

**PACIFIC PLANNING PTY LTD**

**TRAFFIC AND PARKING IMPACT ASSESSMENT  
FOR PLANNING PROPOSAL  
FOR PROPOSED REZONING  
FROM IN1 GENERAL INDUSTRIAL  
TO B5 BUSINESS DEVELOPMENT  
AT  
2 BACHELL AVENUE  
LIDCOMBE**

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## 1.0 INTRODUCTION

### 1.1 Background

This report has been prepared in support of a Planning Proposal to be submitted to Cumberland Council in relation to Industrial zoned land at 2 Bachell Avenue, Lidcombe. The existing site is zoned IN1 General Industrial, and the Planning Proposal seeks to rezone the land to B5 Business Development and amend the corresponding maximum floor space ratio control to facilitate a mix of employment generating business uses in accordance with the objectives of the Business Development zone.

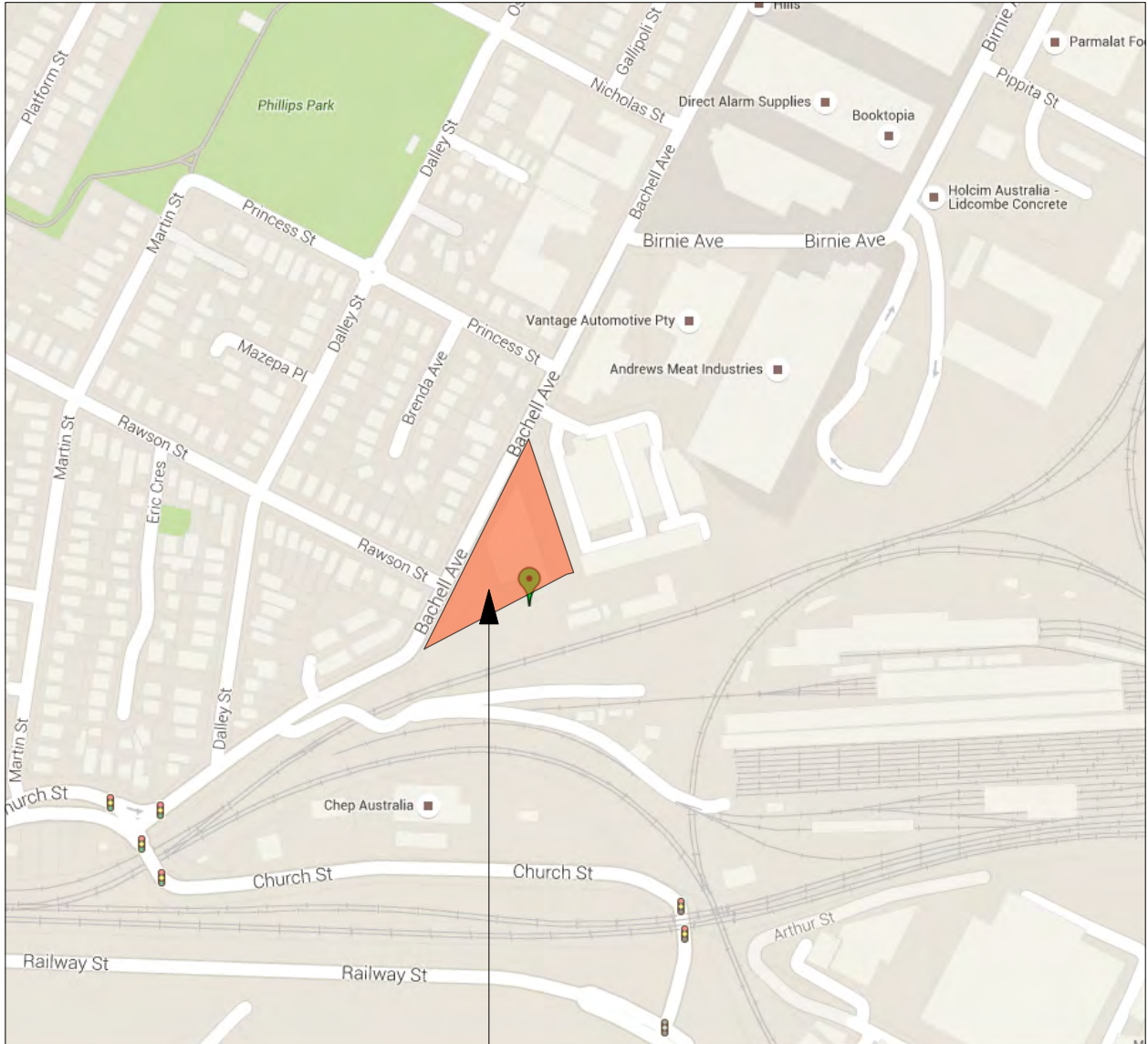
This Traffic and Parking report has been prepared to assess the traffic and parking impacts associated with the traffic generated under the proposed 3:1 FSR development scenario.

The site is shown in the Locality Plan at **Figure 1**. 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<sup>2</sup>.

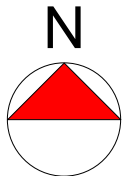
### 1.2 Scope of Report

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.



**PROPOSED SITE:  
2 BACHELL AVE, LIDCOMBE**



**FIGURE 1**  
**LOCALITY MAP**  
SCALE 1:6000(A4)

### 1.3 Transport Choice

We refer to the Report Transport Choice- Integrating Land-use and Transport, Improving Transport Choice- Guidelines for Planning and Development DUAP 2001.

We refer to *Principle 1* in this document which states:-

*“Develop concentrated centres containing the highest appropriate densities of housing, employment, services and public facilities within an acceptable walking distance — 400 to 1000 metres — of major public transport nodes, such as railway stations and high frequency bus routes with at least a 15-minute frequency at peak times.”*

The proposed development is located approximately 893 metres to Lidcombe Railway Station. The town centre is also located on the southern side of the Railway Station. To the west of Bachell Avenue the site is a residential area and south of the subject site is a number of schools, churches and nursing homes.

This development creates an environment which provides for a choice in transport modes, bicycles, walking, car share and public transport. Facilities will be provided that allow users to make sustainable choices creating a better environment and reducing car dependent trips.

## 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<sup>2</sup>**. 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 unsignalized 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.

### 2.3 Existing Peak Hour Traffic Volumes

Traffic Counts were made at the following intersections in *15-minute intervals* on Tuesday 1<sup>st</sup> December 2015 from **7:00am** to **9:00am** and **4:00pm** to **6:00pm** to correspond with the commuter *peak hours* and on Wednesday 2<sup>nd</sup> December 2015 respectively. The location of the Traffic Counts are shown in **Figure 2b**.

#### Tuesday 1<sup>st</sup> December:

- Church Street Railway Street.
- Arthur Street/ Railway Street.

#### Wednesday 2<sup>nd</sup> December:

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

## 2.3 (Continued)

The **AM** peak hour was **7:30am – 8:30am** at Swete St and Church Street , Bachell Ave and Church Street and **7:45am - 8:45am** at Church Street / Railway Street and Arthur Street / Railway Street and **8:00am – 9:00am** at Church Street Railway Street Bridge. The **PM** peak hour was **5:00 – 6:00pm** at Swete St/ Church St, Church Street / Railway Street and Bachell Avenue / Church Street and at Arthur Street/ Railway Street and at Church Street/ Railway Street Bridge the **PM** peak hour was **4.45 – 5.45pm**.

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

## 2.4 Intersection Performance

The signalized intersections have been analysed using **SIDRA**.

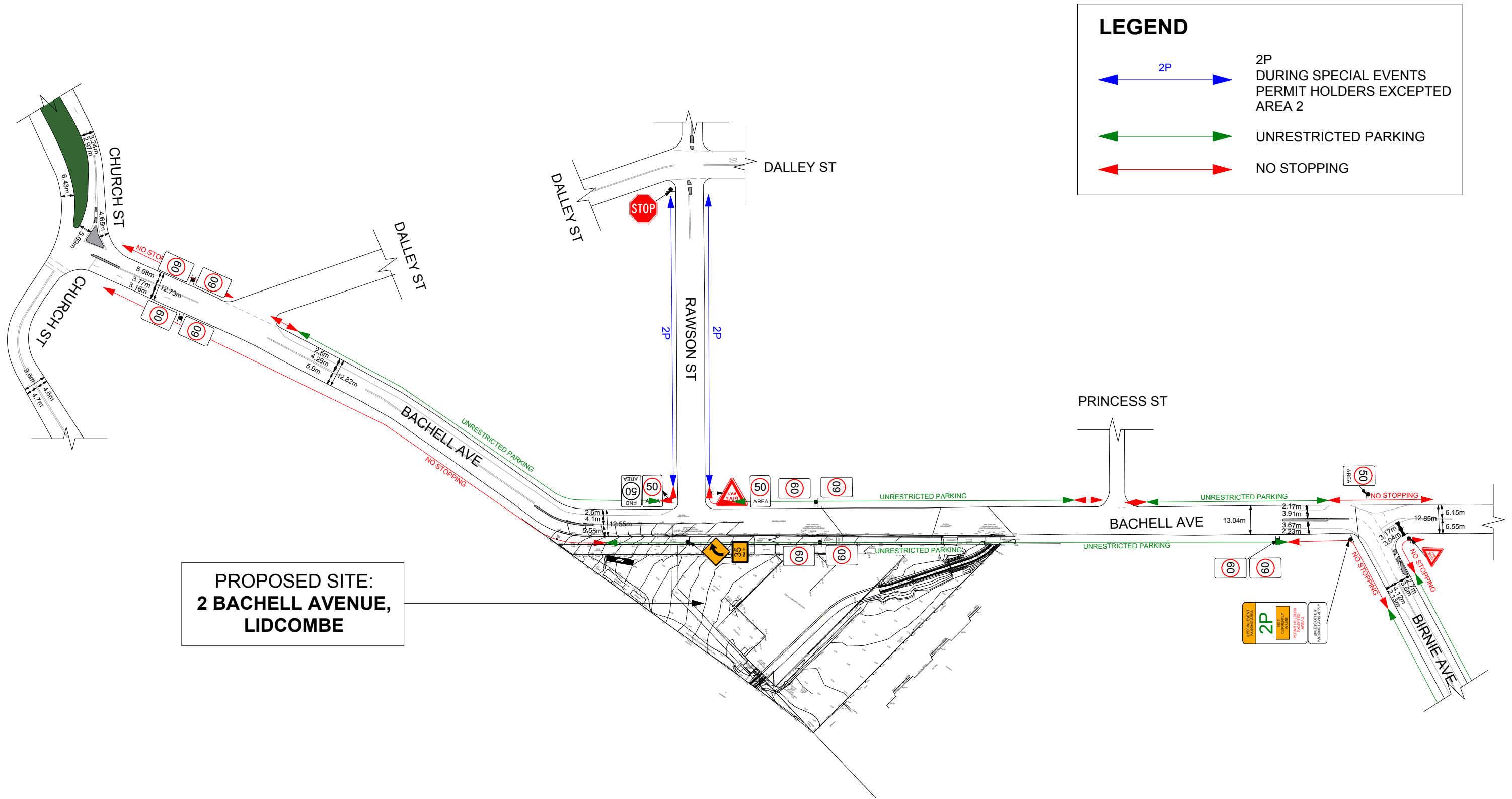
The network performance is determined by the *Level of Service (LoS) Average Vehicle Delay (AVD)*, *Degree of Saturation (DoS)* and maximum delay on the critical movement during peak hours. The Level of Service criteria for intersections are explained in **Table 4.2** taken from the *RTA Guide to Traffic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

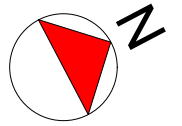
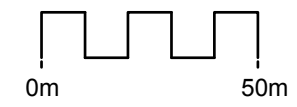
The results of the analysis are set out in **Table 2.4**





**PROPOSED SITE:  
2 BACHELL AVENUE,  
LIDCOMBE**

LEGEND	
	2P DURING SPECIAL EVENTS PERMIT HOLDERS EXCEPTED AREA 2
	UNRESTRICTED PARKING
	NO STOPPING



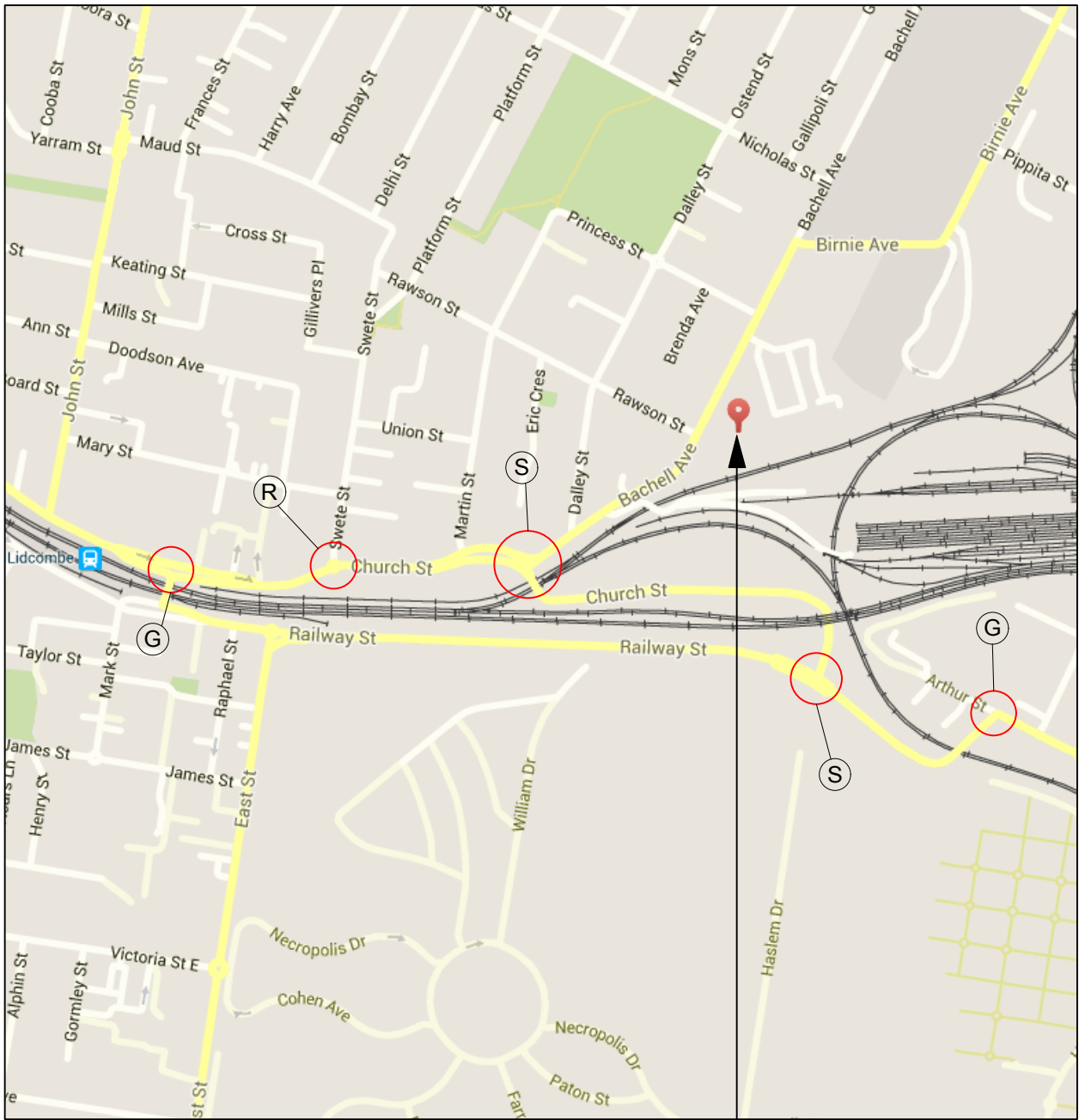
**FIGURE 2a**  
**STREET INVENTORY**  
**2 BACHELL AVE, LIDCOMBE**  
**SCALE - 1:1750(A3)**



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

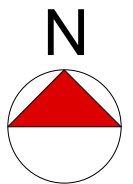


Photograph 2: Sign along Rawson Street

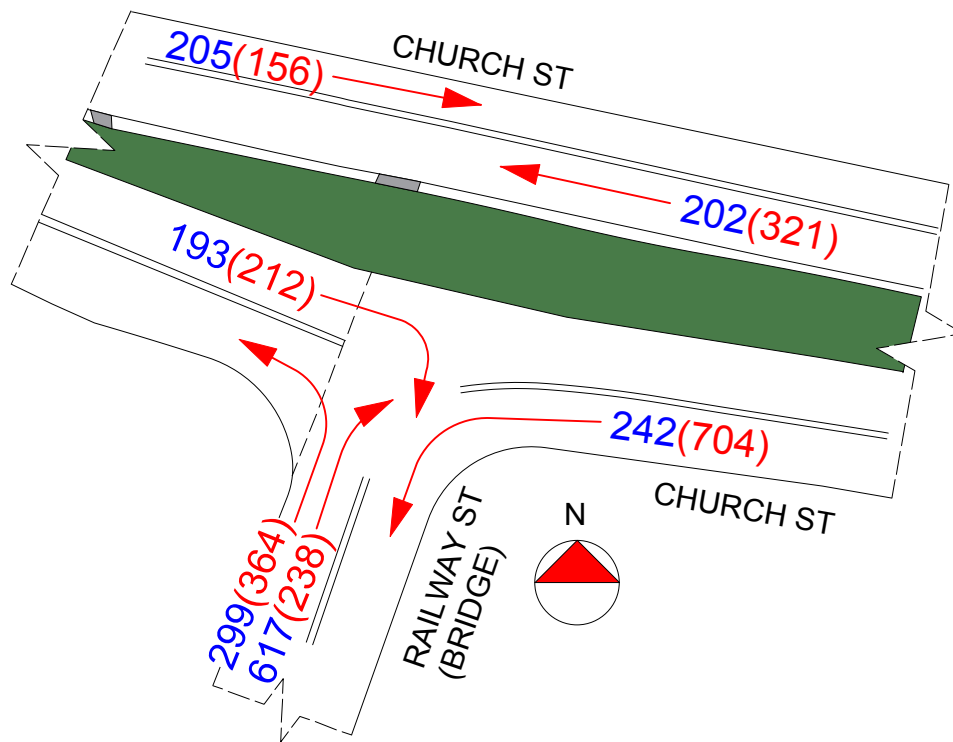


**PROPOSED DEVELOPMENT:  
2 BACHELL AVE, LIDCOMBE**

LEGEND	
(G)	GIVEWAY/STOP
(S)	SIGNALS
(R)	ROUNDBABOUT
(Red Circle)	TRAFFIC COUNT LOCATION

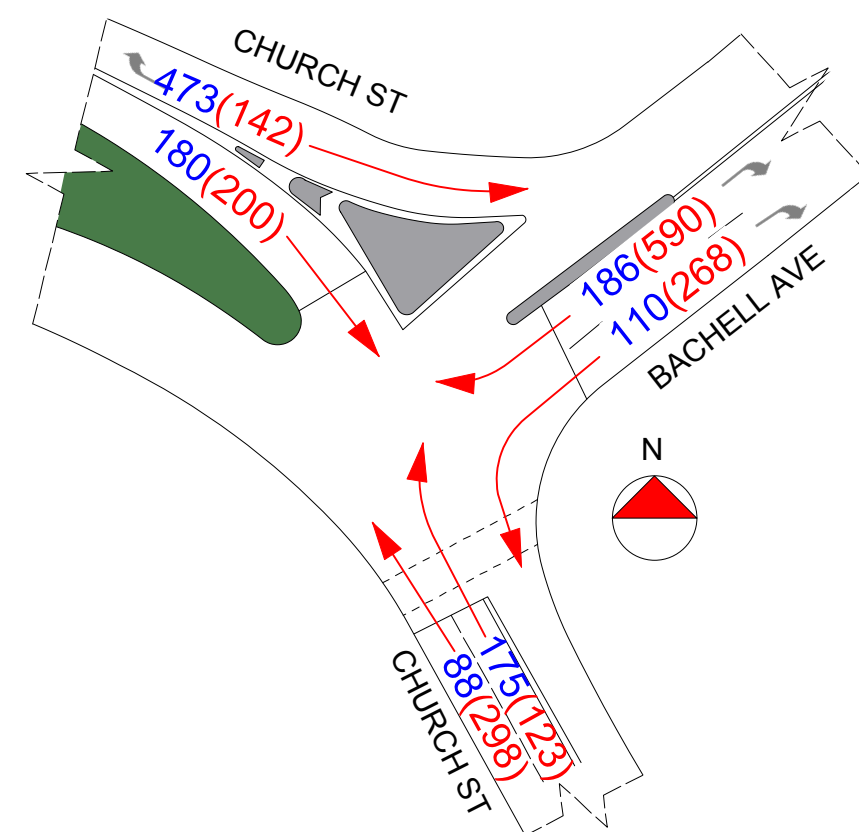


**FIGURE 2b  
TRAFFIC COUNT LOCATIONS**



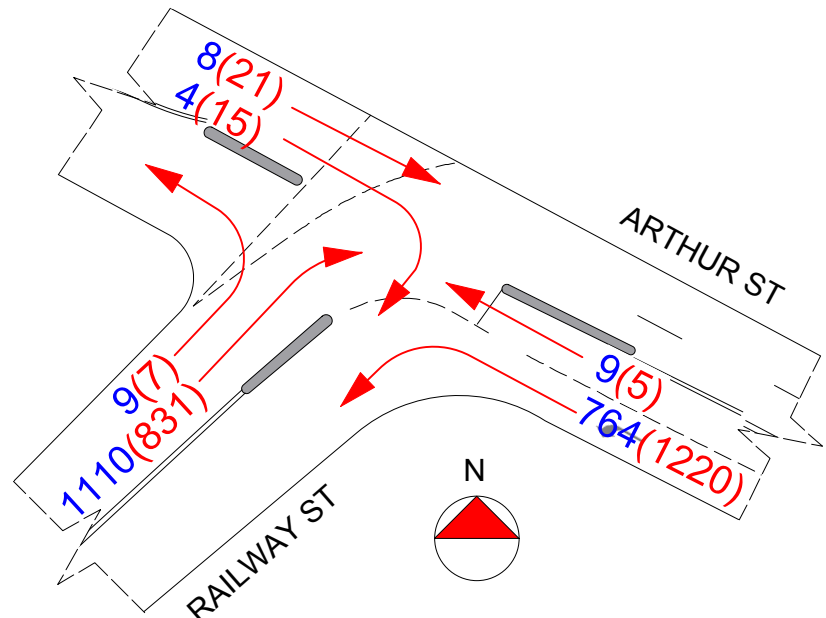
CHURCH ST/RAILWAY ST (BRIDGE)  
TRAFFIC VOLUME COUNT  
CARRIED OUT WEDNESDAY 2/12/15

