAL SECTION THROUGH
INSIDE EDGE OF RAMP TO LEVEL 2

0 5m 10m

DRAFT

No.	Date	Issue Notes

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DATUM: A.H.D

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Client: RAAD ACQUISITION No 10 PTY LTD

2 BACHELL AVENUE LIDCOMBE
LEVEL 2 LONGITUDINAL SECTION INSIDE EDGE

SCALE	PASSED	DATE FIRST ISSUED
1:250(A3)	EME	26.09.2024

DESIGN		Sheet No. 23 of	Drawing No. 1194-1-22
DRAWN	EM		
CHECK	CHK		

APPENDIX G

APPENDIX G

Possible Mitigation Measure at Church Street/Railway Street For Development Traffic

The Nearmap image in **Figure 10** indicates that it may be feasible to construct a left turn slip lane from Railway Street west to Church Street.

The SIDRA analysis shows that a slip lane would significantly improve the level of Service to A in the AM Peak Hour and toe LoS A in the PM Peak Hour.

Left turn slip lane from west approach to Church Street north. 60 metres.

Table 3.7c Mitigation at Church Street/ Railway Street Intersection

No	Location	Sign/ Control	Peak Hour	Level of Service (LoS)	Degree of Saturation (DoS)	Average Delay (Av)	95a% Back of Queue Length (Veh)	Critical Movement
1	Church Street/ Railway Street	S	AM	C	0.842	35.5	14.5veh 101.7m	RHT from Railway St (E) 84.7 secs
1	Church Street/ Railway Street	S	PM	A	0.614	13.2	5.2veh 36.2m	RHT from Railway St (E) 28.5secs

The mitigation measure is illustrated in **Figure 9.**

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.

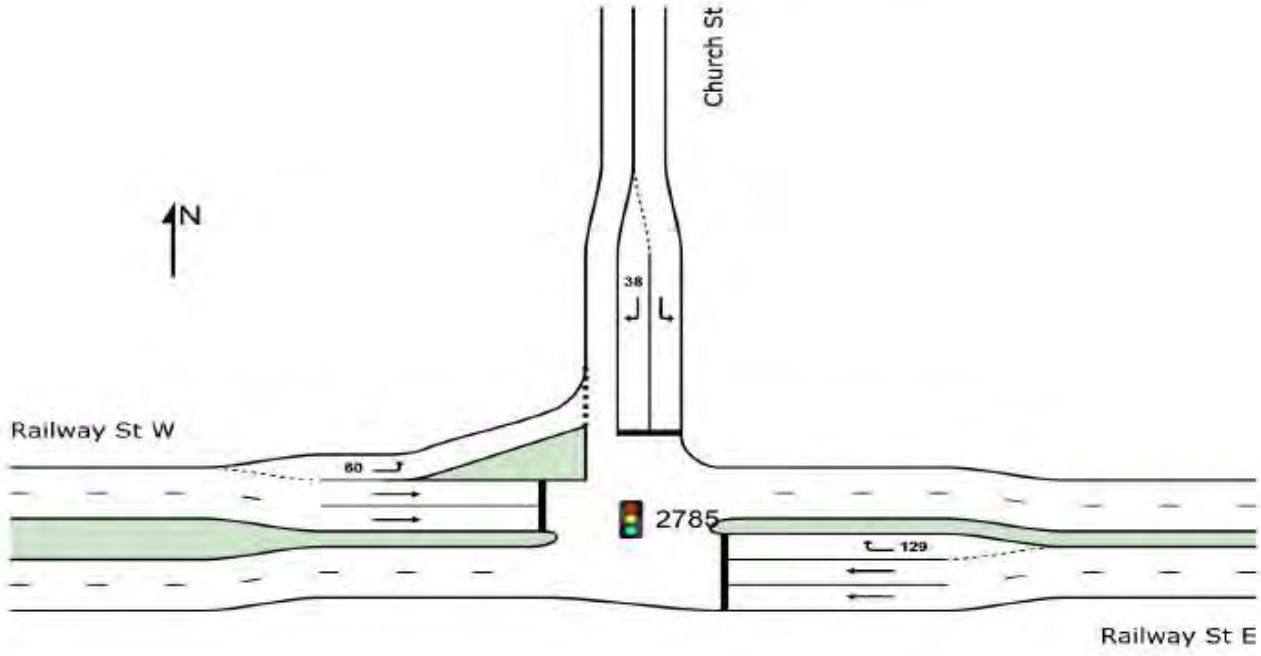


FIGURE 9
FUTURE MITIGATION
AT CHURCH STREET AND RAILWAY STREET
LIDCOMBE

NORTH

SOURCE: NEARMAPS

LEGEND

FUTURE
SLIP LANE LOCATION
MITIGATION WORKS

FIGURE 10
RAILWAY STREET AND
CHURCH STREET
INTERSECTION

INTERSECTION SUMMARY

Site: 2785 [Future Mitigation AM: Church St/Railway St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 7:45-8:45am
Site Category: (None)
Signals - Actuated Isolated Cycle Time = 150 seconds (Site User-Given Phase Times)

Intersection Performance - Hourly Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Travel Speed (Average)	km/h	40.2	40.2 km/h
Travel Distance (Total)	veh-km/h	2845.2	3414.2 pers-km/h
Travel Time (Total)	veh-h/h	70.8	85.0 pers-h/h
Desired Speed	km/h	60.0	
Speed Efficiency		0.67	
Travel Time Index		6.33	
Congestion Coefficient		1.49	
Demand Flows (Total)	veh/h	2336	2803 pers/h
Arrival Flows (Total)	veh/h	2336	
Percent Heavy Vehicles (Demand)	%	0.0	
Percent Heavy Vehicles (Arrivals)	%	0.0	
Degree of Saturation		0.842	
Practical Spare Capacity	%	6.9	
Effective Intersection Capacity	veh/h	2775	
Control Delay (Total)	veh-h/h	23.05	27.66 pers-h/h
Control Delay (Average)	sec	35.5	35.5 sec
Control Delay (Worst Lane by MC)	sec	84.7	
Control Delay (Worst Movement by MC)	sec	84.7	84.7 sec
Geometric Delay (Average)	sec	1.2	
Stop-Line Delay (Average)	sec	34.3	
Idling Time (Average)	sec	27.0	
Intersection Level of Service (LOS)		LOS C	
95% Back of Queue - Veh (Worst Lane)	veh	31.1	
95% Back of Queue - Dist (Worst Lane)	m	217.7	
Ave. Que Storage Ratio (Worst Lane)		0.27	
Effective Stops (Total)	veh/h	1486	1783 pers/h
Effective Stop Rate		0.64	0.64
Proportion Queued		0.69	0.69
Performance Index		121.5	121.5
Cost (Total)	$/h	2508.08	2508.08 $/h
Fuel Consumption (Total)	L/h	228.2	
Carbon Dioxide (Total)	kg/h	536.2	
Hydrocarbons (Total)	kg/h	0.046	
Carbon Monoxide (Total)	kg/h	0.63	
NOx (Total)	kg/h	0.141	

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.

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

Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 0.0 %

Number of Iterations: 2 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Main (Timing-Capacity) Iterations: 5.0% 0.0% 0.0%

Intersection Performance - Annual Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Demand Flows (Total)	veh/y	1,121,280	1,345,536 pers/y
Delay (Total)	veh-h/y	11,065	13,278 pers-h/y
Effective Stops (Total)	veh/y	713,119	855,743 pers/y

Travel Distance (Total)	veh-km/y	1,365,679	1,638,815	pers-km/y
Travel Time (Total)	veh-h/y	34,006	40,807	pers-h/y
Cost (Total)	$/y	1,203,876	1,203,876	$/y
Fuel Consumption (Total)	L/y	109,513		
Carbon Dioxide (Total)	kg/y	257,357		
Hydrocarbons (Total)	kg/y	22		
Carbon Monoxide (Total)	kg/y	301		
NOx (Total)	kg/y	68		

1 Hours per Year: 480 (Site)

MOVEMENT SUMMARY

Site: 2785 [Future Mitigation AM: Church St/Railway St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

AM Peak Hour: 7:45-8:45am
Site Category: (None)
Signals - Actuated Isolated Cycle Time = 150 seconds (Site User-Given Phase Times)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Railway St E															
5	T1	All MCs	648	0.0	648	0.0	0.267	16.0	LOS B	11.1	78.0	0.50	0.44	0.50	49.6
6	R2	All MCs	197	0.0	197	0.0	0.842	84.7	LOS F	14.5	101.7	1.00	0.79	1.00	24.7
Approach			845	0.0	845	0.0	0.842	32.0	LOS C	14.5	101.7	0.62	0.52	0.62	41.4
North: Church St															
7	L2	All MCs	234	0.0	234	0.0	* 0.300	40.8	LOS C	11.1	77.4	0.68	0.76	0.68	36.5
9	R2	All MCs	48	0.0	48	0.0	0.040	46.6	LOS D	2.3	16.2	0.69	0.69	0.69	37.8
Approach			282	0.0	282	0.0	0.300	41.8	LOS C	11.1	77.4	0.68	0.75	0.68	35.3
West: Railway St W															
10	L2	All MCs	44	0.0	44	0.0	0.029	20.2	LOS B	0.3	2.0	0.13	0.58	0.13	53.9
11	T1	All MCs	1165	0.0	1165	0.0	* 0.618	37.2	LOS C	31.1	217.7	0.77	0.69	0.77	42.8
Approach			1209	0.0	1209	0.0	0.618	36.5	LOS C	31.1	217.7	0.75	0.69	0.75	40.5
All Vehicles			2336	0.0	2336	0.0	0.842	35.5	LOS C	31.1	217.7	0.69	0.64	0.69	40.2

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

* Critical Movement (Signal Timing)

INTERSECTION SUMMARY

Site: 2785 [Future Mitigation PM: Church St/Railway St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

PM Peak Hour: 5:00-6:00pm
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 50 seconds (Site Optimum Cycle Time - Minimum Delay)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Travel Speed (Average)	km/h	50.2	50.2	km/h
Travel Distance (Total)	veh-km/h	2904.9	3485.9	pers-km/h
Travel Time (Total)	veh-h/h	57.8	69.4	pers-h/h
Desired Speed	km/h	60.0		
Speed Efficiency		0.84		
Travel Time Index		8.19		
Congestion Coefficient		1.19		
Demand Flows (Total)	veh/h	2417	2900	pers/h
Arrival Flows (Total)	veh/h	2417		
Percent Heavy Vehicles (Demand)	%	0.0		
Percent Heavy Vehicles (Arrivals)	%	0.0		
Degree of Saturation		0.614		
Practical Spare Capacity	%	46.6		
Effective Intersection Capacity	veh/h	3936		
Control Delay (Total)	veh-h/h	8.89	10.67	pers-h/h
Control Delay (Average)	sec	13.2	13.2	sec
Control Delay (Worst Lane by MC)	sec	28.5		
Control Delay (Worst Movement by MC)	sec	28.5	28.5	sec
Geometric Delay (Average)	sec	1.6		
Stop-Line Delay (Average)	sec	11.6		
Idling Time (Average)	sec	8.3		
Intersection Level of Service (LOS)		LOS A		
95% Back of Queue - Veh (Worst Lane)	veh	9.5		
95% Back of Queue - Dist (Worst Lane)	m	66.8		
Ave. Que Storage Ratio (Worst Lane)		0.10		
Effective Stops (Total)	veh/h	1567	1880	pers/h
Effective Stop Rate		0.65	0.65	
Proportion Queued		0.74	0.74	
Performance Index		83.4	83.4	
Cost (Total)	$/h	2187.74	2187.74	$/h
Fuel Consumption (Total)	L/h	221.1		
Carbon Dioxide (Total)	kg/h	519.7		
Hydrocarbons (Total)	kg/h	0.044		
Carbon Monoxide (Total)	kg/h	0.63		
NOx (Total)	kg/h	0.144		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 0.0 %
Number of Iterations: 2 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Main (Timing-Capacity) Iterations: 8.0% 6.8% 0.0%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Demand Flows (Total)	veh/y	1,160,160	1,392,192	pers/y
Delay (Total)	veh-h/y	4,268	5,122	pers-h/y

Effective Stops (Total)	veh/y	752,112	902,534	pers/y
Travel Distance (Total)	veh-km/y	1,394,360	1,673,233	pers-km/y
Travel Time (Total)	veh-h/y	27,752	33,302	pers-h/y
Cost (Total)	$/y	1,050,114	1,050,114	$/y
Fuel Consumption (Total)	L/y	106,150		
Carbon Dioxide (Total)	kg/y	249,452		
Hydrocarbons (Total)	kg/y	21		
Carbon Monoxide (Total)	kg/y	301		
NOx (Total)	kg/y	69		

1 Hours per Year: 480 (Site)

MOVEMENT SUMMARY

Site: 2785 [Future Mitigation PM: Church St/Railway St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.4.221

PM Peak Hour: 5:00-6:00pm
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 50 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Railway St E															
5	T1	All MCs	753	0.0	753	0.0	0.287	4.3	LOS A	4.1	28.4	0.47	0.41	0.47	56.8
6	R2	All MCs	219	0.0	219	0.0	* 0.468	28.5	LOS B	5.2	36.2	0.98	0.78	0.98	39.8
Approach			972	0.0	972	0.0	0.468	9.7	LOS A	5.2	36.2	0.58	0.49	0.58	52.5
North: Church St															
7	L2	All MCs	384	0.0	384	0.0	0.574	19.9	LOS B	7.8	54.7	0.86	0.82	0.86	43.8
9	R2	All MCs	76	0.0	76	0.0	* 0.171	27.5	LOS B	1.7	12.0	0.93	0.73	0.93	43.0
Approach			460	0.0	460	0.0	0.574	21.2	LOS B	7.8	54.7	0.87	0.80	0.87	43.6
West: Railway St W															
10	L2	All MCs	27	0.0	27	0.0	0.021	6.7	LOS A	0.1	0.8	0.30	0.60	0.30	53.5
11	T1	All MCs	958	0.0	958	0.0	* 0.614	13.2	LOS A	9.5	66.8	0.85	0.74	0.85	51.1
Approach			985	0.0	985	0.0	0.614	13.0	LOS A	9.5	66.8	0.83	0.73	0.83	51.2
All Vehicles			2417	0.0	2417	0.0	0.614	13.2	LOS A	9.5	66.8	0.74	0.65	0.74	50.2

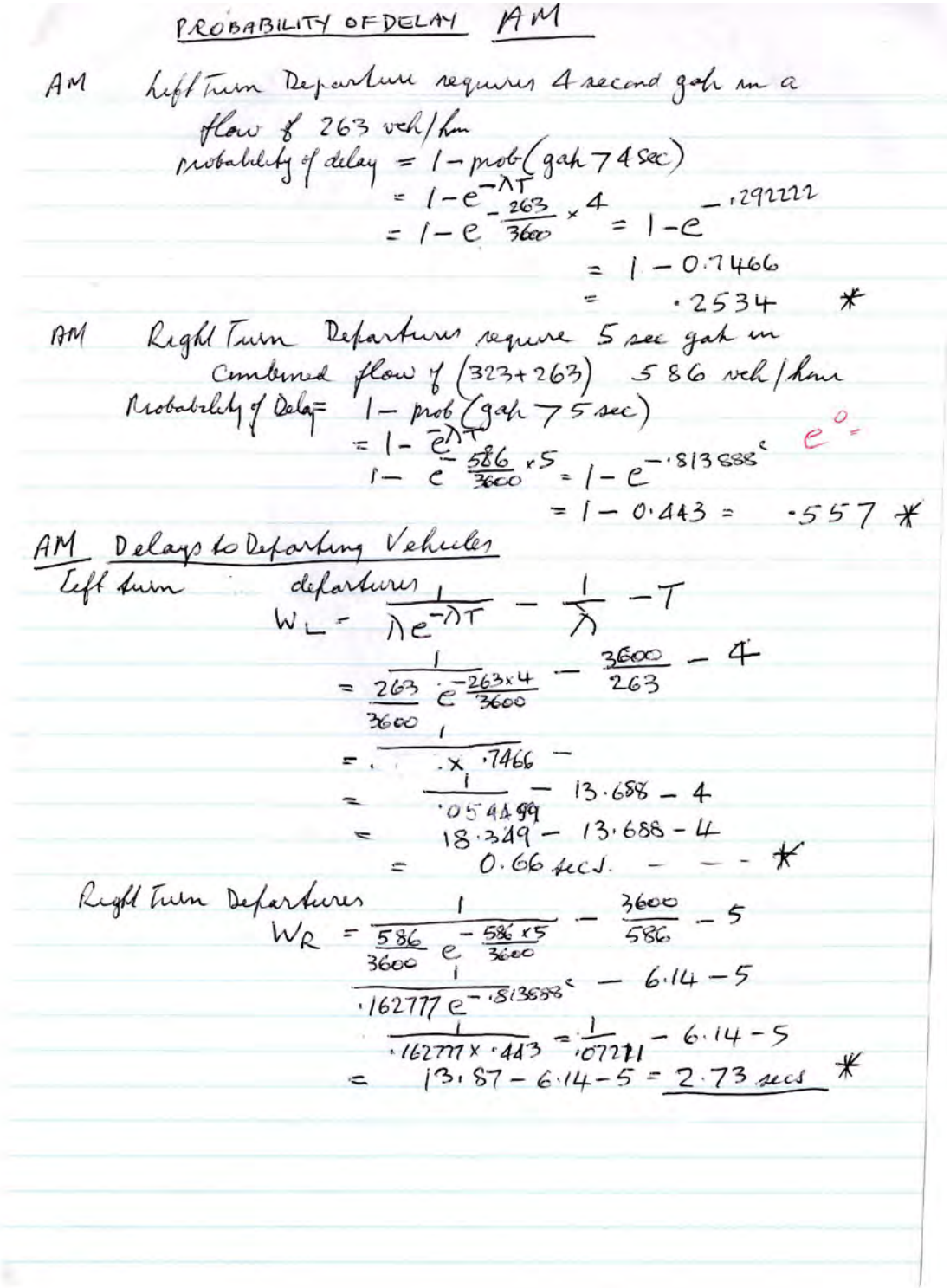
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: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

* Critical Movement (Signal Timing)

APPENDIX H

APPENDIX H

The probability of Delay has been calculated for turning movements at the intersection for left and right turning vehicles.



PROBABILITY OF DELAY AM

AM Left Turn Departure requires 4 second gah in a flow of 263 veh/hr

Probability of delay = 1 − prob(gah > 4 sec)

$= 1 - e^{-\lambda T}$

$= 1 - e^{-\frac{263}{3600} \times 4} = 1 - e^{-.292222}$

$= 1 - 0.7466$

$= .2534$ *

AM Right Turn Departures require 5 sec gah in combined flow of (323+263) 586 veh/hr

Probability of Delay = 1 − prob(gah > 5 sec)

$= 1 - e^{-\lambda T}$

$1 - e^{-\frac{586}{3600} \times 5} = 1 - e^{-.813888}$ ($e^0 =$)

$= 1 - 0.443 = .557$ *

AM Delays to Departing Vehicles

Left turn departures

$W_L = \frac{1}{\lambda e^{-\lambda T}} - \frac{1}{\lambda} - T$

$= \frac{1}{\frac{263}{3600} e^{-\frac{263 \times 4}{3600}}} - \frac{3600}{263} - 4$

$= \frac{1}{\quad \times .7466} -$

$= \frac{1}{.054499} - 13.688 - 4$

$= 18.349 - 13.688 - 4$

$= 0.66$ secs. — — — *

Right Turn Departures

$W_R = \frac{1}{\frac{586}{3600} e^{-\frac{586 \times 5}{3600}}} - \frac{3600}{586} - 5$

$\frac{1}{.162777 e^{-.813888}} - 6.14 - 5$

$\frac{1}{.162777 \times .443} = \frac{1}{.072121} - 6.14 - 5$

$= 13.87 - 6.14 - 5 = 2.73$ secs *

Probability of Delay PM

Left turn departures require 4 sec gah on a flow of 538 veh/hr

probability of delay = 1 − prob(gah > 4 secs)

$= 1 - e^{-\lambda T} = 1 - e^{-\frac{538 \times 4}{3600}} = 1 - e^{-.59777}$

$= 1 - .55 = 0.45$ ⊗

Right turn departures require 5 sec gah in combined flow of (538+213) 751 veh/hr.

Probability of delay = 1 − prob (gah > 5 sec)

$1 - e^{-\lambda T} = 1 - e^{-\frac{751 \times 5}{3600}}$

$= 1 - e^{-1.04305}$

$= 1 - 0.352 = 0.648$ ⊗

DELAYS TO DEPARTING VEHICLES

Left turn departure $W_L = \frac{1}{\lambda e^{-\lambda T}} - \frac{1}{\lambda} - T$

$= \frac{1}{.1494 e^{-.5977}} - \frac{3600}{538} - 4$

$= \frac{1}{.1494 \times .55} - 6.69 - 4$

$= \frac{1}{.0792} - 6.69 - 4$

$= 12.63 - 10.69 = 1.94$ secs ⊗

Right Turn Departure $W_R = \frac{1}{\lambda e^{-\lambda T}} - \frac{1}{\lambda} - 5$

$= \frac{1}{\frac{751}{3600} e^{-1.04305}} - \frac{3600}{751} - 5$

$= \frac{1}{.2086 \times .352} - 4.79 - 5$

$= \frac{1}{.0743} - 9.79 =$

$= 13.62 - 9.79 = 3.83$ secs

APPENDIX I

RAAD PROPERTY ACQUISITION No 10 PTY LTD

SUPPLEMENTARY REPORT
TECHNICAL WORKING PAPER NO 1

2 BACHELL AVENUE LIDCOMBE

PARKING RATES, TRIP DISTRIBUTION AND TRAFFIC GENERATION RATES FOR PROPOSED DEVELOPMENT SITE

Prepared by:

Lyle Marshall & Partners Pty Ltd
Consulting Engineers, Architects
Transportation and Environmental Planners

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Job No.: 1194-22
Report No.: 15/23

OCTOBER 2023

CONTENTS

LIST OF FIGURES

APPENDIX 1
Surveys carried out at the Hound Lounge, 212-220 Parramatta Road Annandale on 18/09/2023 from 7:00 am to 9:00 am and on 18/09/2023 from 3:45 pm to 6:00 pm.

APPENDIX 2
NSW Planning Circular PS 18-008 Amendments to Retail Land Use Definitions Pages 1 and 6.

1.0 INTRODUCTION

1.1 Scope of Report

This report has been prepared in accordance with the *CDCP 2021 Part G3 Parking* and where there is no specific rate, justification is provided through comparable survey data.

This report details the following: -

1. Parking rates for specialised retail and doggy daycare. The purpose is to provide Council an alternative method for the calculation of parking where there is no DCP rate provided or TfNSW(RMS) rate. This methodology is based on survey data.

2. Trip distribution for local customers for the café, restaurant, childcare centre and gymnasium and doggy daycare users, customer travelling to and from the site for specialised retail use and workers/employees travelling to the site from employment and the routes taken on the area wide network.

3. Justification for shared parking between uses (gymnasium and office).

2.0 PARKING RATES

2.1 Parking for Specialised Retail Use – Comparative Surveys Reviewed for Bulky Goods Use

Planning Circular PS 18-008 issued by the NSW Department of Planning and Environment on 31st August 2018 has replaced the definition for bulky goods premises with "specialised retail premises."

The Purpose of the Amendment was stated as "Many specialised retailers no longer require the capacity to store large quantities of goods in their shops as customers order from the retailer and goods are dispatched from a central warehouse direct to the customer at a later date. This showroom style model may also negate the need for customer loading facilities."

The types of goods that fall within the definition of "specialised retail premises" include:-

- animal supplies including equestrian and pet goods
- automotive parts and accessories
- camping, outdoor and recreation goods
- electric light fittings
- floor, wall and window coverings
- furniture, bedding, furnishings, fabric and manchester and homewares
- household appliances and fittings
- household electrical goods and home entertainment goods
- party supplies
- swimming pools and spas
- baby and children's goods, children's play equipment and accessories
- barbeques, fireplaces and gas appliances
- sporting, cycling, leisure, fitness goods and accessories

A copy of this Planning Circular is located in **Appendix 2** of this report.

2.1.1 DCP Controls

Table 2 of CDCP Part G does not provide a rate for specialised retail premises or bulky goods retail, and therefore the following note applies:

"Where a parking rate has not been specified in the table, the Guide to Traffic Generating Developments shall be used to calculate the parking requirements for the proposed development. Alternatively, a parking study may be used to determine the parking, subject to prior approval by Council".

2.1.2 RMS Guide

The RMS Guide to Traffic Generating Developments does not have a specific rate for Bulky Goods retail (the previous land use definition). Furthermore, the RMS Guide directs the reader to refer to the report Land Use Traffic Generation – Date and Analysis 18 – Bulky Goods Retail Stores. Technical direction TDT 2013/04a updated the counts for, amongst other uses, Bulky Goods Retail Stores.

(2.1.2 continued.)

The most similar store is the neighbouring Harvey Norman Auburn, which has 14,849sm GFA. There are 350 parking spaces onsite equating to 2.36 spaces/100sqm GFA.

This method considers a revised parking rate for specialised retail premises based on count data from similar venues.

2.1.3 Survey Data

Table 2.1A Applied Rates to 2 Bachell Avenue Lidcombe

Facility	GFA Area	Parking Rate	Requirement
Specialised Retail	3625	1.403 spaces/100m^2	50.875(51)

*Note: This equates to 1 space per 73.1sq*m

The following surveys are prepared by TTW *Report No 991597*.

Table 2.1B Parking Generation Rates based on Surveys

Tenancy	Areas	Thursday rate (spaces/100m^2)	Sunday rate (spaces/100m^2)
Harvey Norman Furniture store, Auburn	7,500	0.6	1.4
Harvey Norman White Goods/Electrical, Auburn	4,000	2	2.85
Freedom Furniture, Gladesville	-	0.7	1.5
Harvey Norman, Wiley Park	5,000	1	2
Harvey Norman, Miranda	4,500	-	1.3
Average Rate		1.075	1.81

Source: Part extracts from Project Planning Associates. 1995.

(2.1.3 continued.)

The following surveys are from the *TfNSW(RMS) Publication Land Use Traffic Generation Analysis 18 Bulky Goods and Retail Stores*.

Table 2.1C Parking Demand Bulky Goods Stores
Surveys by Traffic and Transport May 1990

Store	Location	GFA	GFLA	Parking per 100m^2 GFA	
				Thursday PM	Sunday PM
Nick Scali	Auburn	6885	4865	0.3	1.05
Keith Lord	Ashfield	7104	6924	0.34	0.27
Mills & Moore	Chatswood	1345	1345	0.34	0.57
IKEA	Gordon	2288	2216	1.25	3.92
Brodie Lighthouse	Manly Vale	435.5	435.5	2.76	5.19
Barbeques Galore	Kogarah	288	288	1.49	2.49
Harvey Norman	Fairfield	3005	3005	0.57	0.6
Bing Lee	Eastwood	528	528	1.7	1.14
BBC Hardware	Marrickville	2064	2064	0.58	0.97
Betta Stores	Kingsford	459	459	0.22	0.65
			14564.5	0.958/100m^2	1.685/100m^2

The following, as stated in **Table 9.0**, is a Comparative Survey Analysis from *TfNSW(RMS) TDT/2013/04a*.

Table 2.1D

Site No	Type	Location	GFA	Thursday Rate /100m^2	Sunday Rate/100m^2
BG1	Freedom	Balgowlah	4000	0.65	0.91
BG2	Harvey Norman	Auburn	14849	0.90	1.64
BG3* outlier	Retravision	Springwood	600	3.17	2.17
BG4	Domayne	Kotara	6029	0.68	0.85
BG5	Bing Lee	Warwilla	1200	2.0	2.25
BG6	Fantastic	South Nowra	1700	0.41	0.35
Average				1.30/100m^2	1.36/100m^2

* Outlier as was within an isolated area

The following is survey data from *Traffic Report No 10830/2* prepared by Colston Budd Rogers and Kafes Pty Ltd prepared for an approved development 108 Woodpark Road Smithfield DA 2018/132. The report used surveys at Belrose Supa Centre as shown in **Table 2.1E**. The parking demand rate is stated below.

(2.1.3 continued.)

Table 2.1E

Site No	Type	Location	GFA	Total Parking Demand	Sunday Rate/100m^2
	Supacentre	Belrose	20004	263	0.76/100m^2

The approved development adopted a rate of 1 space per 70m^2 or 1.43/100m^2. The range is between 1.11 – 1.30/100m^2 for Thursday PM and Sunday 0.76-1.685/100m^2. If we take the average Sunday rate of 1.403/100m^2 this equates to 51 spaces for 3625m^2 GFA.

2.2 Parking for Dog Day Care Centre – Comparative Approved Premises for Dog Day Care Use

Table 2.2A

Address	DA No	LGA Area	Use	No of Dogs	Gross Floor Area m2	NLA		No of Spaces	Hours of Operation
						Staff	Rate		
42-44 Epsom Road Zetland	D/2016/1472	City of Sydney Council	Dog Daycare	35	294	3			7:00am - 6:30pm Monday-Friday
42 McCauley Street Alexandria	D/2021/406	City of Sydney Council	Dog Daycare	85	796	4			7:00am - 6:30pm Monday-Friday
212-220 Parramatta Road Annandale	D/2017/546	Innerwest Council	Dog Daycare. Change of use	40	339.3	3	1 per 100m^2		7:00am - 7:00pm
Average Area				60	476.43	3.33		2.66	

Using a rate of 1 space/100m^2 we have (3) spaces provided for the dog day care facility.

Table 2.2B

Facility	GFA Area	Parking Rate	Requirement
Dog Day Care	276	1/100m^2	3

Surveys carried out at the 'Hound Lounge' 212-220 Parramatta Road Annandale showed 5 spaces including 1 van for the centre and 4 customer spaces. Surveys showing parking and trip generation for the dog daycare 'Hound Lounge' are included in **Appendix 1** of this report.

2.3 Justification for Shared Parking

Gymnasium peak use is typically in the evenings and on Saturday mornings. This is evident from profile analysis we have undertaken. The profile analysis is based upon RMS Survey data Report No 24 Gymnasiums.

A gymnasium traffic generation profile use is shown below in **Figure 0**.

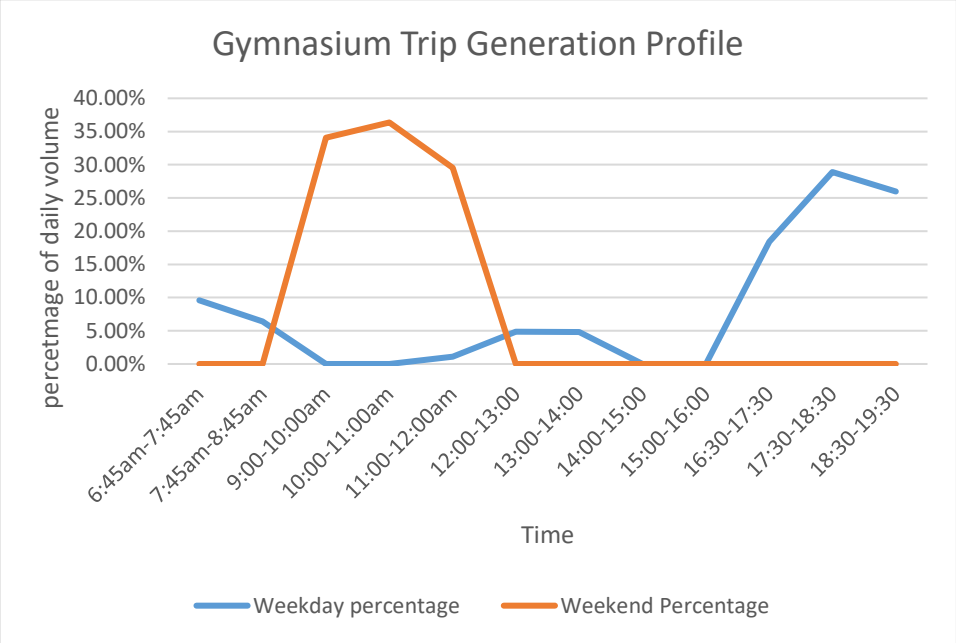


Figure 0 Gymnasium Traffic Generation Profile from RMS Data and Analysis No 24.

The peak parking would follow the traffic generation profile and therefore 8 shared spaces between office use and gymnasium use can be shared as their traffic generation profiles do not overlap.

3.0 TRIP DISTRIBUTION

3.1 Trip Distribution for Local Customer, Café, Restaurant, Gymnasium, Childcare and Dog Daycare Use and Food and Drink

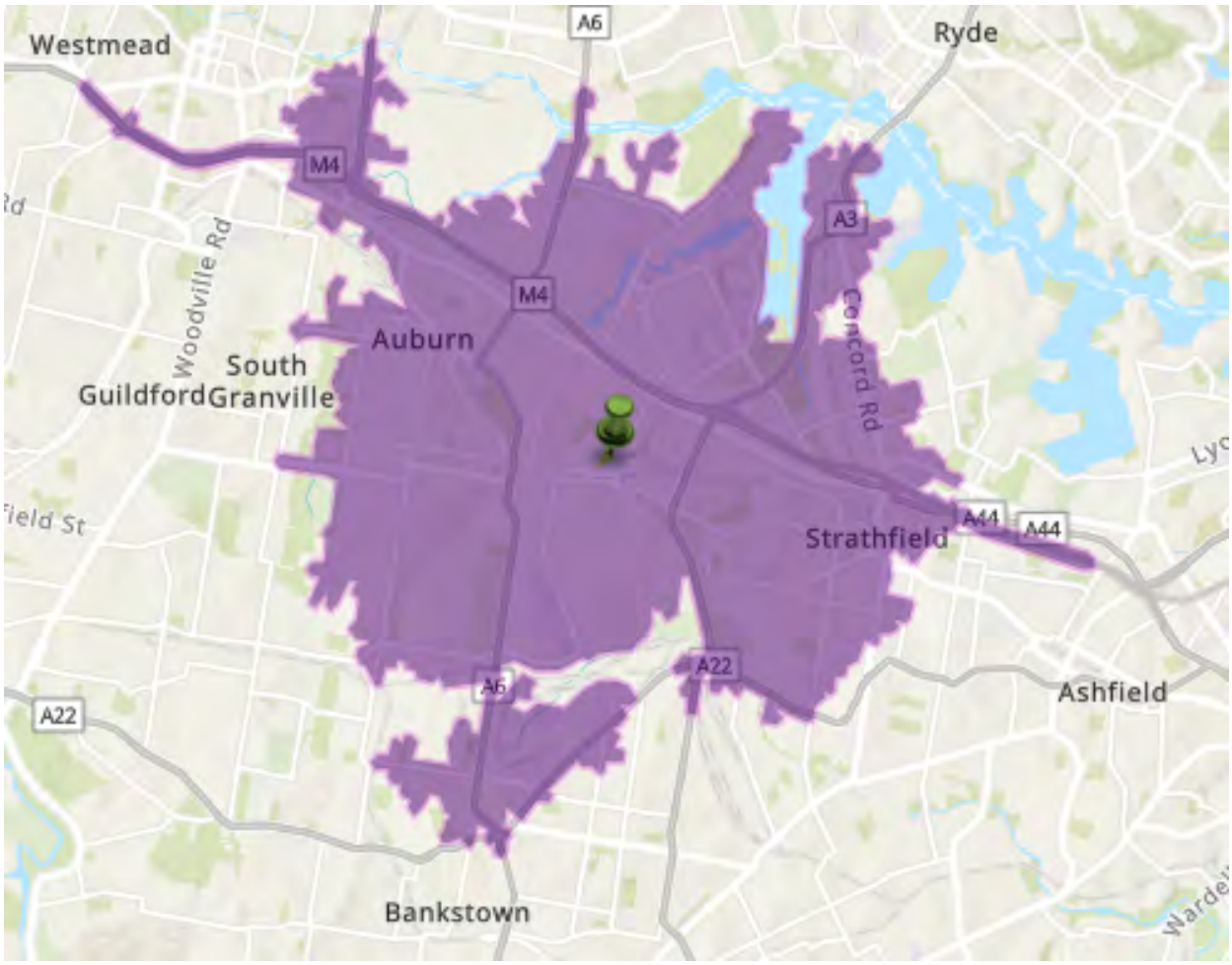
Proposed traffic distribution for local service users' local trips were analysed using travel time analysis mapping using ESRI geographical mapping portal. The 10 minute travel analysis to and from the site is shown in **Figure 1a** and **1b**. The areas located within the 10 minute travel distance for the café and childcare centre are shown in **Table 3.1A**. A 10 minute travel distance is considered an acceptable time to travel for local users from within and local surrounding localities.

An assessment of the SA2 zones is presented in **Table 3.1A**. Travel routes are detailed in **Table 3.1B** and directions by percentage shown in **Table 3.1C**

Table 3.1A

	Place of Residence	No of People Residing	Percentage of Persons within Surrounding SA2	Approach Direction
1	Strathfield	25813	26.04%	E
2	Regents Park	5138	5.18%	SW
3	Concord West	5914	5.97%	NE
4	Newington	5802	5.85%	N
5	Auburn	12501	12.61%	W/S
6	Greenacre	24323	24.54%	S
7	Lidcombe	19627	19.80%	N/S
		99118	100%	

Please note that medical centres have been analysed as 100% employees for the purposes of trip assignments and are included in Section 3.3. Clients to medical centres may be traveling outside of the peak traffic hours.



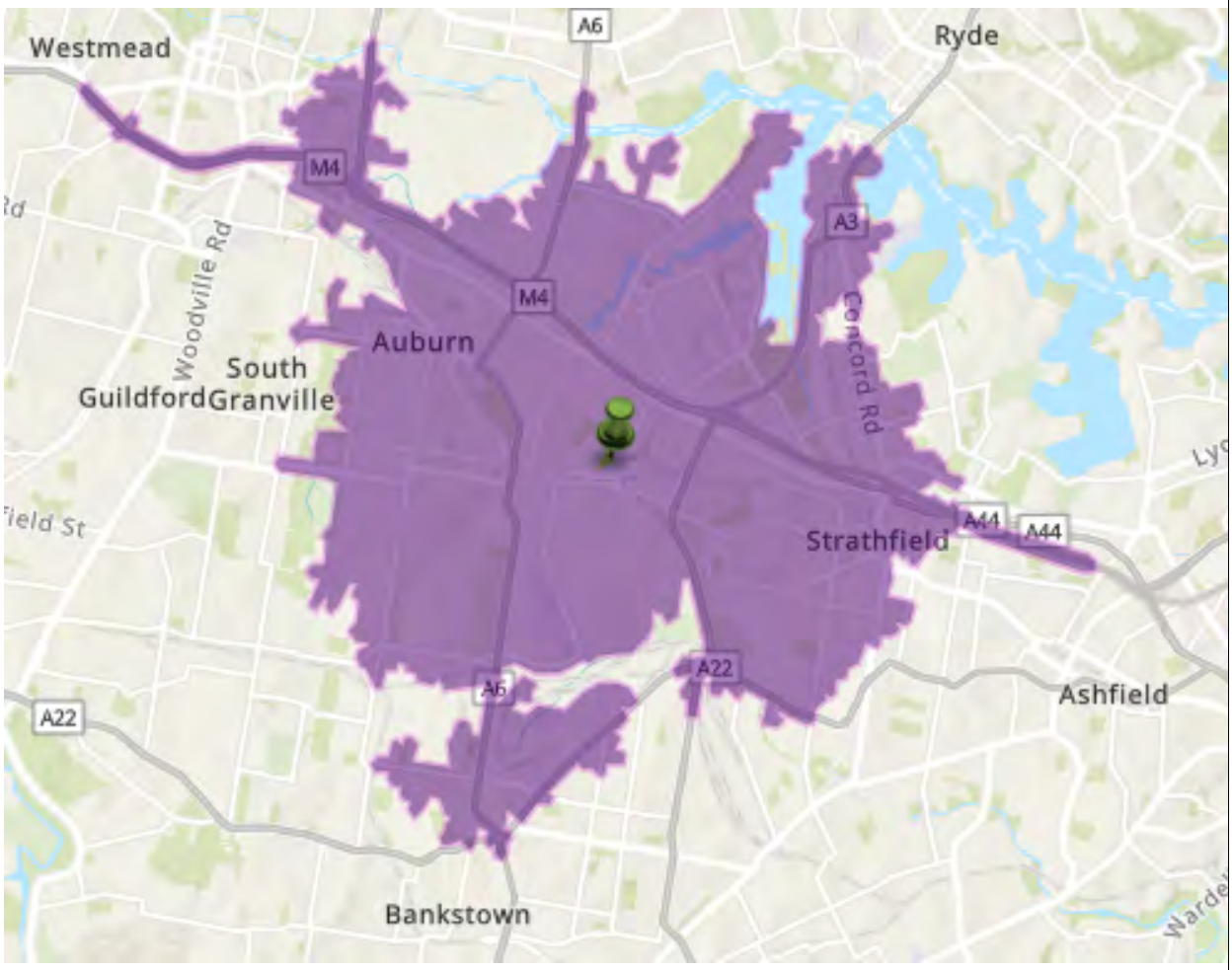
source ESRI Geographic online mapping

Legend

10 minute travel distance during AM peak hour

N

FIGURE 1a
AM Peak Hour
travel time 10 minutes
to the site for local users



source ESRI Geographic online mapping

Legend

10 minute travel distance during PM peak hour

N

FIGURE 1b
PM Peak Hour
travel time 10 minutes
to the site for local users

(3.1 continued.)

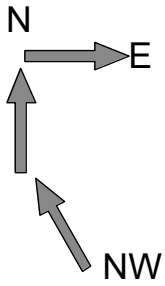
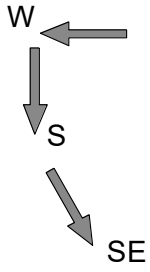
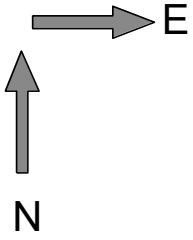
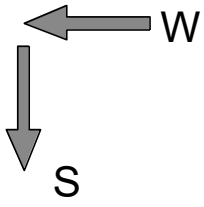
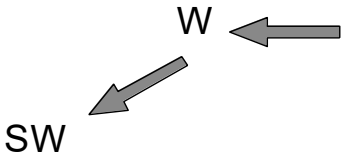
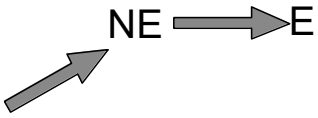
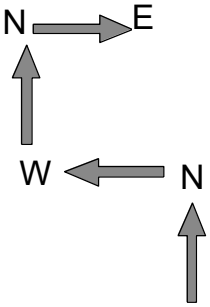
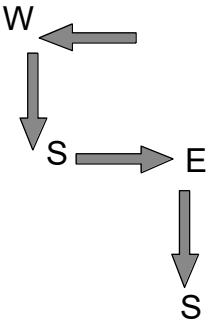
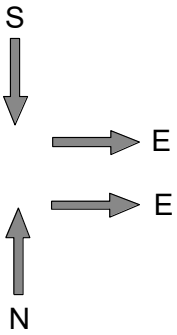
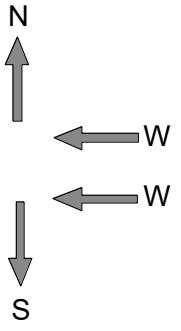
For the purposes of analysing the traffic assignment the route choices are described below: -

Table 3.1B Customers/User Travelling to and from Strathfield

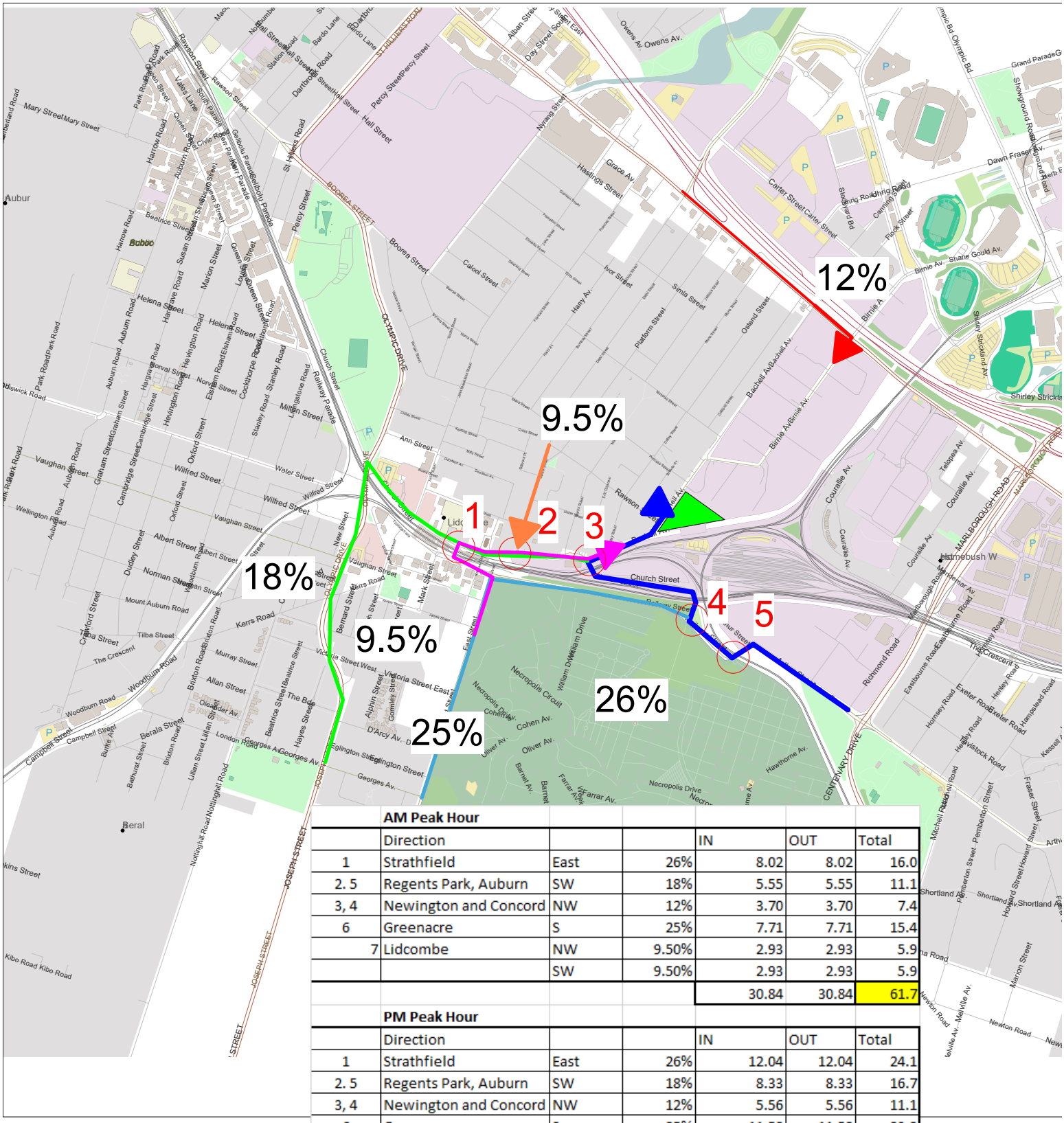
Area	Route Choice AM	Route Choice PM
1. Strathfield	Travel west along Barker Road. Travel north, turn right into Pemberton Road and left into Arthur Street. Turn right into Railway Street and right into Church Street and continue east to Bachell Avenue.	**Travel East.** Turn left and travel along Bachell Avenue to turn left into Church Street, turn left into Arthur Street, turn right into Pemberton Street and turn left into Barker Road.
2. Regents Park and 5. Auburn	Head north along Campbell Road turn into Kerrs Road and travel north along Olympic Drive. Turn right into Church Street and travel west to Bachell Avenue	**Travel West.** Turn left at Bachell Avenue, travel west along Church Street to Olympic Drive, turn right into Kerrs Road. Head west along Campbell Road.
3. Concord West / Strathfield North	**T**ravel south west along concord Road, turn right into Hiller Street and left into Pomeroy Street and right inro Underwood Road, turn left and travel east along Parramatta Road and left into Bachell Avenue.	**Travel North East.** Travel north along Bachell Avenue, turn right into A44 Parramatta Road, turn left into Underwood Road and right into Hiller Street and left into Concord Road.
4. Newington	Travel south west along Jameison Road, left into Holkier Street travelling west and left into Hill End Road travelling south. Turn left into Parramatta Road travelling east and left into Bachell Avenue travelling south west.	**Travel North.** Travel north along Bachell Avenue, turn left at Parramatta Road and right into Hill End Road, left into Holkier Street and right inti Jamieson Street.
6. Greenacre	Travel north along A3 Centenary Drive. Turn right into Church Street and travel east towards Bachell Avenue**.**	**Travel South.** Travel west, turn left at Bachell Avenue and turn left into Church Street. Turn left into Railway Street and right into Aurthur Street and Right onto A3 Centenary Drive towards Greenacre.
7. Lidcombe	**North** Travel south along Rawson or Swete Street towards and east into Bachell Avenue. **South** Local customers will travel south west along Bachell and turn left at Railway Street Bridge to continue to travel in a southwards direction.	**50% North, 50% South.** Local customers will either travel left at Bachell Avenue and then travel west along Swete Street.

(3.1 continued.)

Table 3.1C Approach Direction and Percentage

Approach Direction	Percentage	AM Direction	PM Direction
1. Strathfield. .	26.06% (26%)		
2. Regents Park and 5. Auburn.	5.18 + 12.61 (18%)		
3. Newington and 4. Concord West.	5.97 + 5.85 (12%)		
6. Greenacre.	24.54% (25%)		
7. Lidcombe	19.80% (19%)		

For the distribution of local trips to childcare centre and café refer to **Figure 1c.**



	AM Peak Hour					
	Direction			IN	OUT	Total
1	Strathfield	East	26%	8.02	8.02	16.0
2. 5	Regents Park, Auburn	SW	18%	5.55	5.55	11.1
3, 4	Newington and Concord	NW	12%	3.70	3.70	7.4
6	Greenacre	S	25%	7.71	7.71	15.4
7	Lidcombe	NW	9.50%	2.93	2.93	5.9
		SW	9.50%	2.93	2.93	5.9
				30.84	30.84	61.7
	PM Peak Hour					
	Direction			IN	OUT	Total
1	Strathfield	East	26%	12.04	12.04	24.1
2. 5	Regents Park, Auburn	SW	18%	8.33	8.33	16.7
3, 4	Newington and Concord	NW	12%	5.56	5.56	11.1
6	Greenacre	S	25%	11.58	11.58	23.2
7	Lidcombe	NW	9.50%	4.40	4.40	8.8
		SW	9.50%	4.40	4.40	8.8
				46.31	46.31	92.6

FIGURE 1c
Customer/Users travelling for cafe, restaurant, gymnasium, childcare, dog daycare and food and drink

(3.1 continued.)

Location of nearest Childcare Centres and Cafes

The nearest childcare centres and cafes are located at the following locations:-

Table 3.1D Location of Early Learning/Childcare Centres

Business	Address	Distance (m)
Childcare Centres		
OZ Education Childcare and Preschool	31 Swete St Lidcombe	530
Fantastic Gems Before and After School Care	7 Mary St Lidcombe	600
St Joseph's Childcare Centre	29 Mary St Lidcombe	650
Scribbles & Giggles Childcare Centre	7 Mrytle St Rydalmere	2600
Woodstock Childcare Centre	Australia Tower, Shop 5/11 Australia Ave, Sydney Olympic Park	5000
Café		**Within 1000m**
Café Culture	3/42 Birnie Avenue Lidcombe	
Café Rodem 2	10 Joseph Street Lidcombe	
Sunnys Flower Café	29A John Street Lidcombe	
Café		**Further than 1000m**
Bunker 64 Café	64 Railway Street Lidcombe	
Café on Railway	66 Railway Street Lidcombe	
Café Rodem 1 Lidcombe	7B John St Lidcombe	
Interlink Café	42/159 Arthur St Homebush West	
May Story Café	144 John St Lidcombe	
Meeps Café	36C John St Lidcombe	
Pumphouse Café	3/9 Birnie St Lidcombe	
Yellow Day Coffee Roasters	18 Bridge St Lidcombe	

3.2 User/Customers Travelling to Specialised Retail Use

Customers/Users travelling to the specialised retail centre use are shown in **Table 3.2A.**

Table 3.2A SA3 Areas for Service Users – Specialised Retail (Customers) from 2016 Census Data

Place of Residence	No of People Residing	Percentage of Persons within Surrounding SA3	SA3 Code
Parramatta	140891	14.21%	12504
Merrylands Guildford	151262	15.25%	12503
Auburn(1)	89670	9.04%	12501
Strathfield / Burwood / Ashfield	151873	15.32%	12003
Carlingford	66570	6.71%	12502
Canada Bay	85356	8.61%	12001
Ryde / Hunters Hill	134538	13.57%	12602
Bankstown	171429	17.29%	11901
	991589	100.00%	

Note [1] Auburn has 3 specialised retail service centres.

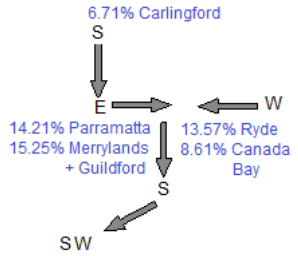
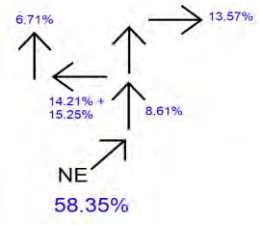
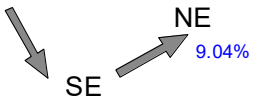
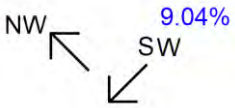
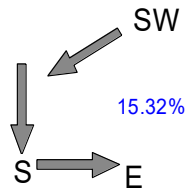
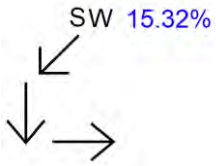
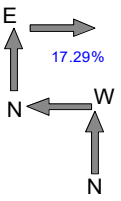
(3.2 continued.)

Table 3.2B Users/Customers Travelling to and from the Site Route Path

Place of Residence	Route Choice AM	Route Choice PM
Parramatta / Merrylands and Guildford	Travel east along M4. Turn Right at Silverwater Road to St Hilliers Street and turn left into A44 Parramatta Road. Turn right into Birne Street at the lights.	Travel north east along Bachell Avenue and continue north to M4 Western Motorway towards Parramatta.
Auburn	Travel south-east along South Parade, turn right into A6 Olympic Drive and left into Church Street. Travel north-east along Church Street to Bachell Avenue.	Travel left at Bachell Avenue, turn right into Rawson Street and into Boorea Street. Turn right into A6 Olympic Drive and left into South Parade.
Strathfield / Burwood / Ashfield	Travel NW along Arthur Street. Turn left into Church Street and turn right into Bachell Avenue and travel east to site.	Travel west along Bachell Avenue and turn left into Church Street, left into Railway Street. Travel south then right into Authur Street - travel east.
Carlingford	Travel south along Silverwater Road. Turn right into Parramatta Road and Right into Birne Avenue to Bachell Avenue.	Travel north east along Bachell Avenue. Turn left into Parramatta Road and turn right at Silverwater Road and travel north to Carlingford.
Canada Bay	Travel south along Hill End Road and right into Parramatta Road and travel east. Turn right into Birnie Avenue	Travel north east along Bachell Avenue, turn left into Parramatta Road and right into Hill End Road and turn left into M4 and travel east (M4 East).
Ryde / Hunters Hill	Travel South along A3 Homebush Bay Drive and turn right into Parramatta Road and left into Bachell Avenue.	Travel north east along Bachell Avenue, turn right into Parramatta Road and left into Birnie Avenue, right into Edwin Flack Avenue and left into Sarah Durack Avenue and left into A3 Homebush Bay Drive.
Bankstown	Travel north along Jospeh Street A6,	Travel south west along Bachell Avenue into Church Street, turn left into Railway Street and right into East Street, turn right into Eglington Street and left into Joseph Street A6.

(3.2 continued.)

Table 3.2C Approach/Depart Direction and Percentage

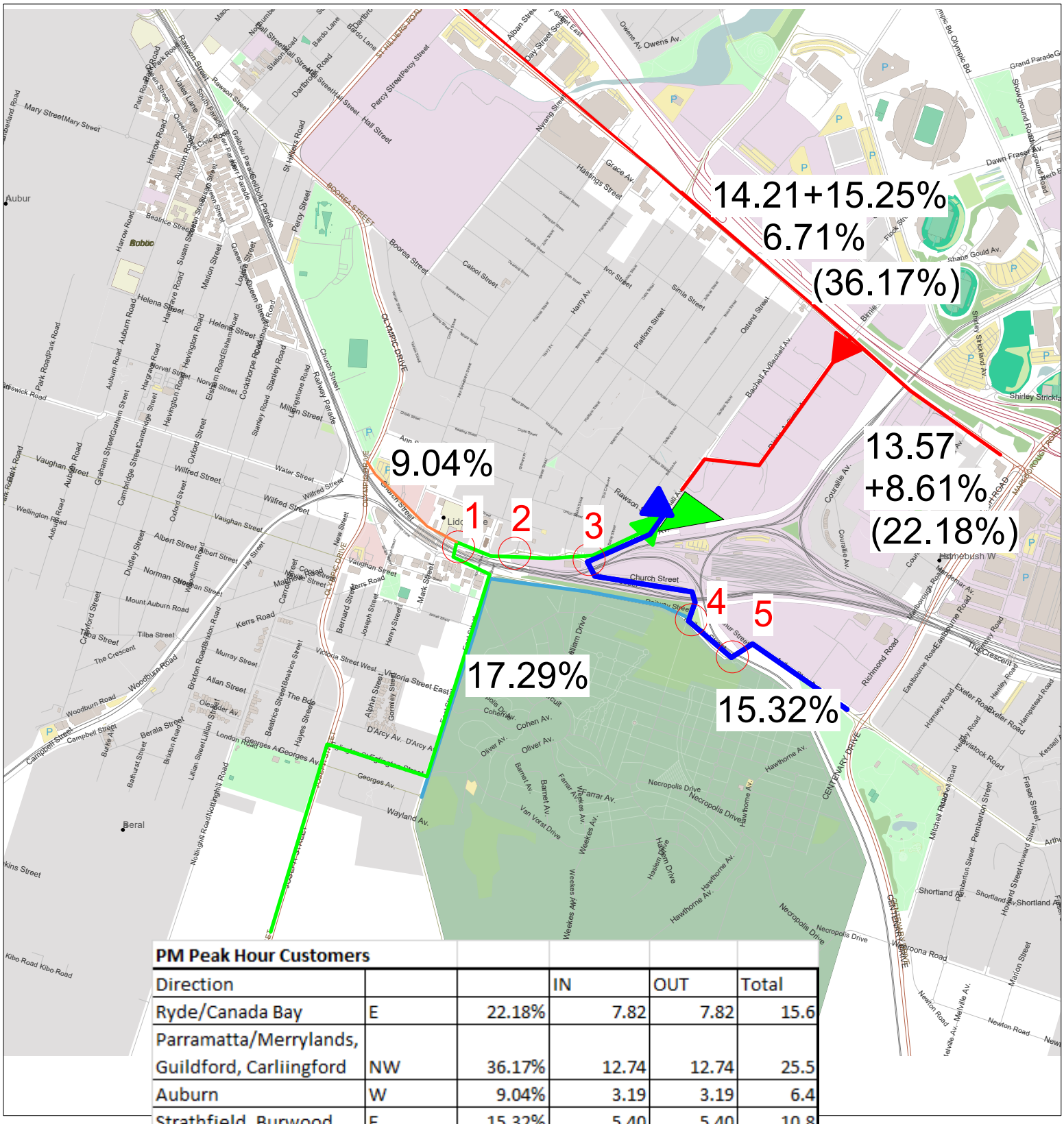
Approach Direction AM	Approach Direction PM	Direction AM	Direction PM
Parramatta, Merrylands Guildford **Ryde/Canada Bay** Travel east along M4. Turn Right at Silverwater Road to St Hilliers Street and turn left into A44 Parramatta Road. Turn right into Birne Street at the	**Parramatta, Merrylands Guildford** **Ryde/Canada Bay** Travel north east along Bachell Avenue and continue north to M4 Western Motorway towards Parramatta.		
Auburn Travel south-east along South Parade, turn right into A6 Olympic Drive and left into Church Street. Travel north-east along Church Street to Bachell Avenue	**Auburn** Travel left at Bachell Avenue, turn right into Rawson Street and into Boorea Street. Turn right into A6 Olympic Drive and left into South Parade.		
Strathfield Burwood Travel NW along Arthur Street. Turn left into Church Street and turn right into Bachell Avenue and travel east to site.	**Strathfield Burwood** Travel south west along Bachell Avenue, turn left into Church Street and left into Railway Street, right into Arthur Street.		
Bankstown Travel South along A3 Homebush Bay Drive and turn right into Parramatta Road and left into Bachell Avenue	**Bankstown** Travel to Bankstown south west along Bachell to Church Street, left into Railway Street.		

For the distribution of local trips to specialised retail refer to **Figure 2a**.

Table 3.2D Location for Specialised retail Centres

Address	Name
219 Parramatta Road Auburn	Auburn Home Centre
265 Parramatta Road Auburn	Prime West Megamall
300 Parramatta Road Auburn	Officeworks/Bulkygoods Centre

Refer to **Figure 2b** for locations shown in Nearmap**.**



PM Peak Hour Customers					
Direction			IN	OUT	Total
Ryde/Canada Bay	E	22.18%	7.82	7.82	15.6
Parramatta/Merrylands, Guildford, Carliingford	NW	36.17%	12.74	12.74	25.5
Auburn	W	9.04%	3.19	3.19	6.4
Strathfield, Burwood	E	15.32%	5.40	5.40	10.8
Bankstown	S	17.29%	6.09	6.09	12.2
No AM Peak hour customer trips					70.47

SITE

TRAVEL TO AND FROM SITE FROM WEST

TRAVEL TO AND FROM SITE FROM SOUTH-WEST

TRAVEL TO AND FROM SITE FROM SOUTH

TRAVEL TO AND FROM SITE FROM EAST

TRAVEL TO AND FROM SITE FROM NORTH WEST/NORTH-EAST

1 INTERSECTIONS

N

FIGURE 2a
Customer/Users travelling specialised retail

FIGURE 2b
LOCATIONS OF NEAREST SPECIALISED RETAIL CENTRES

N

3.3 Employees/Workers Travelling to and from the Site

The Journey to Work data was reviewed based upon Australian Bureau of Statistics (ABS) 2016 Journey to Work data. Although 2021 is available it has inconsistencies due to COVID restrictions and work from home. The SA2 Areas were used to determine travel to and from the site for employees.