**LEGEND**  
AM PEAK HOUR  
8:00-9:00AM = 193  
PM PEAK HOUR  
4:45-5:45PM = (212)



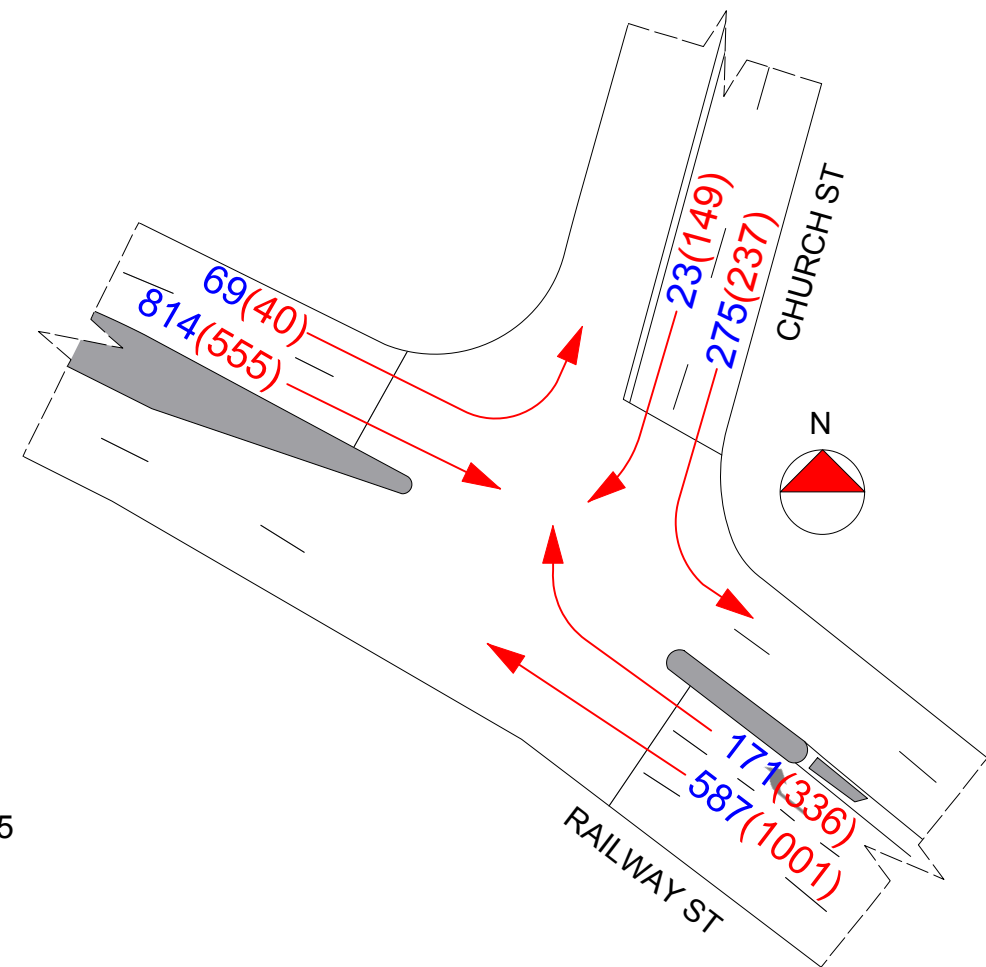
CHURCH ST/BACHELL AVENUE  
TRAFFIC VOLUME COUNT  
CARRIED OUT WEDNESDAY 2/12/15

**LEGEND**  
AM PEAK HOUR  
7:30-8:30AM = 180  
PM PEAK HOUR  
5:00-6:00PM = (200)



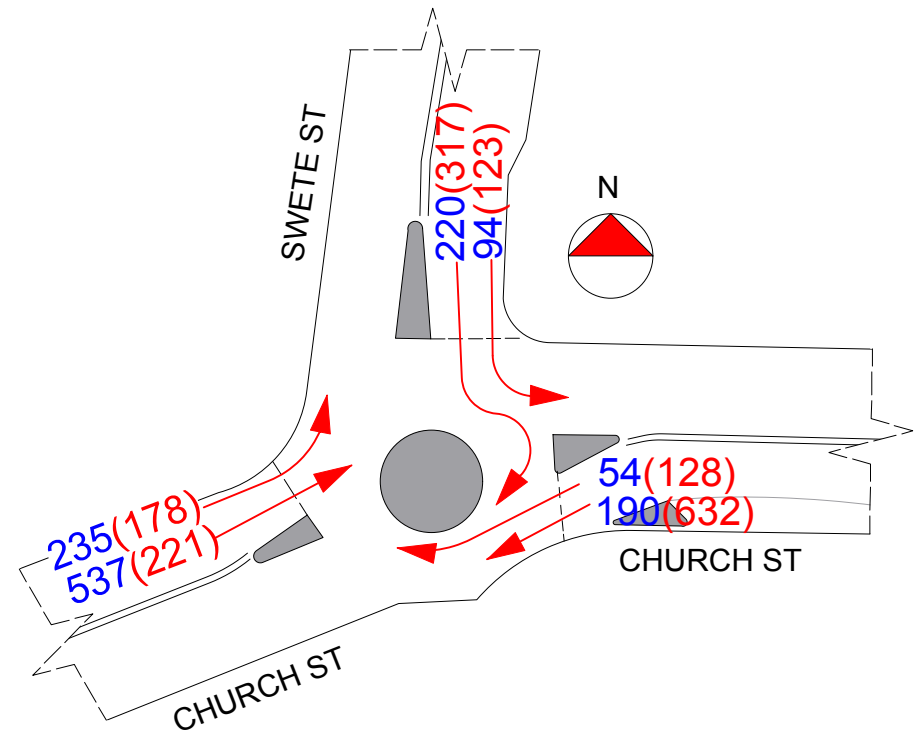
ARTHUR ST/RAILWAY ST  
TRAFFIC VOLUME COUNT  
CARRIED OUT TUESDAY 1/12/15

**LEGEND**  
AM PEAK HOUR  
7:45-8:45AM = 1110  
PM PEAK HOUR  
4:45-5:45PM = (831)



CHURCH ST/RAILWAY ST  
TRAFFIC VOLUME COUNT  
CARRIED OUT TUESDAY 1/12/15

**LEGEND**  
AM PEAK HOUR  
7:45-8:45AM = 814  
PM PEAK HOUR  
5:00-6:00PM = (555)



CHURCH ST/SWETE ST  
TRAFFIC VOLUME COUNT  
CARRIED OUT WEDNESDAY 2/12/15

**LEGEND**  
AM PEAK HOUR  
7:30-8:30AM = 235  
PM PEAK HOUR  
5:00-6:00PM = (178)

**FIGURE 3**  
EXISTING AM & PM PEAK HOUR  
TRAFFIC VOLUME COUNTS  
CARRIED OUT ON TUES 1/12/15 & WED 2/12/15

**2.4 (Continued)****Table 2.4 Existing Intersection Performance**

No	Location	Sign/ Control	Peak Hour	Level Of Service (LoS)	Degree of Saturation (DoS)	Average Delay (Av)	Critical Movement
1	Church Street/ Railway Street	S	AM	F	1.130	161.8	RHT from Railway St (east) 299.4 secs
1	Church Street/ Railway Street	S	PM	D*	1.086	46.8	RHT from Railway St (east) 192.6 secs
2	Arthur Street/ Railway Street	G	AM	A*	0.603	6.1	RHT Arthur ST (west) 102 secs
2	Arthur Street/ Railway Street	G	PM	A	0.657	7.6	RHT Arthur ST (west) 187.1 secs
3	Swete St/ Church St	R	AM	A	0.545	6.2	RHT from, Swete ST 10.6 secs
3	Swete St/ Church St	R	PM	A	0.766	9.1	RHT from Church ST (East) 14.4 secs
4	Church St/ Bachell Ave	S	AM	A	0.601	12.2	RHT Bachell Ave 22.3 secs
4	Church St/ Bachell Ave	S	PM	B	0.855	19.4	Through Church St (West) 30.3 secs
5	Church Street/ Railway St Bridge	G	AM	A	0.493	6.2	RHT Church Street 15.5 secs
5	Church Street/ Railway St Bridge	G	PM	A	0.614	6.7	RHT Church Street 19.7 secs

**NOTE****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.

**Note:** **S** Analysed using SIDRA 8.0

## 2.5 Previous Use of Existing Site

The existing site is used as a warehouse/ factory building. The Factory/ Warehouse building has an approximate Gross Floor area of **1974sqm** and an ancillary office area of **250sqm**.

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

**Warehouses- Daily Trips = 4 trips per 100m<sup>2</sup>**

**Morning Peak Hour Trips = 0.5 per 100m<sup>2</sup>**  
**= 10.87 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 only **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 an 8-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**.

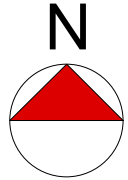
An off-road cycleway for recreational engagement is located in Philips Park between Nicolas Avenue and Platform Street west of the subject site.



**PROPOSED SITE:  
2 BACHELL AVENUE,  
LIDCOMBE**

**LEGEND**

-  BUS STOPS
-  9 MINS WALK TO BUS STOP NO. 214132  
SWETE STREET NEAR RAWSON STREET
-  SWETE STREET BUS STOP NO. 214132  
TO LIDCOMBE STATION BUS STOP NO. 2141173  
ROUTE NO. 401 (SYDNEY OLYMPIC PARK TO LIDCOMBE)
-  LIDCOMBE STATION (1.0KM - 13 MINS WALK/ 2MINS DRIVE)
-  FLEMINGTON STATION (2.7KM - 6 MINS DRIVE)



**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 *MRA Michael Raad Architects Pty Ltd* and are shown on the concept plans for basement one, ground floor and levels 1 to 7 and are summarized in a Table on the ground floor plan. The proposed gross floor areas and uses shown on the plans are summarized in **Table 3.1**.

**Table 3.1 Proposed Uses and Gross Floor Areas**

Land Use Groups	Gross Floor Area m <sup>2</sup>									Total
	Basement One	Ground	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	
<ul style="list-style-type: none"> <li>• Food and Drink Premises</li> <li>• Neighborhood Shops</li> <li>• Recreation Facility Indoor</li> </ul>		3320	1958							5278 (5560)
<ul style="list-style-type: none"> <li>• Light Industries</li> <li>• Industrial Retail Outlets</li> <li>• Hardware Building Supplies</li> </ul>	1665	2055	2776	468	410					7374 (7769)
<ul style="list-style-type: none"> <li>• High Technology Industry</li> <li>• Office &amp; Business Premises</li> <li>• Digital Technologies &amp; Creative Industries</li> </ul>				2496	1762					4258 (4486)
<ul style="list-style-type: none"> <li>• Warehouse &amp; Distribution</li> <li>• Storage Facilities</li> <li>• Wholesale Suppliers</li> </ul>	1963		1086	1127	997	700	700	700	700	7973 (8400)
<b>TOTAL</b>	<b>3628</b>	<b>5375</b>	<b>5820</b>	<b>4091</b>	<b>3169</b>	<b>700</b>	<b>700</b>	<b>700</b>		<b>24883 (26214)</b>

The FSR based on a site area of 8738m<sup>2</sup> is 2.848 to 1. An FSR of 3 to 1 yields a gross floor area of 26214m<sup>2</sup>. The GFA in each use category has been increased pro-rata and rounded to the nearest whole number. The GFA for each use category for an FSR of 3 to 1 are shown in brackets.

Since the ancillary office in the warehouse use category is not stated, it has been assumed to be 15% of the GFA.



### 3.2 Car Parking Requirements

The car parking requirements have been calculated for each main land use group in accordance with **Tables 6 and 7** from *Auburn DCP 2010 Section 5.1.4*. The Parking and Loading Section of the *Auburn City Council DCP 2010* for an FSR of 3 to 1 and are listed in **Table 3.2**.

**Table 3.2 Estimated Car Parking Requirements**

Land Use Groups	Gross Floor Area (m <sup>2</sup> )	Parking Rate	Parking Spaces Required
<ul style="list-style-type: none"> <li>• Food and Drink Premises</li> <li>• Neighborhood Shops</li> <li>• Recreation Facility Indoor</li> </ul>	5560 m <sup>2</sup>	1 per 40 m <sup>2</sup>	139
<ul style="list-style-type: none"> <li>• Light Industries</li> <li>• Industrial Retail Outlets</li> <li>• Hardware Building Supplies</li> </ul>	7769 m <sup>2</sup>	1.3 per 100 m <sup>2</sup>	101
<ul style="list-style-type: none"> <li>• High Technology Industry</li> <li>• Office &amp; Business Premises</li> <li>• Digital Technologies &amp; Creative Industries</li> </ul>	4486 m <sup>2</sup>	1 per 40 m <sup>2</sup>	112
<ul style="list-style-type: none"> <li>• Warehouse &amp; Distribution</li> <li>• Storage Facilities</li> <li>• Wholesale Suppliers</li> </ul>	6777 m <sup>2</sup>	1 per 300 m <sup>2</sup>	23
<ul style="list-style-type: none"> <li>• Ancillary Offices 15%</li> </ul>	1196 m <sup>2</sup>	1 per 40 m <sup>2</sup>	30
		<b>TOTAL</b>	<b>405</b>

These calculations are approximate as the uses in each of the 4 groups have different parking requirements. The concept that supports the Planning Proposal is indicative, and further refinement of the floorspace requirements of individual uses and tenancies will be refined as part of the Development Application process, and further assessment of traffic implications undertaken at this time.

### 3.3 Car Parking Provision

There are 49 spaces shown on the ground floor plan and 28 spaces shown on the Level 1 plan. The large car parking area shown on basement 1 would provide in excess of 115 spaces and the larger car parking area of 6095m<sup>2</sup> on basement level 2 would provide a further 203 parking spaces. Therefore, the total parking provision based upon the concept plans would be about 395 spaces. A parking layout with circulation and parking aisles has yet to be prepared for Basements B1 and B2.

If 4 car share spaces were provided which would result in a reduction in parking as 1 car share space = 3 parking spaces, a reduction of 8 car parking spaces is possible. Refer to **Green Travel Plan Section 3.5** in this report.

### 3.4 Bicycle Storage Facilities

*Clause 3.1 Bicycle Parking* in the Parking and Loading part of *Auburn City Council DCP 2010* requires bicycle racks for all developments with a gross floor area exceeding 1000m<sup>2</sup>. This site has a potential GFA of 26214m<sup>2</sup>. There is no storage rate for bicycles in a B5 Business Development Zone in the Parking and Loading part of *DCP2010*. If a rate similar to Newington Business Park is applied to this site, some 26 bicycle racks would be required.

### 3.5 Green Travel Plan

#### 3.5.1 Green Travel Plan

A Green Travel Plan is an initiative to encourage travel mode behavior change. Green Travel Plans are used to promote and encourage people to choose sustainable transport options such as walking, cycling, public transport and carpooling in preference to single occupant car trips whenever practicable.

The coordination, implementation and funding for the Green Travel Plan will be the responsibility of the Building Manager. Acknowledging the location and accessibility of the subject development, this Green Travel Plan seeks to minimize staff use of private vehicle transport through:-

- a) Providing convenient access to current and relevant public transport information to all staff;
- b) Improved road safety and personal security for pedestrians and cyclists; maximizing the efficient use of on-site bicycle parking;
- c) Providing a mechanism to review the efficiency of green travel initiatives and amend existing or implement new initiatives as warranted.

#### 3.5.2 Action Plan

A draft action plan is provided in **Appendix E**. The plan is an outline of the actions and incentives that will be adopted to encourage the use of sustainable transport modes.

### 3.5.3 Green Travel Initiatives

The site is ideally located to take advantage of the nearby public transport services. Future extension to the on-road Bicycle paths in Bachell Avenue could provide excellent connection opportunities to Sydney Olympic Park and to the Sydney CBD.

Sustainable transport information could be placed in key building foyer locations where it will be clearly visible to the staff and visitors of the building. Detailed travel information will be available in the end of trip facilities located within the basement for cyclists.

### 3.5.4 Public Transport

To encourage public transport use, information sourced Transport For NSW Apps and Cyclepath Finder will be provided through posters and leaflets and through wayfinding signage. The information provided will detail the scheduling / frequency of local services, the location of train stations / bus stops and linkages to other networks.

### 3.5.5 Cycling

To promote and market the use of bicycles, a map of the extensive network of on and off-street bicycle paths in the vicinity of the site will be provided to employees and visitors in the form of building signage.

#### Bicycle Network

Existing Auburn Bicycle Path and Transport for NSW Bicycle Routes are located in **Appendix D** of this report.

There could be a provision to extend the on-road cycleway from the subject site to connect to the existing northern bicycle route in Bachell Avenue that extends to Parramatta Road and off-road from Parramatta Road to Sydney Olympic Park.

### 3.5.6 Walking

To highlight pedestrian accessibility in the vicinity of the site, an access plan will be prepared showing pedestrian linkages in the vicinity of the site.

### 3.5.7 Motor Bike Parking

Provision for motorbike parking could be included within the basement car park. *Auburn DCP 2010* does not have lot rates for motorbike parking. A rate of 1 space per 50 cars could be provided within the car park.

### 3.6 Estimated Traffic Generation

The traffic generation has been estimated using the rates in *Section 3* of the *RMS Guide to Traffic Generating Developments 2002*. The rate for High Technology is based upon a car driver travel mode of 69% for employees travelling to work in TZ1337 and TZ1338 in the BTS-JTW (*Bureau of Statistics Journey to Work Explorer 2011 data*) and a gross floor area per employee of 50m<sup>2</sup> from *Section 3.10.1 Factories* in the *RMS Guide to Traffic Generating Developments*. 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. The rate for neighborhood retail shops is 46A(SS) vehicle trips per 1000m<sup>2</sup> in the PM peak hour on Thursday from the *RMS Guide to Traffic Generating Developments*. For slow trade shops like electrical and white goods stores, it is 20A(S) and medical office is 22A(OM). For the AM peak hour, the generation rate is 20% of the PM peak hour. The directional distribution in both peak hours is 50% In and 50% OUT. The estimated traffic generation is listed in **Table 3.5**.

**Table 3.5 Estimated Traffic Generation**

Table 3.5 Estimated Traffic Generation						
Land Use Groups	Peak Hour	Gross Floor Area (m <sup>2</sup> )	Generation Rate	Traffic Generation		
				IN	OUT	TOTAL
Food and Drink Premises/ Neighbourhood Shops and Recreational Facility	AM	3058	46A/1000 X 20%	14.1	14.1	28.1
	PM		46A/1000 X 80%	56.3	56.3	112.5
Slow Trade Shops	AM	2224	20A/1000 x 20%	4.4	4.4	8.9
	PM		20A/1000 x 80%	17.8	17.8	35.6
Medical Office	AM	278	22A/1000x20%	0.6	0.6	1.2
	PM		22A/1000x80%	2.4	2.4	4.9
		5560				
• Light Industries						
• Industrial Retail Outlets	AM	7769 m <sup>2</sup>	1 per 100 m <sup>2</sup>	62	16	78
• Hardware Building Supplies	PM		1 per 100 m <sup>2</sup>	16	62	78
• High Technology Industry						
• Office & Business Premises	AM	4486 m <sup>2</sup>	1 per 50 m <sup>2</sup> x 0.69	50	12	62
• Digital Technologies & Creative Industries	PM		1 per 50 m <sup>2</sup> x 0.69	12	50	62
• Warehouse & Distribution	AM	6777 m <sup>2</sup>	0.5 x A/100*80%	27	7	34
• Storage Facilities	PM		0.5 x A/100*20%	7	27	34
• Wholesale Suppliers						
	AM		1.6 per 100 m <sup>2</sup>	15	4	19
• Ancillary Offices 15%	PM	1196 m <sup>2</sup>	1.2 per 100 m <sup>2</sup>	3	11	14
			<b>TOTAL AM</b>	<b>173.1</b>	<b>58.1</b>	<b>231</b>
			<b>TOTAL PM</b>	<b>114.5</b>	<b>226.5</b>	<b>341</b>
			AM Reduction by 15%	<b>147</b>	<b>49</b>	<b>197</b>
			PM Reduction by 15%	<b>97.3</b>	<b>192.5</b>	<b>290</b>

### 3.6.1 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<sup>2</sup> GLFA), 20% (10,000-30,000m<sup>2</sup> GLFA) and 15% (over 30,000m<sup>2</sup> GLFA) indicative.”* as stated in the RMS Guide to Traffic Generating Developments Section 3 Land-Use Traffic Generation.

We have adopted a reduction of 15% to all trips as a Green Travel Plan has been adopted for employees and visitors and there are many retail uses and facilities provided within the development with good public transport access.

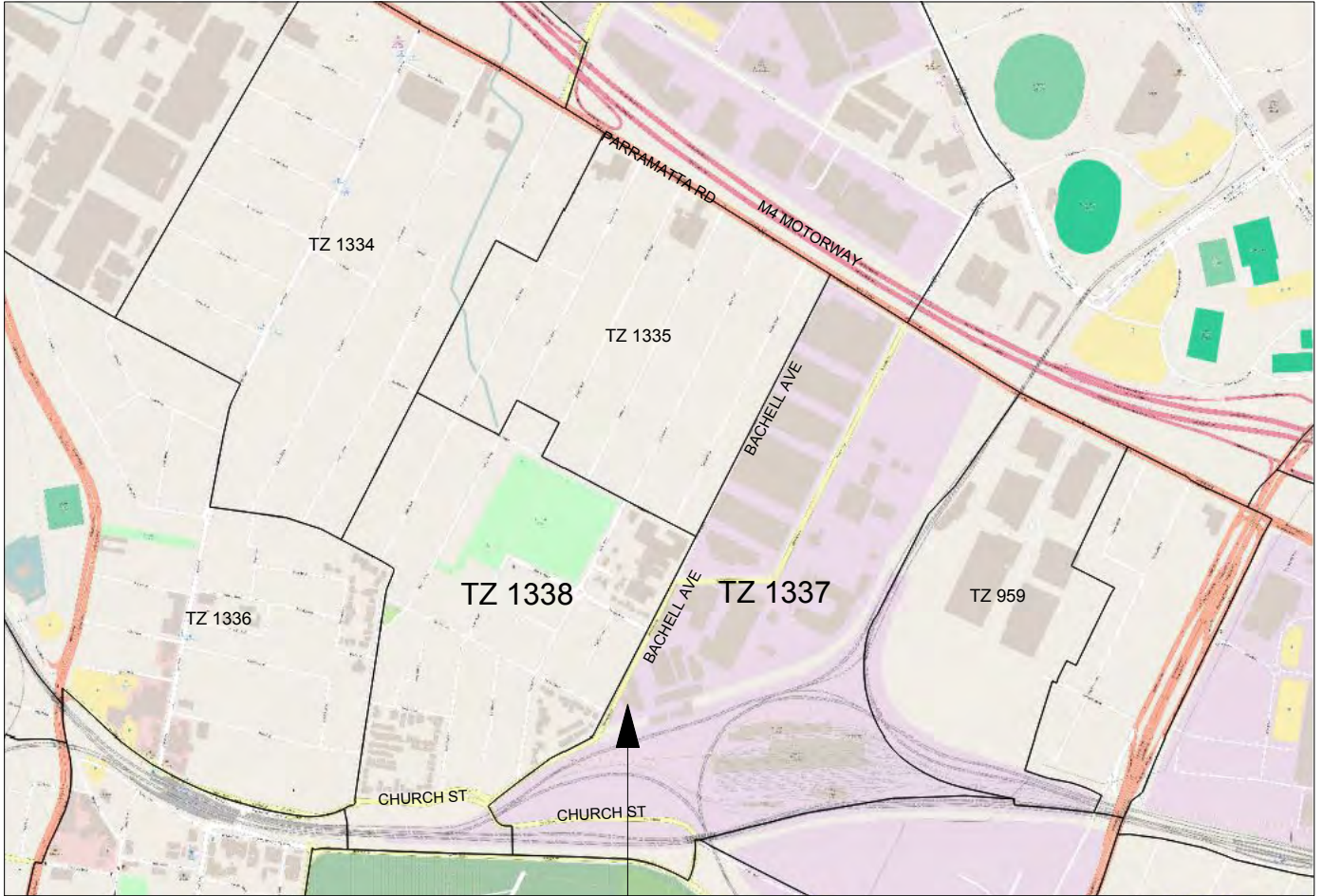
### 3.7 Future Traffic Volume Assignment to Road Network

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**.