Table 3.3A Journey to Work to Travel Zones: 1337 and 1338 for Employees

Origin SA3	Origin SA3 ID	No. of Vehicle Drivers	%
Merrylands - Guildford	12503	142.2	8.30%
Fairfield	12702	128.6	7.50%
Bankstown	11901	122.2	7.13%
Auburn	12501	113.6	6.63%
Parramatta	12504	93.8	5.47%
Blacktown	11601	93.2	5.44%
Mount Druitt	11603	87.4	5.10%
Baulkham Hills	11501	78	4.55%
Strathfield - Burwood - Ashfield	12003	70.4	4.11%
Campbelltown (NSW)	12302	61.6	3.59%
Canterbury	11902	60.2	3.51%
Penrith	12403	59	3.44%
Liverpool	12703	58.2	3.40%
Bringelly - Green Valley	12701	56	3.27%
Blacktown - North	11602	55.4	3.23%
Kogarah - Rockdale	11904	50.2	2.93%
St Marys	12405	44	2.57%
Sutherland - Menai - Heathcote	12802	43.8	2.56%
Ryde - Hunters Hill	12602	41.8	2.44%
Canada Bay	12001	36.4	2.12%
Cronulla - Miranda - Caringbah	12801	35.4	2.07%
Hurstville	11903	35.2	2.05%
Carlingford	12502	34	1.98%
Camden	12301	26	1.52%
Ku-ring-gai	12103	25.2	1.47%
Sydney Inner City	11703	21.4	1.25%
Leichhardt	12002	21.2	1.24%
Warringah	12203	19.2	1.12%
Total		**1713.6**	**100.00%**

Note: Employees travelling from Origin SA3 to Travel Zones 1337 and 1338 with vehicle driver trips less than 1% of total trips have been omitted.

(3.3 continued.)

Table 3.3B Route Choice for Employees to the Site

Travel	Route Choice AM	Percentage of Trips
Fairfield, Merrylands Group North-West (1)	Travel along M4 to A6 Silverwater Road and travel along Hilliers Street to urn left at Olympic Drive turn right into Church Street and travel east to Bachell Avenue.	7.50%, 8.30% +21.41% **=37.21%**
Auburn/Campbellown	Travel north along Olympic drive and turn right into Church Street.	6.63%+3.59%**=-10.22%**
Bankstown, Liverpool Bringelly, Sutherland	Turn right at Railway Street Bridge and travel east along Church Street to Bachell Avenue.	7.13%+3.40%+3.27%+2.56 % **= 16.36%**
Group North-West (2)	Travel east along Parramatta Road and turn right at Bachell Ave.	**14.28%**
Strathfield, Canterbury, Kogarah-Rockdale, Canada Bay, Cronulla, Hurstville, Camden, City, Leichhardt, Warringah	Travel along Homebush Bay Drive A3 to turn right at Arthur Street.	4.11%+3.51%, 2.93%+2.12%+2.07%+2.05 %+ 1.52%+1.24%+1.12% **=21.92%**

Notes:
Group North-West (1) and (2)

Parramatta	5.47%
Blacktown	5.44%
Mount Druitt	5.10%
Baulkham Hills	4.55%
Penrith	3.44%
Blacktown	3.23%
St Marys	2.57%
Ryde	2.44%
Carlingford	1.98%
Ku-ring-gai	1.47%
	35.69%

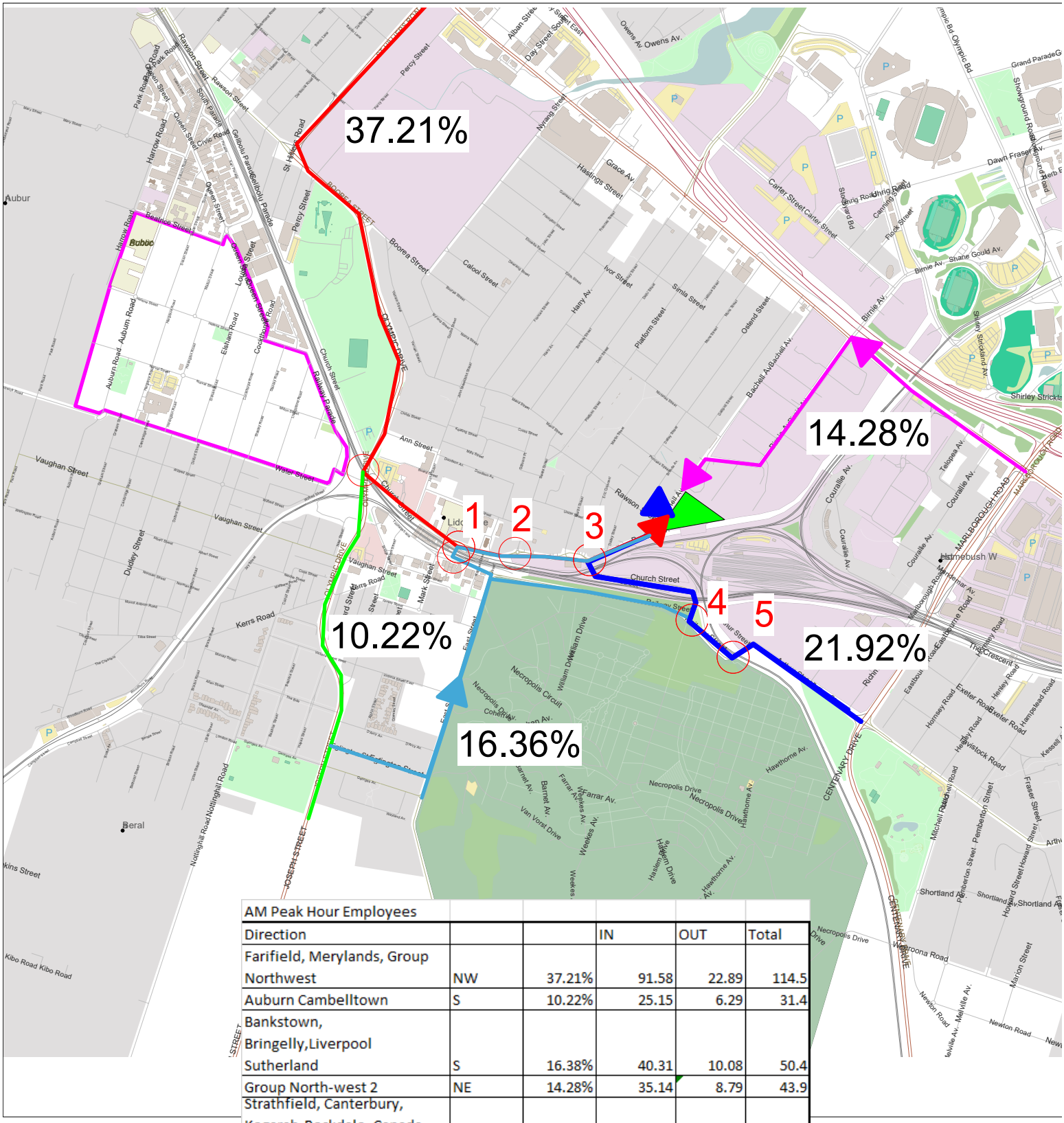
Via Parramatta Road=14.28%(2)
Via Church Street/ Olympic Drive = 21.41%(1)

(3.3 continued.)

Table 3.3C Route Choice for Employees from the Site

Travel	Route Choice PM	Percentage of Trips
Fairfield, Merrylands Group North-West (1)	Travel west along Bachell Avenue to Church Street. Turn right at Church Street into Olympic Drive to A6 to M4.	7.50%, 8.30% +21.41% **=37.21%**
Auburn/Campbelltown Strathfield, Hurstville and Camden, Cronulla	Travel west along Bachell Avenue into Church Street. Turn left at Olympic Drive to travel south.	6.63%+3.59%+4.11%+2.06 %+1.52%**+2.07** **=19.98%**
Bankstown, Liverpool Bringelly, Sutherland	Travel west along Bachell Avenue and turn left at Railway St Bridge. Travel left into Railway Street and turn right into East Street and travel south.	7.13%+3.40%+3.27%+2.56 % **= 16.36%**
Group North-West (2)	Travel north-east along Bachell Avenue and turn left into Parramatta Road A44.	**14.28%**
Canterbury, Kogarah-Rockdale, Canada Bay, Canada Bay, City, Leichhardt, Warringah	Travel west along Bachell Avenue and turn right at Church Street, turn right at Railway Street and right at Arthur Street.	+3.51%+2.93%+2.12%+1.2 5%+1.24%+1.12% **=12.17%**

For the distribution of employee trips to the network refer to **Figure 3a** and **3b**.



AM Peak Hour Employees					
Direction			IN	OUT	Total
Farifield, Merylands, Group Northwest	NW	37.21%	91.58	22.89	114.5
Auburn Cambelltown	S	10.22%	25.15	6.29	31.4
Bankstown, Bringelly,Liverpool Sutherland	S	16.38%	40.31	10.08	50.4
Group North-west 2	NE	14.28%	35.14	8.79	43.9
Strathfield, Canterbury, Kogarah-Rockdale, Canada Bay, Cronulla, Hurstville, Camden, City, Leichhardt,	E	21.92%	53.95	13.49	67.4
		100.0%			307.7

TRAVEL TO AND FROM SITE FROM SOUTH-WEST

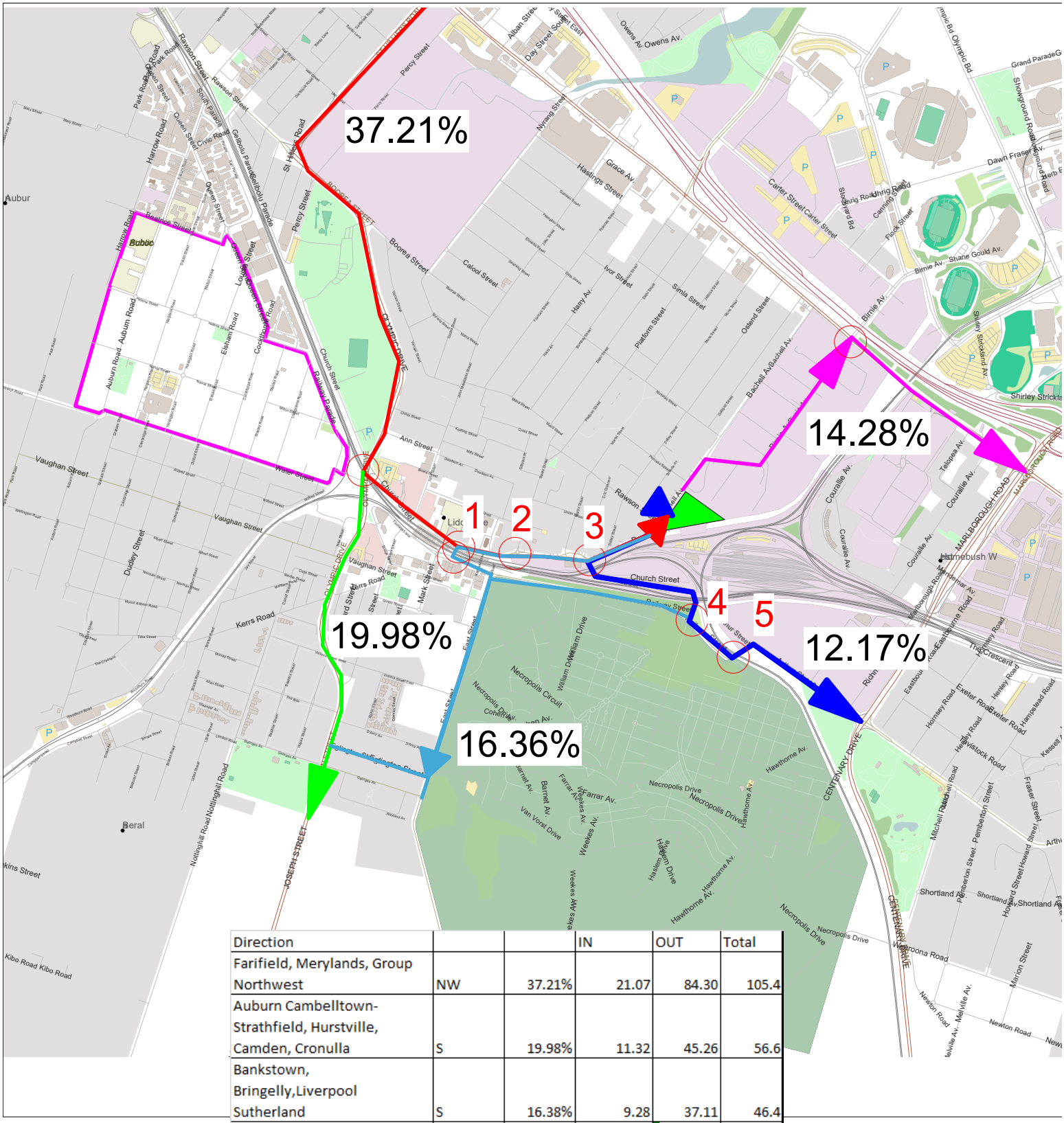
TRAVEL TO AND FROM SITE FROM EAST

TRAVEL TO AND FROM SITE FROM NORTH WEST/NORTH-EAST

TRAVEL TO AND FROM SITE FROM NORTH-EAST

1 INTERSECTION LOCATION

FIGURE 3a
Trip Distribution Employees
Travel to the Site



Direction			IN	OUT	Total
Farifield, Merylands, Group Northwest	NW	37.21%	21.07	84.30	105.4
Auburn Cambelltown-Strathfield, Hurstville, Camden, Cronulla	S	19.98%	11.32	45.26	56.6
Bankstown, Bringelly,Liverpool Sutherland	S	16.38%	9.28	37.11	46.4
Group North-west 2	NE	14.28%	8.09	32.35	40.4
Canterbury, Kogarah-Rockdale, Canada Bay , Hurstville, City, Leichhardt, Warringah	E	12.17%	6.89	27.57	34.5
		100.0%			283.2

SITE

N

TRAVEL TO AND FROM SITE FROM SOUTH-WEST

TRAVEL TO AND FROM SITE FROM EAST

TRAVEL TO AND FROM SITE FROM NORTH WEST/NORTH-EAST

TRAVEL TO AND FROM SITE FROM NORTH-EAST

1 INTERSECTION LOCATION

FIGURE 3b
Trip Distribution Employees Travel from the Site

4.0 TRAFFIC GENERATION RATES

4.1 Proposed Traffic Generation Rates

Trip generation rates are described below for the following uses:-

Specialised Retail

The rate of 2.7 trips/100m^2 GFA not GLFA. 20% assignment to AM is acceptable.

In the document (*RMS Guide to Traffic Generating Developments*) a reduction of 20% for linked trips is acceptable practice for developments where there are multiple attractors such as specialised retail use, café, dog daycare, restaurant and food and drink premises.

Office Use

The rates for Norwest Business Park in TDT20B/04a of 2.75 trips/100m^2 GFA for AM and 1.17 trips/100m^2 GFA for the PM have been adopted based on agreement with TfNSW on DA No. 2022/0463. Refer to main paper for updates.

A green travel plan has been provided for the centre to support the reduction for linked trips and encourage staff employees to use the extensive surrounding off road bicycle paths. It may be possible to further reduce car dependency based on the alternative active travel mode.

A 5% reduction has been provided due to implementation of a green travel plan and the close proximity of an off road cycle path is located north of the development site.

Food and Drink Premises

The rate from the *RMS Guide to Traffic Generating Developments* has been adopted for food and drink premises within commercial retail centres where:-

Vehicle(P) = vehicles trips per 1000m^2 = 46A(SS)
Whereby SS = speciality shops and take away food shops which are not the primary attractors to the centre.

The traffic generation has been calculated as 46 x 1542/1000 = 70.9.100% trips for the PM. In the AM peak hour 20% of trips are assigned to staff.

Restaurant

The rate for the restaurant adopted is 5 trips per 100m^2 GFA in the PM peak hour. An allowance of 1/100m^2 GFA is adopted for the AM peak hour for staff trips.

Café

The café is open in the morning AM peak hour so 5/100m^2 GFA is provided and 1/100m^2 GFA in the PM peak hour. This rate has been adopted at similar developments.

(4.1 continued.)

Light Industry/ High Technology
The rate used has adopted the business and industrial parks rates from TDT2013/04a of AM peak hour Rate 0.52/100m^2 GFA and PM peak hour rate of 0.56/100m^2 GFA.

High technology use uses the same rates as Light Industrial.

Self-Storage
The rate for warehouse and distribution is adopted from the *RMS Guide to Traffic Generating Developments Section 3.10 Warehouse* of 0.5/100m^2 GFA.

Healthcare Services
The rates for medical centres and medical consulting rooms were reviewed from the following sources: *Roads and Maritime Services Trip Generation Rates for Medical Centres Analysis Report* by TEF Consulting and *RMS Land Use Data* and *Analysis No 20 Extended Hours Medical Centres*. Whilst the facilities in this development may include some medical consulting use there will be other facilities such as medical offices and support facilities. Health services can include a broad range of services including allied health services. Allied health professionals provide a broad range of diagnostic, technical, therapeutic and direct health services to improve the health and wellbeing of the consumers they support. It may include aged care support, social health support services, disability consulting services, herbal or therapeutic remedies.

The following rates have been applied:-
The AM peak hour rate rate of 1.6/100m^2 GFA has been adopted. A PM peak hour rate of 3.1/100m^2 GFA has been adopted.

Dog Day Care
It is assumed for a facility with 276m^2 GFA there will be 2 staff and 40 animals. The traffic generation for this facility has been based on surveys undertaken at a similar sized facility, The Hound Lounge, located at 212-220 Parramatta Road Annandale with a GFA of 339.3m^2 GFA. The traffic generation rate pro-rata to GFA is 7 trips in and 7 trips out in the AM peak hour and 6.3 trips in and 6.3 trips out in the PM peak hour. Refer to **Appendix 1** in this report for survey results.

The revised traffic generation table is shown in **Table 4.1A.**

(4.1 continued.)

Table 4.1A Traffic Generation

	Land Use Groups	Peak Hour	Gross Floor Area (m^2)	Generation Rate	Traffic Generation			Reductions
					IN	OUT	TOTAL	Linked Trips
	Food and Drink Premises ***	AM	1542	46A/1000 X 20%	7.1	7.1	14.2	11.3
		PM		46A/1000 X 100%	35.5	35.5	70.9	56.7
	Specialised Retail ***	AM	3625	2.7/100m^2x 20%	9.8	9.8	19.6	15.7
		PM		2.7/100m^2x 100%	48.9	48.9	97.9	78.3
	Restaurant ***	AM	1154	1 per 100 m^2	9.2	2.3	11.5	9.2
		PM		5 per 100 m^2	28.9	28.9	57.7	46.2
Note 3	Café ***	AM	159	5 per 100 m^2	4.0	4.0	8.0	6.4
		PM		1 per 100 m^2	0.0	1.6	1.6	1.3
	Reduction Linked trips 20%	AM			6.0	4.6	10.7	Green Travel
	Reduction Linked trips 20%	PM			22.7	23.0	45.6	
	Light Industries****	AM	3036	0.52 per 100 m^2	12.6	3.2	15.8	15.0
		PM		0.56 per 100 m^2	3.4	13.6	17.0	16.2
	High Technology Industry****	AM	5790	0.52 per 100 m^2	24.1	6.0	30.1	28.6
		PM		0.56 per 100 m^2	6.5	25.9	32.4	30.8
Note 1	Centre Based Child Care Facility****	AM	711	0.8 per child	21.2	21.2	42.4	40.3
		PM	(106)	0.7 per child	18.6	18.6	37.1	35.2
	Self Storage****	AM	954	0.5/100*50% IN &50% OUT	2.4	2.4	4.8	4.56
	Facilities****	PM		0.5/100*50% IN &50% OUT	2.4	2.4	4.8	4.56
Note 2	**Gymnasium** ****	AM	881	0.18 per 100 m^2	0.8	0.8	1.6	1.5
		PM		0.9 per 100 m^2	3.96	4.0	7.9	7.5
	Office & Business Premises ****	AM	6972	2.75 per 100 m^2	153.4	38.3	191.7	182.1
		PM		1.17 per 100 m^2	16.3	65.3	81.6	77.5
Note 4	Health Care Services ****	AM	2695	1.6 per 100 m^2	21.6	21.6	43.1	41.0
		PM		3.1 per 100 m^2	41.8	41.8	83.55	79.4
	Reduction for Green Travel 5%	AM			11.8	4.7	16.5	
	Reduction for Green Travel 5%	PM			4.6	8.6	13.2	
Note 5	**Dog Daycare**	AM	276	see notes	7.0	7.0	14.0	
		PM			6.3	6.3	12.6	
Note 6	**Care Taker**	AM/PM	35				0.0	
			27830	**TOTAL AM**	**266.2**	**116.7**	**382.8**	
				TOTAL PM	**206.14**	**286.33**	**492.47**	
				AM Reduction for linked trips and green travel	**248.4**	**107.4**	**369.7**	
				PM Reduction for linked trips and green travel	**178.8**	**254.8**	**446.2**	

NOTES: -

Note 1: Traffic generation for childcare centres is calculated in accordance with the *RMS Guide to Traffic Generating Developments – Table 3.6 Traffic Generation Rates for Childcare Centres.* Long day is 0.8 trips per child over 2 hours 7 – 9am and 0.7 trips per child over 2 hours 4 – 6pm. Rates are for a 2 hour period and 106 children.

Note 2: AM rate based upon average 7 sub-regional centres.

Note 3: Most cafes are very busy in the AM peak hour period. Same rate as for restaurants.

Note 4: Based upon RTA data.

Note 5: 40 animals. Surveys carried out at a similar centre determined trip generation rate.
Factor 0.7 x 20 = 14 AM trips and 0.7 x 18 = 12.6 trips PM

Note 6: Caretaker on site. No traffic generation during AM/PM Peak Hours.

Note *** Reduction of 20% for linked multipurpose trips.

Note **** Reduction of 5% for green travel.

(4.1 continued.)

Table 4.1B Trip Generation for Employees and Customers
The calculation of employee trips to customer trips

AM Peak Hour Use								
Use	**Employee**	**Customer**	**In**	**Out**	**Assigned Trips Employees**	**In**	**Out**	**Assigned Trips Customers**
Food and Drink Premises	10%	90%	0.565	0.565	1.13	5.085	5.085	10.17
Specialised Retail	100%		15.7	7.85	15.7			
Restaurant	100%		4.6	4.6	9.2			
Café	100%		3.2	3.2	6.4			
Light Industries	100%		12	3	15			
High Technology	100%		22.88	5.72	28.6			
Childcare Centre	10%	90%	2	2	4	18	18	36
Self-storage	100%		2.25	2.25	4.5			
Gymnasium		100%				0.75	0.75	1.5
Office	100%	-	145.68	36.42	182.1			
Healthcare Services	100%		32.8	8.2	41			
Dog Daycare		100%				7	7	14
Totals					**307.63**			**61.67**
PM Peak Hour Use								
Use	**Employee**	**Customer**	**In**	**Out**	**Assigned Trips Employees**	**In**	**Out**	**Assigned Trips Customers**
Food and Drink Premises	100%		28.35	28.35	56.7			
Specialised Retail	10%	90%	3.915	3.915	7.83	35.235	35.235	70.47
Restaurant	10%	90%	2.31	2.31	4.62	20.79	20.79	41.58
Café	100%		0.65	0.65	1.3			
Light Industries	100%		8.1	8.1	16.2			
High Technology	100%		15.4	15.4	30.8			
Childcare Centre	10%	90%	1.76	1.76	3.52	15.84	15.84	31.68
Self-storage	100%		2.28	2.28	4.56			
Gymnasium	10%	90%	0.375	0.375	0.75	3.375	3.375	6.75
Office	100%	-	38.75	38.75	77.5			
Heathcare Services		100%	39.7	39.7	79.4			
Dog Daycare		100%	6.3	6.3	12.6			
Totals					**295.78**			**150.48**

5.0 SUMMARY

This report has been prepared in accordance with the *CDCP 2021 Part G3 Parking* and where there is no specific rate, justification is provided through comparable survey data.

Table 2 of *CDCP Part G* does not provide a rate for specialised retail premises or bulky goods retail, and therefore the following note applies:

"Where a parking rate has not been specified in the table, the Guide to Traffic Generating Developments shall be used to calculate the parking requirements for the proposed development. Alternatively, a parking study may be used to determine the parking, subject to prior approval by Council."

Trip distribution for local customers and those visiting specialised retail uses are described in detail. The distribution of employee trips is also described in detail and the assignment to the road network. This report is to be read in conjunction with *Report No 34_22 Traffic and Parking Impact Assessment for Development Application for Proposed Business Development at 2 Bachell Avenue Lidcombe*.

APPENDIX I

Curtis Traffic Surveys

Job: 230901lm
Client: Lyle Marshall & Partners
Day, date 18/09/23 Average length of stay 00:02
Location: Hound Lounge Annandale
Weather: Fine
Surveyor MC

Arrival time	Vehicle Identifier	Departure Time	Comment	Length of stay	Mode Split Staff Van	Mode Split No of Car Drivers	Mode Split Walked
07:01		07:04		00:03			
07:09		>9:00	Hound Lounge van		1		
07:09		07:11		00:02		1	
07:10		07:12		00:02		1	
07:20		07:22		00:02		1	
07:22		07:24		00:02		1	
07:31		07:31	walked				1
07:38		07:39		00:01		1	
07:45		07:49		00:04		1	
07:46		07:48		00:02		1	
07:48		07:48	walked				1
07:49		07:51		00:02		1	
07:53		07:57		00:04		1	
07:55		07:58		00:03		1	
07:55		07:57		00:02		1	
07:59		08:02		00:03		1	
07:59		08:01		00:02		1	
08:06		08:09	walked				1
08:10		08:13		00:03		1	
08:11		08:12	walked				1
08:15		08:18		00:03		1	
08:20		08:24		00:04		1	
08:23		08:26		00:03		1	
08:29		08:35		00:06		1	
08:30		08:31	walked				1
08:39		08:40		00:01		1	
08:41		08:43		00:02		1	
Average Length of Stay				**00:02**		**20**	**5**

Curtis Traffic Surveys

Job: 230901lm
Client: Lyle Marshall & Partners
Day, date 18/09/23 Average length of stay 00:05
Location: Hound Lounge Annandale
Weather: Fine
Surveyor MC

Arrival time	Vehicle Identifier	Departure Time	Comment	Length of stay	Mode Split: No of Car Drive	Mode Split: Walked
<16:00	Hound Lounge van	16:58	Hound Lounge van			
15:44		15:51		00:07	1	
15:52		15:56		00:04	1	
16:03		16:07		00:04	1	
16:09		16:12		00:03	1	
16:21		16:28		00:07	1	
16:21		16:25		00:04	1	
16:29		16:32		00:03	1	
16:32		16:40		00:08	1	
16:37		16:41		00:04	1	
16:39		16:45		00:06	1	
17:04		17:11		00:07	1	
17:07		17:14		00:07	1	
17:17	Hound Lounge van	<18:00	Hound Lounge van			
17:21		17:24		00:03	1	
17:21		17:29		00:08	1	
17:25		17:31		00:06	1	
17:42		17:45		00:03	1	
17:44		17:49		00:05	1	
17:46		17:50		00:04	1	
17:49		17:53		00:04	1	
17:52		17:55	walked			1
				00:05	**18**	**1**

APPENDIX 2

NSW GOVERNMENT

Planning circular

PLANNING SYSTEM

Amendments to retail land use definitions - garden centre, artisan food and drink industry, local distribution premises, neighbourhood supermarkets and specialised retail premises

Circular	PS 18-008
Issued	31 Aug 2018 (replaces version issued 27 July 2018)
Related	PS 13-001

Amendments to Retail Land Use Definitions

This Circular is to advise local councils and other relevant planning authorities, community, industry and practitioners of a number of retail land use definitions (new or revised) introduced into the Standard Instrument (Local Environmental Plans) Order 2006 and certain other environmental planning instruments.

Updating retail land uses

The NSW retail sector is dynamic and highly competitive. With constantly evolving consumer preferences and technology continuing to transform traditional retail, the NSW planning system must be able to adapt.

The NSW Department of Planning and Environment exhibited five strategic amendments to retail land uses from 3 April 2018 to 18 May 2018. The proposed definition amendments aimed to provide consistency, efficiency and clarity to the NSW planning system for retail and include:

- A new definition for 'artisan food and drink industry';
- A revised definition for 'garden centre'
- A new definition for 'local distribution premises'
- A new definition for 'neighbourhood supermarkets'; and
- Replacement of the definition for 'bulky goods premises' with 'specialised retail premises'.

This Planning Circular provides an overview of the purpose of the amendments, and the impact of the change for local government, stakeholders and the community.

Revised 'garden centre' definition

Overview of the amendment

A revised definition of 'garden centre' has been included in the *Standard Instrument (Local Environmental Plans) Order 2006* (SI LEP Order) to clarify the type of uses that may be included in a garden centre and to remove the requirement for the uses to be ancillary to the retail sale of plants and landscaping and gardening supplies and equipment.

The amended definition of 'garden centre' replaces all definitions of 'garden centre' in standard instrument local environmental plans and certain other environmental planning instruments.

Purpose of the amendment

The revised definition of 'garden centre' seeks to balance the views of stakeholders and deliver a contemporary definition which responds to the changing nature of the garden centre format.

The amendment to the SI LEP Order restructures the definition of 'garden centre' to clarify the principal and complementary uses that may be carried out in a garden centre. It removes the term 'ancillary', lists the uses that may be associated with a garden centre and restructures the definition to remove ambiguity.

Garden centres have evolved into places where customers can shop for their gardening and outdoor improvement needs. The amendment allows for a mix of complementary uses to better serve customer needs.

Revised 'garden centre' definition

The definition of 'garden centre' will now read:

garden centre *means a building or place the principal purpose of which is the retail sale of plants and landscaping and gardening supplies and equipment. It may include a restaurant or cafe and the sale of any of the following:*

There is also a growing requirement for a larger floor plate because of the quantity and range of products on offer, rather than the size of an individual product.

The new definition of ‘specialised retail premises’ differs from the previous definition of ‘bulky goods premises’ in that:

- It is no longer a requirement that the goods be of such a size or weight as to require both a large area for handling, display and storage and direct vehicular access to loading facilities for members of the public. Only one of these requirements needs to be met.
- Retailers that stock a large quantity or volume of products are characterised as specialised retail premises even if those products are not large or heavy, but the quantity or volume of goods requires a large area for handling, display and storage or direct vehicular access to loading facilities for members of the public.

New ‘specialised retail premises’ definition

The new definition of ‘specialised retail premises’ is:

specialised retail premises *means a building or place the principal purpose of which is the sale, hire or display of goods that are of a size, weight or quantity, that requires:*

(a) a large area for handling, display or storage, or

(b) direct vehicular access to the site of the building or place by members of the public for the purpose of loading or unloading such goods into or from their vehicles after purchase or hire,

but does not include a building or place used for the sale of foodstuffs or clothing unless their sale is ancillary to those goods being sold, hired or displayed.

Note. *Examples of goods that may be sold at specialised retail premises include automotive parts and accessories, household appliances and fittings, furniture, homewares, office equipment, outdoor and recreation equipment, pet supplies and party supplies.*

Specialised retail premises are a type of retail premises—see the definition of that term in this Dictionary.

Types of goods that fall within the definition of ‘specialised retail premises’

The definition includes a list of examples of goods that may be sold, displayed or hired at specialised retail premises. The term ‘goods’ includes accessories, equipment and supplies.