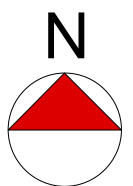
**Table 3.6 Journey To Work To Travel Zones: 1337 and 1338 for Employees**

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%
<b>Total</b>		<b>1713.6</b>	<b>100.00%</b>

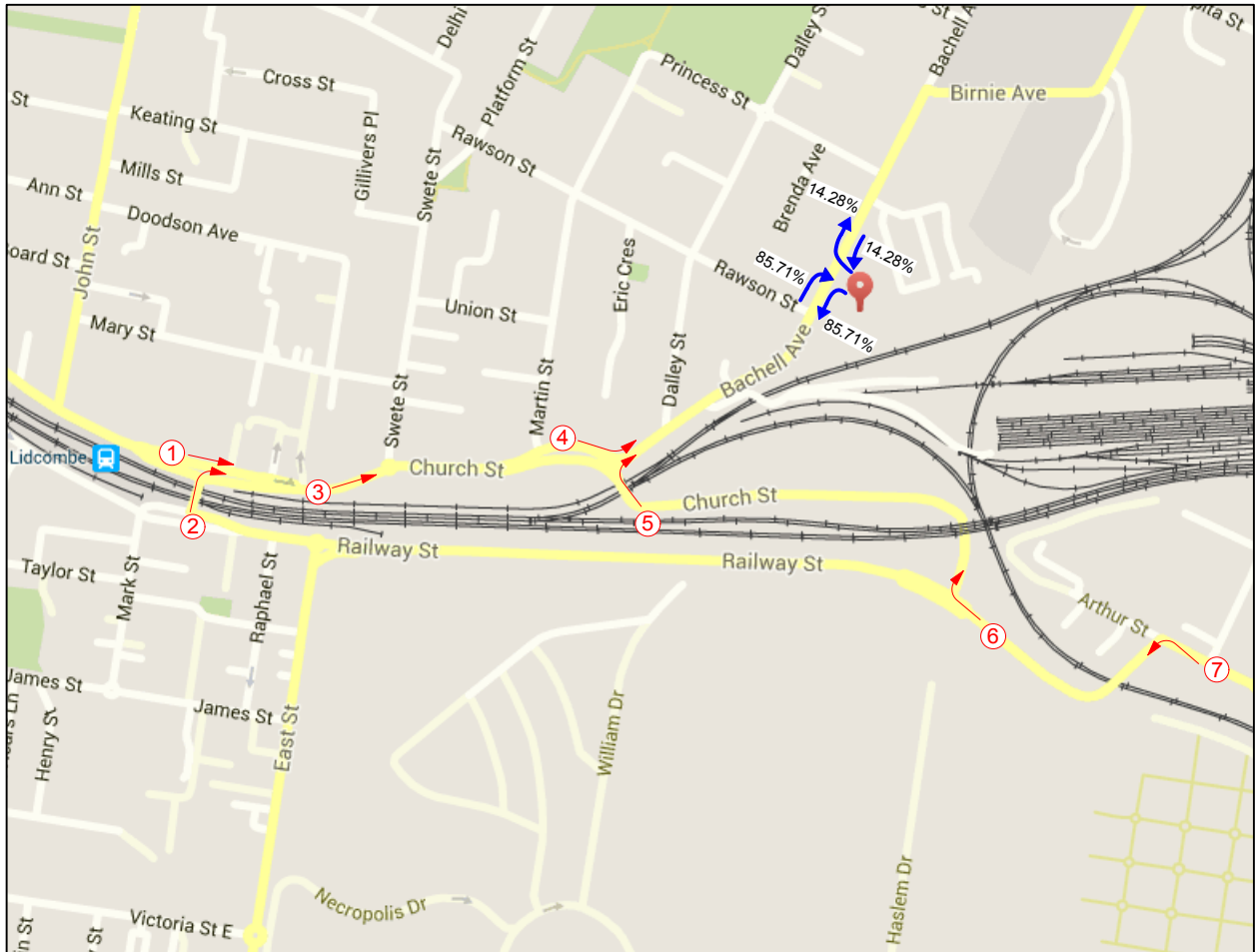
Note: Employees travelling from Origin SA3 to Travel Zones 1337 and 1338 with vehicle driver trips less than 1% of total trips have been omitted.



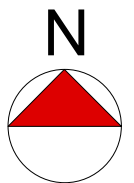
**PROPOSED SITE:  
2 BACHELL AVE, LIDCOMBE**



**FIGURE 5  
TRAVEL ZONE LOCATIONS**

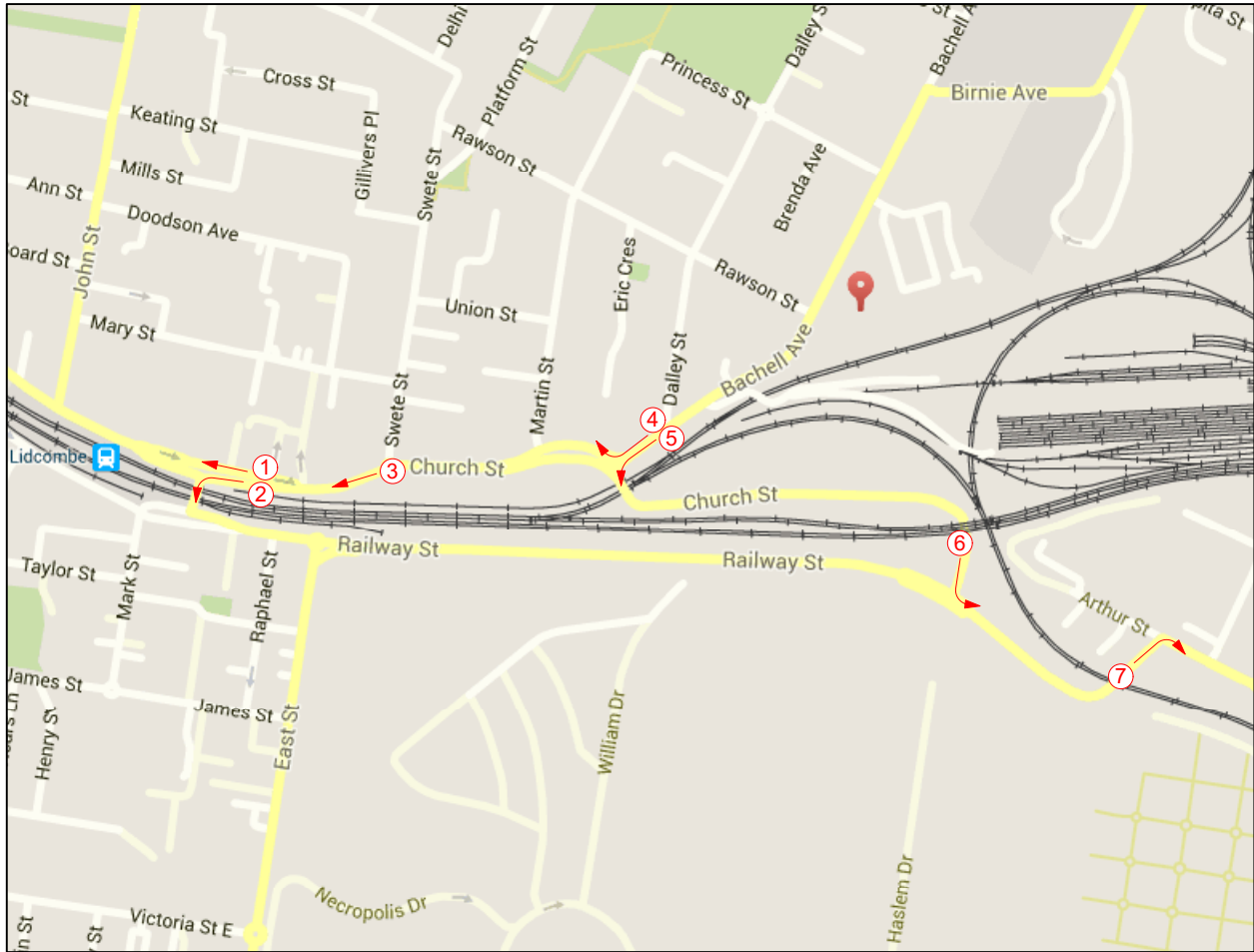


<p><b>① CHURCH ST W THRU</b></p> <p>FAIRFIELD 7.50%</p> <p>CAMPBELLTOWN 3.59%</p> <p>MERRYLANDS 8.30%</p> <p>AUBURN 6.63%</p> <p>GROUP NORTH &amp; WEST 21.41%</p> <p><b>TOTAL 47.43%</b></p>	<p><b>④ CHURCH ST W LHT</b></p> <p>FAIRFIELD 7.50%</p> <p>BANKSTOWN 7.13%</p> <p>CAMPBELLTOWN 3.59%</p> <p>LIVERPOOL 3.40%</p> <p>BINGELLY 3.27%</p> <p>SUTHERLAND 2.56%</p> <p>MERRYLANDS 8.30%</p> <p>AUBURN 6.63%</p> <p>GROUP NORTH &amp; WEST 21.41%</p> <p><b>TOTAL 63.79%</b></p>	<p><b>⑥ RAILWAY ST W RHT</b></p> <p>STRATHFIELD 4.11%</p> <p>CANTERBURY 3.51%</p> <p>KOGARAH-ROCKDALE 2.93%</p> <p>CANADA BAY 2.12%</p> <p>CRONULLA 2.07%</p> <p>HURSTVILLE 2.05%</p> <p>CAMDEN 1.52%</p> <p>CITY 1.25%</p> <p>LEICHHARDT 1.24%</p> <p>WARRINGAH 1.12%</p> <p><b>TOTAL 21.92%</b></p>	<p><b>GROUP NORTH &amp; WEST</b></p> <p>-PARRAMATTA 5.47%</p> <p>-BLACKTOWN 5.44%</p> <p>-MOUNT DRUITT 5.10%</p> <p>-BAULKHAM HILLS 4.55%</p> <p>-PENRITH 3.44%</p> <p>-BLACKTOWN 3.23%</p> <p>-ST MARYS 2.57%</p> <p>-RYDE 2.44%</p> <p>-CARLINGFORD 1.98%</p> <p>-KU-RING-GAI 1.47%</p> <p><b>TOTAL 35.69%</b></p>
<p><b>② RAILWAY ST BRIDGE RHT</b></p> <p>BANKSTOWN 7.13%</p> <p>LIVERPOOL 3.40%</p> <p>BRINGELLY 3.27%</p> <p>SUTHERLAND 2.56%</p> <p><b>TOTAL 16.36%</b></p>	<p><b>⑤ CHURCH ST E RHT</b></p> <p>STRATHFIELD 4.11%</p> <p>CANTERBURY 3.51%</p> <p>KOGARAH-ROCKDALE 2.93%</p> <p>CANADA BAY 2.12%</p> <p>CRONULLA 2.07%</p> <p>HURSTVILLE 2.05%</p> <p>CAMDEN 1.52%</p> <p>CITY 1.25%</p> <p>LEICHHARDT 1.24%</p> <p>WARRINGAH 1.12%</p> <p><b>TOTAL 21.92%</b></p>	<p><b>⑦ ARTHUR ST W LHT</b></p> <p>STRATHFIELD 4.11%</p> <p>CANTERBURY 3.51%</p> <p>KOGARAH-ROCKDALE 2.93%</p> <p>CANADA BAY 2.12%</p> <p>CRONULLA 2.07%</p> <p>HURSTVILLE 2.05%</p> <p>CAMDEN 1.52%</p> <p>CITY 1.25%</p> <p>LEICHHARDT 1.24%</p> <p>WARRINGAH 1.12%</p> <p><b>TOTAL 21.92%</b></p>	<p>-VIA PARRAMATTA RD 14.28%</p> <p>-VIA CHURCH ST/ OLYMPIC DRIVE 21.41%</p>
<p><b>③ CHURCH ST W THRU</b></p> <p>FAIRFIELD 7.50%</p> <p>BANKSTOWN 7.13%</p> <p>CAMPBELLTOWN 3.59%</p> <p>LIVERPOOL 3.40%</p> <p>BRINGELLY 3.27%</p> <p>SUTHERLAND 2.56%</p> <p>MERRYLANDS 8.30%</p> <p>AUBURN 6.63%</p> <p>GROUP NORTH &amp; WEST 21.41%</p> <p><b>TOTAL 63.79%</b></p>			



**FIGURE 6A**  
**TRIP ASSIGNMENT**  
**EMPLOYEES JOURNEY TO WORK**



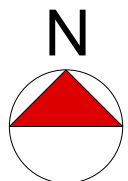


<b>① CHURCH ST W THRU</b>	
FAIRFIELD	7.50%
CAMPBELLTOWN	3.59%
MERRYLANDS	8.30%
AUBURN	6.63%
GROUP NORTH & WEST	21.41%
STRATHFIELD	4.11%
HURSTVILLE	2.06%
CAMDEN	1.52%
<b>TOTAL</b>	<b>55.12%</b>
<b>② RAILWAY ST BRIDGE RHT</b>	
BANKSTOWN	7.13%
LIVERPOOL	3.40%
BRINGELLY	3.27%
SUTHERLAND	2.56%
CRONULLA	2.07%
<b>TOTAL</b>	<b>18.43%</b>
<b>③ CHURCH ST W THRU</b>	
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%
<b>TOTAL</b>	<b>73.56%</b>

<b>④ CHURCH ST W LHT</b>	
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%
<b>TOTAL</b>	<b>73.56%</b>
<b>⑤ CHURCH ST E RHT</b>	
CANTERBURY	3.51%
KOGARAH-ROCKDALE	2.93%
CANADA BAY	2.12%
CITY	1.25%
LEICHHARDT	1.24%
WARRINGAH	1.12%
<b>TOTAL</b>	<b>12.17%</b>

<b>⑥ RAILWAY ST W RHT</b>	
CANTERBURY	3.51%
KOGARAH-ROCKDALE	2.93%
CANADA BAY	2.12%
CITY	1.25%
LEICHHARDT	1.24%
WARRINGAH	1.12%
<b>TOTAL</b>	<b>12.17%</b>
<b>⑦ ARTHUR ST W LHT</b>	
CANTERBURY	3.51%
KOGARAH-ROCKDALE	2.93%
CANADA BAY	2.12%
CITY	1.25%
LEICHHARDT	1.24%
WARRINGAH	1.12%
<b>TOTAL</b>	<b>12.17%</b>

<b>GROUP NORTH &amp; WEST</b>	
-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%
<b>TOTAL</b>	<b>35.69%</b>
-VIA PARRAMATTA RD	14.28%
-VIA CHURCH ST/ OLYMPIC DRIVE	21.41%



**FIGURE 6B**  
**TRIP ASSIGNMENT**  
**EMPLOYEES JOURNEY FROM WORK**

### 3.8 Intersection Performance

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 7A** and **7B** respectively.

The Intersections have been analysed using computer program **SIDRA 8.0**.

**Table 3.7 Future Intersection Performance**

No	Location	Sign/Control	Peak Hour	Level Of Service (LoS)	Degree of Saturation (DoS)	Average Delay (Av)	Critical Movement
1	Church Street/ Railway Street	S	AM	F	1.121	140.9	LHT from Railway St (west) 279.8 secs
1	Church Street/ Railway Street	S	PM	E	1.15	65.3	RHT from Church St (west) 308.8 secs
2	Arthur Street/ Railway Street	G	AM	A*	0.606	6.2	RHT Arthur ST (west) 113.7 secs
2	Arthur Street/ Railway Street	G	PM	A	0.72	9.6	RHT Arthur ST (west) 299.5 secs
3	Swete St/ Church St	R	AM	A	0.606	4.7	RHT from, Swete ST 12.4 secs
3	Swete St/ Church St	R	PM	A	0.911	13.5	RHT from Church ST (East) 22.8 secs
4	Church St/ Bachell Ave	S	AM	A	0.717	12.4	RHT Bachell Ave 23.7 secs
4	Church St/ Bachell Ave	S	PM	B*	0.897	28.9	RHT Church St (East) 46.9 secs
5	Church Street/ Railway St Bridge	G	AM	A*	0.515	6.3	RHT Church Street (west) 16.8 secs
5	Church Street/ Railway St Bridge	G	PM	A*	0.678	7.1	RHT Church Street (west) 23.5 secs

**NOTE**

**S = SIGNALS**

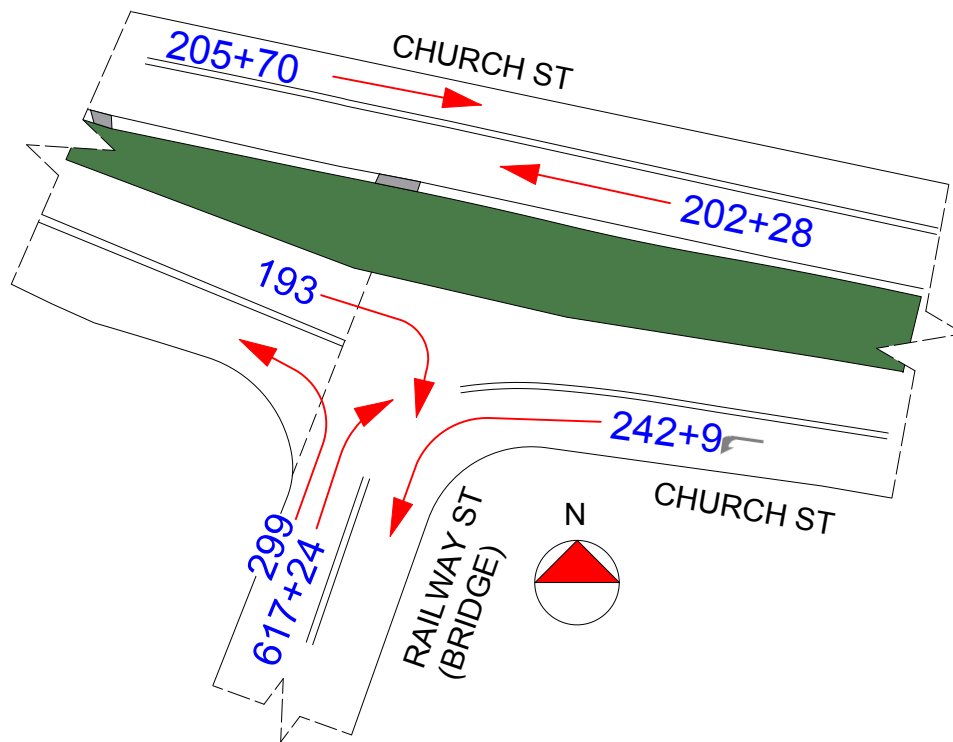
**G = GIVEWAY**

**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.

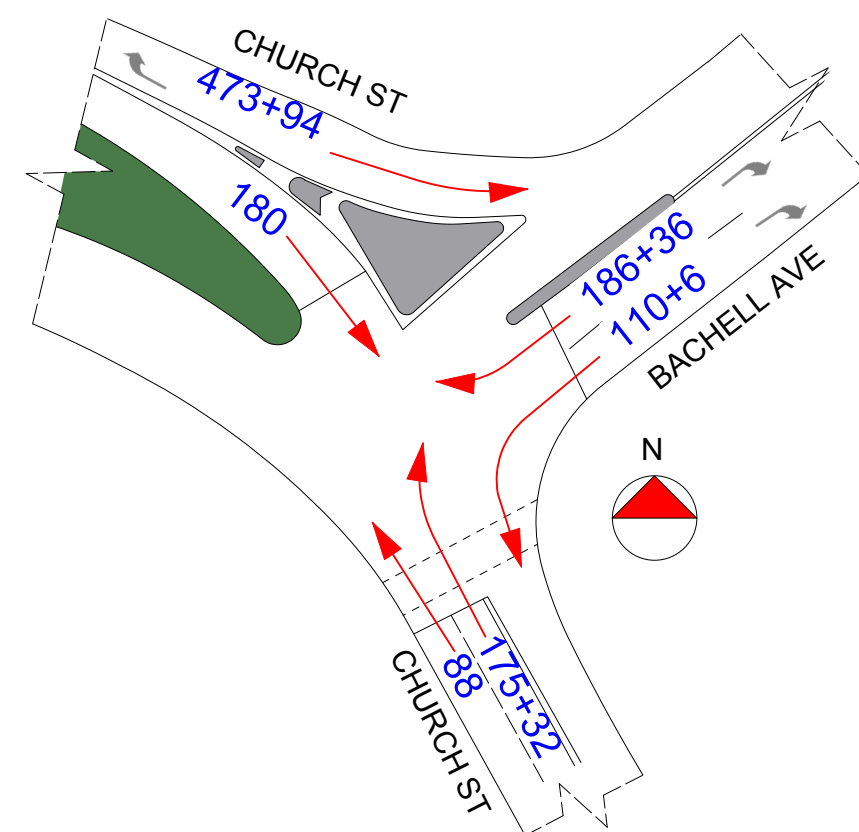
**Note:** **S** Analysed using SIDRA 8.0

\*Refer to **Table 4.2** Level of Service Criteria in **Section 2.4** of this report.



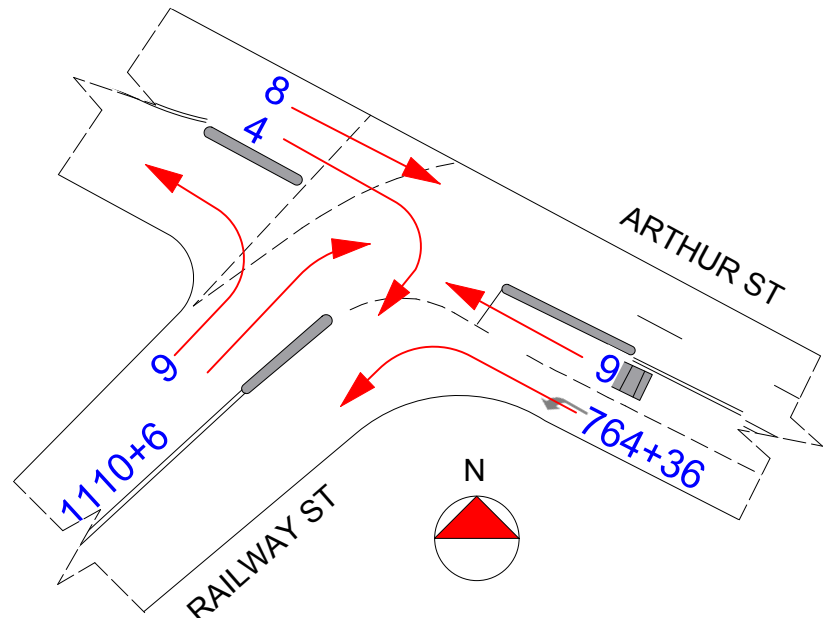
CHURCH ST/RAILWAY ST (BRIDGE)  
TRAFFIC VOLUME COUNT  
CARRIED OUT WEDNESDAY 2/12/15

**LEGEND**  
AM PEAK HOUR  
8:00-9:00AM = 617  
ADDITIONAL  
VOLUMES =+28



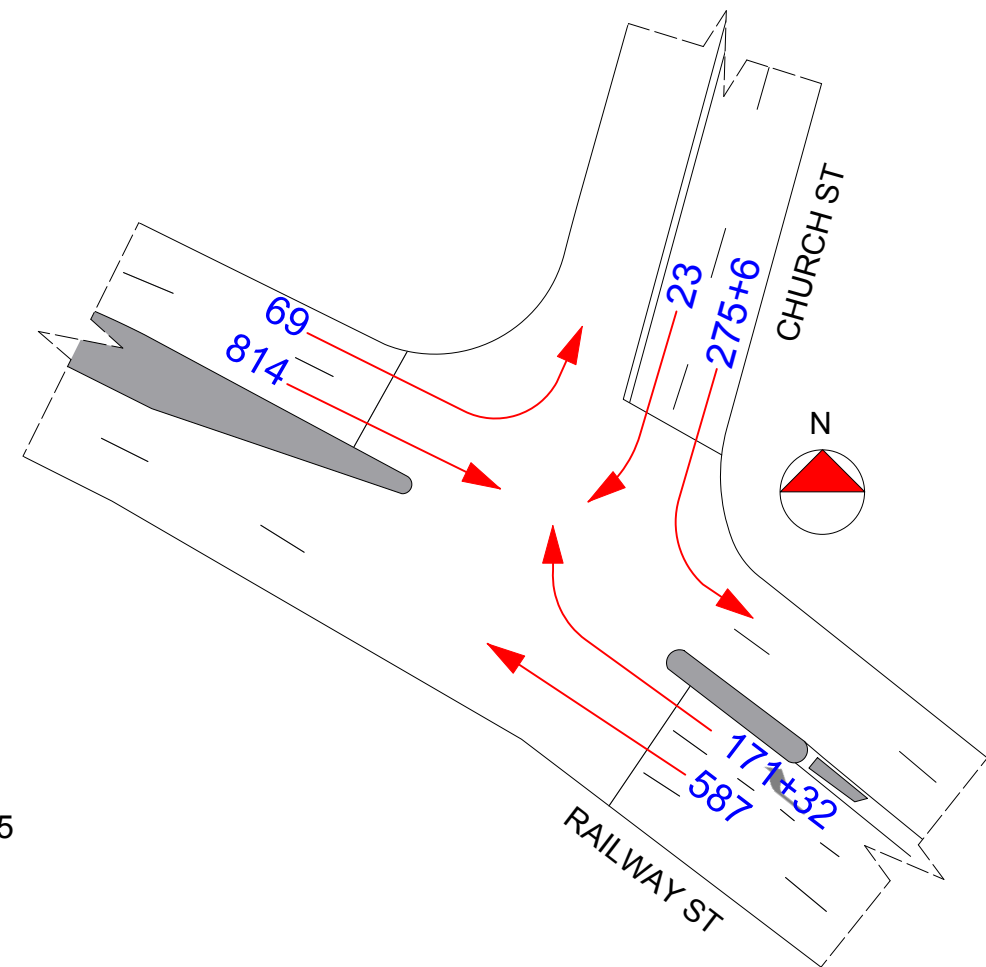
CHURCH ST/BACHELL AVENUE  
TRAFFIC VOLUME COUNT  
CARRIED OUT WEDNESDAY 2/12/15

**LEGEND**  
AM PEAK HOUR  
7:30-8:30AM = 473  
ADDITIONAL  
VOLUMES =+111



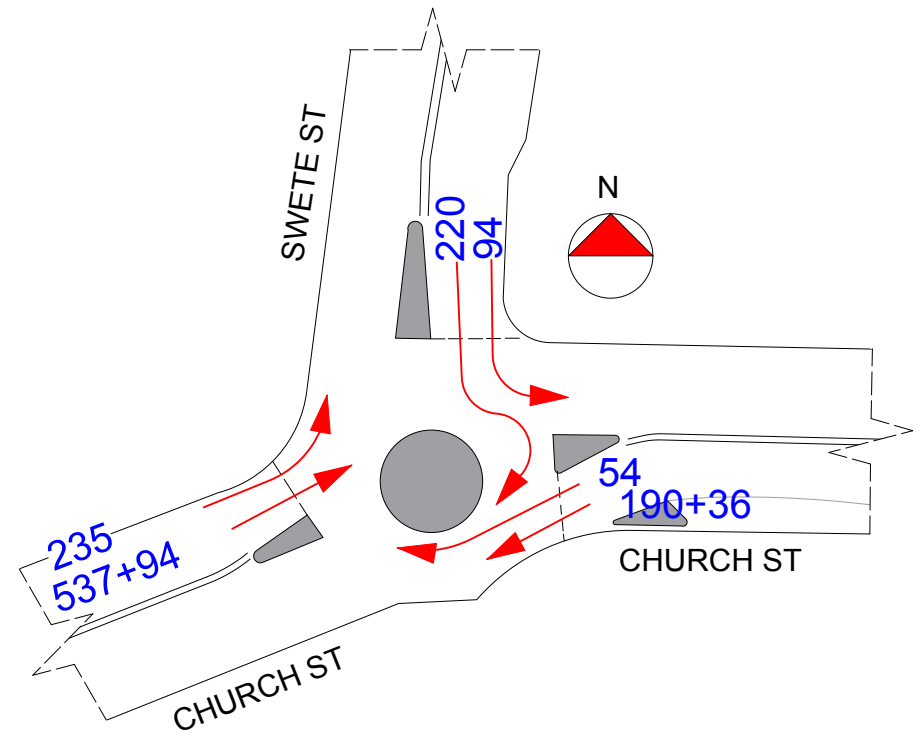
ARTHUR ST/RAILWAY ST  
TRAFFIC VOLUME COUNT  
CARRIED OUT TUESDAY 1/12/15

**LEGEND**  
AM PEAK HOUR  
7:45-8:45AM = 764  
ADDITIONAL  
VOLUMES =+38



CHURCH ST/RAILWAY ST  
TRAFFIC VOLUME COUNT  
CARRIED OUT TUESDAY 1/12/15

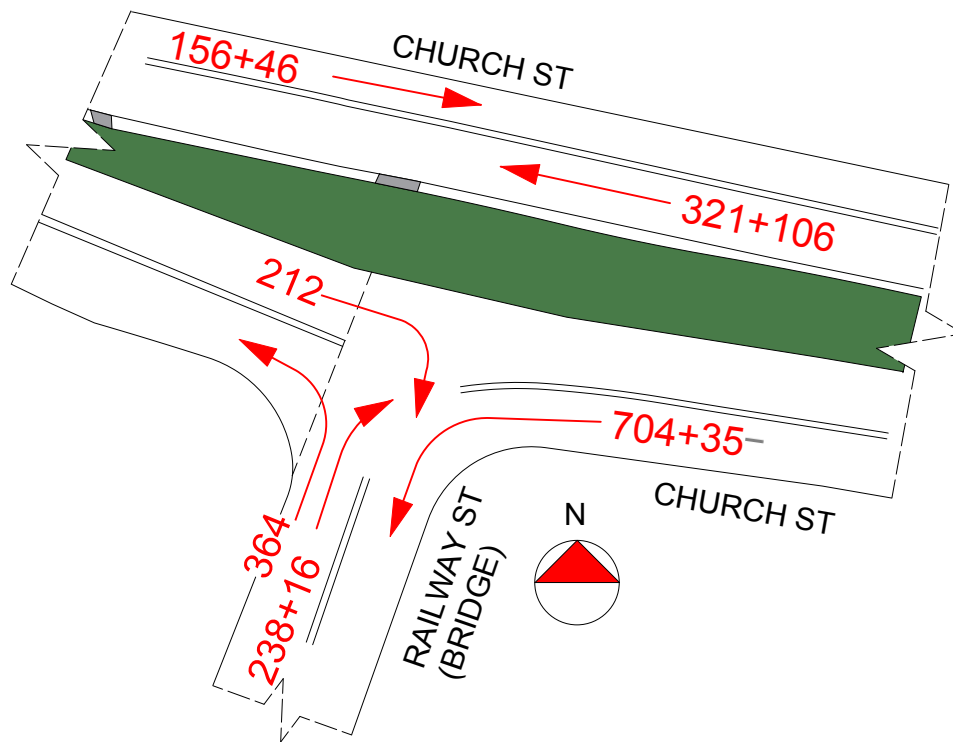
**LEGEND**  
AM PEAK HOUR  
7:45-8:45AM = 171  
ADDITIONAL  
VOLUMES =+38



CHURCH ST/SWETE ST  
TRAFFIC VOLUME COUNT  
CARRIED OUT WEDNESDAY 2/12/15

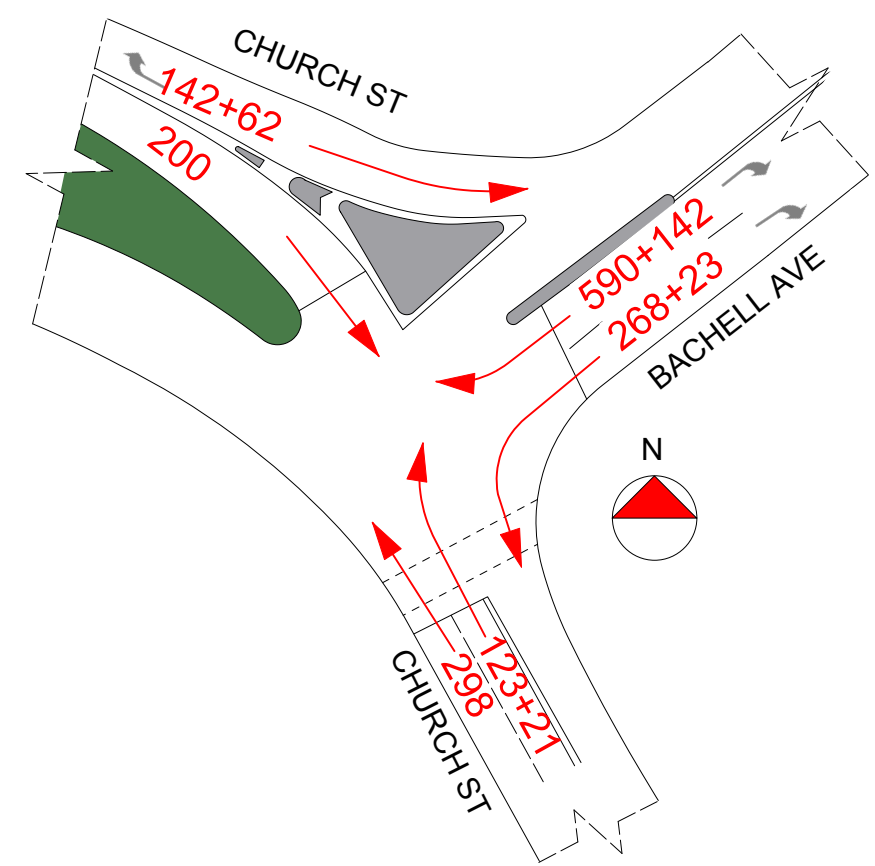
**LEGEND**  
AM PEAK HOUR  
7:30-8:30AM = 537  
ADDITIONAL  
VOLUMES =+111

**FIGURE 7A**  
EXISTING PEAK HOUR TRAFFIC VOLUMES  
PLUS DEVELOPMENT AM PEAK HOUR TRAFFIC VOLUMES



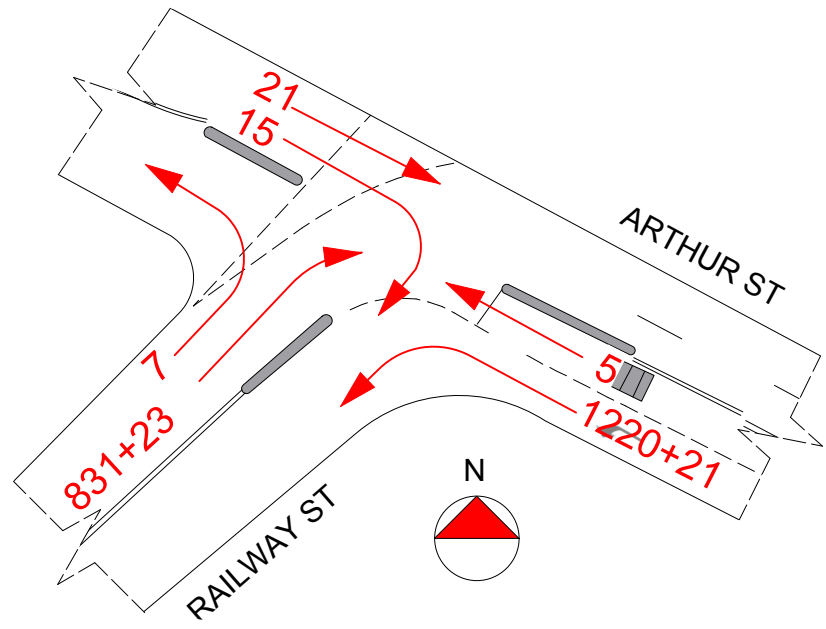
CHURCH ST/RAILWAY ST (BRIDGE)  
TRAFFIC VOLUME COUNT  
CARRIED OUT WEDNESDAY 2/12/15

**LEGEND**  
PM PEAK HOUR  
4:45-5:45PM = 238  
ADDITIONAL  
VOLUMES =+23



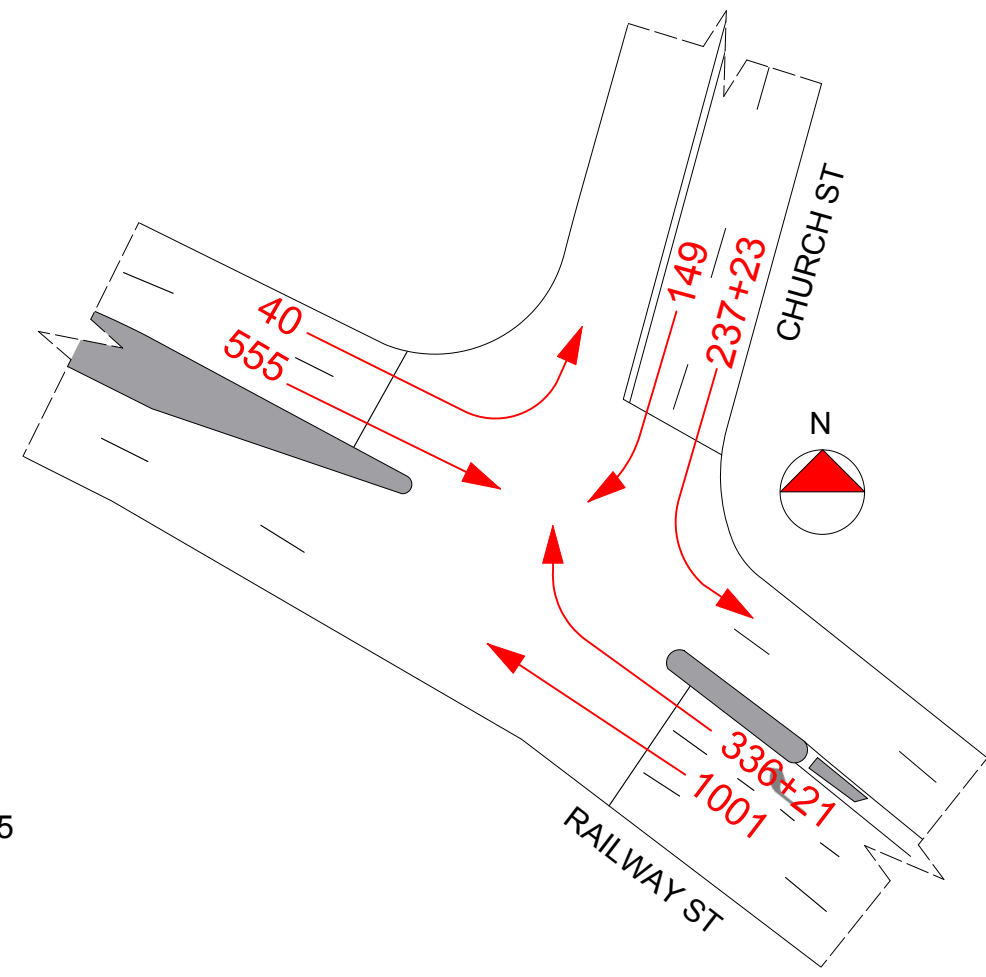
CHURCH ST/BACHELL AVENUE  
TRAFFIC VOLUME COUNT  
CARRIED OUT WEDNESDAY 2/12/15

**LEGEND**  
PM PEAK HOUR  
5:00-6:00PM = 142  
ADDITIONAL  
VOLUMES =+89



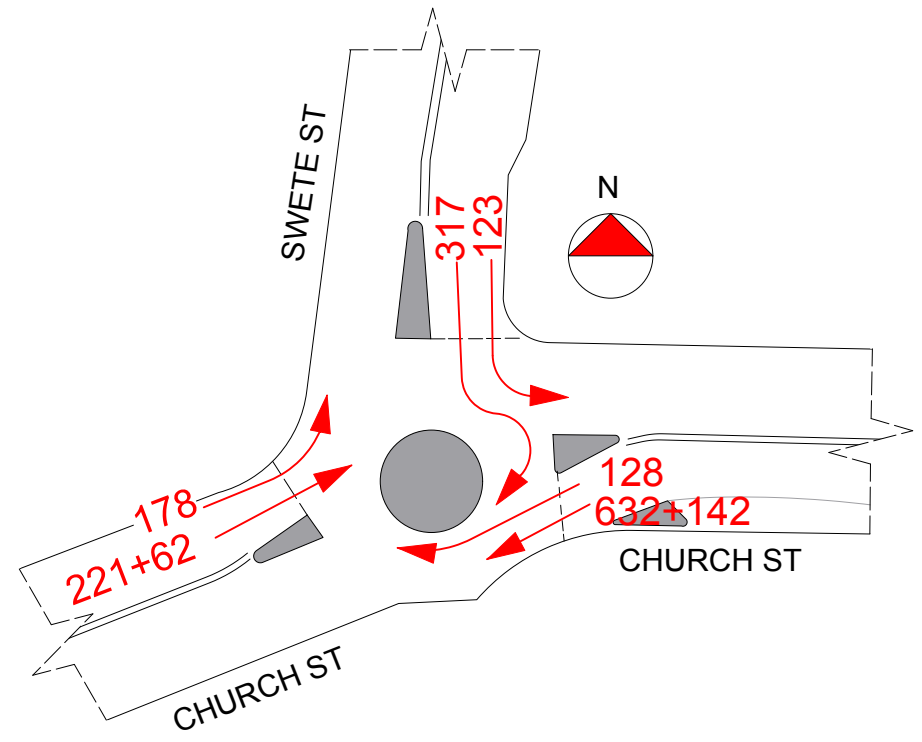
ARTHUR ST/RAILWAY ST  
TRAFFIC VOLUME COUNT  
CARRIED OUT TUESDAY 1/12/15

**LEGEND**  
PM PEAK HOUR  
4:45-5:45PM = 831  
ADDITIONAL  
VOLUMES =+55



CHURCH ST/RAILWAY ST  
TRAFFIC VOLUME COUNT  
CARRIED OUT TUESDAY 1/12/15

**LEGEND**  
PM PEAK HOUR  
5:00-6:00PM = 237  
ADDITIONAL  
VOLUMES =+55



CHURCH ST/SWETE ST  
TRAFFIC VOLUME COUNT  
CARRIED OUT WEDNESDAY 2/12/15

**LEGEND**  
PM PEAK HOUR  
5:00-6:00PM = 221  
ADDITIONAL  
VOLUMES =+89

**FIGURE 7B**  
EXISTING PEAK HOUR TRAFFIC VOLUMES  
PLUS DEVELOPMENT PM PEAK HOUR TRAFFIC VOLUMES

### (3.8 continued)

The Level of Service at Church Street/ Railway Street is unchanged at F in the AM peak hour and there is a small change in Degree of Saturation from 1.086 to 1.15 in the PM peak hour. 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.

Possible Mitigation measure are explained in detail in **Appendix F** of this report.

### 3.9 Delivery / Service Vehicles

The Planning Proposal will facilitate development potentially up to a gross floor area of **26214sq.m**.

Based upon **Table 5.1** in the *RTA Guide to Traffic Generating Developments*, the minimum number of unloading bays for commercial premises with a GFA exceeding 20,000m<sup>2</sup> is **5 spaces** and **1 space** per 8000m<sup>2</sup> over 20,000m<sup>2</sup>. The total requirement is **6 bays**, 50% of which should be adequate for trucks. The majority of deliveries to commercial premises are in small vans and SRV trucks.

It is recommended that **2** loading bays be provided for trucks and that **4** visitor spaces be signposted "**Visitor / Small Delivery Vehicles**". It is suggested that one is **3.5** metres wide by **6.4** metres long and suitable for **SRV** parking and the other is **3.5** metres wide by **12.5** metres long and suitable for **HRV** (heavy rigid vehicles) parking.

## 4.0 SUMMARY

- The Traffic and Parking Report has been prepared to support a rezoning application to change the zone from General Industrial **IN1** to **B5** Business Development at 2 Bachell Avenue.
- Peak hour traffic counts were conducted at 5 intersections in December 2015 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 peak hour and Level of Service D towards E operating near capacity in the PM peak hour. Hence mitigation measures are suggested to improve the Level of Service.
- The other 4 intersections were providing satisfactory performance with spare capacity.
- The proposed business development based upon concept plans comprises 4 groups of retail/ light industry/ warehousing/ high technology uses totaling 26214m<sup>2</sup> at an FSR of 3 to 1.
- The car parking requirement to comply with the *Auburn Council DCP 2010* is approximately **405 spaces**. The concept plans show 49 spaces at ground level and 28 spaces at Level 1 but a parking layout has not been prepared for Basements 1 and 2.
- Vehicular access is proposed to and from Bachell Avenue.
- The peak traffic volume generated by the development is **197** vehicles per hour in the **AM** peak hour and **290** vehicles per hour in the **PM** peak hour.
- 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 only in the AM peak hour. A small change in degree of Saturation in the PM peak hour of 0.064, which is minor, only very small traffic volumes are proposed from this development in the PM peak hour to this intersection. There is no change to the Level of Service at the other intersections for the future and they are operating within plenty of space capacity.
- Based upon RMS Guidelines, 6 spaces are required for delivery/ service vehicles. 4 of these spaces could be dual/ visitor parking spaces. One space should be provided for a HRV vehicle and 1 space for a SRV vehicle.
- A Green Travel Plan has been provided to increase travel by other modes such as walking and cycling and to reduce car travel dependency. An Action Plan is located in **Appendix E**.