This list of examples is not exhaustive or exclusive – any goods that are of such a size, weight or quantity so as to require a large area for handling, display and storage or direct vehicular access to loading facilities for members of the public will meet the definition.

Types of goods that fall within the definition include:

- animal supplies including equestrian and pet goods;
- automotive parts and accessories;
- camping, outdoor and recreation goods;
- electric light fittings;
- floor, wall and window coverings;
- furniture, bedding, furnishings, fabric and manchester and homewares;
- household appliances and fittings;
- household electrical goods and home entertainment goods;
- party supplies;
- swimming pools and spas;
- office equipment and supplies;
- baby and children’s goods, children’s play equipment and accessories;
- barbeques, fireplaces and gas appliances;
- sporting, cycling, leisure, fitness goods and accessories;

Ancillary goods

A comprehensive and full range of goods, of all shapes and sizes, can be sold, displayed and hired in a ‘specialised retail premises’.

A ‘specialised retail premises’ can include the sale and display of foodstuffs and clothing, however they must be ancillary and/or incidental and/or sold in conjunction to the goods which meet one of the two nominated tests in the definition.

Land use permissibility

‘Specialised retail premises’ will replace ‘bulky goods premises’ wherever the term occurs in a Standard Instrument LEP. This means ‘specialised retail premises’ will be permissible wherever ‘bulky good premises’ were permissible.

Like ‘bulky goods premises’, ‘specialised retail premises’ will be a subset of ‘retail premises’ and ‘commercial premises’ and will be permissible wherever these uses are permissible (as long as ‘specialised retail premises’ are not specifically prohibited). ‘Specialised retail premises’ will also remain a mandated permissible use in the B5 Business Development zone.

Need for the change

The Department has received submissions from industry and councils that the current definition of ‘bulky goods premises’ does not reflect the current and future direction of large format retailing. The new definition clarifies that ‘specialised retail premises’ includes, the display, sale or hire of goods that are of a size or weight, or a quantity of products to require a large floor area or access for customer loading facilities.

APPENDIX J

RAAD PROPERTY ACQUISITION NO 10 PTY LTD

BUSINESS DEVELOPMENT

AT
2 BACHELL AVENUE LIDCOMBE

REPORT ON
PARKING UTILISATION AND CAPACITY ANALYSIS OF LOADING FACILITIES FOR SPECIALISED RETAIL

Prepared by:

Lyle Marshall & Partners Pty Ltd
Consulting Engineers, Architects,
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Job No.: 1194-22
Report No.: 18/23 **OCTOBER 2023**

CONTENTS

LIST OF FIGURES

APPENDICES

APPENDIX A

- **NSW Government Planning Circular PS 18-008 dated 31 August 2018 Amendments to Retail Land Use Definitions**

APPENDIX B

Surveys carried out of Loading Dock at 1 Frederick Street Artarmon

- **Tuesday 14/2/2023 between 9:00am and 4:45pm**
- **Wednesday 15/2/2923 between 9:00am and 4:30pm**
- **Thursday 16/2/2023 between 9:00am and 4:30p**

1.0 INTRODUCTION

1.1 Background

The aim of the study is to undertake a capacity and efficiency analysis reviewing the operating development loading facilities to ascertain loading service rates.

The objective of the report is to look at facilities which have mixed use specialised retail facilities**.** Undertake a survey at a comparable centre for specialised retail.

1.2 Scope of Report

The definition of specialised retail is from the *NSW Planning Circular PS 18-008 Amendments to Retail Land Use Definitions: -*

> ***New 'specialised retail premises' definition***
>
> *The new definition of 'specialised retail premises' is:*
> ***specialised retail premises** means a building or place the principal purpose of which is the sale, hire or display of goods that are of a size, weight or quantity, that requires:*
>
> *(a) a large area for handling, display or storage, or*
> *(b) direct vehicular access to the site of the building or place by members of the public for the purpose of loading or unloading such goods into or from their vehicles after purchase or hire, but does not include a building or place used for the sale of foodstuffs or clothing unless their sale is ancillary to those goods being sold, hired or displayed.*
>
> *Note. Examples of goods that may be sold at specialised retail premises include automotive parts and accessories, household appliances and fittings, furniture, homewares, office equipment, outdoor and recreation equipment, pet supplies and party supplies.*

A copy of the Planning Circular is contained in **Appendix A** of this report.

A study of the loading operations at a similar facility will determine loading requirements to gross floor area.

This report has been prepared to :-

Part A1
Undertake surveys at a similar specialised retail facility to ascertain peak loading demand and utilisation rates.

1) A survey over 3 week days between 9:00am – 5:00pm to ascertain peak demand in the loading dock and classification and length of stay.
2) Analyse survey data and determine peak period demand.
3) Analyse vehicle type and demand for type of loading spaces.
4) Calculate demand for loading facility at Hampstead Road Auburn based upon survey data.

2.0 PARKING AND UTILIZATION RATES FOR CAPACITY OF LOADING FACILITY — SPECIALISED RETAIL

We have undertaken a loading classification study at a similar facility located at 1 Frederick Street Artarmon, known as Home HQ. The site is also known as Lot 12, DP 230974 as shown in **Figure 1 Locality Plan**. The centre operations from 9:00am to 5:30pm Monday to Sunday. The centre has a glasshouse café and variety of furniture and retail warehouse stores as shown in **Figure 2**.

Photograph P1 shows the entrance driveway for trucks when viewed from Frederick Street. **Photographs P2** to **P6** show the loading bay areas.

The centre has a GFA of 24191m^2 and has 432 car parking spaces on site as per the approved DA 2014/578.

The loading dock has access from Frederick Street. A plan of the loading dock is shown in **Figure 3**.

The surveys at Home HQ were carried out over 3 consecutive days: Tuesday 14/2/23, Wednesday 15/2/23 and Thursday 16/2/23.

The full results of the surveys are located in **Appendix B** of this report.

Table 2.0 Summary of Peak Loading Activity at 1 Frederick Street Artarmon

Day	Time	Vehicle Type/No	
		MRV's	Vans/Utility
Tuesday 14/2/23	10:30 - 11:00am	4	4
*Wednesday 15/2/23	9:30 - 10:00am	6	3
Thursday 16/2/23	10:30 - 11:00am	3	4
Average (rounded up)		**4**	**4**

* Please note that Bay 4 is not operational due to large skip bin within loading bay on the days of the survey. A truck blocking the entrance driveway from 9:00am to 11:00am meant that trucks could not enter any of the bays.

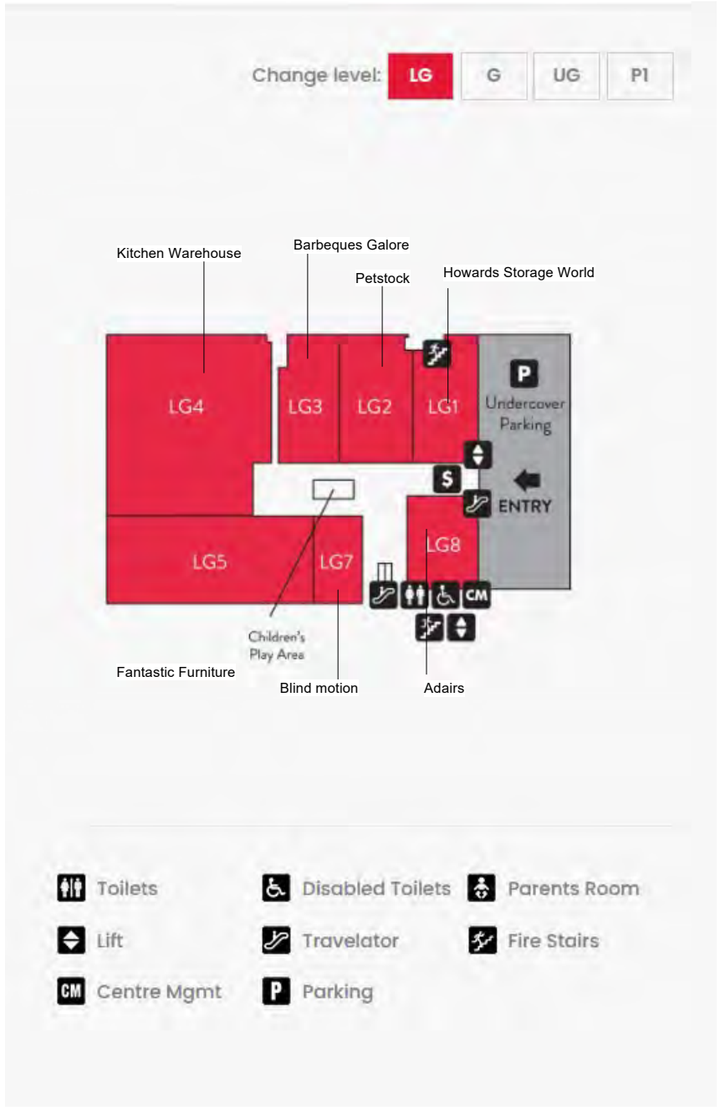
NORTH

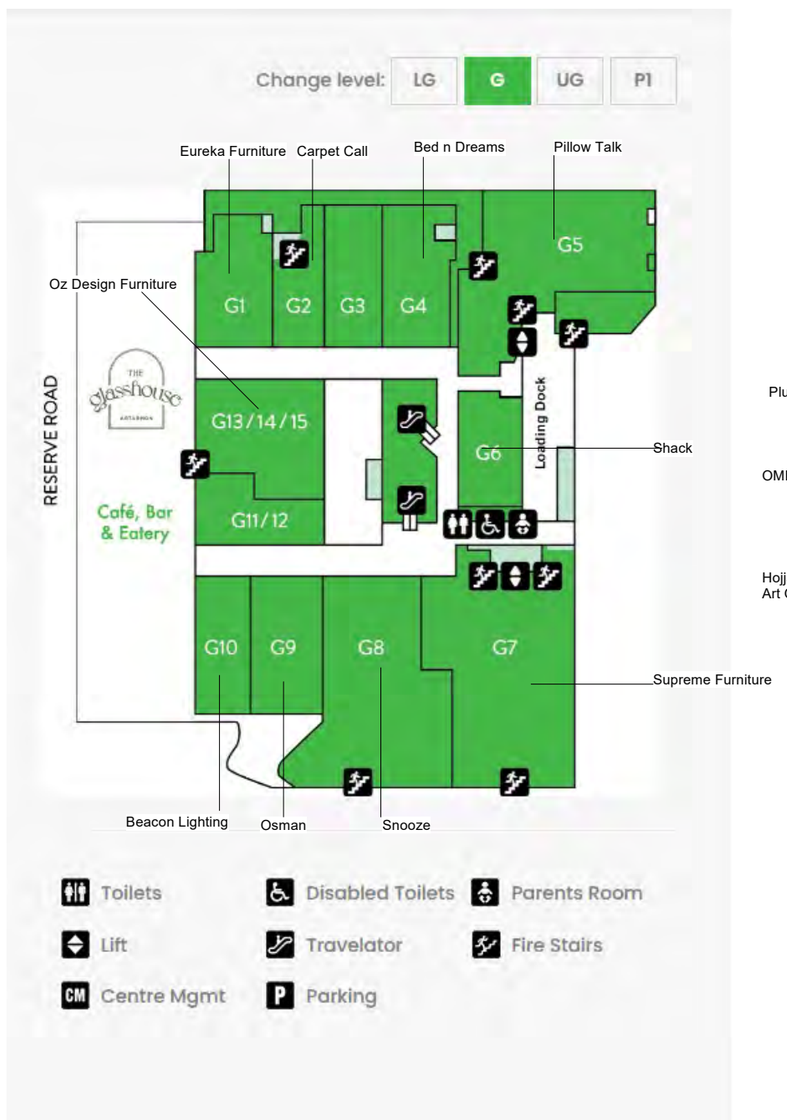
SOURCE NEARMAP 2023

SITE 1

Lot 12 DP 230974
1 FREDERICK STREET ARTARMON

FIGURE 1
LOCALITY MAP





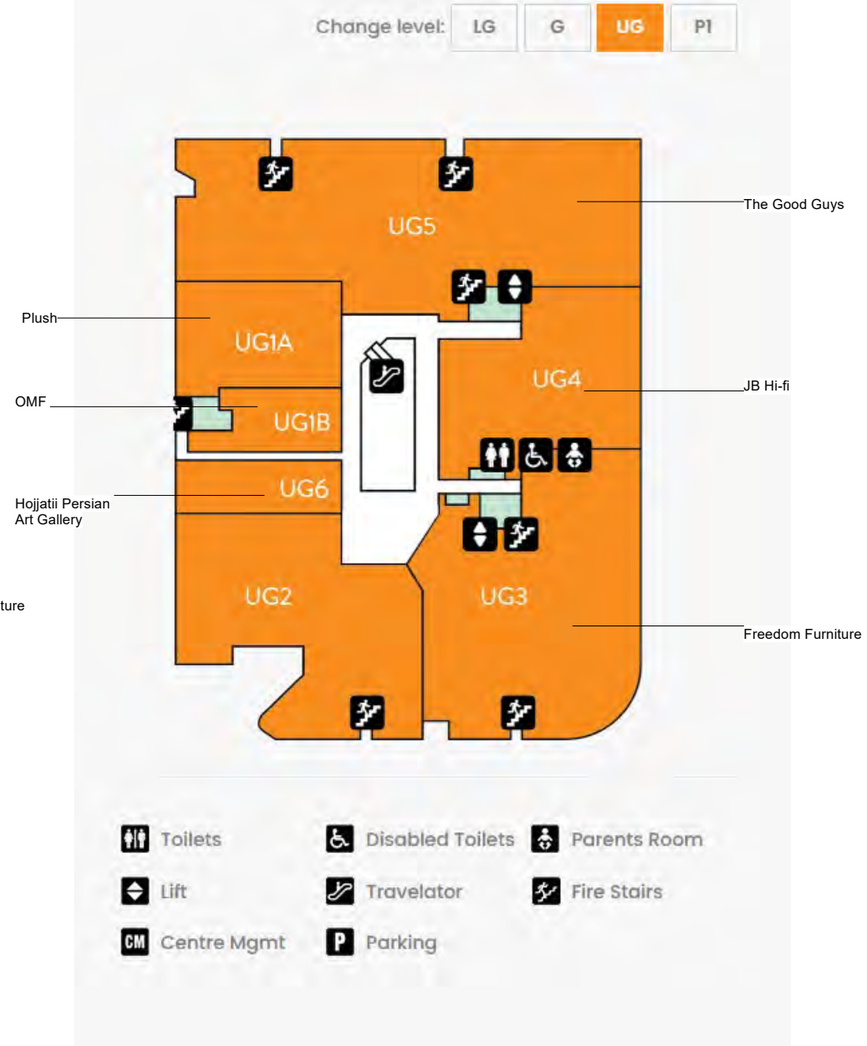


FIGURE 2 SHOP DIRECTORY
HOME HQ
1 FREDERICK STREET ARTARMON

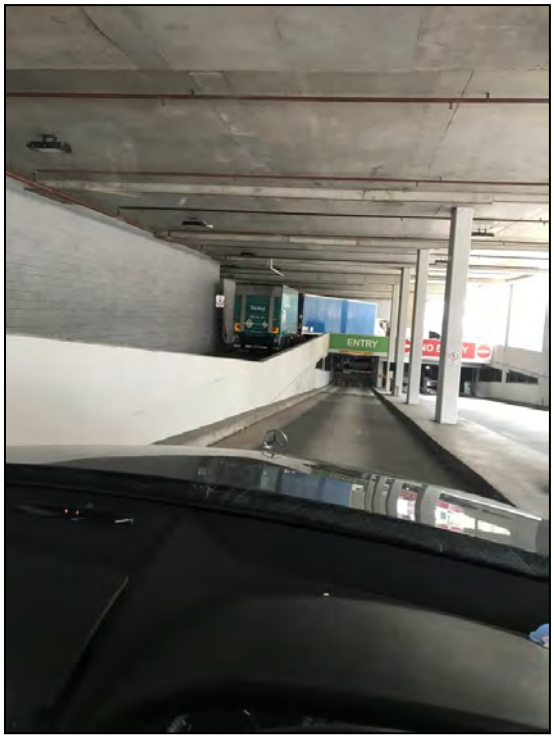


Photo P1: Driveways viewedfrom Frederick Street. 1/2/23.

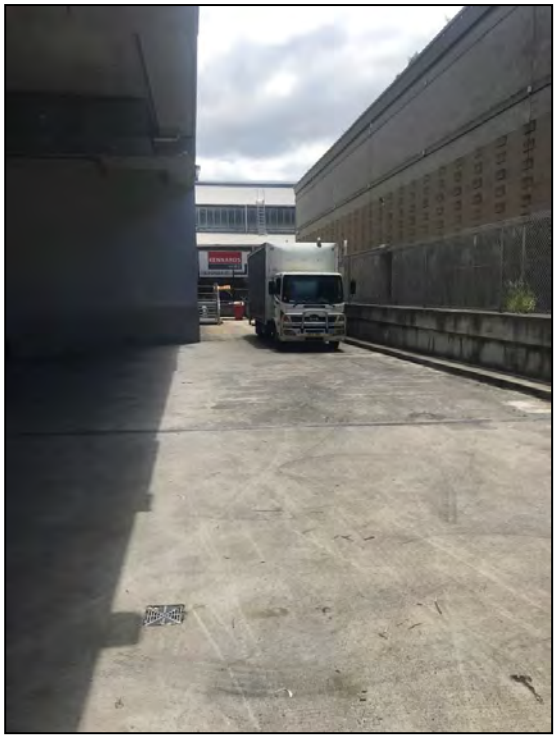


Photo P2: MRV truck in Bay 5.

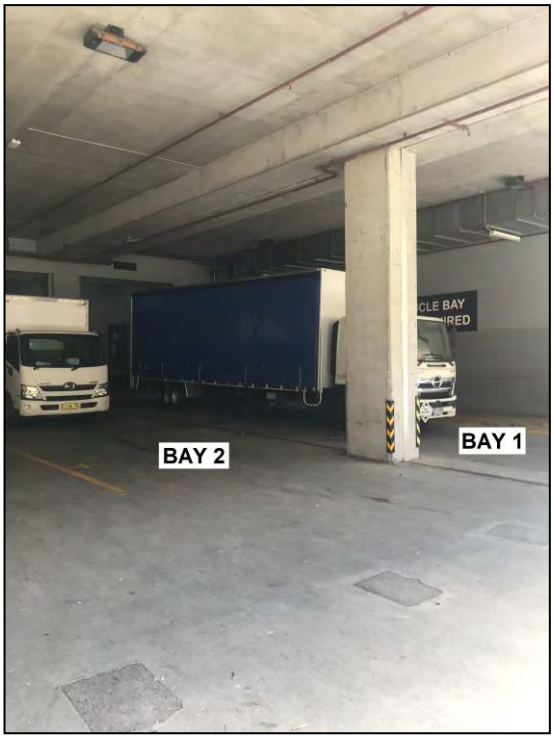


Photo P3: HRV in Bay 1.

Photo P4: MRV trucks in Bays 2 and 3.

Photo P5: Skip bins in Bay 4.

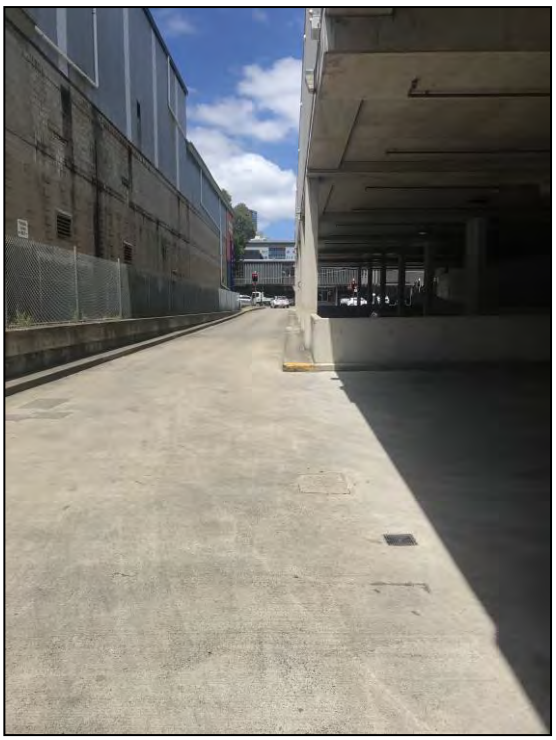


Photo P6: Truck exit drivewaty 1/2/23.

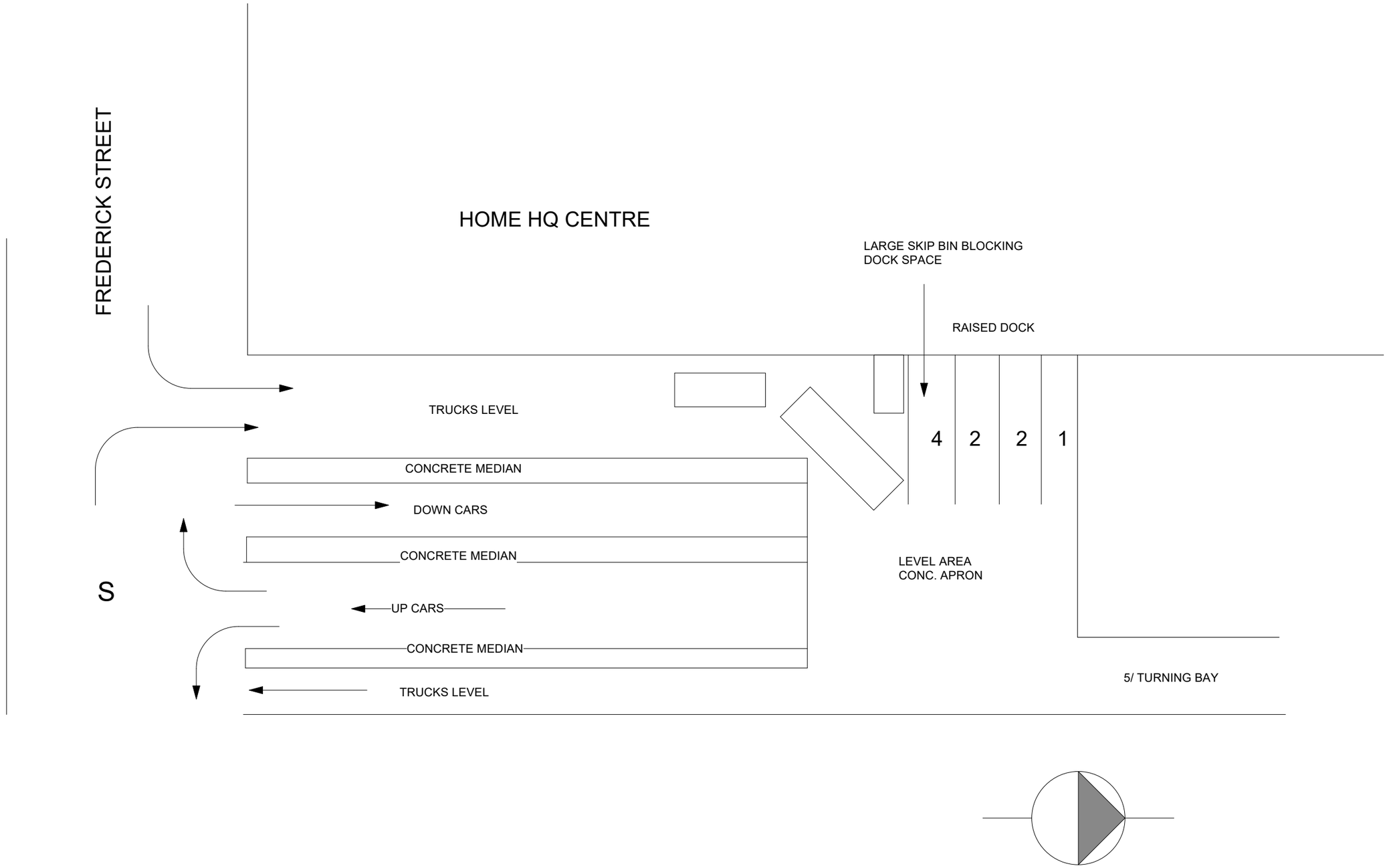


FIGURE 3
LOADING DOCK PLAN
1 FREDERICK STREET ARTARMON

3.0 COMPARISON ANALYSIS – SPECIALISED RETAIL

The loading bay analysis shows that on average there are 4 MRV and 4 small van spaces required for 24191m^2 of GFA based on data recorded at 1 Frederick Street Artarmon.

The occupancy rate can be pro-rata to GFA for the site at 54 – 68 Hampstead Road and 276 – 282 Parramatta Road Auburn. This GFA is for specialised retail on the total site.

2 Bachell Avenue Lidcombe	1 Frederick Street Artarmon
3625m^2 GFA	24191m^2 GFA

Pro-rata rate = 0.15

The required number of loading bays is 0.15 x 8 bays = 1.2 loading bays.

The required number of loading bays was calculated in the master planning **Report No 18-22** under Section 3.9. as 1.81 loading bays. However, 1.2 parking bays will cater for this demand.

4.0 CONCLUSION

The loading dock capacity analysis demonstrates that the demand for specialised retail based on a comparison to a similar facility requires 1.2 spaces.

APPENDICES

APPENDIX A

NSW GOVERNMENT

Planning circular

PLANNING SYSTEM

Amendments to retail land use definitions - garden centre, artisan food and drink industry, local distribution premises, neighbourhood supermarkets and specialised retail premises

Circular	PS 18-008
Issued	31 Aug 2018 (replaces version issued 27 July 2018)
Related	PS 13-001

Amendments to Retail Land Use Definitions

This Circular is to advise local councils and other relevant planning authorities, community, industry and practitioners of a number of retail land use definitions (new or revised) introduced into the Standard Instrument (Local Environmental Plans) Order 2006 and certain other environmental planning instruments.

Updating retail land uses

The NSW retail sector is dynamic and highly competitive. With constantly evolving consumer preferences and technology continuing to transform traditional retail, the NSW planning system must be able to adapt.

The NSW Department of Planning and Environment exhibited five strategic amendments to retail land uses from 3 April 2018 to 18 May 2018. The proposed definition amendments aimed to provide consistency, efficiency and clarity to the NSW planning system for retail and include:

- A new definition for 'artisan food and drink industry';
- A revised definition for 'garden centre'
- A new definition for 'local distribution premises'
- A new definition for 'neighbourhood supermarkets'; and
- Replacement of the definition for 'bulky goods premises' with 'specialised retail premises'.

This Planning Circular provides an overview of the purpose of the amendments, and the impact of the change for local government, stakeholders and the community.

Revised 'garden centre' definition

Overview of the amendment

A revised definition of 'garden centre' has been included in the *Standard Instrument (Local Environmental Plans) Order 2006* (SI LEP Order) to clarify the type of uses that may be included in a garden centre and to remove the requirement for the uses to be ancillary to the retail sale of plants and landscaping and gardening supplies and equipment.

The amended definition of 'garden centre' replaces all definitions of 'garden centre' in standard instrument local environmental plans and certain other environmental planning instruments.

Purpose of the amendment

The revised definition of 'garden centre' seeks to balance the views of stakeholders and deliver a contemporary definition which responds to the changing nature of the garden centre format.

The amendment to the SI LEP Order restructures the definition of 'garden centre' to clarify the principal and complementary uses that may be carried out in a garden centre. It removes the term 'ancillary', lists the uses that may be associated with a garden centre and restructures the definition to remove ambiguity.

Garden centres have evolved into places where customers can shop for their gardening and outdoor improvement needs. The amendment allows for a mix of complementary uses to better serve customer needs.

Revised 'garden centre' definition

The definition of 'garden centre' will now read:

garden centre *means a building or place the principal purpose of which is the retail sale of plants and landscaping and gardening supplies and equipment. It may include a restaurant or cafe and the sale of any of the following:*

There is also a growing requirement for a larger floor plate because of the quantity and range of products on offer, rather than the size of an individual product.

The new definition of ‘specialised retail premises’ differs from the previous definition of ‘bulky goods premises’ in that:

- It is no longer a requirement that the goods be of such a size or weight as to require both a large area for handling, display and storage and direct vehicular access to loading facilities for members of the public. Only one of these requirements needs to be met.
- Retailers that stock a large quantity or volume of products are characterised as specialised retail premises even if those products are not large or heavy, but the quantity or volume of goods requires a large area for handling, display and storage or direct vehicular access to loading facilities for members of the public.

New ‘specialised retail premises’ definition

The new definition of ‘specialised retail premises’ is:

specialised retail premises *means a building or place the principal purpose of which is the sale, hire or display of goods that are of a size, weight or quantity, that requires:*

(a) a large area for handling, display or storage, or

(b) direct vehicular access to the site of the building or place by members of the public for the purpose of loading or unloading such goods into or from their vehicles after purchase or hire,

but does not include a building or place used for the sale of foodstuffs or clothing unless their sale is ancillary to those goods being sold, hired or displayed.

Note. *Examples of goods that may be sold at specialised retail premises include automotive parts and accessories, household appliances and fittings, furniture, homewares, office equipment, outdoor and recreation equipment, pet supplies and party supplies.*

Specialised retail premises are a type of retail premises—see the definition of that term in this Dictionary.

Types of goods that fall within the definition of ‘specialised retail premises’

The definition includes a list of examples of goods that may be sold, displayed or hired at specialised retail premises. The term ‘goods’ includes accessories, equipment and supplies.

This list of examples is not exhaustive or exclusive – any goods that are of such a size, weight or quantity so as to require a large area for handling, display and storage or direct vehicular access to loading facilities for members of the public will meet the definition.

Types of goods that fall within the definition include:

- animal supplies including equestrian and pet goods;
- automotive parts and accessories;
- camping, outdoor and recreation goods;
- electric light fittings;
- floor, wall and window coverings;
- furniture, bedding, furnishings, fabric and manchester and homewares;
- household appliances and fittings;
- household electrical goods and home entertainment goods;
- party supplies;
- swimming pools and spas;
- office equipment and supplies;
- baby and children’s goods, children’s play equipment and accessories;
- barbeques, fireplaces and gas appliances;
- sporting, cycling, leisure, fitness goods and accessories;

Ancillary goods

A comprehensive and full range of goods, of all shapes and sizes, can be sold, displayed and hired in a ‘specialised retail premises’.

A ‘specialised retail premises’ can include the sale and display of foodstuffs and clothing, however they must be ancillary and/or incidental and/or sold in conjunction to the goods which meet one of the two nominated tests in the definition.

Land use permissibility

‘Specialised retail premises’ will replace ‘bulky goods premises’ wherever the term occurs in a Standard Instrument LEP. This means ‘specialised retail premises’ will be permissible wherever ‘bulky good premises’ were permissible.

Like ‘bulky goods premises’, ‘specialised retail premises’ will be a subset of ‘retail premises’ and ‘commercial premises’ and will be permissible wherever these uses are permissible (as long as ‘specialised retail premises’ are not specifically prohibited). ‘Specialised retail premises’ will also remain a mandated permissible use in the B5 Business Development zone.

Need for the change

The Department has received submissions from industry and councils that the current definition of ‘bulky goods premises’ does not reflect the current and future direction of large format retailing. The new definition clarifies that ‘specialised retail premises’ includes, the display, sale or hire of goods that are of a size or weight, or a quantity of products to require a large floor area or access for customer loading facilities.