**(4.0 continued)**

- This assessment has found that all intersections within the vicinity of the site operate satisfactorily under existing conditions and under full development capacity facilitated by the Planning Proposal, with the exception of the Church Street/ Railway Street intersection that is already operating at LoS F.
- The intersection of Church Street/ Railway Street Bridge located 890 metres to the west of the intersection of Church Street/ Railway Street LoS A in the future and is an alternative route for drivers travelling eastbound. As the intersection of Church Street/ Railway Street reaches capacity, driver behavior 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 F** and would change the operational Level of Service to A in both AM and PM peak hours.

## APPENDICES



## APPENDIX A



## DRAWING LIST

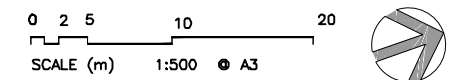
COVER PAGE / 3D

SITE PLAN  
 GROUND FLOOR  
 LEVEL 1  
 LEVEL 2  
 LEVEL 3  
 LEVEL 4-7  
 BASEMENT LEVEL 1  
 BASEMENT LEVEL 2

SHADOW DIAGRAMS

MASSING 3D - VIEW 1  
 MASSING 3D - VIEW 2  
 MASSING 3D - VIEW 3  
 MASSING 3D - VIEW 4  
 MASSING 3D - VIEW 5

## COVER PAGE



14 AUG 2018

**PROPOSED DEVELOPMENT**  
 CONCEPT DESIGN  
 2 BACHELL AVENUE, LIDCOMBE NSW 2141

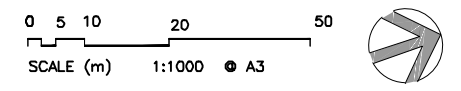
MRA | Michael Raad Architects

DRAFT

DRAFT



SITE PLAN

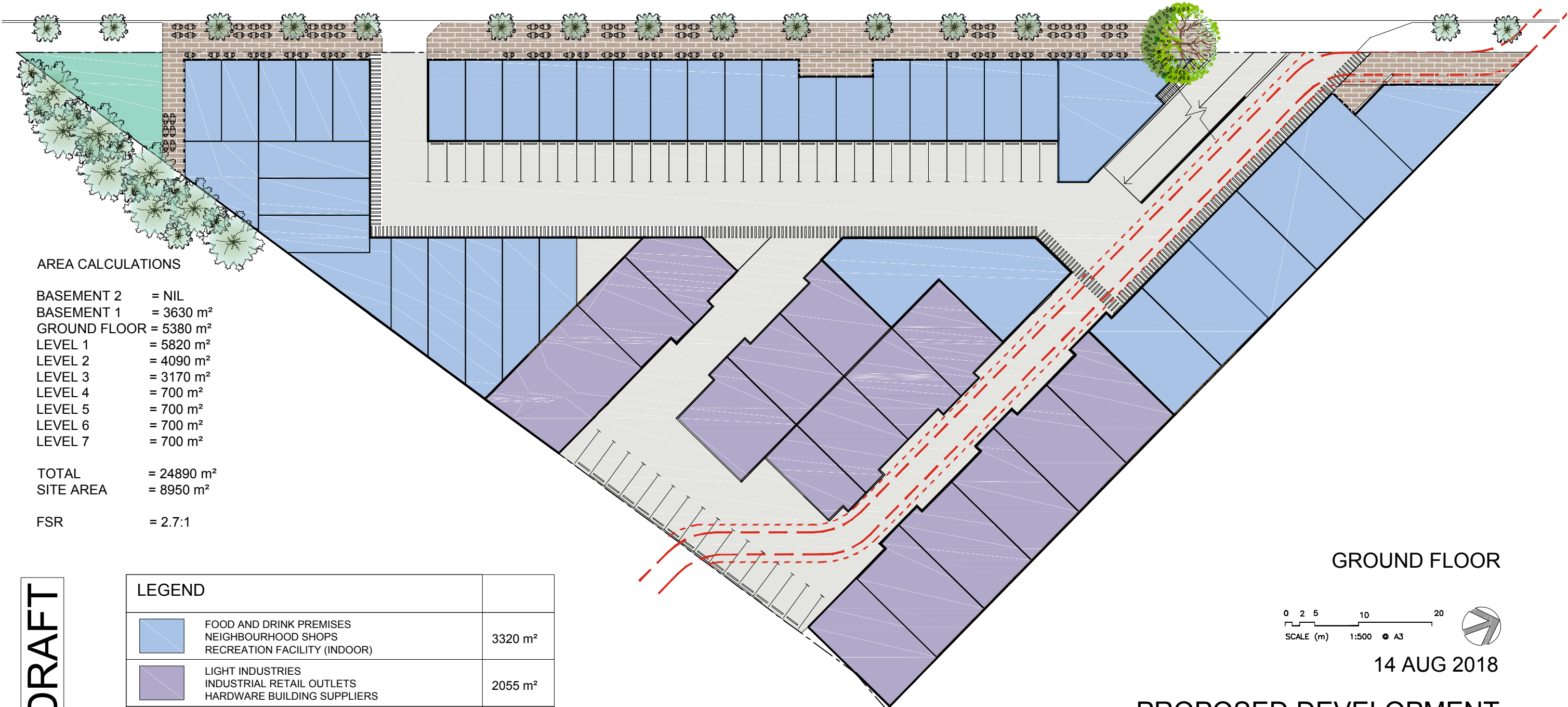


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PROPOSED DEVELOPMENT  
CONCEPT DESIGN  
2 BACHELL AVENUE, LIDCOMBE NSW 2141

I Michael Raad Architects

# BACHELL AVENUE



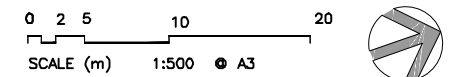
## AREA CALCULATIONS

BASEMENT 2	= NIL
BASEMENT 1	= 3630 m <sup>2</sup>
GROUND FLOOR	= 5380 m <sup>2</sup>
LEVEL 1	= 5820 m <sup>2</sup>
LEVEL 2	= 4090 m <sup>2</sup>
LEVEL 3	= 3170 m <sup>2</sup>
LEVEL 4	= 700 m <sup>2</sup>
LEVEL 5	= 700 m <sup>2</sup>
LEVEL 6	= 700 m <sup>2</sup>
LEVEL 7	= 700 m <sup>2</sup>
<b>TOTAL</b>	<b>= 24890 m<sup>2</sup></b>
<b>SITE AREA</b>	<b>= 8950 m<sup>2</sup></b>
<b>FSR</b>	<b>= 2.7:1</b>

**DRAFT**

LEGEND		
	FOOD AND DRINK PREMISES NEIGHBOURHOOD SHOPS RECREATION FACILITY (INDOOR)	3320 m <sup>2</sup>
	LIGHT INDUSTRIES INDUSTRIAL RETAIL OUTLETS HARDWARE BUILDING SUPPLIERS	2055 m <sup>2</sup>
	HIGH TECHNOLOGY INDUSTRY OFFICE PREMISES AND BUSINESS PREMISES DIGITAL TECHNOLOGIES AND CREATIVE INDUSTRIES	-
	WAREHOUSE AND DISTRIBUTION STORAGE FACILITIES WHOLESALE SUPPLIERS	-
	PUBLIC OPEN SPACE	190 m <sup>2</sup>
	RELOCATED AND CAPPED STORM-WATER CULVERT WITH 1000 CLEARANCE	

## GROUND FLOOR



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**PROPOSED DEVELOPMENT**  
**CONCEPT DESIGN**  
 2 BACHELL AVENUE, LIDCOMBE NSW 2141

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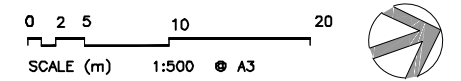
BACHELL AVENUE



LEGEND

	FOOD AND DRINK PREMISES NEIGHBOURHOOD SHOPS RECREATION FACILITY (INDOOR)	1958 m <sup>2</sup>
	LIGHT INDUSTRIES INDUSTRIAL RETAIL OUTLETS HARDWARE BUILDING SUPPLIERS	2776 m <sup>2</sup>
	HIGH TECHNOLOGY INDUSTRY OFFICE PREMISES AND BUSINESS PREMISES DIGITAL TECHNOLOGIES AND CREATIVE INDUSTRIES	-
	WAREHOUSE AND DISTRIBUTION STORAGE FACILITIES WHOLESALE SUPPLIERS	1086 m <sup>2</sup>
	PUBLIC OPEN SPACE	200 m <sup>2</sup>
	RELOCATED AND CAPPED STORM-WATER CULVERT WITH 1000 CLEARANCE	

LEVEL 1



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PROPOSED DEVELOPMENT

CONCEPT DESIGN

2 BACHELL AVENUE, LIDCOMBE NSW 2141

DRAFT

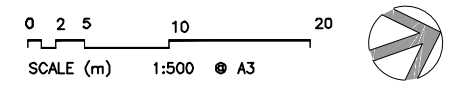
BACHELL AVENUE



LEGEND		
	FOOD AND DRINK PREMISES NEIGHBOURHOOD SHOPS RECREATION FACILITY (INDOOR)	-
	LIGHT INDUSTRIES INDUSTRIAL RETAIL OUTLETS HARDWARE BUILDING SUPPLIERS	468 m <sup>2</sup>
	HIGH TECHNOLOGY INDUSTRY OFFICE PREMISES AND BUSINESS PREMISES DIGITAL TECHNOLOGIES AND CREATIVE INDUSTRIES	2496 m <sup>2</sup>
	WAREHOUSE AND DISTRIBUTION STORAGE FACILITIES WHOLESALE SUPPLIERS	1127 m <sup>2</sup>
	PUBLIC OPEN SPACE	110 m <sup>2</sup>
	RELOCATED AND CAPPED STORM-WATER CULVERT WITH 1000 CLEARANCE	

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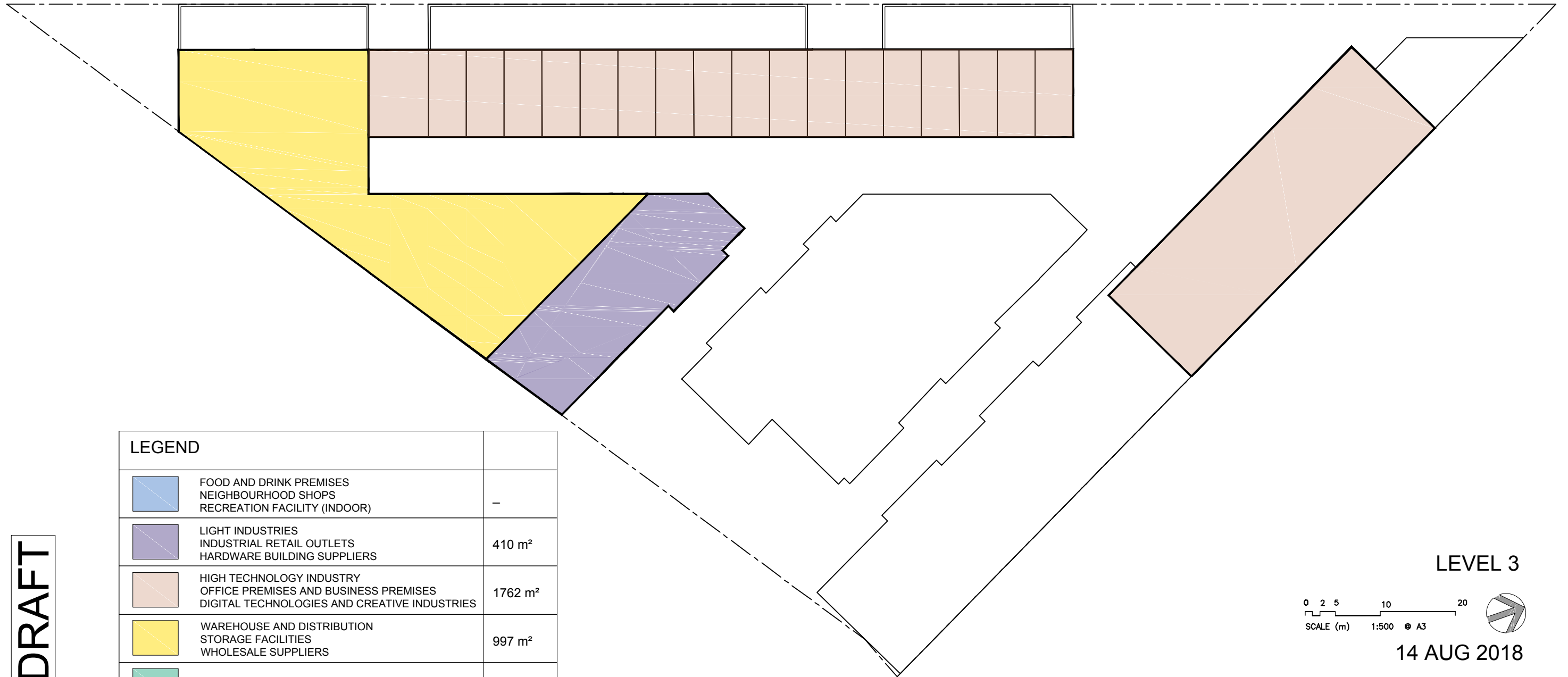
LEVEL 2



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**PROPOSED DEVELOPMENT**  
 CONCEPT DESIGN  
 2 BACHELL AVENUE, LIDCOMBE NSW 2141

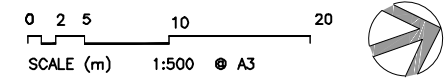
BACHELL AVENUE



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LEGEND		
	FOOD AND DRINK PREMISES NEIGHBOURHOOD SHOPS RECREATION FACILITY (INDOOR)	-
	LIGHT INDUSTRIES INDUSTRIAL RETAIL OUTLETS HARDWARE BUILDING SUPPLIERS	410 m <sup>2</sup>
	HIGH TECHNOLOGY INDUSTRY OFFICE PREMISES AND BUSINESS PREMISES DIGITAL TECHNOLOGIES AND CREATIVE INDUSTRIES	1762 m <sup>2</sup>
	WAREHOUSE AND DISTRIBUTION STORAGE FACILITIES WHOLESALE SUPPLIERS	997 m <sup>2</sup>
	PUBLIC OPEN SPACE	-
	RELOCATED AND CAPPED STORM-WATER CULVERT WITH 1000 CLEARANCE	

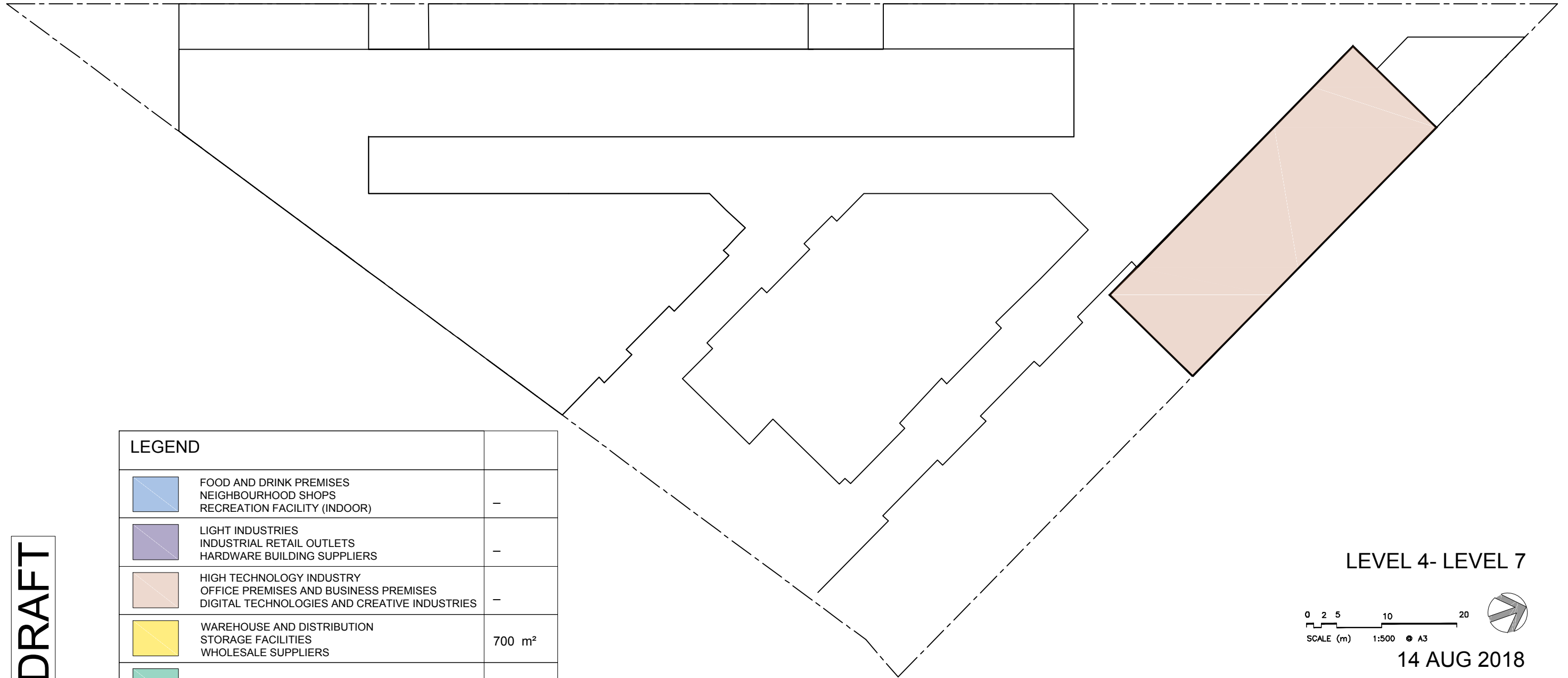
LEVEL 3









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**PROPOSED DEVELOPMENT**  
CONCEPT DESIGN  
2 BACHELL AVENUE, LIDCOMBE NSW 2141

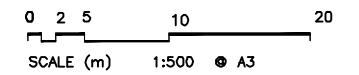
BACHELL AVENUE



DRAFT

LEGEND		
	FOOD AND DRINK PREMISES NEIGHBOURHOOD SHOPS RECREATION FACILITY (INDOOR)	-
	LIGHT INDUSTRIES INDUSTRIAL RETAIL OUTLETS HARDWARE BUILDING SUPPLIERS	-
	HIGH TECHNOLOGY INDUSTRY OFFICE PREMISES AND BUSINESS PREMISES DIGITAL TECHNOLOGIES AND CREATIVE INDUSTRIES	-
	WAREHOUSE AND DISTRIBUTION STORAGE FACILITIES WHOLESALE SUPPLIERS	700 m <sup>2</sup>
	PUBLIC OPEN SPACE	-
	RELOCATED AND CAPPED STORM-WATER CULVERT WITH 1000 CLEARANCE	

LEVEL 4- LEVEL 7



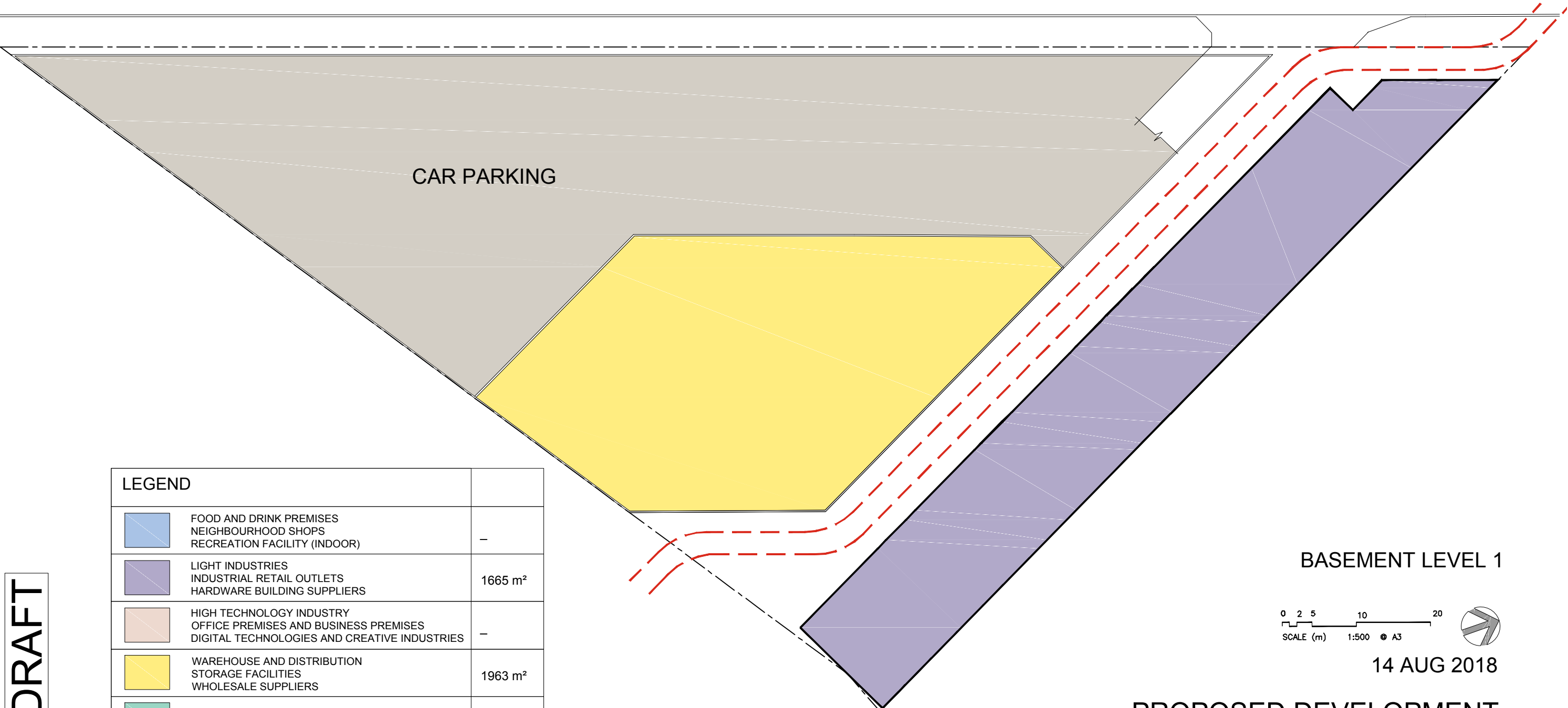
14 AUG 2018

**PROPOSED DEVELOPMENT**  
CONCEPT DESIGN  
2 BACHELL AVENUE, LIDCOMBE NSW 2141



BACHELL AVENUE

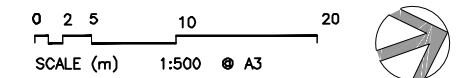
CAR PARKING



LEGEND

	FOOD AND DRINK PREMISES NEIGHBOURHOOD SHOPS RECREATION FACILITY (INDOOR)	-
	LIGHT INDUSTRIES INDUSTRIAL RETAIL OUTLETS HARDWARE BUILDING SUPPLIERS	1665 m <sup>2</sup>
	HIGH TECHNOLOGY INDUSTRY OFFICE PREMISES AND BUSINESS PREMISES DIGITAL TECHNOLOGIES AND CREATIVE INDUSTRIES	-
	WAREHOUSE AND DISTRIBUTION STORAGE FACILITIES WHOLESALE SUPPLIERS	1963 m <sup>2</sup>
	PUBLIC OPEN SPACE	-
	RELOCATED AND CAPPED STORM-WATER CULVERT WITH 1000 CLEARANCE	