APPENDIX B

Curtis Traffic Surveys

Job: 230201lm (1193_2_23)
Client: Lyle Marshall & Partners
Day, date: Tue 14 Feb 23
Location: 1 Frederick St
Weather: Fine early, rain in afternoon
Surveyor: MC

					LOCATION WHERE PARKED								
	Arrival time	Vehicle type	on rear axles?	No of axles	Bay 1	Bay 2	Bay 3	Bay 4	Turning Area	Drivewa y	Departure time	Length of stay	Number of bays required
1	<9:00	2 axle truck	yes	2	1						09:15	00:15	
2	<9:00	van	no	2					1		>17:00	>8:00	
3	<9:00	utility	no	2					1		>17:00	>8:00	
4	09:07	2 axle truck	yes	2		1					09:23	00:16	
5	09:10	utility	no	2					1		09:27	00:17	
6	09:10	van	no	2					1		09:50	00:40	
7	09:18	utility	no	2					1		09:28	00:10	
	9:00-9:30:00 AM				1	1	0	0	5	0			**7**
8	09:40	van	no	2					1		10:12	00:32	
9	09:42	van	no	2	1						10:03	00:21	
10	09:48	2 axle truck	yes	2			1				10:00	00:12	
11	09:51	2 axle truck	yes	2		1					10:18	00:27	
12	09:52	2 axle truck	yes	2					1		09:59	00:07	
13	09:54	2 axle truck	yes	2			1				10:36	00:42	
	9:30-10:00:00 AM				1	1	1	0	4	0			**7**
14	10:04	utility	no	2		1					10:21	00:17	
15	10:06	utility	no	2	1						10:12	00:06	
16	10:22	2 axle truck	yes	2		1					11:00	00:38	
17	10:23	2 axle truck	yes	2			1				10:43	00:20	
18	10:26	2 axle truck	yes	2	1						10:28	00:02	
	10:00-10:30:00 AM				1	1	1	0	2	0			**5**
19	10:33	3	yes	3			1				11:01	00:28	
20	10:35	van	no	2					1		10:36	00:01	
21	10:45	van	no	2						1	10:48	00:03	
22	10:52	van	no	2	1						11:13	00:21	
23	10:55	2 axle truck	yes	2						1	11:17	00:22	
24	10:59	2 axle truck	yes	2						1	11:15	00:16	
	10:30-11:00:00 AM				1	0	1	0	3	3			**8**
25	11:07	van	no	2						1	11:18	00:11	
26	11:15	2 axle truck	yes	2			1				11:32	00:17	
27	11:18	van	no	2					1		11:30	00:12	
28	11:27	van	no	2	1						11:35	00:08	
29	11:27	2 axle truck	yes	2						1	11:28	00:01	
	11:00-11:30:00 AM				1	0	1	0	3	2			**7**
30	11:30	2 axle truck	yes	2					1		11:48	00:18	
31	11:32	2 axle truck	yes	2						1	11:37	00:05	
32	11:43	2 axle truck	yes	2			1				11:57	00:14	
33	11:44	van	no	2		1					12:09	00:25	
34	11:48	2 axle truck	yes	2						1	12:15	00:27	
35	11:51	2 axle truck	yes	2			1				12:06	00:15	
	11:30-12:00:00 PM				0	1	1	0	3	2			**7**
36	12:13	van	no	2					1		12:32	00:19	
37	12:20	2 axle truck	yes	2					1		12:43	00:23	
38	12:24	2 axle truck	yes	2	1						13:10	00:46	
39	12:26	3	yes	3			1				12:35	00:09	
	12:00-12:30:00 PM				1	0	1	0	4	0			**6**
40	12:30	2 axle truck	yes	2		1					12:36	00:06	
41	12:31	2 axle truck	yes	2			1				13:07	00:36	
42	12:35	2 axle truck	yes	2	1						12:58	00:23	
43	12:59	2 axle truck	yes	2			1				13:06	00:07	
	12:30-1:00:00 PM				1	1	1	0	2	0			**5**
44	13:08	2 axle truck	yes	2			1				13:21	00:13	
45	13:12	van	no	2		1					13:15	00:03	
46	13:20	2 axle truck	yes	2		1					13:42	00:22	
47	13:22	2 axle truck	yes	2			1				13:44	00:22	

48	13:25	van	no	2					1		13:41	00:16	
49	13:26	van	no	2		1					13:39	00:13	
	1:00-1:30:00 PM				0	1	1	0	3	0			5
50	13:51	2 axle truck	yes	2		1					13:56	00:05	
51	13:52	van	no	2	1						13:54	00:02	
	1:30-2:00:00 PM				1	1	0	0	2	0			4
52	14:04	van	no	2	1						14:32	00:28	
53	14:05	van	no	2		1					14:21	00:16	
54	14:11	2 axle truck	yes	2			1				14:42	00:31	
55	14:12	van	no	2					1		14:25	00:13	
56	14:15	van	no	2					1		14:31	00:16	
57	14:18	2 axle truck	yes	2		1					14:53	00:35	
58	14:29	2 axle truck	yes	2			1				14:37	00:08	
	2:00-2:30:00 PM				1	1	1	0	4	0			7
59	14:49	2 axle truck	yes	2		1					14:53	00:04	
60	14:51	van	no	2	1						15:00	00:09	
	2:30-3:00:00 PM				1	1	0	0	2	0			4
61	15:14	van	no	2		1					16:05	00:51	
62	15:18	van	no	2			1				15:42	00:24	
63	15:28	2 axle truck	yes	2	1						15:40	00:12	
64	15:37	3 axle rigid truck	yes	3					1		>17:00	>1:27	
65	15:45	2 axle truck	yes	2	1						15:52	00:07	
	3:00-4:00:00 PM				1	1	1	0	3	0			6
66	16:07	van	no	2		1					16:27	00:20	
67	16:46	2 axle truck	yes	2			1				>17:00	>0:14	
	4:00-5:00:00 PM				0	1	1	0	2	0			4
	Average Service Time											00:17	

Legend

van	small vans and utilitys normal car space required
	Length of stay over 6 hours

Curtis Traffic Surveys

Job: 230201lm (1193_2_23)
Client: Lyle Marshall & Partners
Day, date ##########
Location: 1 Frederick St
Weather: Fine
Surveyor MC

	Arrival time	Vehicle type	on rear axles?	No of axles	Bay 1	Bay 2	Bay 3	Bay 4	Turning Area	Drivewa y	Departur e time	Length of sta	Total Number of bays required
1	<9:00	2 axle truck	1	2			1				09:03	<0:03	
2	<9:00	2 axle truck	1	2		1					11:10	<2:10	
3	<9:00	utility	0	2					1		09:01	<0:01	
4	<9:00	van	0	2					1		15:49	<6:49	
5	<9:00	utility	0	2					1		15:19	<6:19	
6	<9:00	van	0	2					1		09:43	<0:43	
7	09:03	2 axle truck	1	2			1				09:21	00:18	
8	09:16	utility	0	2						1	10:44	01:28	
9	09:19	2 axle truck	1	2			1				09:22	00:03	
10	09:29	2 axle truck	1	2			1				09:52	00:23	
	9:00-9:30:00 AM				0	0	1	0	4	1			**6**
11	09:35	van	0	2		1					10:25	00:50	
12	09:41	2 axle truck	1	2						1	10:05	00:24	
13	09:41	2 axle truck	1	2						1	10:22	00:41	blockage to bays
14	09:48	2 axle truck	1	2						1	10:54	01:06	
15	09:53	2 axle truck	1	2						1	11:51	01:58	
16	09:54	2 axle truck	1	2						1	11:25	01:31	
	9:30-10:00:00 AM				0	1	1	0	2	5			**9**
17	10:11	2 axle truck	1	2						1	11:50	01:39	blockage to bays
18	10:35	2 axle truck	1	2						1	11:12	00:37	
	10:00-10:30:00 AM				0	0	0	0	2	7			**9**
19	10:40	2 axle truck	1	2						1	10:43	00:03	blockage to bays
20	10:42	2 axle truck	1	2						1	11:35	00:53	
21	10:56	van	0	2						1	11:22	00:26	
	10:30-11:00:00 AM				0	0	0	0	2	10			**12**
22	11:06	2 axle truck	1	2						1	11:11	00:05	
23	11:12	van	0	2					1		11:27	00:15	
24	11:13	van	0	2						1	11:20	00:07	
25	11:19	2 axle truck	1	2						1	11:26	00:07	
	11:00-11:30:00 AM				0	0	0	0	3	3			**6**
26	11:31	van	0	2		1					11:44	00:13	
27	11:33	2 axle truck	1	2			1				11:55	00:22	
28	11:41	2 axle truck	1	2		1					12:31	00:50	
29	11:46	van	0	2	1						11:54	00:08	
30	11:49	2 axle truck	1	2					1		12:02	00:13	
31	11:52	2 axle truck	1	2					1		12:02	00:10	
32	11:58	van	0	2			1				12:16	00:18	
	11:30-12:00:00 PM				1	1	1	0	4	0			**7**
33	12:00	2 axle truck	1	2		1					12:17	00:17	
34	12:23	van	0	2	1						12:38	00:15	
	1:00-1:30:00 PM				1	1	0	0	2	0			**4**
35	13:04	2 axle truck	1	2			1				13:32	00:28	
36	13:06	2 axle truck	1	2		1					13:23	00:17	
37	13:08	van	0	2	1						13:21	00:13	
	1:30-2:00:00 PM				1	1	1	0	2	0			**5**
38	13:34	van	0	2					1		13:51	00:17	
39	13:38	van	0	2	1						13:51	00:13	
40	13:46	van	0	2		1					14:53	01:07	
41	13:46	van	0	2			1				14:03	00:17	
42	13:48	2 axle truck	1	2						1	15:59	02:11	
43	13:50	van	0	2						1	14:00	00:10	
	2:00-2:30:00 PM				1	1	1	0	3	2			**8**
44	14:09	van	0	2			1				14:31	00:22	
45	14:10	2 axle truck	1	2	1						14:42	00:32	
	2:30-3:00:00 PM				1	0	1	0	2	0			**4**
46	14:32	2 axle truck	1	2						1	15:49	01:17	
47	14:41	2 axle truck	1	2	1						15:01	00:20	
48	14:59	van	0	2					1		15:52	00:53	
	3:00-3:30:00 PM				1	0	0	0	3	1			**5**
49	15:00	van	0	2		1					15:06	00:06	
50	15:11	2 axle truck	1	2			1				15:41	00:30	

51	15:12	van	0	2		1					16:19	01:07	
52	15:15	van	0	2					1		>17:00	>1:45	
53	15:23	2 axle truck	1	2	1						15:40	00:17	
	3:30-4:00:00 PM				1	2	1	0	1	0			5
54	15:36	van	0	2					1		17:00	01:24	
55	16:05	van	0	2					1		16:13	00:08	
56	16:12	2 axle truck	1	2			1				16:39	00:27	
57	16:21	car	0	2		1					16:35	00:14	
58	16:21	2 axle truck	1	2	1						>17:00	>0:39	
	4:00-4:30:00 PM				1	1	1	0	2	0			5
	Average Service Time											00:34	

Legend

1	Length of stay over 6 hours
van	small vans and utilitys normal car space required

Curtis Traffic Surveys

Job: 230201lm (1193_2_23)
Client: Lyle Marshall & Partners
Day, date: Thu 16 Feb 23
Location: 1 Frederick St
Weather: Fine
Surveyor: MC

	Arrival time	Vehicle type	on rear axles?	No of axles	Bay 1	Bay 2	Bay 3	Bay 4	Turning Area	Entry Driveway	Departure time	Length of stay	Number of bays required
1	<9:00	2 axle truck	yes	2			1				09:21	>0:21	
2	<9:00	2 axle truck	yes	2	1						09:07	>0:07	
3	<9:00	van	no	2					1		16:41	>7:41	
4	09:07	2 axle truck	yes	2		1					09:25	00:18	
5	09:08	van	no	2					1		11:11	02:03	
6	09:27	2 axle truck	yes	2	1						09:30	00:03	
	9:00-9:30:00 AM				1	1	1	0	2	0			**5**
7	09:42	2 axle truck	yes	2					1		09:44	00:02	
8	09:43	2 axle truck	yes	2			1				09:57	00:14	
9	09:49	ute with trailer	no	3	1						10:15	00:26	
10	09:56	2 axle truck	yes	2		1					10:10	00:14	
11	09:57	2 axle truck	yes	2			1				10:07	00:10	
12	09:59	van	no	2			1				10:05	00:06	
	9:30-10:00:00 AM				1	1	1	0	2	0			**5**
13	10:03	2 axle truck	yes	2					1		>17:00	>6:57	
14	10:18	van	no	2	1						10:22	00:04	
15	10:32	van	no	2		1					10:50	00:18	
16	10:36	van	no	2						1	10:50	00:14	
17	10:44	2 axle truck	yes	2			1				11:05	00:21	
18	10:59	2 axle truck	yes	2		1					11:11	00:12	
	10:30-11:00:00 AM				1	2	1	0	2	1			**7**
19	11:08	van	no	2					1		11:23	00:15	
20	11:14	car	no	2					1		11:22	00:08	
	11:00-11:30:00 AM				0	0	0	0	3	0			**3**
21	11:30	2 axle truck	yes	2	1						11:49	00:19	
22	11:33	van	no	2		1					11:38	00:05	
23	11:33	van	no	2					1		11:38	00:05	
24	11:39	2 axle truck	yes	2			1				12:27	00:48	
25	11:45	2 axle truck	yes	2		1					11:59	00:14	
	11:30-12:00:00 PM				1	2	1	0	2	0			**6**
26	12:00	van	no	2			1				12:08	00:08	
27	12:01	2 axle truck	yes	2	1						14:14	02:13	
28	12:11	van	no	2	1						12:25	00:14	
29	12:17	van	no	2		1					13:09	00:52	
30	12:18	van	no	2					1		12:21	00:03	
31	12:28	2 axle truck	yes	2		1					13:09	00:41	
	12:00-12:30:00 PM				2	1	1	0	2	0			**6**
32	12:33	2 axle truck	yes	2					1		12:37	00:04	
33	12:51	van	no	2					1		13:00	00:09	
34	12:57	2 axle truck	yes	2		1					14:56	01:59	
	12:30-1:00:00 PM				0	1	0	0	3	0			**4**
35	13:01	2 axle truck	yes	2			1				13:31	00:30	
36	13:08	van	no	2					1		13:33	00:25	
37	13:10	van	no	2		1					13:35	00:25	
38	13:12	van	no	2	1						13:21	00:09	
39	13:14	2 axle truck	yes	2			1				13:28	00:14	
40	13:16	van	no	2					1		14:00	00:44	
41	13:23	2 axle truck	yes	2			1				14:15	00:52	
	1:00-1:30:00 PM				1	1	1	0	3	0			**6**
42	13:46	van	no	2					1		14:00	00:14	
43	13:53	van	no	2					1		13:54	00:01	
44	13:58	2 axle truck	yes	2		1					14:23	00:25	
	1:30-2:00:00 PM				0	1	0	0	3	0			**4**
45	14:00	van	no	2	1						14:20	00:20	
46	14:03	2 axle truck	yes	2			1				14:41	00:38	

47	14:05	van	no	2						1	14:23	00:18	
	2:00-2:30:00 PM				1	0	1	0	1	1			4
48	14:50	2 axle truck	yes	2		1					14:59	00:09	
49	14:53	van	no	2			1				15:28	00:35	
50	14:54	van	no	2		1					15:21	00:27	
	2:30-3:00:00 PM				0	2	1	0	1	0			4
51	15:06	van	no	2	1						15:57	00:51	
52	15:25	2 axle truck	yes	2	1						15:36	00:11	
53	15:27	2 axle truck	yes	2			1				16:16	00:49	
	3:00-3:30:00 PM				2	0	1	0	1	0			4
54	15:38	van	no	2		1					15:45	00:07	
55	15:41	2 axle truck	yes	2	1						16:39	00:58	
56	16:07	2 axle truck	yes	2					1		16:09	00:02	
57	16:09	van	no	2		1					16:35	00:26	
58	16:24	utility	no	2					1		16:48	00:24	
	3:30-4:00:00 PM				1	1	0	0	3	0			5
	Average Service Time											00:26	

Legend

1	Length of stay over 6 hours
van	small vans and utilitys normal car space required

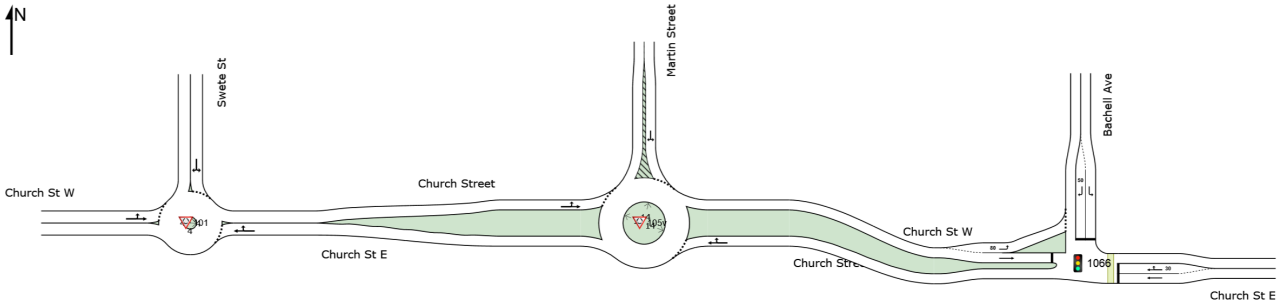
APPENDIX K

NETWORK LAYOUT

Network: N102 [Existing AM Network Swete-St-Martin-Bachell Ave (Network Folder: General)]

New Network
Network Category: (None)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SITES IN NETWORK		
Site ID	**CCG ID**	**Site Name**
101	NA	Existing AM: Church St/Swete St, Lidcombe
105v	NA	EXISTING AM: BACHELL Ave/ Martin St
1066	NA	Existing AM: Church St/Bachell Ave, Lidcombe

INTERSECTION SUMMARY

Site: 101 [Existing AM: Church St/Swete St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [Existing AM Network Swete-St-Martin-Bachell Ave (Network Folder: General)]

AM Peak Hour: 7:30-8:30am
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Travel Speed (Average)	km/h	45.2	45.2 km/h
Travel Distance (Total)	veh-km/h	1004.5	1205.4 pers-km/h
Travel Time (Total)	veh-h/h	22.2	26.6 pers-h/h
Desired Speed	km/h	51.4	
Speed Efficiency		0.88	
Travel Time Index		8.66	
Congestion Coefficient		1.14	
Demand Flows (Total)	veh/h	1143	1372 pers/h
Arrival Flows (Total)	veh/h	1143	1372 pers/h
Percent Heavy Vehicles (Demand)	%	0.0	
Percent Heavy Vehicles (Arrivals)	%	0.0	
Degree of Saturation		0.455	
Practical Spare Capacity	%	86.7	
Effective Intersection Capacity	veh/h	2511	
Control Delay (Total)	veh-h/h	2.04	2.44 pers-h/h
Control Delay (Average)	sec	6.4	6.4 sec
Control Delay (Worst Lane by MC)	sec	7.3	
Control Delay (Worst Movement by MC)	sec	8.7	8.7 sec
Geometric Delay (Average)	sec	5.2	
Stop-Line Delay (Average)	sec	1.3	
Idling Time (Average)	sec	0.0	
Intersection Level of Service (LOS)		LOS A	
Average Back of Queue - Veh (Worst Lane)	veh	1.4	
Average Back of Queue - Dist (Worst Lane)	m	9.8	
Ave. Que Storage Ratio (Worst Lane)		0.02	
Effective Stops (Total)	veh/h	652	782 pers/h
Effective Stop Rate		0.57	0.57
Proportion Queued		0.47	0.47
Performance Index		30.3	30.3
Cost (Total)	$/h	832.52	832.52 $/h
Fuel Consumption (Total)	L/h	81.4	
Carbon Dioxide (Total)	kg/h	191.4	
Hydrocarbons (Total)	kg/h	0.015	
Carbon Monoxide (Total)	kg/h	0.17	
NOx (Total)	kg/h	0.054	

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Roundabout LOS Method: Same as Signalised Intersections.
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 1.0 %
Number of Iterations: 4 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 0.0% 1.2% 0.7%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Demand Flows (Total)	veh/y	548,716	658,459	pers/y
Arrival Flows (Total)	veh/y	548,716		
Delay (Total)	veh-h/y	977	1,172	pers-h/y
Effective Stops (Total)	veh/y	312,925	375,510	pers/y
Travel Distance (Total)	veh-km/y	482,145	578,574	pers-km/y
Travel Time (Total)	veh-h/y	10,657	12,788	pers-h/y
Cost (Total)	$/y	399,612	399,612	$/y
Fuel Consumption (Total)	L/y	39,093		
Carbon Dioxide (Total)	kg/y	91,868		
Hydrocarbons (Total)	kg/y	7		
Carbon Monoxide (Total)	kg/y	80		
NOx (Total)	kg/y	26		

1 Hours per Year: 480 (Network)

MOVEMENT SUMMARY

Site: 101 [Existing AM: Church St/Swete St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [Existing AM Network Swete-St-Martin-Bachell Ave (Network Folder: General)]

AM Peak Hour: 7:30-8:30am
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Church St E															
5	T1	All MCs	171	0.0	171	0.0	0.299	6.0	LOS A	0.8	5.4	0.45	0.60	0.45	48.1
6	R2	All MCs	156	0.0	156	0.0	0.299	8.7	LOS A	0.8	5.4	0.45	0.60	0.45	47.5
Approach			326	0.0	326	0.0	0.299	7.3	LOS A	0.8	5.4	0.45	0.60	0.45	47.8
North: Swete St															
7	L2	All MCs	97	0.0	97	0.0	0.270	6.0	LOS A	0.7	4.7	0.47	0.61	0.47	41.7
9	R2	All MCs	185	0.0	185	0.0	0.270	7.9	LOS A	0.7	4.7	0.47	0.61	0.47	44.1
Approach			282	0.0	282	0.0	0.270	7.2	LOS A	0.7	4.7	0.47	0.61	0.47	43.6
West: Church St W															
10	L2	All MCs	321	0.0	321	0.0	0.455	5.8	LOS A	1.4	9.8	0.48	0.53	0.48	44.9
11	T1	All MCs	214	0.0	214	0.0	0.455	5.0	LOS A	1.4	9.8	0.48	0.53	0.48	42.9
Approach			535	0.0	535	0.0	0.455	5.5	LOS A	1.4	9.8	0.48	0.53	0.48	44.4
All Vehicles			1143	0.0	1143	0.0	0.455	6.4	LOS A	1.4	9.8	0.47	0.57	0.47	45.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

INTERSECTION SUMMARY

Site: 105v [EXISTING AM: BACHELL Ave/ Martin St (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [Existing AM Network Swete-St-Martin-Bachell Ave (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Travel Speed (Average)	km/h	38.0	38.0 km/h
Travel Distance (Total)	veh-km/h	279.9	335.8 pers-km/h
Travel Time (Total)	veh-h/h	7.4	8.8 pers-h/h
Desired Speed	km/h	60.0	
Speed Efficiency		0.63	
Travel Time Index		5.93	
Congestion Coefficient		1.58	
Demand Flows (Total)	veh/h	1143	1372 pers/h
Arrival Flows (Total)	veh/h	1143	1372 pers/h
Percent Heavy Vehicles (Demand)	%	0.0	
Percent Heavy Vehicles (Arrivals)	%	0.0	
Degree of Saturation		0.442	
Practical Spare Capacity	%	92.3	
Effective Intersection Capacity	veh/h	2587	
Control Delay (Total)	veh-h/h	2.21	2.66 pers-h/h
Control Delay (Average)	sec	7.0	7.0 sec
Control Delay (Worst Lane by MC)	sec	8.5	
Control Delay (Worst Movement by MC)	sec	10.0	10.0 sec
Geometric Delay (Average)	sec	5.5	
Stop-Line Delay (Average)	sec	1.5	
Idling Time (Average)	sec	0.0	
Intersection Level of Service (LOS)		LOS A	
Average Back of Queue - Veh (Worst Lane)	veh	1.7	
Average Back of Queue - Dist (Worst Lane)	m	11.8	
Ave. Que Storage Ratio (Worst Lane)		0.06	
Effective Stops (Total)	veh/h	630	757 pers/h
Effective Stop Rate		0.55	0.55
Proportion Queued		0.48	0.48
Performance Index		16.7	16.7
Cost (Total)	$/h	377.76	377.76 $/h
Fuel Consumption (Total)	L/h	45.6	
Carbon Dioxide (Total)	kg/h	107.2	
Hydrocarbons (Total)	kg/h	0.011	
Carbon Monoxide (Total)	kg/h	0.11	
NOx (Total)	kg/h	0.047	

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 1.0 %
Number of Iterations: 4 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 0.0% 1.3% 0.8%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Demand Flows (Total)	veh/y	548,716	658,459	pers/y
Arrival Flows (Total)	veh/y	548,716		
Delay (Total)	veh-h/y	1,063	1,276	pers-h/y
Effective Stops (Total)	veh/y	302,607	363,129	pers/y
Travel Distance (Total)	veh-km/y	134,338	161,205	pers-km/y
Travel Time (Total)	veh-h/y	3,536	4,243	pers-h/y
Cost (Total)	$/y	181,323	181,323	$/y
Fuel Consumption (Total)	L/y	21,901		
Carbon Dioxide (Total)	kg/y	51,466		
Hydrocarbons (Total)	kg/y	5		
Carbon Monoxide (Total)	kg/y	54		
NOx (Total)	kg/y	23		

1 Hours per Year: 480 (Network)

MOVEMENT SUMMARY

Site: 105v [EXISTING AM: BACHELL Ave/ Martin St (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [Existing AM Network Swete-St-Martin-Bachell Ave (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Church Street															
5	T1	All MCs	171	0.0	171	0.0	0.297	5.9	LOS A	0.7	5.2	0.37	0.60	0.37	29.5
6	R2	All MCs	156	0.0	156	0.0	0.297	9.8	LOS A	0.7	5.2	0.37	0.60	0.37	37.1
Approach			326	0.0	326	0.0	0.297	7.8	LOS A	0.7	5.2	0.37	0.60	0.37	34.2
North: Martin Street															
7	L2	All MCs	97	0.0	97	0.0	0.269	5.8	LOS A	0.8	5.3	0.52	0.61	0.52	33.7
9	R2	All MCs	185	0.0	185	0.0	0.269	10.0	LOS A	0.8	5.3	0.52	0.61	0.52	33.7
Approach			282	0.0	282	0.0	0.269	8.5	LOS A	0.8	5.3	0.52	0.61	0.52	33.7
West: Church Street															
10	L2	All MCs	321	0.0	321	0.0	0.442	5.5	LOS A	1.7	11.8	0.52	0.49	0.52	42.9
11	T1	All MCs	214	0.0	214	0.0	0.442	5.9	LOS A	1.7	11.8	0.52	0.49	0.52	38.9
Approach			535	0.0	535	0.0	0.442	5.7	LOS A	1.7	11.8	0.52	0.49	0.52	41.7
All Vehicles			1143	0.0	1143	0.0	0.442	7.0	LOS A	1.7	11.8	0.48	0.55	0.48	38.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

INTERSECTION SUMMARY

Site: 1066 [Existing AM: Church St/Bachell Ave, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [Existing AM Network Swete-St-Martin-Bachell Ave (Network Folder: General)]

AM Peak Hour: 7:30-8:30am
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 40 seconds (Site Practical Cycle Time)

Intersection Performance - Hourly Values

Performance Measure	Vehicles:	All MCs	Pedestrians	Persons
Travel Speed (Average)	km/h	43.0	2.4 km/h	42.0 km/h
Travel Distance (Total)	veh-km/h	599.1	1.1 ped-km/h	720.0 pers-km/h
Travel Time (Total)	veh-h/h	13.9	0.4 ped-h/h	17.2 pers-h/h
Desired Speed	km/h	60.0		
Speed Efficiency		0.72		
Travel Time Index		6.85		
Congestion Coefficient		1.40		
Demand Flows (Total)	veh/h	978	53 ped/h	1226 pers/h
Arrival Flows (Total)	veh/h	978		1226 pers/h
Percent Heavy Vehicles (Demand)	%	0.1		
Percent Heavy Vehicles (Arrivals)	%	0.1		
Degree of Saturation		0.626	0.029	
Practical Spare Capacity	%	43.7		
Effective Intersection Capacity	veh/h	1561		
Control Delay (Total)	veh-h/h	3.61	0.21 ped-h/h	4.54 pers-h/h
Control Delay (Average)	sec	13.3	14.5 sec	13.3 sec
Control Delay (Worst Lane by MC)	sec	20.7		
Control Delay (Worst Movement by MC)	sec	20.7	14.5 sec	20.7 sec
Geometric Delay (Average)	sec	3.5		
Stop-Line Delay (Average)	sec	9.8		
Idling Time (Average)	sec	6.7		
Intersection Level of Service (LOS)		LOS B	LOS B	
Average Back of Queue - Veh (Worst Lane)	veh	2.6		
Average Back of Queue - Dist (Worst Lane)	m	18.3		
Ave. Que Storage Ratio (Worst Lane)		0.04		
Effective Stops (Total)	veh/h	697	45 ped/h	881 pers/h
Effective Stop Rate		0.71	0.85	0.72
Proportion Queued		0.71	0.85	0.72
Performance Index		34.5	0.7	35.2
Cost (Total)	$/h	543.36	10.74 $/h	554.10 $/h
Fuel Consumption (Total)	L/h	60.6		
Carbon Dioxide (Total)	kg/h	142.5		
Hydrocarbons (Total)	kg/h	0.013		
Carbon Monoxide (Total)	kg/h	0.16		
NOx (Total)	kg/h	0.052		

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.

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

Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 0.0 %

Number of Iterations: 2 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Main (Timing-Capacity) Iterations: 4.4% 0.0% 0.0%

Intersection Performance - Annual Values

Performance Measure	Vehicles:	All MCs	Pedestrians	Persons
Demand Flows (Total)	veh/y	469,390	25,263 ped/y	588,531 pers/y
Arrival Flows (Total)	veh/y	469,390		
Delay (Total)	veh-h/y	1,732	102 ped-h/y	2,180 pers-h/y
Effective Stops (Total)	veh/y	334,435	21,521 ped/y	422,843 pers/y
Travel Distance (Total)	veh-km/y	287,579	505 ped-km/y	345,600 pers-km/y
Travel Time (Total)	veh-h/y	6,690	210 ped-h/y	8,238 pers-h/y
Cost (Total)	$/y	260,811	5,156 $/y	265,966 $/y
Fuel Consumption (Total)	L/y	29,108		
Carbon Dioxide (Total)	kg/y	68,411		
Hydrocarbons (Total)	kg/y	6		
Carbon Monoxide (Total)	kg/y	77		
NOx (Total)	kg/y	25		

1 Hours per Year: 480 (Network)

MOVEMENT SUMMARY

Site: 1066 [Existing AM: Church St/Bachell Ave, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [Existing AM Network Swete-St-Martin-Bachell Ave (Network Folder: General)]

AM Peak Hour: 7:30-8:30am
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 40 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Church St E															
5	T1	All MCs	147	0.1	147	0.1	0.345	6.8	LOS A	1.7	11.7	0.70	0.58	0.70	23.2
6	R2	All MCs	107	0.1	107	0.1	* 0.345	16.4	LOS B	1.7	11.7	0.80	0.69	0.80	42.0
Approach			255	0.1	255	0.1	0.345	10.9	LOS B	1.7	11.7	0.74	0.63	0.74	36.4
North: Bachell Ave															
7	L2	All MCs	105	0.1	105	0.1	0.108	10.8	LOS B	0.6	4.5	0.53	0.69	0.53	43.8
9	R2	All MCs	172	0.1	172	0.1	* 0.411	20.7	LOS C	1.9	13.1	0.90	0.78	0.90	35.9
Approach			277	0.1	277	0.1	0.411	16.9	LOS B	1.9	13.1	0.76	0.75	0.76	38.9
West: Church St W															
10	L2	All MCs	233	0.0	233	0.0	0.194	7.0	LOS A	0.6	4.2	0.39	0.66	0.39	51.8
11	T1	All MCs	214	0.0	214	0.0	* 0.626	18.3	LOS B	2.6	18.3	0.97	0.83	1.07	39.9
Approach			446	0.0	446	0.0	0.626	12.4	LOS B	2.6	18.3	0.67	0.74	0.72	46.9
All Vehicles			978	0.1	978	0.1	0.626	13.3	LOS B	2.6	18.3	0.71	0.71	0.73	43.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
East: Church St E											
P2	Full	53	14.5	LOS B	0.1	0.1	0.85	0.85	29.9	20.0	0.67
All Pedestrians		53	14.5	LOS B	0.1	0.1	0.85	0.85	29.9	20.0	0.67

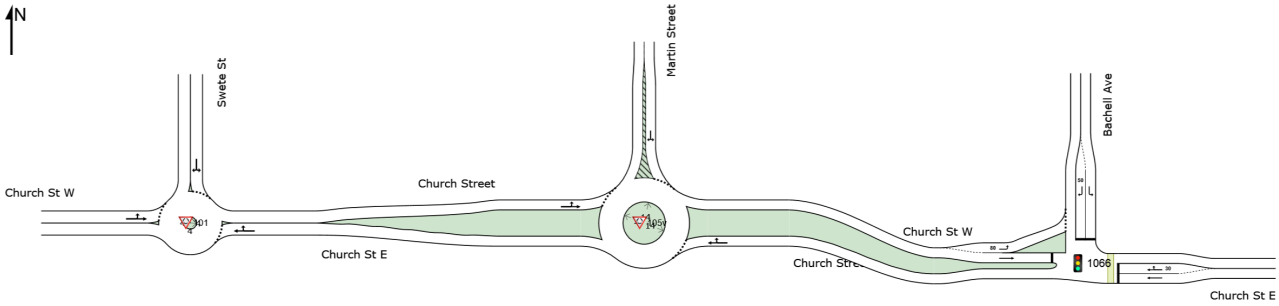
Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

NETWORK LAYOUT

Network: N102 [Existing AM Network Swete-St-Martin-Bachell Ave (Network Folder: General)]

New Network
Network Category: (None)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SITES IN NETWORK		
Site ID	**CCG ID**	**Site Name**
101	NA	Existing AM: Church St/Swete St, Lidcombe
105v	NA	EXISTING AM: BACHELL Ave/ Martin St
1066	NA	Existing AM: Church St/Bachell Ave, Lidcombe

INTERSECTION SUMMARY

Site: 101 [Existing PM: Church St/Swete St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [Existing PM Swete St- Martin St- Bachell Ave (Network Folder: General)]

AM Peak Hour: 5:00-6:00pm
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Travel Speed (Average)	km/h	45.7	45.7 km/h
Travel Distance (Total)	veh-km/h	866.6	1039.9 pers-km/h
Travel Time (Total)	veh-h/h	18.9	22.7 pers-h/h
Desired Speed	km/h	52.0	
Speed Efficiency		0.88	
Travel Time Index		8.66	
Congestion Coefficient		1.14	
Demand Flows (Total)	veh/h	985	1182 pers/h
Arrival Flows (Total)	veh/h	985	1182 pers/h
Percent Heavy Vehicles (Demand)	%	0.0	
Percent Heavy Vehicles (Arrivals)	%	0.0	
Degree of Saturation		0.344	
Practical Spare Capacity	%	147.0	
Effective Intersection Capacity	veh/h	2863	
Control Delay (Total)	veh-h/h	1.75	2.10 pers-h/h
Control Delay (Average)	sec	6.4	6.4 sec
Control Delay (Worst Lane by MC)	sec	7.1	
Control Delay (Worst Movement by MC)	sec	8.7	8.7 sec
Geometric Delay (Average)	sec	5.3	
Stop-Line Delay (Average)	sec	1.1	
Idling Time (Average)	sec	0.0	
Intersection Level of Service (LOS)		LOS A	
Average Back of Queue - Veh (Worst Lane)	veh	0.9	
Average Back of Queue - Dist (Worst Lane)	m	6.4	
Ave. Que Storage Ratio (Worst Lane)		0.01	
Effective Stops (Total)	veh/h	558	670 pers/h
Effective Stop Rate		0.57	0.57
Proportion Queued		0.42	0.42
Performance Index		25.3	25.3
Cost (Total)	$/h	711.18	711.18 $/h
Fuel Consumption (Total)	L/h	69.9	
Carbon Dioxide (Total)	kg/h	164.2	
Hydrocarbons (Total)	kg/h	0.013	
Carbon Monoxide (Total)	kg/h	0.15	
NOx (Total)	kg/h	0.046	

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Roundabout LOS Method: Same as Signalised Intersections.
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 0.9 %
Number of Iterations: 3 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 100.0% 0.0% 0.9%

Intersection Performance - Annual Values

Performance Measure	Vehicles:	All MCs	Persons
Demand Flows (Total)	veh/y	472,926	567,512 pers/y
Arrival Flows (Total)	veh/y	472,926	
Delay (Total)	veh-h/y	839	1,007 pers-h/y
Effective Stops (Total)	veh/y	268,006	321,607 pers/y
Travel Distance (Total)	veh-km/y	415,956	499,147 pers-km/y
Travel Time (Total)	veh-h/y	9,093	10,912 pers-h/y
Cost (Total)	$/y	341,365	341,365 $/y
Fuel Consumption (Total)	L/y	33,532	
Carbon Dioxide (Total)	kg/y	78,801	
Hydrocarbons (Total)	kg/y	6	
Carbon Monoxide (Total)	kg/y	70	
NOx (Total)	kg/y	22	

1 Hours per Year: 480 (Network)

MOVEMENT SUMMARY

Site: 101 [Existing PM: Church St/Swete St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [Existing PM Swete St- Martin St- Bachell Ave (Network Folder: General)]

AM Peak Hour: 5:00-6:00pm
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Church St E															
5	T1	All MCs	233	0.0	233	0.0	0.344	6.0	LOS A	0.9	6.4	0.45	0.59	0.45	48.2
6	R2	All MCs	155	0.0	155	0.0	0.344	8.7	LOS A	0.9	6.4	0.45	0.59	0.45	47.6
Approach			387	0.0	387	0.0	0.344	7.1	LOS A	0.9	6.4	0.45	0.59	0.45	47.9
North: Swete St															
7	L2	All MCs	92	0.0	92	0.0	0.244	5.7	LOS A	0.6	4.1	0.41	0.60	0.41	41.9
9	R2	All MCs	177	0.0	177	0.0	0.244	7.6	LOS A	0.6	4.1	0.41	0.60	0.41	44.2
Approach			268	0.0	268	0.0	0.244	6.9	LOS A	0.6	4.1	0.41	0.60	0.41	43.7
West: Church St W															
10	L2	All MCs	154	0.0	154	0.0	0.288	5.6	LOS A	0.7	5.1	0.40	0.52	0.40	45.1
11	T1	All MCs	176	0.0	176	0.0	0.288	4.8	LOS A	0.7	5.1	0.40	0.52	0.40	43.3
Approach			329	0.0	329	0.0	0.288	5.2	LOS A	0.7	5.1	0.40	0.52	0.40	44.4
All Vehicles			985	0.0	985	0.0	0.344	6.4	LOS A	0.9	6.4	0.42	0.57	0.42	45.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

INTERSECTION SUMMARY

Site: 105v [EXISTING PM: BACHELL Ave/ Martin St (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [Existing PM Swete St- Martin St- Bachell Ave (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Travel Speed (Average)	km/h	36.9	36.9 km/h
Travel Distance (Total)	veh-km/h	217.1	260.5 pers-km/h
Travel Time (Total)	veh-h/h	5.9	7.1 pers-h/h
Desired Speed	km/h	60.0	
Speed Efficiency		0.61	
Travel Time Index		5.72	
Congestion Coefficient		1.63	
Demand Flows (Total)	veh/h	985	1182 pers/h
Arrival Flows (Total)	veh/h	985	1182 pers/h
Percent Heavy Vehicles (Demand)	%	0.0	
Percent Heavy Vehicles (Arrivals)	%	0.0	
Degree of Saturation		0.344	
Practical Spare Capacity	%	147.1	
Effective Intersection Capacity	veh/h	2864	
Control Delay (Total)	veh-h/h	1.92	2.30 pers-h/h
Control Delay (Average)	sec	7.0	7.0 sec
Control Delay (Worst Lane by MC)	sec	8.2	
Control Delay (Worst Movement by MC)	sec	9.8	9.8 sec
Geometric Delay (Average)	sec	5.7	
Stop-Line Delay (Average)	sec	1.3	
Idling Time (Average)	sec	0.1	
Intersection Level of Service (LOS)		LOS A	
Average Back of Queue - Veh (Worst Lane)	veh	0.9	
Average Back of Queue - Dist (Worst Lane)	m	6.3	
Ave. Que Storage Ratio (Worst Lane)		0.06	
Effective Stops (Total)	veh/h	545	654 pers/h
Effective Stop Rate		0.55	0.55
Proportion Queued		0.41	0.41
Performance Index		13.5	13.5
Cost (Total)	$/h	304.63	304.63 $/h
Fuel Consumption (Total)	L/h	37.5	
Carbon Dioxide (Total)	kg/h	88.2	
Hydrocarbons (Total)	kg/h	0.009	
Carbon Monoxide (Total)	kg/h	0.09	
NOx (Total)	kg/h	0.040	

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 0.9 %
Number of Iterations: 4 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 0.0% 1.2% 0.7%

Intersection Performance - Annual Values

Performance Measure	Vehicles:	All MCs	Persons
Demand Flows (Total)	veh/y	472,926	567,512 pers/y
Arrival Flows (Total)	veh/y	472,926	
Delay (Total)	veh-h/y	919	1,103 pers-h/y
Effective Stops (Total)	veh/y	261,435	313,722 pers/y
Travel Distance (Total)	veh-km/y	104,212	125,055 pers-km/y
Travel Time (Total)	veh-h/y	2,824	3,389 pers-h/y
Cost (Total)	$/y	146,224	146,224 $/y
Fuel Consumption (Total)	L/y	18,006	
Carbon Dioxide (Total)	kg/y	42,314	
Hydrocarbons (Total)	kg/y	4	
Carbon Monoxide (Total)	kg/y	44	
NOx (Total)	kg/y	19	

1 Hours per Year: 480 (Network)

MOVEMENT SUMMARY

Site: 105v [EXISTING PM: BACHELL Ave/ Martin St (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [Existing PM Swete St- Martin St- Bachell Ave (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Church Street															
5	T1	All MCs	233	0.0	233	0.0	0.344	5.9	LOS A	0.9	6.3	0.36	0.59	0.36	29.9
6	R2	All MCs	155	0.0	155	0.0	0.344	9.8	LOS A	0.9	6.3	0.36	0.59	0.36	37.4
Approach			387	0.0	387	0.0	0.344	7.4	LOS A	0.9	6.3	0.36	0.59	0.36	34.0
North: Martin Street															
7	L2	All MCs	92	0.0	92	0.0	0.244	5.5	LOS A	0.7	4.6	0.46	0.59	0.46	34.1
9	R2	All MCs	177	0.0	177	0.0	0.244	9.6	LOS A	0.7	4.6	0.46	0.59	0.46	34.1
Approach			268	0.0	268	0.0	0.244	8.2	LOS A	0.7	4.6	0.46	0.59	0.46	34.1
West: Church Street															
10	L2	All MCs	154	0.0	154	0.0	0.279	5.3	LOS A	0.9	6.3	0.44	0.48	0.44	43.3
11	T1	All MCs	176	0.0	176	0.0	0.279	5.6	LOS A	0.9	6.3	0.44	0.48	0.44	39.4
Approach			329	0.0	329	0.0	0.279	5.5	LOS A	0.9	6.3	0.44	0.48	0.44	41.7
All Vehicles			985	0.0	985	0.0	0.344	7.0	LOS A	0.9	6.3	0.41	0.55	0.41	36.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

INTERSECTION SUMMARY

Site: 1066 [Existing PM: Church St/Bachell Ave, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [Existing PM Swete St- Martin St- Bachell Ave (Network Folder: General)]

PM Peak Hour: 5:00-6:00pm
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 50 seconds (Site Practical Cycle Time)

Intersection Performance - Hourly Values

Performance Measure	Vehicles:	All MCs	Pedestrians	Persons
Travel Speed (Average)	km/h	39.5	2.4 km/h	38.6 km/h
Travel Distance (Total)	veh-km/h	648.4	1.1 ped-km/h	779.2 pers-km/h
Travel Time (Total)	veh-h/h	16.4	0.4 ped-h/h	20.2 pers-h/h
Desired Speed	km/h	60.0		
Speed Efficiency		0.66		
Travel Time Index		6.20		
Congestion Coefficient		1.52		
Demand Flows (Total)	veh/h	1162	53 ped/h	1447 pers/h
Arrival Flows (Total)	veh/h	1162		1447 pers/h
Percent Heavy Vehicles (Demand)	%	0.0		
Percent Heavy Vehicles (Arrivals)	%	0.0		
Degree of Saturation		0.658	0.020	
Practical Spare Capacity	%	36.7		
Effective Intersection Capacity	veh/h	1766		
Control Delay (Total)	veh-h/h	5.36	0.22 ped-h/h	6.65 pers-h/h
Control Delay (Average)	sec	16.6	15.2 sec	16.5 sec
Control Delay (Worst Lane by MC)	sec	23.2		
Control Delay (Worst Movement by MC)	sec	23.2	15.2 sec	23.2 sec
Geometric Delay (Average)	sec	3.8		
Stop-Line Delay (Average)	sec	12.8		
Idling Time (Average)	sec	9.5		
Intersection Level of Service (LOS)		LOS B	LOS B	
Average Back of Queue - Veh (Worst Lane)	veh	5.8		
Average Back of Queue - Dist (Worst Lane)	m	40.6		
Ave. Que Storage Ratio (Worst Lane)		0.04		
Effective Stops (Total)	veh/h	872	41 ped/h	1087 pers/h
Effective Stop Rate		0.75	0.78	0.75
Proportion Queued		0.75	0.78	0.75
Performance Index		48.3	0.7	49.0
Cost (Total)	$/h	637.69	11.02 $/h	648.71 $/h
Fuel Consumption (Total)	L/h	70.2		
Carbon Dioxide (Total)	kg/h	164.9		
Hydrocarbons (Total)	kg/h	0.015		
Carbon Monoxide (Total)	kg/h	0.18		
NOx (Total)	kg/h	0.059		

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.

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

Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 0.0 %

Number of Iterations: 2 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Main (Timing-Capacity) Iterations: 3.7% 29.0% 0.0%

Intersection Performance - Annual Values

Performance Measure	Vehicles:	All MCs	Pedestrians	Persons

Demand Flows (Total)	veh/y	557,811	25,263	ped/y	694,636	pers/y
Arrival Flows (Total)	veh/y	557,811				
Delay (Total)	veh-h/y	2,572	107	ped-h/y	3,193	pers-h/y
Effective Stops (Total)	veh/y	418,358	19,749	ped/y	521,778	pers/y
Travel Distance (Total)	veh-km/y	311,249	505	ped-km/y	374,004	pers-km/y
Travel Time (Total)	veh-h/y	7,887	215	ped-h/y	9,680	pers-h/y
Cost (Total)	$/y	306,092	5,287	$/y	311,379	$/y
Fuel Consumption (Total)	L/y	33,683				
Carbon Dioxide (Total)	kg/y	79,158				
Hydrocarbons (Total)	kg/y	7				
Carbon Monoxide (Total)	kg/y	88				
NOx (Total)	kg/y	28				

1 Hours per Year: 480 (Network)

MOVEMENT SUMMARY

Site: 1066 [Existing PM: Church St/Bachell Ave, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [Existing PM Swete St- Martin St- Bachell Ave (Network Folder: General)]

PM Peak Hour: 5:00-6:00pm
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 50 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Church St E															
5	T1	All MCs	172	0.0	172	0.0	0.316	11.2	LOS B	2.0	14.1	0.76	0.61	0.76	19.0
6	R2	All MCs	54	0.0	54	0.0	* 0.316	21.0	LOS C	2.0	14.1	0.80	0.66	0.80	40.4
Approach			225	0.0	225	0.0	0.316	13.6	LOS B	2.0	14.1	0.77	0.62	0.77	28.9
North: Bachell Ave															
7	L2	All MCs	126	0.0	126	0.0	0.113	10.2	LOS B	0.8	5.7	0.45	0.68	0.45	44.4
9	R2	All MCs	440	0.0	440	0.0	* 0.658	20.8	LOS C	5.8	40.6	0.89	0.84	0.92	35.8
Approach			566	0.0	566	0.0	0.658	18.5	LOS B	5.8	40.6	0.80	0.81	0.82	37.7
West: Church St W															
10	L2	All MCs	171	0.0	171	0.0	0.133	6.7	LOS A	0.4	2.9	0.30	0.63	0.30	52.1
11	T1	All MCs	200	0.0	200	0.0	* 0.641	23.2	LOS C	3.1	21.4	0.98	0.84	1.08	36.5
Approach			371	0.0	371	0.0	0.641	15.6	LOS B	3.1	21.4	0.67	0.74	0.72	44.4
All Vehicles			1162	0.0	1162	0.0	0.658	16.6	LOS B	5.8	40.6	0.75	0.75	0.78	39.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
East: Church St E											
P2	Full	53	15.2	LOS B	0.1	0.1	0.78	0.78	30.6	20.0	0.65
All Pedestrians		53	15.2	LOS B	0.1	0.1	0.78	0.78	30.6	20.0	0.65

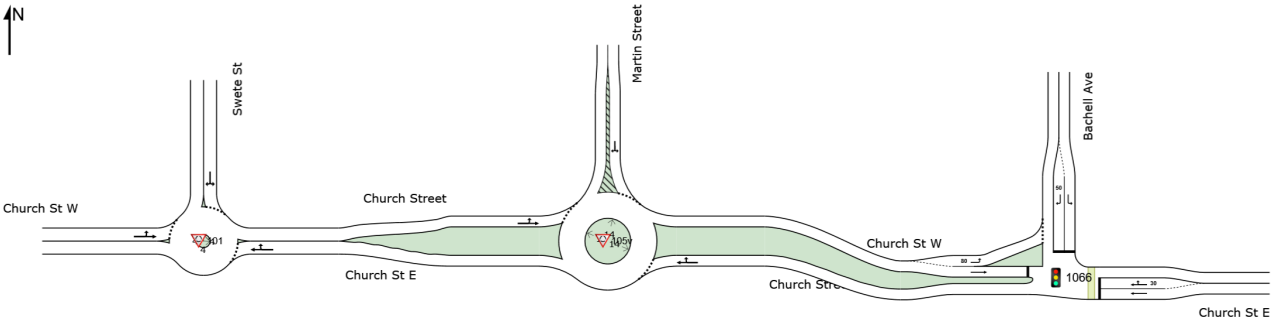
Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

NETWORK LAYOUT

Network: N101 [Existing plus BTG 2032-Swete St-Martin St-Bachell Avenue (Network Folder: General)]

New Network
Network Category: (None)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SITES IN NETWORK		
Site ID	**CCG ID**	**Site Name**
101	NA	EX+BTG 2032 AM: Church St/Swete St, Lidcombe
105v	NA	EXISTING+BTG 2032 AM: BACHELL Ave/ Martin St
1066	NA	EX+BTG 2032 AM: Church St/Bachell Ave, Lidcombe

INTERSECTION SUMMARY

Site: 101 [EX+BTG 2032 PM: Church St/Swete St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Existing PM + BTG 2032-Swete St-Martin St-Bachell Ave (Network Folder: General)]

AM Peak Hour: 5:00-6:00pm
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Travel Speed (Average)	km/h	45.7	45.7 km/h
Travel Distance (Total)	veh-km/h	866.6	1039.9 pers-km/h
Travel Time (Total)	veh-h/h	18.9	22.7 pers-h/h
Desired Speed	km/h	52.0	
Speed Efficiency		0.88	
Travel Time Index		8.66	
Congestion Coefficient		1.14	
Demand Flows (Total)	veh/h	985	1182 pers/h
Arrival Flows (Total)	veh/h	985	1182 pers/h
Percent Heavy Vehicles (Demand)	%	0.0	
Percent Heavy Vehicles (Arrivals)	%	0.0	
Degree of Saturation		0.344	
Practical Spare Capacity	%	147.0	
Effective Intersection Capacity	veh/h	2863	
Control Delay (Total)	veh-h/h	1.75	2.10 pers-h/h
Control Delay (Average)	sec	6.4	6.4 sec
Control Delay (Worst Lane by MC)	sec	7.1	
Control Delay (Worst Movement by MC)	sec	8.7	8.7 sec
Geometric Delay (Average)	sec	5.3	
Stop-Line Delay (Average)	sec	1.1	
Idling Time (Average)	sec	0.0	
Intersection Level of Service (LOS)		LOS A	
Average Back of Queue - Veh (Worst Lane)	veh	0.9	
Average Back of Queue - Dist (Worst Lane)	m	6.4	
Ave. Que Storage Ratio (Worst Lane)		0.01	
Effective Stops (Total)	veh/h	558	670 pers/h
Effective Stop Rate		0.57	0.57
Proportion Queued		0.42	0.42
Performance Index		25.3	25.3
Cost (Total)	$/h	711.18	711.18 $/h
Fuel Consumption (Total)	L/h	69.9	
Carbon Dioxide (Total)	kg/h	164.2	
Hydrocarbons (Total)	kg/h	0.013	
Carbon Monoxide (Total)	kg/h	0.15	
NOx (Total)	kg/h	0.046	

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Roundabout LOS Method: Same as Signalised Intersections.
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 0.9 %
Number of Iterations: 3 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 100.0% 0.0% 0.9%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Demand Flows (Total)	veh/y	472,926	567,512	pers/y
Arrival Flows (Total)	veh/y	472,926		
Delay (Total)	veh-h/y	839	1,007	pers-h/y
Effective Stops (Total)	veh/y	268,006	321,607	pers/y
Travel Distance (Total)	veh-km/y	415,956	499,147	pers-km/y
Travel Time (Total)	veh-h/y	9,093	10,912	pers-h/y
Cost (Total)	$/y	341,365	341,365	$/y
Fuel Consumption (Total)	L/y	33,532		
Carbon Dioxide (Total)	kg/y	78,801		
Hydrocarbons (Total)	kg/y	6		
Carbon Monoxide (Total)	kg/y	70		
NOx (Total)	kg/y	22		

1 Hours per Year: 480 (Network)

MOVEMENT SUMMARY

Site: 101 [EX+BTG 2032 PM: Church St/Swete St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Existing PM + BTG 2032-Swete St-Martin St-Bachell Ave (Network Folder: General)]

AM Peak Hour: 5:00-6:00pm
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Church St E															
5	T1	All MCs	233	0.0	233	0.0	0.344	6.0	LOS A	0.9	6.4	0.45	0.59	0.45	48.2
6	R2	All MCs	155	0.0	155	0.0	0.344	8.7	LOS A	0.9	6.4	0.45	0.59	0.45	47.6
Approach			387	0.0	387	0.0	0.344	7.1	LOS A	0.9	6.4	0.45	0.59	0.45	47.9
North: Swete St															
7	L2	All MCs	92	0.0	92	0.0	0.244	5.7	LOS A	0.6	4.1	0.41	0.60	0.41	41.9
9	R2	All MCs	177	0.0	177	0.0	0.244	7.6	LOS A	0.6	4.1	0.41	0.60	0.41	44.2
Approach			268	0.0	268	0.0	0.244	6.9	LOS A	0.6	4.1	0.41	0.60	0.41	43.7
West: Church St W															
10	L2	All MCs	154	0.0	154	0.0	0.288	5.6	LOS A	0.7	5.1	0.40	0.52	0.40	45.1
11	T1	All MCs	176	0.0	176	0.0	0.288	4.8	LOS A	0.7	5.1	0.40	0.52	0.40	43.3
Approach			329	0.0	329	0.0	0.288	5.2	LOS A	0.7	5.1	0.40	0.52	0.40	44.4
All Vehicles			985	0.0	985	0.0	0.344	6.4	LOS A	0.9	6.4	0.42	0.57	0.42	45.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 105v [EXISTING+BTG 2032 PM: BACHELL Ave/ Martin St (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Existing PM + BTG 2032-Swete St-Martin St-Bachell Ave (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Church Street															
5	T1	All MCs	233	0.0	233	0.0	0.344	5.9	LOS A	0.9	6.3	0.36	0.59	0.36	29.9
6	R2	All MCs	155	0.0	155	0.0	0.344	9.8	LOS A	0.9	6.3	0.36	0.59	0.36	37.4
Approach			387	0.0	387	0.0	0.344	7.4	LOS A	0.9	6.3	0.36	0.59	0.36	34.0
North: Martin Street															
7	L2	All MCs	92	0.0	92	0.0	0.244	5.5	LOS A	0.7	4.6	0.46	0.59	0.46	34.1
9	R2	All MCs	177	0.0	177	0.0	0.244	9.6	LOS A	0.7	4.6	0.46	0.59	0.46	34.1
Approach			268	0.0	268	0.0	0.244	8.2	LOS A	0.7	4.6	0.46	0.59	0.46	34.1
West: Church Street															
10	L2	All MCs	154	0.0	154	0.0	0.279	5.3	LOS A	0.9	6.3	0.44	0.48	0.44	43.3
11	T1	All MCs	176	0.0	176	0.0	0.279	5.6	LOS A	0.9	6.3	0.44	0.48	0.44	39.4
Approach			329	0.0	329	0.0	0.279	5.5	LOS A	0.9	6.3	0.44	0.48	0.44	41.7
All Vehicles			985	0.0	985	0.0	0.344	7.0	LOS A	0.9	6.3	0.41	0.55	0.41	36.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

INTERSECTION SUMMARY

Site: 105v [EXISTING+BTG 2032 PM: BACHELL Ave/ Martin St (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Existing PM + BTG 2032-Swete St-Martin St-Bachell Ave (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Travel Speed (Average)	km/h	36.9	36.9 km/h
Travel Distance (Total)	veh-km/h	217.1	260.5 pers-km/h
Travel Time (Total)	veh-h/h	5.9	7.1 pers-h/h
Desired Speed	km/h	60.0	
Speed Efficiency		0.61	
Travel Time Index		5.72	
Congestion Coefficient		1.63	
Demand Flows (Total)	veh/h	985	1182 pers/h
Arrival Flows (Total)	veh/h	985	1182 pers/h
Percent Heavy Vehicles (Demand)	%	0.0	
Percent Heavy Vehicles (Arrivals)	%	0.0	
Degree of Saturation		0.344	
Practical Spare Capacity	%	147.1	
Effective Intersection Capacity	veh/h	2864	
Control Delay (Total)	veh-h/h	1.92	2.30 pers-h/h
Control Delay (Average)	sec	7.0	7.0 sec
Control Delay (Worst Lane by MC)	sec	8.2	
Control Delay (Worst Movement by MC)	sec	9.8	9.8 sec
Geometric Delay (Average)	sec	5.7	
Stop-Line Delay (Average)	sec	1.3	
Idling Time (Average)	sec	0.1	
Intersection Level of Service (LOS)		LOS A	
Average Back of Queue - Veh (Worst Lane)	veh	0.9	
Average Back of Queue - Dist (Worst Lane)	m	6.3	
Ave. Que Storage Ratio (Worst Lane)		0.06	
Effective Stops (Total)	veh/h	545	654 pers/h
Effective Stop Rate		0.55	0.55
Proportion Queued		0.41	0.41
Performance Index		13.5	13.5
Cost (Total)	$/h	304.63	304.63 $/h
Fuel Consumption (Total)	L/h	37.5	
Carbon Dioxide (Total)	kg/h	88.2	
Hydrocarbons (Total)	kg/h	0.009	
Carbon Monoxide (Total)	kg/h	0.09	
NOx (Total)	kg/h	0.040	

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 0.9 %
Number of Iterations: 4 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 0.0% 1.2% 0.7%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Demand Flows (Total)	veh/y	472,926	567,512	pers/y
Arrival Flows (Total)	veh/y	472,926		
Delay (Total)	veh-h/y	919	1,103	pers-h/y
Effective Stops (Total)	veh/y	261,435	313,722	pers/y
Travel Distance (Total)	veh-km/y	104,212	125,055	pers-km/y
Travel Time (Total)	veh-h/y	2,824	3,389	pers-h/y
Cost (Total)	$/y	146,224	146,224	$/y
Fuel Consumption (Total)	L/y	18,006		
Carbon Dioxide (Total)	kg/y	42,314		
Hydrocarbons (Total)	kg/y	4		
Carbon Monoxide (Total)	kg/y	44		
NOx (Total)	kg/y	19		

1 Hours per Year: 480 (Network)

INTERSECTION SUMMARY

Site: 1066 [EX+BTG 2032 PM: Church St/Bachell Ave, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Existing PM + BTG 2032-Swete St-Martin St-Bachell Ave (Network Folder: General)]

PM Peak Hour: 5:00-6:00pm
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 50 seconds (Site Practical Cycle Time)

Intersection Performance - Hourly Values							
Performance Measure	**Vehicles:**	**All MCs**	**Pedestrians**		**Persons**	
Travel Speed (Average)	km/h	39.5	2.4	km/h	38.6	km/h
Travel Distance (Total)	veh-km/h	648.4	1.1	ped-km/h	779.2	pers-km/h
Travel Time (Total)	veh-h/h	16.4	0.4	ped-h/h	20.2	pers-h/h
Desired Speed	km/h	60.0				
Speed Efficiency		0.66				
Travel Time Index		6.20				
Congestion Coefficient		1.52				
Demand Flows (Total)	veh/h	1162	53	ped/h	1447	pers/h
Arrival Flows (Total)	veh/h	1162			1447	pers/h
Percent Heavy Vehicles (Demand)	%	0.0				
Percent Heavy Vehicles (Arrivals)	%	0.0				
Degree of Saturation		0.658	0.020			
Practical Spare Capacity	%	36.7				
Effective Intersection Capacity	veh/h	1766				
Control Delay (Total)	veh-h/h	5.36	0.22	ped-h/h	6.65	pers-h/h
Control Delay (Average)	sec	16.6	15.2	sec	16.5	sec
Control Delay (Worst Lane by MC)	sec	23.2				
Control Delay (Worst Movement by MC)	sec	23.2	15.2	sec	23.2	sec
Geometric Delay (Average)	sec	3.8				
Stop-Line Delay (Average)	sec	12.8				
Idling Time (Average)	sec	9.5				
Intersection Level of Service (LOS)		LOS B	LOS B			
Average Back of Queue - Veh (Worst Lane)	veh	5.8				
Average Back of Queue - Dist (Worst Lane)	m	40.6				
Ave. Que Storage Ratio (Worst Lane)		0.04				
Effective Stops (Total)	veh/h	872	41	ped/h	1087	pers/h
Effective Stop Rate		0.75	0.78		0.75	
Proportion Queued		0.75	0.78		0.75	
Performance Index		48.3	0.7		49.0	
Cost (Total)	$/h	637.69	11.02	$/h	648.71	$/h
Fuel Consumption (Total)	L/h	70.2				
Carbon Dioxide (Total)	kg/h	164.9				
Hydrocarbons (Total)	kg/h	0.015				
Carbon Monoxide (Total)	kg/h	0.18				
NOx (Total)	kg/h	0.059				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.