BASEMENT LEVEL 1



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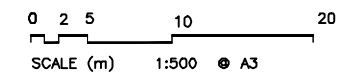
**PROPOSED DEVELOPMENT**  
CONCEPT DESIGN  
2 BACHELL AVENUE, LIDCOMBE NSW 2141

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BACHELL AVENUE

CAR PARKING

BASEMENT LEVEL 2

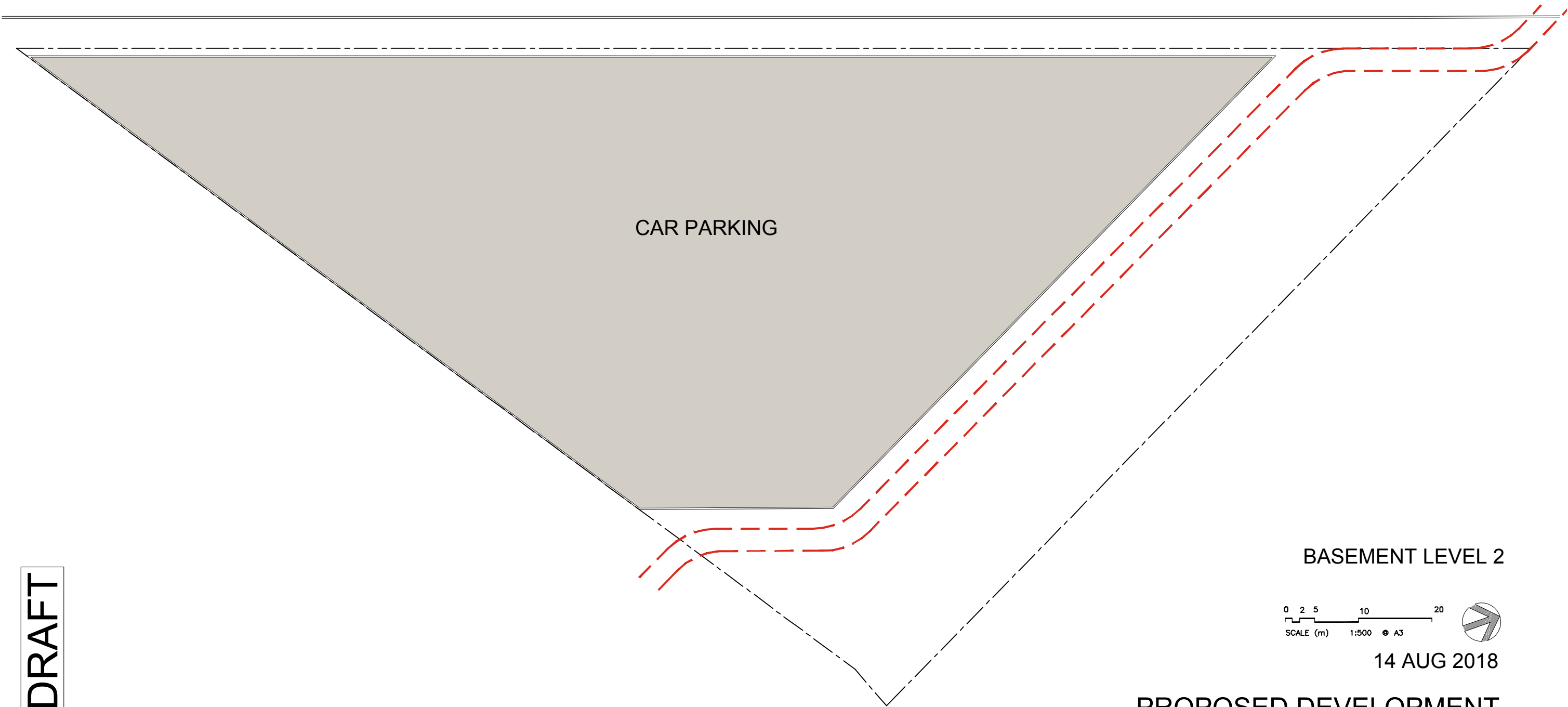


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**PROPOSED DEVELOPMENT**  
CONCEPT DESIGN  
2 BACHELL AVENUE, LIDCOMBE NSW 2141

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DRAFT





**LEGEND**

- FOOD AND DRINK PREMISES  
 NEIGHBOURHOOD SHOPS  
 RECREATION FACILITY (INDOOR)
- LIGHT INDUSTRIES  
 INDUSTRIAL RETAIL OUTLETS  
 HARDWARE BUILDING SUPPLIERS
- HIGH TECHNOLOGY INDUSTRY  
 OFFICE PREMISES AND BUSINESS PREMISES  
 DIGITAL TECHNOLOGIES AND CREATIVE INDUSTRIES
- WAREHOUSE AND DISTRIBUTION  
 STORAGE FACILITIES  
 WHOLESALE SUPPLIERS
- RELOCATED AND CAPPED  
 STORM-WATER CULVERT

**MASSING MODEL  
VIEW 5**

14 AUG 2018

**PROPOSED DEVELOPMENT**  
 CONCEPT DESIGN  
 2 BACHELL AVENUE, LIDCOMBE NSW 2141

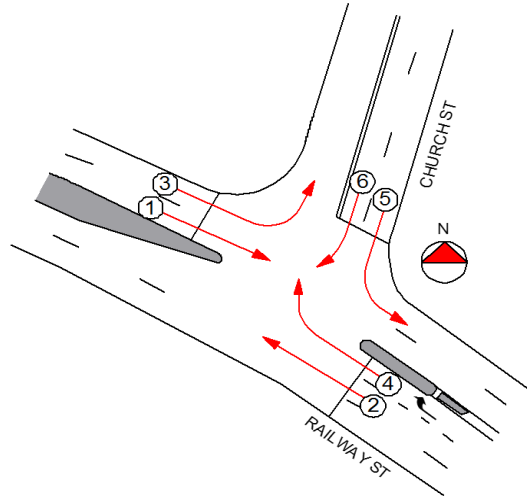
I Michael Raad **Architects**

## **APPENDIX B**

## INTERSECTION: CHURCH ST/RAILWAY ST, LIDCOMBE

### TRAFFIC VOLUME COUNT

DAY: Tuesday..... DATE: 1.12.15..... WEATHER...Fine.....OBSERVER...R. Rabinovitch & G. Dodiak.....



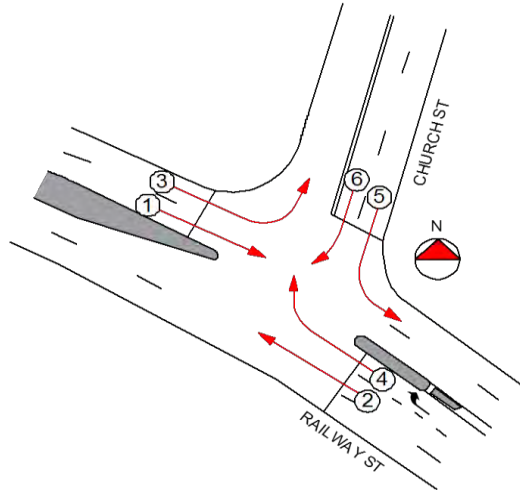
Time AM	MOVEMENT NUMBER					
	1	2	3	4	5	6
7:00AM TO 7.15AM	187	89	20	34	36	2
7:15AM TO 7.30AM	218	105	30	22	63	6
7:30AM TO 7.45AM	188	133	20	35	42	2
7:45AM TO 8.00AM	193	168	16	37	81	4
8:00AM TO 8.15AM	208	136	20	46	60	5
8:15AM TO 8.30AM	198	124	22	44	63	8
8:30AM TO 8.45AM	215	159	11	44	71	6
8:45AM TO 9:00AM	213	142	13	39	54	3

7:00 - 8:00	786	495	86	128	222	14
7:15 - 8:15	807	542	86	140	246	17
7:30 - 8:30	787	561	78	162	246	19
7:45 - 8:45	814	587	69	171	275	23
8:00 - 9:00	834	561	66	173	248	22

## INTERSECTION: CHURCH ST/RAILWAY ST, LIDCOMBE

### TRAFFIC VOLUME COUNT

DAY: Tuesday..... DATE: 1.12.15..... WEATHER...Fine.....OBSERVER...R. Rabinovitch & G. Dodiak.....



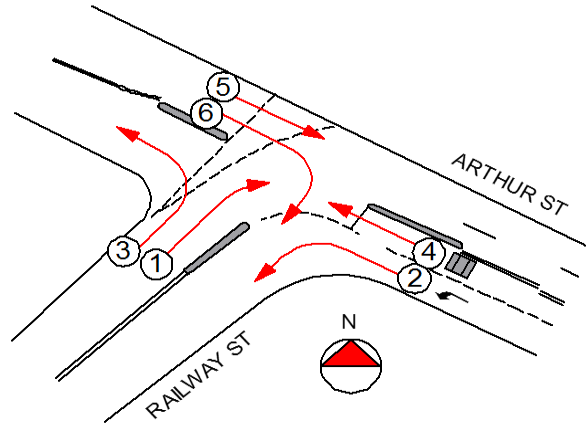
Time AM	MOVEMENT NUMBER					
	1	2	3	4	5	6
4.00PM TO 4.15PM	131	228	3	85	57	28
4.15PM TO 4.30PM	111	231	4	88	54	26
4.30PM TO 4.45PM	148	178	10	78	69	39
4.45PM TO 5.00PM	131	212	8	78	59	34
5.00PM TO 5.15PM	145	239	6	80	66	38
5.15PM TO 5.30PM	158	234	15	75	64	42
5.30PM TO 5.45PM	129	282	9	101	52	37
5.45PM TO 6.00PM	123	246	10	80	55	32

16:00 - 17:00	521	849	25	329	239	127
16:15 - 17:15	535	860	28	324	248	137
16:30 - 17:30	582	863	39	311	258	153
16:45 - 17:45	563	967	38	334	241	151
17:00 - 18:00	555	1001	40	336	237	149

## INTERSECTION: ARTHUR ST/RAILWAY ST, LIDCOMBE

### TRAFFIC VOLUME COUNT

DAY: Tuesday..... DATE: 1.12.15..... WEATHER...Fine.....OBSERVER...B. Haldey & E. Haldey.....



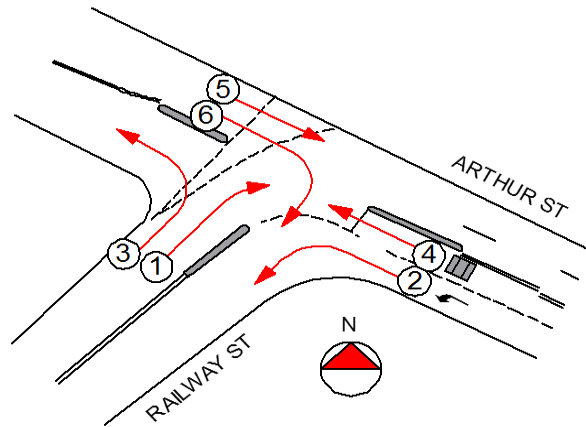
Time AM	MOVEMENT NUMBER					
	1	2	3	4	5	6
7:00AM TO 7.15AM	249	133	1	5	3	-
7:15AM TO 7.30AM	269	140	3	2	4	2
7:30AM TO 7.45AM	237	167	1	3	2	2
7:45AM TO 8.00AM	274	189	1	1	3	1
8:00AM TO 8.15AM	266	194	2	1	1	2
8:15AM TO 8:30AM	275	180	2	2	1	1
8:30AM TO 8:45AM	295	201	4	5	3	-
8:45AM TO 9:00AM	250	195	7	7	4	2

7:00 - 8:00	1029	629	6	11	12	5
7:15 - 8:15	1046	690	7	7	10	7
7:30 - 8:30	1052	730	6	7	7	6
7:45 - 8:45	1110	764	9	9	8	4
8:00 - 9:00	1086	770	15	15	9	5

**INTERSECTION: ARTHUR ST/RAILWAY ST, LIDCOMBE**

TRAFFIC VOLUME COUNT

DAY: Tuesday..... DATE: 1.12.15..... WEATHER...Fine.....OBSERVER...B. Haldey & E. Haldey.....



Time AM	MOVEMENT NUMBER					
	1	2	3	4	5	6
4.00PM TO 4.15PM	190	338	1	1	1	4
4.15PM TO 4.30PM	188	268	—	3	7	—
4.30PM TO 4.45PM	205	250	—	7	2	2
4.45PM TO 5.00PM	197	274	2	1	6	3
5.00PM TO 5.15PM	223	303	1	2	9	9
5.15PM TO 5.30PM	227	292	3	1	4	2
5.30PM TO 5.45PM	184	351	1	1	2	1
5.45PM TO 6.00PM	188	232	—	3	4	1

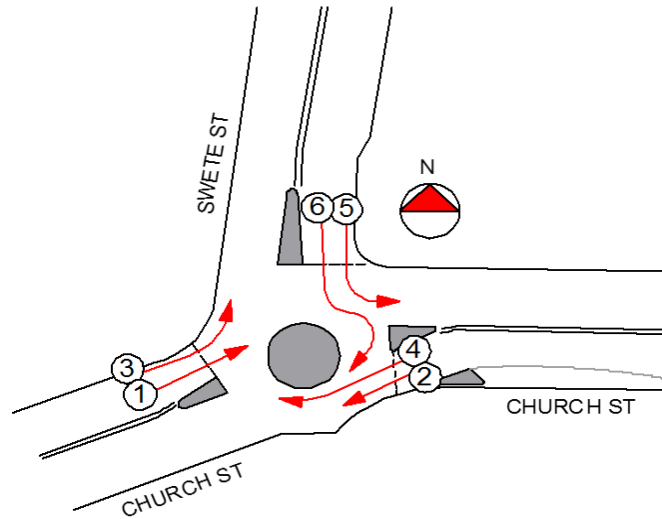
16:00 - 17:00	780	1130	3	12	16	9
16:15 - 17:15	813	1095	3	13	24	14
16:30 - 17:30	852	1119	6	11	21	16
16:45 - 17:45	831	1220	7	5	21	15
17:00 - 18:00	822	1178	5	7	19	13



## INTERSECTION: CHURCH ST/SWETE ST, LIDCOMBE

### TRAFFIC VOLUME COUNT

DAY: Wednesday..... DATE: 2.12.15..... WEATHER...Fine.....OBSERVER...V. Karpel.....



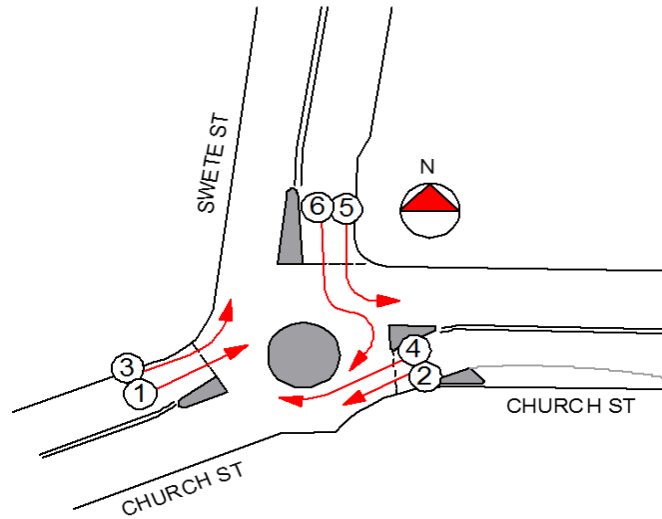
Time AM	MOVEMENT NUMBER					
	1	2	3	4	5	6
7:00AM TO 7.15AM	108	31	53	9	19	27
7:15AM TO 7.30AM	125	42	36	6	23	36
7:30AM TO 7.45AM	143	48	54	10	25	56
7:45AM TO 8.00AM	149	47	51	10	19	53
8:00AM TO 8.15AM	128	57	51	22	22	56
8:15AM TO 8:30AM	117	38	79	12	28	55
8:30AM TO 8:45AM	108	45	80	17	19	44
8:45AM TO 9:00AM	113	51	85	15	21	47

7:00 - 8:00	525	168	194	35	86	172
7:15 - 8:15	545	194	192	48	89	201
7:30 - 8:30	537	190	235	54	94	220
7:45 - 8:45	502	187	261	61	88	208
8:00 - 9:00	466	191	295	66	90	202

## INTERSECTION: CHURCH ST/SWETE ST, LIDCOMBE

### TRAFFIC VOLUME COUNT

DAY: Wednesday..... DATE: 2.12.15..... WEATHER...Fine.....OBSERVER...V. Karpel.....



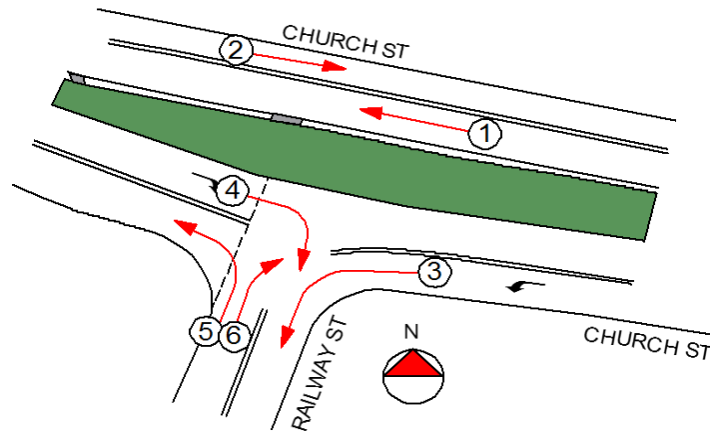
Time AM	MOVEMENT NUMBER					
	1	2	3	4	5	6
4.00PM TO 4.15PM	45	153	39	47	33	77
4.15PM TO 4.30PM	41	162	40	36	28	69
4.30PM TO 4.45PM	41	161	26	39	22	67
4.45PM TO 5.00PM	36	169	51	25	25	71
5.00PM TO 5.15PM	59	151	46	23	35	95
5.15PM TO 5.30PM	48	171	42	41	25	73
5.30PM TO 5.45PM	58	157	46	30	32	76
5.45PM TO 6.00PM	56	153	44	34	31	73

16:00 - 17:00	163	645	156	147	108	284
16:15 - 17:15	177	643	163	123	110	302
16:30 - 17:30	184	652	165	128	107	306
16:45 - 17:45	201	648	185	119	117	315
17:00 - 18:00	221	632	178	128	123	317

## INTERSECTION: CHURCH ST/RAILWAY ST BRIDGE, LIDCOMBE

### TRAFFIC VOLUME COUNT

DAY: Wednesday..... DATE: 2.12.15..... WEATHER...Cloudy.....OBSERVER...R. Rabinovitch & G. Dodiak.....



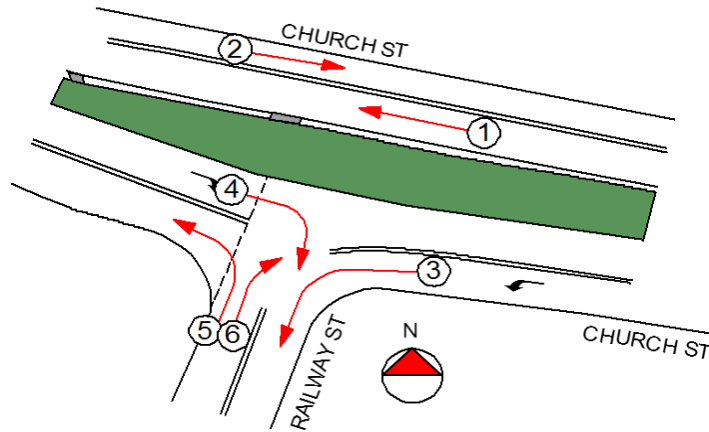
Time AM	MOVEMENT NUMBER					
	1	2	3	4	5	6
7:00AM TO 7.15AM	28	41	41	45	46	146
7:15AM TO 7.30AM	43	38	39	32	40	141
7:30AM TO 7.45AM	69	45	48	33	55	154
7:45AM TO 8.00AM	58	53	57	36	63	164
8:00AM TO 8.15AM	61	52	64	44	73	126
8:15AM TO 8.30AM	64	53	49	41	71	166
8:30AM TO 8.45AM	44	49	59	58	73	154
8:45AM TO 9:00AM	33	51	70	50	82	171

7:00 - 8:00	198	177	185	146	204	605
7:15 - 8:15	231	188	208	145	231	585
7:30 - 8:30	252	203	218	154	262	610
7:45 - 8:45	227	207	229	179	280	610
8:00 - 9:00	202	205	242	193	299	617

## INTERSECTION: CHURCH ST/RAILWAY ST BRIDGE, LIDCOMBE

### TRAFFIC VOLUME COUNT

DAY: Wednesday..... DATE: 2.12.15..... WEATHER...Cloudy.....OBSERVER...R. Rabinovitch & G. Dodiak.....



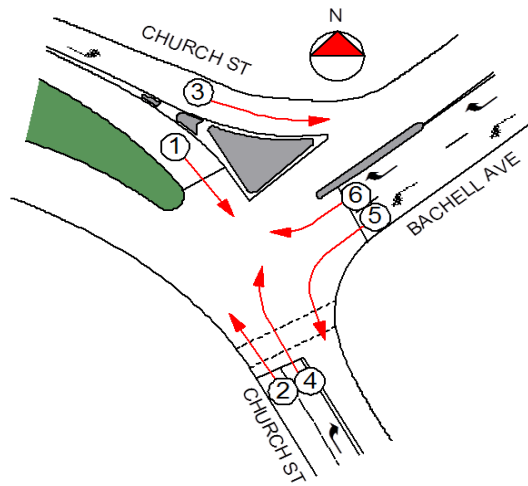
Time AM	MOVEMENT NUMBER					
	1	2	3	4	5	6
4.00PM TO 4.15PM	85	23	162	38	103	51
4.15PM TO 4.30PM	87	40	155	52	89	49
4.30PM TO 4.45PM	90	30	157	41	106	40
4.45PM TO 5.00PM	81	37	167	64	83	59
5.00PM TO 5.15PM	73	45	196	48	81	55
5.15PM TO 5.30PM	84	32	165	45	106	54
5.30PM TO 5.45PM	83	42	176	55	94	70
5.45PM TO 6.00PM	92	42	151	50	83	68

16:00 - 17:00	343	130	641	195	381	199
16:15 - 17:15	331	152	675	205	359	203
16:30 - 17:30	328	144	685	198	376	208
16:45 - 17:45	321	156	704	212	364	238
17:00 - 18:00	332	161	688	198	364	247

## INTERSECTION: CHURCH ST/BACHELL AVE, LIDCOMBE

### TRAFFIC VOLUME COUNT

DAY: Wednesday..... DATE: 2.12.15..... WEATHER...Cloudy.....OBSERVER...B. Haldey & E. Haldey.....