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

Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 0.0 %

Number of Iterations: 2 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Main (Timing-Capacity) Iterations: 3.7% 29.0% 0.0%

Intersection Performance - Annual Values

Performance Measure	Vehicles:	All MCs	Pedestrians	Persons
Demand Flows (Total)	veh/y	557,811	25,263 ped/y	694,636 pers/y
Arrival Flows (Total)	veh/y	557,811		
Delay (Total)	veh-h/y	2,572	107 ped-h/y	3,193 pers-h/y
Effective Stops (Total)	veh/y	418,358	19,749 ped/y	521,778 pers/y
Travel Distance (Total)	veh-km/y	311,249	505 ped-km/y	374,004 pers-km/y
Travel Time (Total)	veh-h/y	7,887	215 ped-h/y	9,680 pers-h/y
Cost (Total)	$/y	306,092	5,287 $/y	311,379 $/y
Fuel Consumption (Total)	L/y	33,683		
Carbon Dioxide (Total)	kg/y	79,158		
Hydrocarbons (Total)	kg/y	7		
Carbon Monoxide (Total)	kg/y	88		
NOx (Total)	kg/y	28		

1 Hours per Year: 480 (Network)

MOVEMENT SUMMARY

Site: 1066 [EX+BTG 2032 PM: Church St/Bachell Ave, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Existing PM + BTG 2032-Swete St-Martin St-Bachell Ave (Network Folder: General)]

PM Peak Hour: 5:00-6:00pm
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 50 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Church St E															
5	T1	All MCs	172	0.0	172	0.0	0.316	11.2	LOS B	2.0	14.1	0.76	0.61	0.76	19.0
6	R2	All MCs	54	0.0	54	0.0	* 0.316	21.0	LOS C	2.0	14.1	0.80	0.66	0.80	40.4
Approach			225	0.0	225	0.0	0.316	13.6	LOS B	2.0	14.1	0.77	0.62	0.77	28.9
North: Bachell Ave															
7	L2	All MCs	126	0.0	126	0.0	0.113	10.2	LOS B	0.8	5.7	0.45	0.68	0.45	44.4
9	R2	All MCs	440	0.0	440	0.0	* 0.658	20.8	LOS C	5.8	40.6	0.89	0.84	0.92	35.8
Approach			566	0.0	566	0.0	0.658	18.5	LOS B	5.8	40.6	0.80	0.81	0.82	37.7
West: Church St W															
10	L2	All MCs	171	0.0	171	0.0	0.133	6.7	LOS A	0.4	2.9	0.30	0.63	0.30	52.1
11	T1	All MCs	200	0.0	200	0.0	* 0.641	23.2	LOS C	3.1	21.4	0.98	0.84	1.08	36.5
Approach			371	0.0	371	0.0	0.641	15.6	LOS B	3.1	21.4	0.67	0.74	0.72	44.4
All Vehicles			1162	0.0	1162	0.0	0.658	16.6	LOS B	5.8	40.6	0.75	0.75	0.78	39.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
East: Church St E											
P2	Full	53	15.2	LOS B	0.1	0.1	0.78	0.78	30.6	20.0	0.65
All Pedestrians		53	15.2	LOS B	0.1	0.1	0.78	0.78	30.6	20.0	0.65

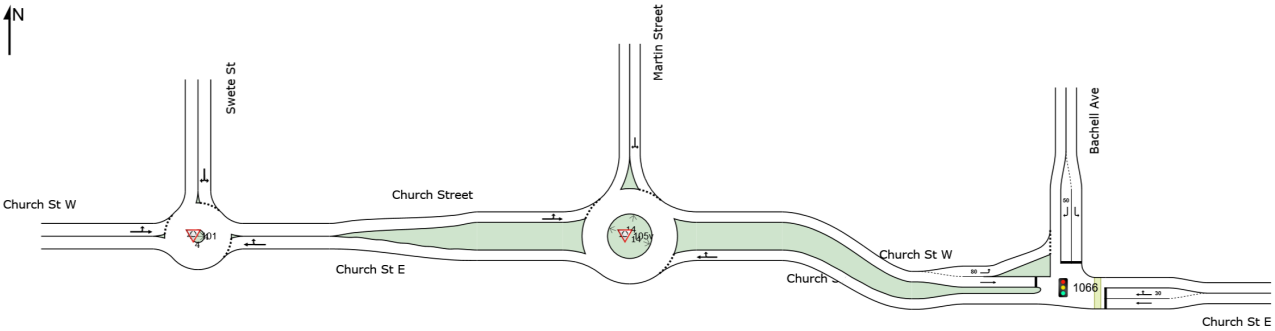
Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

NETWORK LAYOUT

Network: N101 [Existing PM + BTG 2032 Network-Swete St-Martin St-Bachell Ave (Network Folder: General)]

New Network
Network Category: (None)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SITES IN NETWORK		
Site ID	**CCG ID**	**Site Name**
101	NA	EX+BTG 2032 PM: Church St/Swete St, Lidcombe
105v	NA	EXISTING+BTG 2032 PM: BACHELL Ave/ Martin St
1066	NA	EX+BTG 2032 PM: Church St/Bachell Ave, Lidcombe

INTERSECTION SUMMARY

Site: 101 [EX+BTG 2032 PM: Church St/Swete St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Existing PM + BTG 2032 Network-Swete St-Martin St-Bachell Ave (Network Folder: General)]

AM Peak Hour: 5:00-6:00pm
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Travel Speed (Average)	km/h	45.7	45.7 km/h
Travel Distance (Total)	veh-km/h	866.6	1039.9 pers-km/h
Travel Time (Total)	veh-h/h	18.9	22.7 pers-h/h
Desired Speed	km/h	52.0	
Speed Efficiency		0.88	
Travel Time Index		8.66	
Congestion Coefficient		1.14	
Demand Flows (Total)	veh/h	985	1182 pers/h
Arrival Flows (Total)	veh/h	985	1182 pers/h
Percent Heavy Vehicles (Demand)	%	0.0	
Percent Heavy Vehicles (Arrivals)	%	0.0	
Degree of Saturation		0.344	
Practical Spare Capacity	%	147.0	
Effective Intersection Capacity	veh/h	2863	
Control Delay (Total)	veh-h/h	1.75	2.10 pers-h/h
Control Delay (Average)	sec	6.4	6.4 sec
Control Delay (Worst Lane by MC)	sec	7.1	
Control Delay (Worst Movement by MC)	sec	8.7	8.7 sec
Geometric Delay (Average)	sec	5.3	
Stop-Line Delay (Average)	sec	1.1	
Idling Time (Average)	sec	0.0	
Intersection Level of Service (LOS)		LOS A	
Average Back of Queue - Veh (Worst Lane)	veh	0.9	
Average Back of Queue - Dist (Worst Lane)	m	6.4	
Ave. Que Storage Ratio (Worst Lane)		0.01	
Effective Stops (Total)	veh/h	558	670 pers/h
Effective Stop Rate		0.57	0.57
Proportion Queued		0.42	0.42
Performance Index		25.3	25.3
Cost (Total)	$/h	711.18	711.18 $/h
Fuel Consumption (Total)	L/h	69.9	
Carbon Dioxide (Total)	kg/h	164.2	
Hydrocarbons (Total)	kg/h	0.013	
Carbon Monoxide (Total)	kg/h	0.15	
NOx (Total)	kg/h	0.046	

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Roundabout LOS Method: Same as Signalised Intersections.
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 0.9 %
Number of Iterations: 3 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 100.0% 0.0% 0.9%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Demand Flows (Total)	veh/y	472,926	567,512	pers/y
Arrival Flows (Total)	veh/y	472,926		
Delay (Total)	veh-h/y	839	1,007	pers-h/y
Effective Stops (Total)	veh/y	268,006	321,607	pers/y
Travel Distance (Total)	veh-km/y	415,956	499,147	pers-km/y
Travel Time (Total)	veh-h/y	9,093	10,912	pers-h/y
Cost (Total)	$/y	341,365	341,365	$/y
Fuel Consumption (Total)	L/y	33,532		
Carbon Dioxide (Total)	kg/y	78,801		
Hydrocarbons (Total)	kg/y	6		
Carbon Monoxide (Total)	kg/y	70		
NOx (Total)	kg/y	22		

1 Hours per Year: 480 (Network)

MOVEMENT SUMMARY

Site: 101 [EX+BTG 2032 PM: Church St/Swete St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Existing PM + BTG 2032 Network-Swete St-Martin St-Bachell Ave (Network Folder: General)]

AM Peak Hour: 5:00-6:00pm
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Church St E															
5	T1	All MCs	233	0.0	233	0.0	0.344	6.0	LOS A	0.9	6.4	0.45	0.59	0.45	48.2
6	R2	All MCs	155	0.0	155	0.0	0.344	8.7	LOS A	0.9	6.4	0.45	0.59	0.45	47.6
Approach			387	0.0	387	0.0	0.344	7.1	LOS A	0.9	6.4	0.45	0.59	0.45	47.9
North: Swete St															
7	L2	All MCs	92	0.0	92	0.0	0.244	5.7	LOS A	0.6	4.1	0.41	0.60	0.41	41.9
9	R2	All MCs	177	0.0	177	0.0	0.244	7.6	LOS A	0.6	4.1	0.41	0.60	0.41	44.2
Approach			268	0.0	268	0.0	0.244	6.9	LOS A	0.6	4.1	0.41	0.60	0.41	43.7
West: Church St W															
10	L2	All MCs	154	0.0	154	0.0	0.288	5.6	LOS A	0.7	5.1	0.40	0.52	0.40	45.1
11	T1	All MCs	176	0.0	176	0.0	0.288	4.8	LOS A	0.7	5.1	0.40	0.52	0.40	43.3
Approach			329	0.0	329	0.0	0.288	5.2	LOS A	0.7	5.1	0.40	0.52	0.40	44.4
All Vehicles			985	0.0	985	0.0	0.344	6.4	LOS A	0.9	6.4	0.42	0.57	0.42	45.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

INTERSECTION SUMMARY

Site: 105v [EXISTING+BTG 2032 PM: BACHELL Ave/ Martin St (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Existing PM + BTG 2032 Network-Swete St-Martin St-Bachell Ave (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Travel Speed (Average)	km/h	36.9	36.9 km/h
Travel Distance (Total)	veh-km/h	217.1	260.5 pers-km/h
Travel Time (Total)	veh-h/h	5.9	7.1 pers-h/h
Desired Speed	km/h	60.0	
Speed Efficiency		0.61	
Travel Time Index		5.72	
Congestion Coefficient		1.63	
Demand Flows (Total)	veh/h	985	1182 pers/h
Arrival Flows (Total)	veh/h	985	1182 pers/h
Percent Heavy Vehicles (Demand)	%	0.0	
Percent Heavy Vehicles (Arrivals)	%	0.0	
Degree of Saturation		0.344	
Practical Spare Capacity	%	147.1	
Effective Intersection Capacity	veh/h	2864	
Control Delay (Total)	veh-h/h	1.92	2.30 pers-h/h
Control Delay (Average)	sec	7.0	7.0 sec
Control Delay (Worst Lane by MC)	sec	8.2	
Control Delay (Worst Movement by MC)	sec	9.8	9.8 sec
Geometric Delay (Average)	sec	5.7	
Stop-Line Delay (Average)	sec	1.3	
Idling Time (Average)	sec	0.1	
Intersection Level of Service (LOS)		LOS A	
Average Back of Queue - Veh (Worst Lane)	veh	0.9	
Average Back of Queue - Dist (Worst Lane)	m	6.3	
Ave. Que Storage Ratio (Worst Lane)		0.06	
Effective Stops (Total)	veh/h	545	654 pers/h
Effective Stop Rate		0.55	0.55
Proportion Queued		0.41	0.41
Performance Index		13.5	13.5
Cost (Total)	$/h	304.63	304.63 $/h
Fuel Consumption (Total)	L/h	37.5	
Carbon Dioxide (Total)	kg/h	88.2	
Hydrocarbons (Total)	kg/h	0.009	
Carbon Monoxide (Total)	kg/h	0.09	
NOx (Total)	kg/h	0.040	

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 0.9 %
Number of Iterations: 4 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 0.0% 1.2% 0.7%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Demand Flows (Total)	veh/y	472,926	567,512	pers/y
Arrival Flows (Total)	veh/y	472,926		
Delay (Total)	veh-h/y	919	1,103	pers-h/y
Effective Stops (Total)	veh/y	261,435	313,722	pers/y
Travel Distance (Total)	veh-km/y	104,212	125,055	pers-km/y
Travel Time (Total)	veh-h/y	2,824	3,389	pers-h/y
Cost (Total)	$/y	146,224	146,224	$/y
Fuel Consumption (Total)	L/y	18,006		
Carbon Dioxide (Total)	kg/y	42,314		
Hydrocarbons (Total)	kg/y	4		
Carbon Monoxide (Total)	kg/y	44		
NOx (Total)	kg/y	19		

1 Hours per Year: 480 (Network)

MOVEMENT SUMMARY

Site: 105v [EXISTING+BTG 2032 PM: BACHELL Ave/ Martin St (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Existing PM + BTG 2032 Network-Swete St-Martin St-Bachell Ave (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Church Street															
5	T1	All MCs	233	0.0	233	0.0	0.344	5.9	LOS A	0.9	6.3	0.36	0.59	0.36	29.9
6	R2	All MCs	155	0.0	155	0.0	0.344	9.8	LOS A	0.9	6.3	0.36	0.59	0.36	37.4
Approach			387	0.0	387	0.0	0.344	7.4	LOS A	0.9	6.3	0.36	0.59	0.36	34.0
North: Martin Street															
7	L2	All MCs	92	0.0	92	0.0	0.244	5.5	LOS A	0.7	4.6	0.46	0.59	0.46	34.1
9	R2	All MCs	177	0.0	177	0.0	0.244	9.6	LOS A	0.7	4.6	0.46	0.59	0.46	34.1
Approach			268	0.0	268	0.0	0.244	8.2	LOS A	0.7	4.6	0.46	0.59	0.46	34.1
West: Church Street															
10	L2	All MCs	154	0.0	154	0.0	0.279	5.3	LOS A	0.9	6.3	0.44	0.48	0.44	43.3
11	T1	All MCs	176	0.0	176	0.0	0.279	5.6	LOS A	0.9	6.3	0.44	0.48	0.44	39.4
Approach			329	0.0	329	0.0	0.279	5.5	LOS A	0.9	6.3	0.44	0.48	0.44	41.7
All Vehicles			985	0.0	985	0.0	0.344	7.0	LOS A	0.9	6.3	0.41	0.55	0.41	36.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

INTERSECTION SUMMARY

Site: 1066 [EX+BTG 2032 PM: Church St/Bachell Ave, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Existing PM + BTG 2032 Network-Swete St-Martin St-Bachell Ave (Network Folder: General)]

PM Peak Hour: 5:00-6:00pm
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 50 seconds (Site Practical Cycle Time)

Intersection Performance - Hourly Values							
Performance Measure	**Vehicles:**	**All MCs**	**Pedestrians**		**Persons**	
Travel Speed (Average)	km/h	39.5	2.4	km/h	38.6	km/h
Travel Distance (Total)	veh-km/h	648.4	1.1	ped-km/h	779.2	pers-km/h
Travel Time (Total)	veh-h/h	16.4	0.4	ped-h/h	20.2	pers-h/h
Desired Speed	km/h	60.0				
Speed Efficiency		0.66				
Travel Time Index		6.20				
Congestion Coefficient		1.52				
Demand Flows (Total)	veh/h	1162	53	ped/h	1447	pers/h
Arrival Flows (Total)	veh/h	1162			1447	pers/h
Percent Heavy Vehicles (Demand)	%	0.0				
Percent Heavy Vehicles (Arrivals)	%	0.0				
Degree of Saturation		0.658	0.020			
Practical Spare Capacity	%	36.7				
Effective Intersection Capacity	veh/h	1766				
Control Delay (Total)	veh-h/h	5.36	0.22	ped-h/h	6.65	pers-h/h
Control Delay (Average)	sec	16.6	15.2	sec	16.5	sec
Control Delay (Worst Lane by MC)	sec	23.2				
Control Delay (Worst Movement by MC)	sec	23.2	15.2	sec	23.2	sec
Geometric Delay (Average)	sec	3.8				
Stop-Line Delay (Average)	sec	12.8				
Idling Time (Average)	sec	9.5				
Intersection Level of Service (LOS)		LOS B	LOS B			
Average Back of Queue - Veh (Worst Lane)	veh	5.8				
Average Back of Queue - Dist (Worst Lane)	m	40.6				
Ave. Que Storage Ratio (Worst Lane)		0.04				
Effective Stops (Total)	veh/h	872	41	ped/h	1087	pers/h
Effective Stop Rate		0.75	0.78		0.75	
Proportion Queued		0.75	0.78		0.75	
Performance Index		48.3	0.7		49.0	
Cost (Total)	$/h	637.69	11.02	$/h	648.71	$/h
Fuel Consumption (Total)	L/h	70.2				
Carbon Dioxide (Total)	kg/h	164.9				
Hydrocarbons (Total)	kg/h	0.015				
Carbon Monoxide (Total)	kg/h	0.18				
NOx (Total)	kg/h	0.059				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.

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

Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 0.0 %

Number of Iterations: 2 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Main (Timing-Capacity) Iterations: 3.7% 29.0% 0.0%

Intersection Performance - Annual Values

Performance Measure	Vehicles:	All MCs	Pedestrians	Persons
Demand Flows (Total)	veh/y	557,811	25,263 ped/y	694,636 pers/y
Arrival Flows (Total)	veh/y	557,811		
Delay (Total)	veh-h/y	2,572	107 ped-h/y	3,193 pers-h/y
Effective Stops (Total)	veh/y	418,358	19,749 ped/y	521,778 pers/y
Travel Distance (Total)	veh-km/y	311,249	505 ped-km/y	374,004 pers-km/y
Travel Time (Total)	veh-h/y	7,887	215 ped-h/y	9,680 pers-h/y
Cost (Total)	$/y	306,092	5,287 $/y	311,379 $/y
Fuel Consumption (Total)	L/y	33,683		
Carbon Dioxide (Total)	kg/y	79,158		
Hydrocarbons (Total)	kg/y	7		
Carbon Monoxide (Total)	kg/y	88		
NOx (Total)	kg/y	28		

1 Hours per Year: 480 (Network)

MOVEMENT SUMMARY

Site: 1066 [EX+BTG 2032 PM: Church St/Bachell Ave, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Existing PM + BTG 2032 Network-Swete St-Martin St-Bachell Ave (Network Folder: General)]

PM Peak Hour: 5:00-6:00pm
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 50 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Church St E															
5	T1	All MCs	172	0.0	172	0.0	0.316	11.2	LOS B	2.0	14.1	0.76	0.61	0.76	19.0
6	R2	All MCs	54	0.0	54	0.0	* 0.316	21.0	LOS C	2.0	14.1	0.80	0.66	0.80	40.4
Approach			225	0.0	225	0.0	0.316	13.6	LOS B	2.0	14.1	0.77	0.62	0.77	28.9
North: Bachell Ave															
7	L2	All MCs	126	0.0	126	0.0	0.113	10.2	LOS B	0.8	5.7	0.45	0.68	0.45	44.4
9	R2	All MCs	440	0.0	440	0.0	* 0.658	20.8	LOS C	5.8	40.6	0.89	0.84	0.92	35.8
Approach			566	0.0	566	0.0	0.658	18.5	LOS B	5.8	40.6	0.80	0.81	0.82	37.7
West: Church St W															
10	L2	All MCs	171	0.0	171	0.0	0.133	6.7	LOS A	0.4	2.9	0.30	0.63	0.30	52.1
11	T1	All MCs	200	0.0	200	0.0	* 0.641	23.2	LOS C	3.1	21.4	0.98	0.84	1.08	36.5
Approach			371	0.0	371	0.0	0.641	15.6	LOS B	3.1	21.4	0.67	0.74	0.72	44.4
All Vehicles			1162	0.0	1162	0.0	0.658	16.6	LOS B	5.8	40.6	0.75	0.75	0.78	39.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
East: Church St E											
P2	Full	53	15.2	LOS B	0.1	0.1	0.78	0.78	30.6	20.0	0.65
All Pedestrians		53	15.2	LOS B	0.1	0.1	0.78	0.78	30.6	20.0	0.65

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.

NETWORK LAYOUT

Selected Routes

Network: N102 [Future AM Development -Swete St-Martin ST-Bachell Ave-Site Access (Network Folder: General)]

New Network
Network Category: (None)

No Routes for the selected Network.

INTERSECTION SUMMARY

Site: 101 [Future AM: Church St/Swete St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [Future AM Development -Swete St-Martin ST-Bachell Ave-Site Access (Network Folder: General)]

AM Peak Hour: 7:30-8:30am
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Travel Speed (Average)	km/h	45.0	45.0 km/h
Travel Distance (Total)	veh-km/h	1116.0	1339.2 pers-km/h
Travel Time (Total)	veh-h/h	24.8	29.8 pers-h/h
Desired Speed	km/h	51.3	
Speed Efficiency		0.88	
Travel Time Index		8.62	
Congestion Coefficient		1.14	
Demand Flows (Total)	veh/h	1344	1613 pers/h
Arrival Flows (Total)	veh/h	1344	1613 pers/h
Percent Heavy Vehicles (Demand)	%	0.0	
Percent Heavy Vehicles (Arrivals)	%	0.0	
Degree of Saturation		0.563	
Practical Spare Capacity	%	50.8	
Effective Intersection Capacity	veh/h	2386	
Control Delay (Total)	veh-h/h	2.36	2.83 pers-h/h
Control Delay (Average)	sec	6.3	6.3 sec
Control Delay (Worst Lane by MC)	sec	8.6	
Control Delay (Worst Movement by MC)	sec	9.3	9.3 sec
Geometric Delay (Average)	sec	4.9	
Stop-Line Delay (Average)	sec	1.4	
Idling Time (Average)	sec	0.1	
Intersection Level of Service (LOS)		LOS A	
Average Back of Queue - Veh (Worst Lane)	veh	2.1	
Average Back of Queue - Dist (Worst Lane)	m	14.6	
Ave. Que Storage Ratio (Worst Lane)		0.03	
Effective Stops (Total)	veh/h	753	904 pers/h
Effective Stop Rate		0.56	0.56
Proportion Queued		0.51	0.51
Performance Index		35.2	35.2
Cost (Total)	$/h	934.61	934.61 $/h
Fuel Consumption (Total)	L/h	92.9	
Carbon Dioxide (Total)	kg/h	218.4	
Hydrocarbons (Total)	kg/h	0.017	
Carbon Monoxide (Total)	kg/h	0.19	
NOx (Total)	kg/h	0.063	

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Roundabout LOS Method: Same as Signalised Intersections.
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 1.4 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 2.1% 1.3% 0.7%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Demand Flows (Total)	veh/y	645,221	774,265	pers/y
Arrival Flows (Total)	veh/y	645,221		
Delay (Total)	veh-h/y	1,132	1,358	pers-h/y
Effective Stops (Total)	veh/y	361,475	433,770	pers/y
Travel Distance (Total)	veh-km/y	535,675	642,811	pers-km/y
Travel Time (Total)	veh-h/y	11,910	14,293	pers-h/y
Cost (Total)	$/y	448,611	448,611	$/y
Fuel Consumption (Total)	L/y	44,605		
Carbon Dioxide (Total)	kg/y	104,821		
Hydrocarbons (Total)	kg/y	8		
Carbon Monoxide (Total)	kg/y	92		
NOx (Total)	kg/y	30		

1 Hours per Year: 480 (Network)

MOVEMENT SUMMARY

Site: 101 [Future AM: Church St/Swete St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [Future AM Development -Swete St-Martin ST-Bachell Ave-Site Access (Network Folder: General)]

AM Peak Hour: 7:30-8:30am
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Church St E															
5	T1	All MCs	228	0.0	228	0.0	0.315	6.0	LOS A	0.8	5.9	0.48	0.58	0.48	48.2
6	R2	All MCs	112	0.0	112	0.0	0.315	8.7	LOS A	0.8	5.9	0.48	0.58	0.48	47.6
Approach			340	0.0	340	0.0	0.315	6.9	LOS A	0.8	5.9	0.48	0.58	0.48	48.0
North: Swete St															
7	L2	All MCs	99	0.0	99	0.0	0.327	7.4	LOS A	0.8	5.8	0.64	0.68	0.64	40.6
9	R2	All MCs	188	0.0	188	0.0	0.327	9.3	LOS A	0.8	5.8	0.64	0.68	0.64	43.5
Approach			287	0.0	287	0.0	0.327	8.6	LOS A	0.8	5.8	0.64	0.68	0.64	42.8
West: Church St W															
10	L2	All MCs	321	0.0	321	0.0	0.563	5.6	LOS A	2.1	14.6	0.48	0.50	0.48	44.9
11	T1	All MCs	396	0.0	396	0.0	0.563	4.8	LOS A	2.1	14.6	0.48	0.50	0.48	43.0
Approach			717	0.0	717	0.0	0.563	5.1	LOS A	2.1	14.6	0.48	0.50	0.48	44.2
All Vehicles			1344	0.0	1344	0.0	0.563	6.3	LOS A	2.1	14.6	0.51	0.56	0.51	45.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

INTERSECTION SUMMARY

Site: 105v [Future AM: BACHELL Ave/ Martin St - Copy (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [Future AM Development -Swete St-Martin ST-Bachell Ave-Site Access (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Travel Speed (Average)	km/h	37.1	37.1 km/h
Travel Distance (Total)	veh-km/h	321.1	385.3 pers-km/h
Travel Time (Total)	veh-h/h	8.7	10.4 pers-h/h
Desired Speed	km/h	60.0	
Speed Efficiency		0.62	
Travel Time Index		5.76	
Congestion Coefficient		1.62	
Demand Flows (Total)	veh/h	1346	1616 pers/h
Arrival Flows (Total)	veh/h	1346	1616 pers/h
Percent Heavy Vehicles (Demand)	%	0.0	
Percent Heavy Vehicles (Arrivals)	%	0.0	
Degree of Saturation		0.584	
Practical Spare Capacity	%	45.6	
Effective Intersection Capacity	veh/h	2306	
Control Delay (Total)	veh-h/h	2.73	3.28 pers-h/h
Control Delay (Average)	sec	7.3	7.3 sec
Control Delay (Worst Lane by MC)	sec	10.1	
Control Delay (Worst Movement by MC)	sec	11.5	11.5 sec
Geometric Delay (Average)	sec	5.4	
Stop-Line Delay (Average)	sec	1.9	
Idling Time (Average)	sec	0.2	
Intersection Level of Service (LOS)		LOS A	
Average Back of Queue - Veh (Worst Lane)	veh	2.7	
Average Back of Queue - Dist (Worst Lane)	m	18.8	
Ave. Que Storage Ratio (Worst Lane)		0.10	
Effective Stops (Total)	veh/h	755	906 pers/h
Effective Stop Rate		0.56	0.56
Proportion Queued		0.57	0.57
Performance Index		21.2	21.2
Cost (Total)	$/h	446.71	446.71 $/h
Fuel Consumption (Total)	L/h	54.6	
Carbon Dioxide (Total)	kg/h	128.4	
Hydrocarbons (Total)	kg/h	0.013	
Carbon Monoxide (Total)	kg/h	0.13	
NOx (Total)	kg/h	0.058	

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 1.8 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 2.9% 1.7% 0.9%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Demand Flows (Total)	veh/y	646,232	775,478	pers/y
Arrival Flows (Total)	veh/y	646,232		
Delay (Total)	veh-h/y	1,311	1,573	pers-h/y
Effective Stops (Total)	veh/y	362,399	434,879	pers/y
Travel Distance (Total)	veh-km/y	154,110	184,932	pers-km/y
Travel Time (Total)	veh-h/y	4,156	4,987	pers-h/y
Cost (Total)	$/y	214,419	214,419	$/y
Fuel Consumption (Total)	L/y	26,219		
Carbon Dioxide (Total)	kg/y	61,616		
Hydrocarbons (Total)	kg/y	6		
Carbon Monoxide (Total)	kg/y	65		
NOx (Total)	kg/y	28		

1 Hours per Year: 480 (Network)

MOVEMENT SUMMARY

Site: 105v [Future AM: BACHELL Ave/ Martin St - Copy (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [Future AM Development -Swete St-Martin ST-Bachell Ave-Site Access (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Church Street															
5	T1	All MCs	192	0.0	192	0.0	0.319	5.9	LOS A	0.8	5.8	0.38	0.60	0.38	29.5
6	R2	All MCs	156	0.0	156	0.0	0.319	9.8	LOS A	0.8	5.8	0.38	0.60	0.38	37.1
Approach			347	0.0	347	0.0	0.319	7.7	LOS A	0.8	5.8	0.38	0.60	0.38	34.0
North: Martin Street															
7	L2	All MCs	97	0.0	97	0.0	0.329	7.4	LOS A	0.9	6.6	0.70	0.68	0.70	31.7
9	R2	All MCs	185	0.0	185	0.0	0.329	11.5	LOS B	0.9	6.6	0.70	0.68	0.70	31.7
Approach			282	0.0	282	0.0	0.329	10.1	LOS B	0.9	6.6	0.70	0.68	0.70	31.7
West: Church Street															
10	L2	All MCs	321	0.0	321	0.0	0.584	5.8	LOS A	2.7	18.8	0.62	0.50	0.62	42.1
11	T1	All MCs	396	0.0	396	0.0	0.584	6.2	LOS A	2.7	18.8	0.62	0.50	0.62	37.7
Approach			717	0.0	717	0.0	0.584	6.0	LOS A	2.7	18.8	0.62	0.50	0.62	40.2
All Vehicles			1346	0.0	1346	0.0	0.584	7.3	LOS A	2.7	18.8	0.57	0.56	0.57	37.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

INTERSECTION SUMMARY

Site: 1066 [Future AM: Church St/Bachell Ave, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [Future AM Development -Swete St-Martin ST-Bachell Ave-Site Access (Network Folder: General)]

AM Peak Hour: 7:30-8:30am
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 40 seconds (Site Practical Cycle Time)

Intersection Performance - Hourly Values							
Performance Measure	**Vehicles:**	**All MCs**	**Pedestrians**		**Persons**	
Travel Speed (Average)	km/h	40.0	2.4	km/h	39.0	km/h
Travel Distance (Total)	veh-km/h	534.8	1.1	ped-km/h	642.8	pers-km/h
Travel Time (Total)	veh-h/h	13.4	0.4	ped-h/h	16.5	pers-h/h
Desired Speed	km/h	60.0				
Speed Efficiency		0.67				
Travel Time Index		6.30				
Congestion Coefficient		1.50				
Demand Flows (Total)	veh/h	1237	53	ped/h	1537	pers/h
Arrival Flows (Total)	veh/h	1237			1537	pers/h
Percent Heavy Vehicles (Demand)	%	0.0				
Percent Heavy Vehicles (Arrivals)	%	0.0				
Degree of Saturation		0.504	0.029			
Practical Spare Capacity	%	78.6				
Effective Intersection Capacity	veh/h	2455				
Control Delay (Total)	veh-h/h	4.30	0.21	ped-h/h	5.37	pers-h/h
Control Delay (Average)	sec	12.5	14.5	sec	12.6	sec
Control Delay (Worst Lane by MC)	sec	21.1				
Control Delay (Worst Movement by MC)	sec	21.1	14.5	sec	21.1	sec
Geometric Delay (Average)	sec	4.2				
Stop-Line Delay (Average)	sec	8.4				
Idling Time (Average)	sec	5.5				
Intersection Level of Service (LOS)		LOS B	LOS B			
Average Back of Queue - Veh (Worst Lane)	veh	2.3				
Average Back of Queue - Dist (Worst Lane)	m	16.4				
Ave. Que Storage Ratio (Worst Lane)		0.04				
Effective Stops (Total)	veh/h	879	45	ped/h	1100	pers/h
Effective Stop Rate		0.71	0.85		0.72	
Proportion Queued		0.70	0.85		0.70	
Performance Index		27.8	0.7		28.5	
Cost (Total)	$/h	532.86	10.74	$/h	543.60	$/h
Fuel Consumption (Total)	L/h	63.7				
Carbon Dioxide (Total)	kg/h	149.6				
Hydrocarbons (Total)	kg/h	0.014				
Carbon Monoxide (Total)	kg/h	0.16				
NOx (Total)	kg/h	0.056				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.