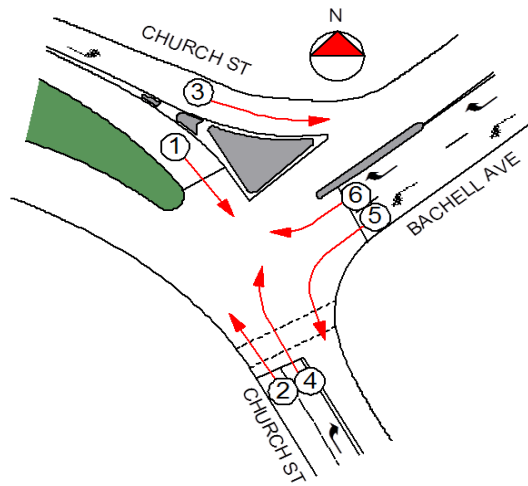
Time AM	MOVEMENT NUMBER					
	1	2	3	4	5	6
7:00AM TO 7.15AM	42	11	115	30	11	34
7:15AM TO 7.30AM	53	16	117	49	11	34
7:30AM TO 7.45AM	39	22	132	42	23	40
7:45AM TO 8.00AM	44	13	116	47	26	50
8:00AM TO 8.15AM	49	34	119	40	29	54
8:15AM TO 8.30AM	48	19	106	46	32	42
8:30AM TO 8.45AM	50	24	88	43	16	45
8:45AM TO 9:00AM	41	39	105	38	12	45

7:00 - 8:00	178	62	480	168	71	158
7:15 - 8:15	185	85	484	178	89	178
7:30 - 8:30	180	88	473	175	110	186
7:45 - 8:45	191	90	429	176	103	191
8:00 - 9:00	188	116	418	167	89	186

## INTERSECTION: CHURCH ST/BACHELL AVE, LIDCOMBE

### TRAFFIC VOLUME COUNT

DAY: Wednesday..... DATE: 2.12.15..... WEATHER...Cloudy.....OBSERVER...B. Haldey & E. Haldey.....



Time AM	MOVEMENT NUMBER					
	1	2	3	4	5	6
4.00PM TO 4.15PM	47	83	29	18	48	159
4.15PM TO 4.30PM	46	76	30	25	48	155
4.30PM TO 4.45PM	36	71	32	26	50	148
4.45PM TO 5.00PM	47	70	19	36	44	137
5.00PM TO 5.15PM	57	66	32	29	92	165
5.15PM TO 5.30PM	39	82	30	33	61	130
5.30PM TO 5.45PM	49	67	44	31	62	145
5.45PM TO 6.00PM	55	83	36	30	53	150

16:00 - 17:00	176	300	110	105	190	599
16:15 - 17:15	186	283	113	116	234	605
16:30 - 17:30	179	289	113	124	247	580
16:45 - 17:45	192	285	125	129	259	577
17:00 - 18:00	200	298	142	123	268	590

## APPENDIX C

# INTERSECTION SUMMARY

 **Site: 101 [Existing AM: Church St/Railway St, Lidcombe]**

AM Peak Hour: 7:45-8:45am

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 115 seconds (Site Optimum Cycle Time - Minimum Delay)

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Travel Speed (Average)	16.1 km/h	16.1 km/h
Travel Distance (Total)	1965.9 veh-km/h	2359.0 pers-km/h
Travel Time (Total)	122.3 veh-h/h	146.8 pers-h/h
Demand Flows (Total)	1939 veh/h	2327 pers/h
Percent Heavy Vehicles (Demand)	0.0 %	
Degree of Saturation	1.130	
Practical Spare Capacity	-20.4 %	
Effective Intersection Capacity	1716 veh/h	
Control Delay (Total)	87.13 veh-h/h	104.55 pers-h/h
Control Delay (Average)	161.8 sec	161.8 sec
Control Delay (Worst Lane)	300.1 sec	
Control Delay (Worst Movement)	299.4 sec	299.4 sec
Geometric Delay (Average)	1.5 sec	
Stop-Line Delay (Average)	160.2 sec	
Idling Time (Average)	153.3 sec	
Intersection Level of Service (LOS)	LOS F	
95% Back of Queue - Vehicles (Worst Lane)	132.5 veh	
95% Back of Queue - Distance (Worst Lane)	927.2 m	
Queue Storage Ratio (Worst Lane)	1.14	
Total Effective Stops	2969 veh/h	3562 pers/h
Effective Stop Rate	1.53	1.53
Proportion Queued	0.82	0.82
Performance Index	247.0	247.0
Cost (Total)	3872.69 \$/h	3872.69 \$/h
Fuel Consumption (Total)	279.5 L/h	
Carbon Dioxide (Total)	656.8 kg/h	
Hydrocarbons (Total)	0.066 kg/h	
Carbon Monoxide (Total)	0.610 kg/h	
NOx (Total)	0.170 kg/h	

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

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

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Site Model Variability Index (Iterations 3 to N): 0.0 %

Number of Iterations: 2 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Main (Timing-Capacity) Iterations: 2.2% 2.4% 0.5%

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	930,720 veh/y	1,116,864 pers/y
Delay	41,821 veh-h/y	50,185 pers-h/y
Effective Stops	1,424,963 veh/y	1,709,956 pers/y
Travel Distance	943,613 veh-km/y	1,132,335 pers-km/y
Travel Time	58,711 veh-h/y	70,454 pers-h/y
Cost	1,858,892 \$/y	1,858,892 \$/y
Fuel Consumption	134,148 L/y	
Carbon Dioxide	315,249 kg/y	
Hydrocarbons	32 kg/y	
Carbon Monoxide	293 kg/y	
NOx	82 kg/y	



# MOVEMENT SUMMARY

 **Site: 101 [Existing AM: Church St/Railway St, Lidcombe]**

AM Peak Hour: 7:45-8:45am

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 115 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Railway St E												
5	T1	587	0.0	0.304	18.2	LOS B	9.6	67.4	0.63	0.55	0.63	46.2
6	R2	171	0.0	1.059	194.4	LOS F	20.3	141.9	1.00	1.49	2.68	14.0
Approach		758	0.0	1.059	58.0	LOS E	20.3	141.9	0.72	0.76	1.10	30.4
North: Church St												
7	L2	275	0.0	0.275	20.7	LOS B	8.2	57.5	0.58	0.74	0.58	43.9
9	R2	23	0.0	0.031	27.6	LOS B	0.8	5.4	0.63	0.68	0.63	40.4
Approach		298	0.0	0.275	21.2	LOS B	8.2	57.5	0.58	0.74	0.58	43.6
West: Railway St W												
10	L2	69	0.0	1.130	285.2	LOS F	13.3	93.0	1.00	1.41	3.51	9.5
11	T1	814	0.0	1.130	299.4	LOS F	132.5	927.2	1.00	2.55	3.14	10.0
Approach		883	0.0	1.130	298.3	LOS F	132.5	927.2	1.00	2.46	3.17	9.9
All Vehicles		1939	0.0	1.130	161.8	LOS F	132.5	927.2	0.82	1.53	1.96	16.1

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

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

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

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Organisation: LYLE MARSHALL & PARTNERS PTY LTD | Processed: Thursday, 20 September 2018 2:39:57 PM

Project: Z:\LMA Jobs\SIDRA\1179-18 2 BACHELL AVENUE LIDCOMBE\1157-15 2 Bachell Avenue\_EM-20.9.18.sip8

# INTERSECTION SUMMARY

 **Site: 101 [Existing PM: Church St/Railway St, Lidcombe ]**

PM Peak Hour: 5:00-6:00pm

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 36 seconds (Site Optimum Cycle Time - Minimum Delay)

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Travel Speed (Average)	33.7 km/h	33.7 km/h
Travel Distance (Total)	2350.1 veh-km/h	2820.1 pers-km/h
Travel Time (Total)	69.8 veh-h/h	83.7 pers-h/h
Demand Flows (Total)	2318 veh/h	2782 pers/h
Percent Heavy Vehicles (Demand)	0.0 %	
Degree of Saturation	1.086	
Practical Spare Capacity	-17.1 %	
Effective Intersection Capacity	2135 veh/h	
Control Delay (Total)	30.10 veh-h/h	36.12 pers-h/h
Control Delay (Average)	46.8 sec	46.8 sec
Control Delay (Worst Lane)	192.6 sec	
Control Delay (Worst Movement)	192.6 sec	192.6 sec
Geometric Delay (Average)	1.8 sec	
Stop-Line Delay (Average)	44.9 sec	
Idling Time (Average)	33.3 sec	
Intersection Level of Service (LOS)	LOS D	
95% Back of Queue - Vehicles (Worst Lane)	30.9 veh	
95% Back of Queue - Distance (Worst Lane)	216.0 m	
Queue Storage Ratio (Worst Lane)	0.10	
Total Effective Stops	2806 veh/h	3368 pers/h
Effective Stop Rate	1.21	1.21
Proportion Queued	0.83	0.83
Performance Index	123.2	123.2
Cost (Total)	2076.78 \$/h	2076.78 \$/h
Fuel Consumption (Total)	224.3 L/h	
Carbon Dioxide (Total)	527.0 kg/h	
Hydrocarbons (Total)	0.048 kg/h	
Carbon Monoxide (Total)	0.580 kg/h	
NOx (Total)	0.151 kg/h	

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

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

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Site Model Variability Index (Iterations 3 to N): 0.0 %

Number of Iterations: 2 (Maximum: 10)

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

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	1,112,640 veh/y	1,335,168 pers/y
Delay	14,449 veh-h/y	17,339 pers-h/y
Effective Stops	1,347,106 veh/y	1,616,528 pers/y
Travel Distance	1,128,041 veh-km/y	1,353,649 pers-km/y
Travel Time	33,492 veh-h/y	40,191 pers-h/y
Cost	996,852 \$/y	996,852 \$/y
Fuel Consumption	107,641 L/y	
Carbon Dioxide	252,957 kg/y	
Hydrocarbons	23 kg/y	
Carbon Monoxide	278 kg/y	
NOx	72 kg/y	

# MOVEMENT SUMMARY

 **Site: 101 [Existing PM: Church St/Railway St, Lidcombe ]**

PM Peak Hour: 5:00-6:00pm

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 36 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Railway St E												
5	T1	1001	0.0	0.513	6.7	LOS A	6.1	42.8	0.72	0.62	0.72	54.0
6	R2	336	0.0	1.086	192.6	LOS F	30.9	216.0	1.00	2.77	6.23	14.2
Approach		1337	0.0	1.086	53.4	LOS D	30.9	216.0	0.79	1.16	2.10	31.7
North: Church St												
7	L2	237	0.0	0.255	11.3	LOS A	2.5	17.2	0.61	0.73	0.61	49.5
9	R2	149	0.0	0.481	21.5	LOS B	2.6	18.1	0.95	0.78	0.95	43.3
Approach		386	0.0	0.481	15.2	LOS B	2.6	18.1	0.74	0.75	0.74	46.9
West: Railway St W												
10	L2	40	0.0	0.982	59.9	LOS E	9.8	68.4	1.00	1.61	3.72	31.0
11	T1	555	0.0	0.982	51.6	LOS D	11.4	80.0	1.00	1.62	3.37	32.4
Approach		595	0.0	0.982	52.2	LOS D	11.4	80.0	1.00	1.62	3.39	32.3
All Vehicles		2318	0.0	1.086	46.8	LOS D	30.9	216.0	0.83	1.21	2.21	33.7

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

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

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

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Organisation: LYLE MARSHALL & PARTNERS PTY LTD | Processed: Thursday, 20 September 2018 2:39:52 PM

Project: Z:\LMA Jobs\SIDRA\1179-18 2 BACHELL AVENUE LIDCOMBE\1157-15 2 Bachell Avenue\_EM-20.9.18.sip8

# INTERSECTION SUMMARY

 Site: 101 [Existing AM: Railway St/Arthur St, Lidcombe]

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

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Travel Speed (Average)	53.0 km/h	53.0 km/h
Travel Distance (Total)	1931.0 veh-km/h	2317.2 pers-km/h
Travel Time (Total)	36.5 veh-h/h	43.7 pers-h/h
Demand Flows (Total)	1904 veh/h	2285 pers/h
Percent Heavy Vehicles (Demand)	0.0 %	
Degree of Saturation	0.603	
Practical Spare Capacity	62.6 %	
Effective Intersection Capacity	3160 veh/h	
Control Delay (Total)	3.24 veh-h/h	3.89 pers-h/h
Control Delay (Average)	6.1 sec	6.1 sec
Control Delay (Worst Lane)	55.0 sec	
Control Delay (Worst Movement)	102.0 sec	102.0 sec
Geometric Delay (Average)	5.5 sec	
Stop-Line Delay (Average)	0.6 sec	
Idling Time (Average)	0.5 sec	
Intersection Level of Service (LOS)	NA	
95% Back of Queue - Vehicles (Worst Lane)	0.4 veh	
95% Back of Queue - Distance (Worst Lane)	3.0 m	
Queue Storage Ratio (Worst Lane)	0.00	
Total Effective Stops	1116 veh/h	1339 pers/h
Effective Stop Rate	0.59	0.59
Proportion Queued	0.01	0.01
Performance Index	42.1	42.1
Cost (Total)	981.15 \$/h	981.15 \$/h
Fuel Consumption (Total)	154.7 L/h	
Carbon Dioxide (Total)	363.6 kg/h	
Hydrocarbons (Total)	0.031 kg/h	
Carbon Monoxide (Total)	0.433 kg/h	
NOx (Total)	0.112 kg/h	

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection delay is not a good LOS measure due to zero delays associated with major road movements.  
 SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.  
 Site Model Variability Index (Iterations 3 to N): 0.0 %  
 Number of Iterations: 3 (Maximum: 10)  
 Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 96.1% 96.7% 0.0%

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	913,920 veh/y	1,096,704 pers/y
Delay	1,557 veh-h/y	1,868 pers-h/y
Effective Stops	535,486 veh/y	642,583 pers/y
Travel Distance	926,891 veh-km/y	1,112,269 pers-km/y
Travel Time	17,497 veh-h/y	20,996 pers-h/y
Cost	470,953 \$/y	470,953 \$/y
Fuel Consumption	74,258 L/y	
Carbon Dioxide	174,506 kg/y	
Hydrocarbons	15 kg/y	
Carbon Monoxide	208 kg/y	
NOx	54 kg/y	

# MOVEMENT SUMMARY

 **Site: 101 [Existing AM: Railway St/Arthur St, Lidcombe]**

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Railway St												
1	L2	9	0.0	0.603	5.7	LOS A	0.0	0.0	0.00	0.59	0.00	53.5
3	R2	1110	0.0	0.603	5.6	LOS A	0.0	0.0	0.00	0.59	0.00	53.2
Approach		1119	0.0	0.603	5.6	NA	0.0	0.0	0.00	0.59	0.00	53.2
East: Arthur St E												
4	L2	764	0.0	0.411	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	53.6
5	T1	9	0.0	0.141	55.0	LOS D	0.4	2.8	0.95	0.95	0.95	31.5
Approach		773	0.0	0.411	6.2	NA	0.4	2.8	0.01	0.58	0.01	53.1
West: Arthur St W												
11	T1	8	0.0	0.160	27.2	LOS B	0.4	3.0	0.94	1.01	0.95	32.3
12	R2	4	0.0	0.160	102.0	LOS F	0.4	3.0	0.94	1.01	0.95	32.2
Approach		12	0.0	0.160	52.1	LOS D	0.4	3.0	0.94	1.01	0.95	32.2
All Vehicles		1904	0.0	0.603	6.1	NA	0.4	3.0	0.01	0.59	0.01	53.0

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

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

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

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

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Organisation: LYLE MARSHALL & PARTNERS PTY LTD | Processed: Saturday, 20 October 2018 6:21:24 PM

Project: Z:\LMA Jobs\SIDRA\1179-18 2 BACHELL AVENUE LIDCOMBE\1157-15 2 Bachell Avenue\_REVISID SIDRA OP 2-19.10.18.sip8

# INTERSECTION SUMMARY

 Site: 101 [Existing PM: Railway St/Arthur St, Lidcombe]

PM Peak Hour: 4:45-5:45pm  
 Site Category: (None)  
 Stop (Two-Way)

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Travel Speed (Average)	51.9 km/h	51.9 km/h
Travel Distance (Total)	2129.7 veh-km/h	2555.6 pers-km/h
Travel Time (Total)	41.0 veh-h/h	49.2 pers-h/h
Demand Flows (Total)	2099 veh/h	2519 pers/h
Percent Heavy Vehicles (Demand)	0.0 %	
Degree of Saturation	0.657	
Practical Spare Capacity	26.9 %	
Effective Intersection Capacity	3195 veh/h	
Control Delay (Total)	4.40 veh-h/h	5.28 pers-h/h
Control Delay (Average)	7.6 sec	7.6 sec
Control Delay (Worst Lane)	116.2 sec	
Control Delay (Worst Movement)	187.1 sec	187.1 sec
Geometric Delay (Average)	5.5 sec	
Stop-Line Delay (Average)	2.0 sec	
Idling Time (Average)	1.8 sec	
Intersection Level of Service (LOS)	NA	
95% Back of Queue - Vehicles (Worst Lane)	4.9 veh	
95% Back of Queue - Distance (Worst Lane)	34.2 m	
Queue Storage Ratio (Worst Lane)	0.03	
Total Effective Stops	1212 veh/h	1454 pers/h
Effective Stop Rate	0.58	0.58
Proportion Queued	0.05	0.05
Performance Index	52.2	52.2
Cost (Total)	1109.93 \$/h	1109.93 \$/h
Fuel Consumption (Total)	171.7 L/h	
Carbon Dioxide (Total)	403.4 kg/h	
Hydrocarbons (Total)	0.034 kg/h	
Carbon Monoxide (Total)	0.479 kg/h	
NOx (Total)	0.123 kg/h	

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

NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Site Model Variability Index (Iterations 3 to N): 0.0 %

Number of Iterations: 3 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 97.0% 90.5% 0.0%

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	1,007,520 veh/y	1,209,024 pers/y
Delay	2,114 veh-h/y	2,536 pers-h/y
Effective Stops	581,732 veh/y	698,078 pers/y
Travel Distance	1,022,242 veh-km/y	1,226,691 pers-km/y
Travel Time	19,698 veh-h/y	23,637 pers-h/y
Cost	532,765 \$/y	532,765 \$/y
Fuel Consumption	82,406 L/y	
Carbon Dioxide	193,653 kg/y	
Hydrocarbons	16 kg/y	
Carbon Monoxide	230 kg/y	
NOx	59 kg/y	

# MOVEMENT SUMMARY

 **Site: 101 [Existing PM: Railway St/Arthur St, Lidcombe]**

PM Peak Hour: 4:45-5:45pm  
 Site Category: (None)  
 Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Railway St												
1	L2	7	0.0	0.586	5.6	LOS A	4.9	34.2	0.07	0.56	0.07	53.4
3	R2	831	0.0	0.586	5.5	LOS A	4.9	34.2	0.07	0.56	0.07	53.2
Approach		838	0.0	0.586	5.5	NA	4.9	34.2	0.07	0.56	0.07	53.2
East: Arthur St E												
4	L2	1220	0.0	0.657	5.7	LOS A	0.0	0.0	0.00	0.57	0.00	53.4
5	T1	5	0.0	0.027	18.1	LOS B	0.1	0.6	0.82	0.82	0.82	46.2
Approach		1225	0.0	0.657	5.7	NA	0.1	0.6	0.00	0.58	0.00	53.4
West: Arthur St W												
11	T1	21	0.0	0.630	65.5	LOS E	2.0	13.8	0.96	1.10	1.35	20.6
12	R2	15	0.0	0.630	187.1	LOS F	2.0	13.8	0.96	1.10	1.35	20.5
Approach		36	0.0	0.630	116.2	LOS F	2.0	13.8	0.96	1.10	1.35	20.6
All Vehicles		2099	0.0	0.657	7.6	NA	4.9	34.2	0.05	0.58	0.05	51.9

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

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

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

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

# INTERSECTION SUMMARY

 Site: 101 [Existing AM: Church St/Swete St, Lidcombe]

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

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Travel Speed (Average)	47.3 km/h	47.3 km/h
Travel Distance (Total)	1349.2 veh-km/h	1619.0 pers-km/h
Travel Time (Total)	28.5 veh-h/h	34.2 pers-h/h
Demand Flows (Total)	1330 veh/h	1596 pers/h
Percent Heavy Vehicles (Demand)	0.0 %	
Degree of Saturation	0.544	
Practical Spare Capacity	56.2 %	
Effective Intersection Capacity	2445 veh/h	
Control Delay (Total)	2.29 veh-h/h	2.75 pers-h/h
Control Delay (Average)	6.2 sec	6.2 sec
Control Delay (Worst Lane)	10.0 sec	
Control Delay (Worst Movement)	10.6 sec	10.6 sec
Geometric Delay (Average)	4.7 sec	
Stop-Line Delay (Average)	1.5 sec	
Idling Time (Average)	0.4 sec	
Intersection Level of Service (LOS)	LOS A	
95% Back of Queue - Vehicles (Worst Lane)	5.2 veh	
95% Back of Queue - Distance (Worst Lane)	36.5 m	
Queue Storage Ratio (Worst Lane)	0.03	
Total Effective Stops	777 veh/h	933 pers/h
Effective Stop Rate	0.58	0.58
Proportion Queued	0.45	0.45
Performance Index	40.2	40.2
Cost (Total)	746.42 \$/h	746.42 \$/h
Fuel Consumption (Total)	106.6 L/h	
Carbon Dioxide (Total)	250.6 kg/h	
Hydrocarbons (Total)	0.019 kg/h	
Carbon Monoxide (Total)	0.238 kg/h	
NOx (Total)	0.070 kg/h	

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

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

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Site Model Variability Index (Iterations 3 to N): 1.4 %

Number of Iterations: 5 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 2.1% 1.4% 0.7%

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	638,400 veh/y	766,080 pers/y
Delay	1,099 veh-h/y	1,319 pers-h/y
Effective Stops	373,195 veh/y	447,834 pers/y
Travel Distance	647,597 veh-km/y	777,116 pers-km/y
Travel Time	13,678 veh-h/y	16,414 pers-h/y
Cost	358,282 \$/y	358,282 \$/y
Fuel Consumption	51,183 L/y	
Carbon Dioxide	120,279 kg/y	
Hydrocarbons	9 kg/y	
Carbon Monoxide	114 kg/y	
NOx	34 kg/y	