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

Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 0.0 %

Number of Iterations: 2 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Main (Timing-Capacity) Iterations: 6.6% 0.1% 0.0%

Intersection Performance - Annual Values

Performance Measure	Vehicles:	All MCs	Pedestrians	Persons
Demand Flows (Total)	veh/y	593,684	25,263 ped/y	737,684 pers/y
Arrival Flows (Total)	veh/y	593,684		
Delay (Total)	veh-h/y	2,065	102 ped-h/y	2,579 pers-h/y
Effective Stops (Total)	veh/y	422,125	21,521 ped/y	528,071 pers/y
Travel Distance (Total)	veh-km/y	256,711	505 ped-km/y	308,559 pers-km/y
Travel Time (Total)	veh-h/y	6,413	210 ped-h/y	7,905 pers-h/y
Cost (Total)	$/y	255,773	5,156 $/y	260,929 $/y
Fuel Consumption (Total)	L/y	30,562		
Carbon Dioxide (Total)	kg/y	71,820		
Hydrocarbons (Total)	kg/y	7		
Carbon Monoxide (Total)	kg/y	79		
NOx (Total)	kg/y	27		

1 Hours per Year: 480 (Network)

MOVEMENT SUMMARY

Site: 1066 [Future AM: Church St/Bachell Ave, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [Future AM Development -Swete St-Martin ST-Bachell Ave-Site Access (Network Folder: General)]

AM Peak Hour: 7:30-8:30am
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 40 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Church St E															
5	T1	All MCs	147	0.0	147	0.0	0.440	6.8	LOS A	2.1	14.8	0.70	0.58	0.70	23.5
6	R2	All MCs	173	0.0	173	0.0	* 0.440	15.9	LOS B	2.1	14.8	0.85	0.75	0.85	18.6
Approach			320	0.0	320	0.0	0.440	11.7	LOS B	2.1	14.8	0.78	0.67	0.78	20.6
North: Bachell Ave															
7	L2	All MCs	128	0.0	128	0.0	0.132	10.8	LOS B	0.8	5.6	0.54	0.70	0.54	43.8
9	R2	All MCs	211	0.0	211	0.0	* 0.504	21.1	LOS C	2.3	16.4	0.92	0.80	0.92	35.7
Approach			339	0.0	339	0.0	0.504	17.2	LOS B	2.3	16.4	0.77	0.76	0.77	38.6
West: Church St W															
10	L2	All MCs	415	0.0	415	0.0	0.359	7.4	LOS A	1.3	9.4	0.47	0.69	0.47	48.1
11	T1	All MCs	163	0.0	163	0.0	* 0.478	17.2	LOS B	1.9	13.3	0.94	0.75	0.94	40.6
Approach			578	0.0	578	0.0	0.478	10.2	LOS B	1.9	13.3	0.61	0.71	0.61	45.5
All Vehicles			1237	0.0	1237	0.0	0.504	12.5	LOS B	2.3	16.4	0.70	0.71	0.70	40.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
East: Church St E											
P2	Full	53	14.5	LOS B	0.1	0.1	0.85	0.85	29.9	20.0	0.67
All Pedestrians		53	14.5	LOS B	0.1	0.1	0.85	0.85	29.9	20.0	0.67

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.

INTERSECTION SUMMARY

Site: 5 [DEV-BACHELL AVE-DRIVEWAY-AM2 - Copy (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [Future AM Development -Swete St-Martin ST-Bachell Ave-Site Access (Network Folder: General)]

New Site
Site Category: Proposed Design 1
Roundabout

Intersection Performance - Hourly Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Travel Speed (Average)	km/h	50.7	50.7 km/h
Travel Distance (Total)	veh-km/h	820.5	984.6 pers-km/h
Travel Time (Total)	veh-h/h	16.2	19.4 pers-h/h
Desired Speed	km/h	60.0	
Speed Efficiency		0.85	
Travel Time Index		8.28	
Congestion Coefficient		1.18	
Demand Flows (Total)	veh/h	1058	1269 pers/h
Arrival Flows (Total)	veh/h	1058	1269 pers/h
Percent Heavy Vehicles (Demand)	%	0.0	
Percent Heavy Vehicles (Arrivals)	%	0.0	
Degree of Saturation		0.403	
Practical Spare Capacity	%	110.7	
Effective Intersection Capacity	veh/h	2623	
Control Delay (Total)	veh-h/h	1.91	2.30 pers-h/h
Control Delay (Average)	sec	6.5	6.5 sec
Control Delay (Worst Lane by MC)	sec	9.6	
Control Delay (Worst Movement by MC)	sec	11.6	11.6 sec
Geometric Delay (Average)	sec	5.7	
Stop-Line Delay (Average)	sec	0.8	
Idling Time (Average)	sec	0.0	
Intersection Level of Service (LOS)		LOS A	
Average Back of Queue - Veh (Worst Lane)	veh	1.2	
Average Back of Queue - Dist (Worst Lane)	m	8.4	
Ave. Que Storage Ratio (Worst Lane)		0.02	
Effective Stops (Total)	veh/h	602	723 pers/h
Effective Stop Rate		0.57	0.57
Proportion Queued		0.27	0.27
Performance Index		25.6	25.6
Cost (Total)	$/h	753.79	753.79 $/h
Fuel Consumption (Total)	L/h	72.0	
Carbon Dioxide (Total)	kg/h	169.3	
Hydrocarbons (Total)	kg/h	0.015	
Carbon Monoxide (Total)	kg/h	0.20	
NOx (Total)	kg/h	0.056	

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 1.4 %
Number of Iterations: 4 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 0.0% 1.8% 1.0%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Demand Flows (Total)	veh/y	507,790	609,347	pers/y
Arrival Flows (Total)	veh/y	507,790		
Delay (Total)	veh-h/y	919	1,103	pers-h/y
Effective Stops (Total)	veh/y	289,079	346,895	pers/y
Travel Distance (Total)	veh-km/y	393,835	472,602	pers-km/y
Travel Time (Total)	veh-h/y	7,768	9,321	pers-h/y
Cost (Total)	$/y	361,819	361,819	$/y
Fuel Consumption (Total)	L/y	34,580		
Carbon Dioxide (Total)	kg/y	81,264		
Hydrocarbons (Total)	kg/y	7		
Carbon Monoxide (Total)	kg/y	95		
NOx (Total)	kg/y	27		

1 Hours per Year: 480 (Network)

MOVEMENT SUMMARY

Site: 5 [DEV-BACHELL AVE-DRIVEWAY-AM2 - Copy (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [Future AM Development -Swete St-Martin ST-Bachell Ave-Site Access (Network Folder: General)]

New Site
Site Category: Proposed Design 1
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: SITE DRIVEWAY															
1	L2	All MCs	83	0.0	83	0.0	0.098	6.3	LOS A	0.2	1.5	0.47	0.60	0.47	44.5
2	T1	All MCs	1	0.0	1	0.0	0.098	6.3	LOS A	0.2	1.5	0.47	0.60	0.47	50.9
3	R2	All MCs	13	0.0	13	0.0	0.098	9.3	LOS A	0.2	1.5	0.47	0.60	0.47	50.1
Approach			97	0.0	97	0.0	0.098	6.7	LOS A	0.2	1.5	0.47	0.60	0.47	46.0
NorthEast: BACHELL AVENUE															
4	L2	All MCs	41	0.0	41	0.0	0.317	6.9	LOS A	0.8	5.6	0.53	0.57	0.53	50.1
5	T1	All MCs	277	0.0	277	0.0	0.317	6.9	LOS A	0.8	5.6	0.53	0.57	0.53	48.5
6	R2	All MCs	1	0.0	1	0.0	0.317	9.9	LOS A	0.8	5.6	0.53	0.57	0.53	51.3
Approach			319	0.0	319	0.0	0.317	6.9	LOS A	0.8	5.6	0.53	0.57	0.53	48.8
NorthWest: RAWSON STREET															
7	L2	All MCs	1	0.0	1	0.0	0.004	8.6	LOS A	0.0	0.1	0.63	0.57	0.63	50.0
8	T1	All MCs	1	0.0	1	0.0	0.004	8.6	LOS A	0.0	0.1	0.63	0.57	0.63	48.7
9	R2	All MCs	1	0.0	1	0.0	0.004	11.6	LOS B	0.0	0.1	0.63	0.57	0.63	45.8
Approach			3	0.0	3	0.0	0.004	9.6	LOS A	0.0	0.1	0.63	0.57	0.63	48.6
SouthWest: BACHELL AVENUE															
10	L2	All MCs	1	0.0	1	0.0	0.403	4.9	LOS A	1.2	8.4	0.11	0.56	0.11	52.1
11	T1	All MCs	340	0.0	340	0.0	0.403	4.9	LOS A	1.2	8.4	0.11	0.56	0.11	52.6
12	R2	All MCs	298	0.0	298	0.0	0.403	7.9	LOS A	1.2	8.4	0.11	0.56	0.11	50.4
Approach			639	0.0	639	0.0	0.403	6.3	LOS A	1.2	8.4	0.11	0.56	0.11	51.6
All Vehicles			1058	0.0	1058	0.0	0.403	6.5	LOS A	1.2	8.4	0.27	0.57	0.27	50.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

NETWORK LAYOUT

Selected Routes

Network: N101 [Future PM Development-Swete St-Martin St- Bachell Ave-Site Acccess (Network Folder: General)]

New Network
Network Category: (None)

No Routes for the selected Network.

INTERSECTION SUMMARY

Site: 101 [Future PM: Church St/Swete St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Future PM Development-Swete St-Martin St- Bachell Ave-Site Acccess (Network Folder: General)]

AM Peak Hour: 5:00-6:00pm
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Travel Speed (Average)	km/h	46.1	46.1 km/h
Travel Distance (Total)	veh-km/h	1061.6	1273.9 pers-km/h
Travel Time (Total)	veh-h/h	23.0	27.7 pers-h/h
Desired Speed	km/h	52.3	
Speed Efficiency		0.88	
Travel Time Index		8.68	
Congestion Coefficient		1.13	
Demand Flows (Total)	veh/h	1219	1463 pers/h
Arrival Flows (Total)	veh/h	1219	1463 pers/h
Percent Heavy Vehicles (Demand)	%	0.0	
Percent Heavy Vehicles (Arrivals)	%	0.0	
Degree of Saturation		0.471	
Practical Spare Capacity	%	80.3	
Effective Intersection Capacity	veh/h	2586	
Control Delay (Total)	veh-h/h	2.09	2.51 pers-h/h
Control Delay (Average)	sec	6.2	6.2 sec
Control Delay (Worst Lane by MC)	sec	7.5	
Control Delay (Worst Movement by MC)	sec	8.8	8.8 sec
Geometric Delay (Average)	sec	5.0	
Stop-Line Delay (Average)	sec	1.2	
Idling Time (Average)	sec	0.0	
Intersection Level of Service (LOS)		LOS A	
Average Back of Queue - Veh (Worst Lane)	veh	1.5	
Average Back of Queue - Dist (Worst Lane)	m	10.3	
Ave. Que Storage Ratio (Worst Lane)		0.02	
Effective Stops (Total)	veh/h	673	807 pers/h
Effective Stop Rate		0.55	0.55
Proportion Queued		0.45	0.45
Performance Index		31.3	31.3
Cost (Total)	$/h	866.03	866.03 $/h
Fuel Consumption (Total)	L/h	85.3	
Carbon Dioxide (Total)	kg/h	200.6	
Hydrocarbons (Total)	kg/h	0.016	
Carbon Monoxide (Total)	kg/h	0.18	
NOx (Total)	kg/h	0.057	

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Roundabout LOS Method: Same as Signalised Intersections.
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 0.9 %
Number of Iterations: 4 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 0.0% 1.1% 0.6%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Demand Flows (Total)	veh/y	585,095	702,114	pers/y
Arrival Flows (Total)	veh/y	585,095		
Delay (Total)	veh-h/y	1,003	1,204	pers-h/y
Effective Stops (Total)	veh/y	322,856	387,428	pers/y
Travel Distance (Total)	veh-km/y	509,562	611,475	pers-km/y
Travel Time (Total)	veh-h/y	11,063	13,276	pers-h/y
Cost (Total)	$/y	415,693	415,693	$/y
Fuel Consumption (Total)	L/y	40,965		
Carbon Dioxide (Total)	kg/y	96,267		
Hydrocarbons (Total)	kg/y	7		
Carbon Monoxide (Total)	kg/y	87		
NOx (Total)	kg/y	27		

1 Hours per Year: 480 (Network)

MOVEMENT SUMMARY

Site: 101 [Future PM: Church St/Swete St, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Future PM Development-Swete St-Martin St- Bachell Ave-Site Acccess (Network Folder: General)]

AM Peak Hour: 5:00-6:00pm
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Church St E															
5	T1	All MCs	443	0.0	443	0.0	0.471	6.2	LOS A	1.5	10.3	0.52	0.57	0.52	48.2
6	R2	All MCs	95	0.0	95	0.0	0.471	8.8	LOS A	1.5	10.3	0.52	0.57	0.52	47.7
Approach			538	0.0	538	0.0	0.471	6.6	LOS A	1.5	10.3	0.52	0.57	0.52	48.1
North: Swete St															
7	L2	All MCs	96	0.0	96	0.0	0.271	6.3	LOS A	0.6	4.5	0.50	0.63	0.50	41.6
9	R2	All MCs	177	0.0	177	0.0	0.271	8.2	LOS A	0.6	4.5	0.50	0.63	0.50	44.0
Approach			273	0.0	273	0.0	0.271	7.5	LOS A	0.6	4.5	0.50	0.63	0.50	43.5
West: Church St W															
10	L2	All MCs	154	0.0	154	0.0	0.324	5.2	LOS A	0.9	6.3	0.33	0.48	0.33	45.3
11	T1	All MCs	255	0.0	255	0.0	0.324	4.4	LOS A	0.9	6.3	0.33	0.48	0.33	43.6
Approach			408	0.0	408	0.0	0.324	4.7	LOS A	0.9	6.3	0.33	0.48	0.33	44.5
All Vehicles			1219	0.0	1219	0.0	0.471	6.2	LOS A	1.5	10.3	0.45	0.55	0.45	46.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Roundabout LOS Method: Same as Signalised Intersections.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

INTERSECTION SUMMARY

Site: 105v [Future PM: BACHELL Ave/ Martin St - Copy - Copy (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Future PM Development-Swete St-Martin St- Bachell Ave-Site Acccess (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Travel Speed (Average)	km/h	36.2	36.2 km/h
Travel Distance (Total)	veh-km/h	248.0	297.6 pers-km/h
Travel Time (Total)	veh-h/h	6.9	8.2 pers-h/h
Desired Speed	km/h	60.0	
Speed Efficiency		0.60	
Travel Time Index		5.59	
Congestion Coefficient		1.66	
Demand Flows (Total)	veh/h	1204	1445 pers/h
Arrival Flows (Total)	veh/h	1204	1445 pers/h
Percent Heavy Vehicles (Demand)	%	0.0	
Percent Heavy Vehicles (Arrivals)	%	0.0	
Degree of Saturation		0.489	
Practical Spare Capacity	%	73.7	
Effective Intersection Capacity	veh/h	2461	
Control Delay (Total)	veh-h/h	2.34	2.81 pers-h/h
Control Delay (Average)	sec	7.0	7.0 sec
Control Delay (Worst Lane by MC)	sec	8.6	
Control Delay (Worst Movement by MC)	sec	10.0	10.0 sec
Geometric Delay (Average)	sec	5.5	
Stop-Line Delay (Average)	sec	1.5	
Idling Time (Average)	sec	0.1	
Intersection Level of Service (LOS)		LOS A	
Average Back of Queue - Veh (Worst Lane)	veh	1.5	
Average Back of Queue - Dist (Worst Lane)	m	10.8	
Ave. Que Storage Ratio (Worst Lane)		0.11	
Effective Stops (Total)	veh/h	667	801 pers/h
Effective Stop Rate		0.55	0.55
Proportion Queued		0.44	0.44
Performance Index		16.8	16.8
Cost (Total)	$/h	357.39	357.39 $/h
Fuel Consumption (Total)	L/h	44.6	
Carbon Dioxide (Total)	kg/h	104.8	
Hydrocarbons (Total)	kg/h	0.011	
Carbon Monoxide (Total)	kg/h	0.11	
NOx (Total)	kg/h	0.048	

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 1.1 %
Number of Iterations: 4 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 0.0% 1.3% 0.8%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Demand Flows (Total)	veh/y	578,021	693,625	pers/y
Arrival Flows (Total)	veh/y	578,021		
Delay (Total)	veh-h/y	1,122	1,347	pers-h/y
Effective Stops (Total)	veh/y	320,295	384,354	pers/y
Travel Distance (Total)	veh-km/y	119,032	142,839	pers-km/y
Travel Time (Total)	veh-h/y	3,291	3,949	pers-h/y
Cost (Total)	$/y	171,546	171,546	$/y
Fuel Consumption (Total)	L/y	21,413		
Carbon Dioxide (Total)	kg/y	50,322		
Hydrocarbons (Total)	kg/y	5		
Carbon Monoxide (Total)	kg/y	52		
NOx (Total)	kg/y	23		

1 Hours per Year: 480 (Network)

MOVEMENT SUMMARY

Site: 105v [Future PM: BACHELL Ave/ Martin St - Copy - Copy (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Future PM Development-Swete St-Martin St- Bachell Ave-Site Acccess (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Church Street															
5	T1	All MCs	408	0.0	408	0.0	0.489	6.1	LOS A	1.5	10.8	0.40	0.58	0.40	30.1
6	R2	All MCs	155	0.0	155	0.0	0.489	10.0	LOS A	1.5	10.8	0.40	0.58	0.40	37.6
Approach			563	0.0	563	0.0	0.489	7.2	LOS A	1.5	10.8	0.40	0.58	0.40	33.1
North: Martin Street															
7	L2	All MCs	92	0.0	92	0.0	0.258	5.8	LOS A	0.7	4.9	0.52	0.61	0.52	33.7
9	R2	All MCs	177	0.0	177	0.0	0.258	10.0	LOS B	0.7	4.9	0.52	0.61	0.52	33.7
Approach			268	0.0	268	0.0	0.258	8.6	LOS A	0.7	4.9	0.52	0.61	0.52	33.7
West: Church Street															
10	L2	All MCs	154	0.0	154	0.0	0.314	5.4	LOS A	1.1	7.4	0.46	0.48	0.46	43.1
11	T1	All MCs	219	0.0	219	0.0	0.314	5.7	LOS A	1.1	7.4	0.46	0.48	0.46	39.2
Approach			373	0.0	373	0.0	0.314	5.5	LOS A	1.1	7.4	0.46	0.48	0.46	41.3
All Vehicles			1204	0.0	1204	0.0	0.489	7.0	LOS A	1.5	10.8	0.44	0.55	0.44	36.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

INTERSECTION SUMMARY

Site: 1066 [Future PM: Church St/Bachell Ave, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Future PM Development-Swete St-Martin St- Bachell Ave-Site Acccess (Network Folder: General)]

PM Peak Hour: 5:00-6:00pm
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 60 seconds (Site Practical Cycle Time)

Intersection Performance - Hourly Values							
Performance Measure	**Vehicles:**	**All MCs**	**Pedestrians**		**Persons**	
Travel Speed (Average)	km/h	33.6	2.6	km/h	33.1	km/h
Travel Distance (Total)	veh-km/h	722.9	1.1	ped-km/h	868.5	pers-km/h
Travel Time (Total)	veh-h/h	21.5	0.4	ped-h/h	26.3	pers-h/h
Desired Speed	km/h	60.0				
Speed Efficiency		0.56				
Travel Time Index		5.10				
Congestion Coefficient		1.79				
Demand Flows (Total)	veh/h	1535	53	ped/h	1894	pers/h
Arrival Flows (Total)	veh/h	1535			1894	pers/h
Percent Heavy Vehicles (Demand)	%	0.0				
Percent Heavy Vehicles (Arrivals)	%	0.0				
Degree of Saturation		0.810	0.013			
Practical Spare Capacity	%	11.2				
Effective Intersection Capacity	veh/h	1896				
Control Delay (Total)	veh-h/h	9.34	0.19	ped-h/h	11.40	pers-h/h
Control Delay (Average)	sec	21.9	12.7	sec	21.7	sec
Control Delay (Worst Lane by MC)	sec	31.3				
Control Delay (Worst Movement by MC)	sec	31.3	12.7	sec	31.3	sec
Geometric Delay (Average)	sec	4.2				
Stop-Line Delay (Average)	sec	17.7				
Idling Time (Average)	sec	12.6				
Intersection Level of Service (LOS)		LOS C	LOS B			
Average Back of Queue - Veh (Worst Lane)	veh	11.7				
Average Back of Queue - Dist (Worst Lane)	m	81.7				
Ave. Que Storage Ratio (Worst Lane)		0.06				
Effective Stops (Total)	veh/h	1243	34	ped/h	1526	pers/h
Effective Stop Rate		0.81	0.65		0.81	
Proportion Queued		0.76	0.65		0.75	
Performance Index		51.0	0.6		51.6	
Cost (Total)	$/h	808.58	10.10	$/h	818.68	$/h
Fuel Consumption (Total)	L/h	88.3				
Carbon Dioxide (Total)	kg/h	207.5				
Hydrocarbons (Total)	kg/h	0.020				
Carbon Monoxide (Total)	kg/h	0.22				
NOx (Total)	kg/h	0.075				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.

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

Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 0.0 %

Number of Iterations: 2 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Main (Timing-Capacity) Iterations: 5.9% 17.6% 0.1%

Intersection Performance - Annual Values

Performance Measure	Vehicles:	All MCs	Pedestrians	Persons
Demand Flows (Total)	veh/y	736,674	25,263 ped/y	909,272 pers/y
Arrival Flows (Total)	veh/y	736,674		
Delay (Total)	veh-h/y	4,484	89 ped-h/y	5,470 pers-h/y
Effective Stops (Total)	veh/y	596,876	16,457 ped/y	732,708 pers/y
Travel Distance (Total)	veh-km/y	346,980	505 ped-km/y	416,881 pers-km/y
Travel Time (Total)	veh-h/y	10,340	197 ped-h/y	12,605 pers-h/y
Cost (Total)	$/y	388,120	4,849 $/y	392,969 $/y
Fuel Consumption (Total)	L/y	42,378		
Carbon Dioxide (Total)	kg/y	99,589		
Hydrocarbons (Total)	kg/y	10		
Carbon Monoxide (Total)	kg/y	107		
NOx (Total)	kg/y	36		

1 Hours per Year: 480 (Network)

MOVEMENT SUMMARY

Site: 1066 [Future PM: Church St/Bachell Ave, Lidcombe (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Future PM Development-Swete St-Martin St- Bachell Ave-Site Acccess (Network Folder: General)]

PM Peak Hour: 5:00-6:00pm
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 60 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Church St E															
5	T1	All MCs	172	0.0	172	0.0	0.468	17.4	LOS B	3.0	21.3	0.85	0.68	0.85	14.0
6	R2	All MCs	79	0.0	79	0.0	* 0.468	29.6	LOS C	3.0	21.3	0.92	0.75	0.92	12.6
Approach			251	0.0	251	0.0	0.468	21.2	LOS C	3.0	21.3	0.87	0.70	0.87	13.5
North: Bachell Ave															
7	L2	All MCs	174	0.0	174	0.0	0.140	12.3	LOS B	1.1	8.0	0.39	0.67	0.39	45.0
9	R2	All MCs	656	0.0	656	0.0	* 0.810	27.8	LOS C	11.7	81.7	0.92	0.92	1.06	33.2
Approach			829	0.0	829	0.0	0.810	24.5	LOS C	11.7	81.7	0.81	0.87	0.92	33.6
West: Church St W															
10	L2	All MCs	255	0.0	255	0.0	0.197	6.7	LOS A	0.7	5.2	0.28	0.63	0.28	49.2
11	T1	All MCs	200	0.0	200	0.0	* 0.769	31.3	LOS C	3.9	27.4	1.00	0.93	1.25	32.2
Approach			455	0.0	455	0.0	0.769	17.5	LOS B	3.9	27.4	0.60	0.76	0.71	39.3
All Vehicles			1535	0.0	1535	0.0	0.810	21.9	LOS C	11.7	81.7	0.76	0.81	0.85	33.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
East: Church St E											
P2	Full	53	12.7	LOS B	0.1	0.1	0.65	0.65	28.1	20.0	0.71
All Pedestrians		53	12.7	LOS B	0.1	0.1	0.65	0.65	28.1	20.0	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.

INTERSECTION SUMMARY

Site: 5 [DEV-BACHELL AVE-DRIVEWAY-PM - Copy (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Future PM Development-Swete St-Martin St- Bachell Ave-Site Acccess (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values			
Performance Measure	**Vehicles:**	**All MCs**	**Persons**
Travel Speed (Average)	km/h	48.9	48.9 km/h
Travel Distance (Total)	veh-km/h	786.5	943.9 pers-km/h
Travel Time (Total)	veh-h/h	16.1	19.3 pers-h/h
Desired Speed	km/h	60.0	
Speed Efficiency		0.82	
Travel Time Index		7.95	
Congestion Coefficient		1.23	
Demand Flows (Total)	veh/h	1267	1521 pers/h
Arrival Flows (Total)	veh/h	1267	1521 pers/h
Percent Heavy Vehicles (Demand)	%	0.0	
Percent Heavy Vehicles (Arrivals)	%	0.0	
Degree of Saturation		0.471	
Practical Spare Capacity	%	80.5	
Effective Intersection Capacity	veh/h	2691	
Control Delay (Total)	veh-h/h	2.42	2.91 pers-h/h
Control Delay (Average)	sec	6.9	6.9 sec
Control Delay (Worst Lane by MC)	sec	9.8	
Control Delay (Worst Movement by MC)	sec	12.3	12.3 sec
Geometric Delay (Average)	sec	5.2	
Stop-Line Delay (Average)	sec	1.7	
Idling Time (Average)	sec	0.4	
Intersection Level of Service (LOS)		LOS A	
Average Back of Queue - Veh (Worst Lane)	veh	1.5	
Average Back of Queue - Dist (Worst Lane)	m	10.2	
Ave. Que Storage Ratio (Worst Lane)		0.03	
Effective Stops (Total)	veh/h	716	860 pers/h
Effective Stop Rate		0.57	0.57
Proportion Queued		0.46	0.46
Performance Index		29.5	29.5
Cost (Total)	$/h	760.16	760.16 $/h
Fuel Consumption (Total)	L/h	75.8	
Carbon Dioxide (Total)	kg/h	178.2	
Hydrocarbons (Total)	kg/h	0.016	
Carbon Monoxide (Total)	kg/h	0.20	
NOx (Total)	kg/h	0.063	

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand effects.
In Network analysis, Arrival Flows will be reduced if Upstream Capacity Constraint exists.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
Site Model Variability Index (Average value of largest changes in Lane Degrees of Saturation from the third to the last Main (Timing-Capacity) Iterations): 2.0 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 3.2% 1.8% 1.0%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles:**	**All MCs**	**Persons**	
Demand Flows (Total)	veh/y	608,337	730,004	pers/y
Arrival Flows (Total)	veh/y	608,337		
Delay (Total)	veh-h/y	1,164	1,397	pers-h/y
Effective Stops (Total)	veh/y	343,887	412,664	pers/y
Travel Distance (Total)	veh-km/y	377,541	453,049	pers-km/y
Travel Time (Total)	veh-h/y	7,714	9,257	pers-h/y
Cost (Total)	$/y	364,876	364,876	$/y
Fuel Consumption (Total)	L/y	36,399		
Carbon Dioxide (Total)	kg/y	85,538		
Hydrocarbons (Total)	kg/y	8		
Carbon Monoxide (Total)	kg/y	98		
NOx (Total)	kg/y	30		

1 Hours per Year: 480 (Network)

MOVEMENT SUMMARY

Site: 5 [DEV-BACHELL AVE-DRIVEWAY-PM - Copy (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Future PM Development-Swete St-Martin St- Bachell Ave-Site Acccess (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: SITE DRIVEWAY															
1	L2	All MCs	271	0.0	271	0.0	0.421	9.3	LOS A	1.2	8.1	0.76	0.73	0.78	40.3
2	T1	All MCs	1	0.0	1	0.0	0.421	9.3	LOS A	1.2	8.1	0.76	0.73	0.78	48.5
3	R2	All MCs	54	0.0	54	0.0	0.421	12.3	LOS B	1.2	8.1	0.76	0.73	0.78	47.8
Approach			325	0.0	325	0.0	0.421	9.8	LOS A	1.2	8.1	0.76	0.73	0.78	42.5
NorthEast: BACHELL AVENUE															
4	L2	All MCs	28	0.0	28	0.0	0.471	5.7	LOS A	1.5	10.2	0.41	0.49	0.41	50.5
5	T1	All MCs	566	0.0	566	0.0	0.471	5.7	LOS A	1.5	10.2	0.41	0.49	0.41	49.2
6	R2	All MCs	1	0.0	1	0.0	0.471	8.7	LOS A	1.5	10.2	0.41	0.49	0.41	51.7
Approach			596	0.0	596	0.0	0.471	5.7	LOS A	1.5	10.2	0.41	0.49	0.41	49.3
NorthWest: RAWSON STREET															
7	L2	All MCs	1	0.0	1	0.0	0.003	6.7	LOS A	0.0	0.0	0.49	0.55	0.49	51.2
8	T1	All MCs	1	0.0	1	0.0	0.003	6.7	LOS A	0.0	0.0	0.49	0.55	0.49	50.1
9	R2	All MCs	1	0.0	1	0.0	0.003	9.7	LOS A	0.0	0.0	0.49	0.55	0.49	47.9
Approach			3	0.0	3	0.0	0.003	7.7	LOS A	0.0	0.0	0.49	0.55	0.49	50.1
SouthWest: BACHELL AVENUE															
10	L2	All MCs	1	0.0	1	0.0	0.255	5.1	LOS A	0.7	4.8	0.24	0.53	0.24	52.0
11	T1	All MCs	224	0.0	224	0.0	0.255	5.1	LOS A	0.7	4.8	0.24	0.53	0.24	52.4
12	R2	All MCs	118	0.0	118	0.0	0.255	8.1	LOS A	0.7	4.8	0.24	0.53	0.24	50.2
Approach			343	0.0	343	0.0	0.255	6.1	LOS A	0.7	4.8	0.24	0.53	0.24	51.7
All Vehicles			1267	0.0	1267	0.0	0.471	6.9	LOS A	1.5	10.2	0.46	0.57	0.46	48.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.