# MOVEMENT SUMMARY

 Site: 101 [Existing AM: Church St/Swete St, Lidcombe]

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Church St E												
5	T1	190	0.0	0.241	6.2	LOS A	1.5	10.6	0.49	0.62	0.49	48.9
6	R2	54	0.0	0.241	8.9	LOS A	1.5	10.6	0.49	0.62	0.49	48.6
Approach		244	0.0	0.241	6.8	LOS A	1.5	10.6	0.49	0.62	0.49	48.9
North: Swete St												
7	L2	94	0.0	0.397	8.7	LOS A	2.6	18.0	0.73	0.83	0.73	45.9
9	R2	220	0.0	0.397	10.6	LOS A	2.6	18.0	0.73	0.83	0.73	43.5
Approach		314	0.0	0.397	10.0	LOS A	2.6	18.0	0.73	0.83	0.73	44.2
West: Church St W												
10	L2	235	0.0	0.544	5.0	LOS A	5.2	36.5	0.32	0.47	0.32	45.7
11	T1	537	0.0	0.544	4.2	LOS A	5.2	36.5	0.32	0.47	0.32	49.5
Approach		772	0.0	0.544	4.5	LOS A	5.2	36.5	0.32	0.47	0.32	48.3
All Vehicles		1330	0.0	0.544	6.2	LOS A	5.2	36.5	0.45	0.58	0.45	47.3

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

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

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

# INTERSECTION SUMMARY

 Site: 101 [Existing PM: Church St/Swete St, Lidcombe ]

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

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Travel Speed (Average)	46.1 km/h	46.1 km/h
Travel Distance (Total)	1623.2 veh-km/h	1947.8 pers-km/h
Travel Time (Total)	35.2 veh-h/h	42.2 pers-h/h
Demand Flows (Total)	1599 veh/h	1919 pers/h
Percent Heavy Vehicles (Demand)	0.0 %	
Degree of Saturation	0.772	
Practical Spare Capacity	10.1 %	
Effective Intersection Capacity	2072 veh/h	
Control Delay (Total)	4.04 veh-h/h	4.84 pers-h/h
Control Delay (Average)	9.1 sec	9.1 sec
Control Delay (Worst Lane)	12.1 sec	
Control Delay (Worst Movement)	14.3 sec	14.3 sec
Geometric Delay (Average)	5.1 sec	
Stop-Line Delay (Average)	3.9 sec	
Idling Time (Average)	0.8 sec	
Intersection Level of Service (LOS)	LOS A	
95% Back of Queue - Vehicles (Worst Lane)	11.2 veh	
95% Back of Queue - Distance (Worst Lane)	78.6 m	
Queue Storage Ratio (Worst Lane)	0.06	
Total Effective Stops	1202 veh/h	1442 pers/h
Effective Stop Rate	0.75	0.75
Proportion Queued	0.69	0.69
Performance Index	54.0	54.0
Cost (Total)	906.53 \$/h	906.53 \$/h
Fuel Consumption (Total)	127.3 L/h	
Carbon Dioxide (Total)	299.1 kg/h	
Hydrocarbons (Total)	0.023 kg/h	
Carbon Monoxide (Total)	0.279 kg/h	
NOx (Total)	0.082 kg/h	

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

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

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Site Model Variability Index (Iterations 3 to N): 1.2 %

Number of Iterations: 5 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 1.9% 1.1% 0.6%

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	767,520 veh/y	921,024 pers/y
Delay	1,938 veh-h/y	2,325 pers-h/y
Effective Stops	576,807 veh/y	692,169 pers/y
Travel Distance	779,113 veh-km/y	934,936 pers-km/y
Travel Time	16,886 veh-h/y	20,263 pers-h/y
Cost	435,136 \$/y	435,136 \$/y
Fuel Consumption	61,101 L/y	
Carbon Dioxide	143,588 kg/y	
Hydrocarbons	11 kg/y	
Carbon Monoxide	134 kg/y	
NOx	39 kg/y	

# MOVEMENT SUMMARY

 **Site: 101 [Existing PM: Church St/Swete St, Lidcombe ]**

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Church St E												
5	T1	632	0.0	0.772	11.7	LOS A	11.2	78.6	0.92	0.91	1.15	46.0
6	R2	128	0.0	0.772	14.3	LOS A	11.2	78.6	0.92	0.91	1.15	45.7
Approach		760	0.0	0.772	12.1	LOS A	11.2	78.6	0.92	0.91	1.15	45.9
North: Swete St												
7	L2	123	0.0	0.413	6.2	LOS A	2.9	20.2	0.54	0.67	0.54	47.3
9	R2	317	0.0	0.413	8.1	LOS A	2.9	20.2	0.54	0.67	0.54	44.7
Approach		440	0.0	0.413	7.6	LOS A	2.9	20.2	0.54	0.67	0.54	45.4
West: Church St W												
10	L2	178	0.0	0.339	5.4	LOS A	2.5	17.7	0.43	0.54	0.43	45.4
11	T1	221	0.0	0.339	4.6	LOS A	2.5	17.7	0.43	0.54	0.43	49.1
Approach		399	0.0	0.339	5.0	LOS A	2.5	17.7	0.43	0.54	0.43	47.4
All Vehicles		1599	0.0	0.772	9.1	LOS A	11.2	78.6	0.69	0.75	0.80	46.1

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

# INTERSECTION SUMMARY

 **Site: 101 [Existing AM: Church St/Bachell Ave, Lidcombe]**

AM Peak Hour: 7:30-8:30am

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 36 seconds (Site Optimum Cycle Time - Minimum Delay)

Intersection Performance - Hourly Values			
Performance Measure	Vehicles	Pedestrians	Persons
Travel Speed (Average)	49.2 km/h	3.1 km/h	48.4 km/h
Travel Distance (Total)	1233.2 veh-km/h	1.6 ped-km/h	1481.4 pers-km/h
Travel Time (Total)	25.1 veh-h/h	0.5 ped-h/h	30.6 pers-h/h
Demand Flows (Total)	1212 veh/h	50 ped/h	1504 pers/h
Percent Heavy Vehicles (Demand)	0.0 %		
Degree of Saturation	0.601	0.025	
Practical Spare Capacity	49.8 %		
Effective Intersection Capacity	2017 veh/h		
Control Delay (Total)	4.10 veh-h/h	0.17 ped-h/h	5.10 pers-h/h
Control Delay (Average)	12.2 sec	12.5 sec	12.2 sec
Control Delay (Worst Lane)	22.3 sec		
Control Delay (Worst Movement)	22.3 sec	12.5 sec	22.3 sec
Geometric Delay (Average)	4.3 sec		
Stop-Line Delay (Average)	7.9 sec		
Idling Time (Average)	4.8 sec		
Intersection Level of Service (LOS)	LOS A	LOS B	
95% Back of Queue - Vehicles (Worst Lane)	3.4 veh		
95% Back of Queue - Distance (Worst Lane)	23.7 m		
Queue Storage Ratio (Worst Lane)	0.03		
Total Effective Stops	880 veh/h	42 ped/h	1098 pers/h
Effective Stop Rate	0.73	0.84	0.73
Proportion Queued	0.71	0.84	0.72
Performance Index	37.8	0.7	38.6
Cost (Total)	704.19 \$/h	12.66 \$/h	716.86 \$/h
Fuel Consumption (Total)	102.6 L/h		
Carbon Dioxide (Total)	241.2 kg/h		
Hydrocarbons (Total)	0.021 kg/h		
Carbon Monoxide (Total)	0.285 kg/h		
NOx (Total)	0.074 kg/h		

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

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Site Model Variability Index (Iterations 3 to N): 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% 0.1% 0.0%

Intersection Performance - Annual Values			
Performance Measure	Vehicles	Pedestrians	Persons
Demand Flows (Total)	581,760 veh/y	24,000 ped/y	722,112 pers/y
Delay	1,969 veh-h/y	84 ped-h/y	2,446 pers-h/y
Effective Stops	422,536 veh/y	20,042 ped/y	527,085 pers/y
Travel Distance	591,927 veh-km/y	766 ped-km/y	711,078 pers-km/y
Travel Time	12,037 veh-h/y	247 ped-h/y	14,691 pers-h/y
Cost	338,013 \$/y	6,079 \$/y	344,092 \$/y
Fuel Consumption	49,266 L/y		
Carbon Dioxide	115,775 kg/y		
Hydrocarbons	10 kg/y		
Carbon Monoxide	137 kg/y		
NOx	36 kg/y		

# MOVEMENT SUMMARY

 **Site: 101 [Existing AM: Church St/Bachell Ave, Lidcombe]**

AM Peak Hour: 7:30-8:30am

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 36 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Church St E												
5	T1	88	0.0	0.361	5.7	LOS A	2.4	16.6	0.60	0.48	0.60	54.0
6	R2	175	0.0	0.361	13.5	LOS A	2.4	16.6	0.81	0.75	0.81	48.0
Approach		263	0.0	0.361	10.9	LOS A	2.4	16.6	0.74	0.66	0.74	49.9
North: Bachell Ave												
7	L2	110	0.0	0.118	10.8	LOS A	1.0	7.3	0.56	0.70	0.56	49.8
9	R2	186	0.0	0.601	22.3	LOS B	3.4	23.7	0.97	0.83	1.07	42.9
Approach		296	0.0	0.601	18.0	LOS B	3.4	23.7	0.82	0.78	0.88	45.2
West: Church St W												
10	L2	473	0.0	0.415	7.7	LOS A	2.5	17.5	0.53	0.71	0.53	52.4
11	T1	180	0.0	0.554	16.3	LOS B	3.2	22.4	0.96	0.79	1.01	47.3
Approach		653	0.0	0.554	10.1	LOS A	3.2	22.4	0.65	0.73	0.66	50.9
All Vehicles		1212	0.0	0.601	12.2	LOS A	3.4	23.7	0.71	0.73	0.73	49.2

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

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

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate	
P2	East Full Crossing	50	12.5	LOS B	0.0	0.0	0.84	0.84	
All Pedestrians		50	12.5	LOS B			0.84	0.84	

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 ]**

PM Peak Hour: 5:00-6:00pm

Site Category: (None)

Signals - Fixed Time Isolated    Cycle Time = 60 seconds (Site Optimum Cycle Time - Minimum Delay)

Intersection Performance - Hourly Values			
Performance Measure	Vehicles	Pedestrians	Persons
Travel Speed (Average)	44.5 km/h	3.0 km/h	44.0 km/h
Travel Distance (Total)	1644.6 veh-km/h	1.6 ped-km/h	1975.1 pers-km/h
Travel Time (Total)	36.9 veh-h/h	0.5 ped-h/h	44.9 pers-h/h
Demand Flows (Total)	1621 veh/h	50 ped/h	1995 pers/h
Percent Heavy Vehicles (Demand)	0.0 %		
Degree of Saturation	0.755	0.013	
Practical Spare Capacity	19.2 %		
Effective Intersection Capacity	2147 veh/h		
Control Delay (Total)	8.96 veh-h/h	0.19 ped-h/h	10.94 pers-h/h
Control Delay (Average)	19.9 sec	13.4 sec	19.7 sec
Control Delay (Worst Lane)	28.6 sec		
Control Delay (Worst Movement)	29.4 sec	13.4 sec	29.4 sec
Geometric Delay (Average)	3.8 sec		
Stop-Line Delay (Average)	16.1 sec		
Idling Time (Average)	12.3 sec		
Intersection Level of Service (LOS)	LOS B	LOS B	
95% Back of Queue - Vehicles (Worst Lane)	15.2 veh		
95% Back of Queue - Distance (Worst Lane)	106.7 m		
Queue Storage Ratio (Worst Lane)	0.05		
Total Effective Stops	1326 veh/h	33 ped/h	1624 pers/h
Effective Stop Rate	0.82	0.67	0.81
Proportion Queued	0.77	0.67	0.77
Performance Index	68.6	0.7	69.3
Cost (Total)	1062.27 \$/h	12.95 \$/h	1075.22 \$/h
Fuel Consumption (Total)	142.4 L/h		
Carbon Dioxide (Total)	334.6 kg/h		
Hydrocarbons (Total)	0.029 kg/h		
Carbon Monoxide (Total)	0.389 kg/h		
NOx (Total)	0.101 kg/h		

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

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Site Model Variability Index (Iterations 3 to N): 4.3 %

Number of Iterations: 4 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Main (Timing-Capacity) Iterations: 4.4%    8.5%    0.0%

Intersection Performance - Annual Values			
Performance Measure	Vehicles	Pedestrians	Persons
Demand Flows (Total)	778,080 veh/y	24,000 ped/y	957,696 pers/y
Delay	4,302 veh-h/y	89 ped-h/y	5,252 pers-h/y
Effective Stops	636,264 veh/y	16,033 ped/y	779,550 pers/y
Travel Distance	789,385 veh-km/y	766 ped-km/y	948,028 pers-km/y
Travel Time	17,730 veh-h/y	253 ped-h/y	21,528 pers-h/y
Cost	509,891 \$/y	6,216 \$/y	516,107 \$/y
Fuel Consumption	68,351 L/y		
Carbon Dioxide	160,625 kg/y		
Hydrocarbons	14 kg/y		
Carbon Monoxide	187 kg/y		
NOx	49 kg/y		

# MOVEMENT SUMMARY

 **Site: 101 [Existing PM: Church St/Bachell Ave, Lidcombe ]**

PM Peak Hour: 5:00-6:00pm

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 60 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Church St E												
5	T1	298	0.0	0.725	20.8	LOS B	8.9	62.1	0.88	0.82	1.12	43.9
6	R2	123	0.0	0.725	29.4	LOS C	8.9	62.1	0.97	0.95	1.32	41.1
Approach		421	0.0	0.725	23.3	LOS B	8.9	62.1	0.91	0.86	1.18	43.1
North: Bachell Ave												
7	L2	268	0.0	0.222	10.2	LOS A	3.2	22.4	0.44	0.70	0.44	50.2
9	R2	590	0.0	0.755	22.1	LOS B	15.2	106.7	0.86	0.88	0.94	42.9
Approach		858	0.0	0.755	18.4	LOS B	15.2	106.7	0.73	0.82	0.79	45.0
West: Church St W												
10	L2	142	0.0	0.112	6.6	LOS A	0.6	4.5	0.27	0.62	0.27	53.3
11	T1	200	0.0	0.684	28.6	LOS C	6.1	42.4	1.00	0.86	1.12	40.8
Approach		342	0.0	0.684	19.5	LOS B	6.1	42.4	0.69	0.76	0.77	45.2
All Vehicles		1621	0.0	0.755	19.9	LOS B	15.2	106.7	0.77	0.82	0.88	44.5

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

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

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate	
P2	East Full Crossing	50	13.4	LOS B	0.1	0.1	0.67	0.67	
All Pedestrians		50	13.4	LOS B			0.67	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 AM: Church St/Railway St Bridge, Lidcombe]

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

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Travel Speed (Average)	45.4 km/h	45.4 km/h
Travel Distance (Total)	1367.9 veh-km/h	1641.5 pers-km/h
Travel Time (Total)	30.1 veh-h/h	36.2 pers-h/h
Demand Flows (Total)	1351 veh/h	1621 pers/h
Percent Heavy Vehicles (Demand)	0.0 %	
Degree of Saturation	0.493	
Practical Spare Capacity	64.1 %	
Effective Intersection Capacity	2739 veh/h	
Control Delay (Total)	2.32 veh-h/h	2.78 pers-h/h
Control Delay (Average)	6.2 sec	6.2 sec
Control Delay (Worst Lane)	15.5 sec	
Control Delay (Worst Movement)	15.5 sec	15.5 sec
Geometric Delay (Average)	4.6 sec	
Stop-Line Delay (Average)	1.6 sec	
Idling Time (Average)	0.9 sec	
Intersection Level of Service (LOS)	NA	
95% Back of Queue - Vehicles (Worst Lane)	2.0 veh	
95% Back of Queue - Distance (Worst Lane)	14.3 m	
Queue Storage Ratio (Worst Lane)	0.01	
Total Effective Stops	828 veh/h	994 pers/h
Effective Stop Rate	0.61	0.61
Proportion Queued	0.12	0.12
Performance Index	35.1	35.1
Cost (Total)	736.48 \$/h	736.48 \$/h
Fuel Consumption (Total)	102.4 L/h	
Carbon Dioxide (Total)	240.5 kg/h	
Hydrocarbons (Total)	0.017 kg/h	
Carbon Monoxide (Total)	0.192 kg/h	
NOx (Total)	0.060 kg/h	

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection delay is not a good LOS measure due to zero delays associated with major road movements.  
 SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.  
 Site Model Variability Index (Iterations 3 to N): 0.0 %  
 Number of Iterations: 2 (Maximum: 10)  
 Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 0.0% 78.7% 0.0%

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	648,480 veh/y	778,176 pers/y
Delay	1,114 veh-h/y	1,337 pers-h/y
Effective Stops	397,625 veh/y	477,151 pers/y
Travel Distance	656,590 veh-km/y	787,908 pers-km/y
Travel Time	14,463 veh-h/y	17,355 pers-h/y
Cost	353,511 \$/y	353,511 \$/y
Fuel Consumption	49,133 L/y	
Carbon Dioxide	115,463 kg/y	
Hydrocarbons	8 kg/y	
Carbon Monoxide	92 kg/y	
NOx	29 kg/y	



# MOVEMENT SUMMARY

Site: 101 [Existing AM: Church St/Railway St Bridge, Lidcombe]

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Railway Street Bridge												
1	L2	299	0.0	0.493	4.6	LOS A	0.0	0.0	0.00	0.55	0.00	46.5
3	R2	617	0.0	0.493	4.6	LOS A	0.0	0.0	0.00	0.55	0.00	46.1
Approach		916	0.0	0.493	4.6	NA	0.0	0.0	0.00	0.55	0.00	46.2
East: Church St E												
4	L2	242	0.0	0.130	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	46.6
Approach		242	0.0	0.130	4.6	NA	0.0	0.0	0.00	0.53	0.00	46.6
West: Church St W												
12	R2	193	0.0	0.487	15.5	LOS B	2.0	14.3	0.81	1.03	1.19	40.5
Approach		193	0.0	0.487	15.5	LOS B	2.0	14.3	0.81	1.03	1.19	40.5
All Vehicles		1351	0.0	0.493	6.2	NA	2.0	14.3	0.12	0.61	0.17	45.4

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

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

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

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

# INTERSECTION SUMMARY

▽ Site: 101 [Existing PM: Church St/Railway St Bridge, Lidcombe ]

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

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Travel Speed (Average)	45.2 km/h	45.2 km/h
Travel Distance (Total)	1539.4 veh-km/h	1847.3 pers-km/h
Travel Time (Total)	34.0 veh-h/h	40.8 pers-h/h
Demand Flows (Total)	1518 veh/h	1822 pers/h
Percent Heavy Vehicles (Demand)	0.0 %	
Degree of Saturation	0.614	
Practical Spare Capacity	30.4 %	
Effective Intersection Capacity	2473 veh/h	
Control Delay (Total)	2.83 veh-h/h	3.40 pers-h/h
Control Delay (Average)	6.7 sec	6.7 sec
Control Delay (Worst Lane)	19.7 sec	
Control Delay (Worst Movement)	19.7 sec	19.7 sec
Geometric Delay (Average)	4.6 sec	
Stop-Line Delay (Average)	2.2 sec	
Idling Time (Average)	1.3 sec	
Intersection Level of Service (LOS)	NA	
95% Back of Queue - Vehicles (Worst Lane)	2.8 veh	
95% Back of Queue - Distance (Worst Lane)	19.8 m	
Queue Storage Ratio (Worst Lane)	0.02	
Total Effective Stops	934 veh/h	1121 pers/h
Effective Stop Rate	0.62	0.62
Proportion Queued	0.12	0.12
Performance Index	39.9	39.9
Cost (Total)	834.04 \$/h	834.04 \$/h
Fuel Consumption (Total)	115.1 L/h	
Carbon Dioxide (Total)	270.5 kg/h	
Hydrocarbons (Total)	0.019 kg/h	
Carbon Monoxide (Total)	0.216 kg/h	
NOx (Total)	0.067 kg/h	

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection delay is not a good LOS measure due to zero delays associated with major road movements.  
 SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.  
 Site Model Variability Index (Iterations 3 to N): 0.0 %  
 Number of Iterations: 2 (Maximum: 10)  
 Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 0.0% 81.4% 0.0%

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	728,640 veh/y	874,368 pers/y
Delay	1,358 veh-h/y	1,630 pers-h/y
Effective Stops	448,452 veh/y	538,142 pers/y
Travel Distance	738,932 veh-km/y	886,718 pers-km/y
Travel Time	16,333 veh-h/y	19,600 pers-h/y
Cost	400,339 \$/y	400,339 \$/y
Fuel Consumption	55,249 L/y	
Carbon Dioxide	129,835 kg/y	
Hydrocarbons	9 kg/y	
Carbon Monoxide	104 kg/y	
NOx	32 kg/y	

# MOVEMENT SUMMARY

Site: 101 [Existing PM: Church St/Railway St Bridge, Lidcombe]

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Railway Street Bridge												
1	L2	364	0.0	0.324	4.6	LOS A	0.0	0.0	0.00	0.54	0.00	46.6
3	R2	238	0.0	0.324	4.6	LOS A	0.0	0.0	0.00	0.54	0.00	46.2
Approach		602	0.0	0.324	4.6	NA	0.0	0.0	0.00	0.54	0.00	46.4
East: Church St E												
4	L2	704	0.0	0.379	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	46.6
Approach		704	0.0	0.379	4.6	NA	0.0	0.0	0.00	0.53	0.00	46.6
West: Church St W												
12	R2	212	0.0	0.614	19.7	LOS B	2.8	19.8	0.88	1.12	1.48	38.7
Approach		212	0.0	0.614	19.7	LOS B	2.8	19.8	0.88	1.12	1.48	38.7
All Vehicles		1518	0.0	0.614	6.7	NA	2.8	19.8	0.12	0.62	0.21	45.2

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

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

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

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

# INTERSECTION SUMMARY

 Site: 101 [Future AM: Church St/Swete St, Lidcombe ]

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

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Travel Speed (Average)	47.3 km/h	47.3 km/h
Travel Distance (Total)	1481.0 veh-km/h	1777.2 pers-km/h
Travel Time (Total)	31.3 veh-h/h	37.6 pers-h/h
Demand Flows (Total)	1460 veh/h	1752 pers/h
Percent Heavy Vehicles (Demand)	0.0 %	
Degree of Saturation	0.606	
Practical Spare Capacity	40.2 %	
Effective Intersection Capacity	2408 veh/h	
Control Delay (Total)	2.61 veh-h/h	3.13 pers-h/h
Control Delay (Average)	6.4 sec	6.4 sec
Control Delay (Worst Lane)	11.5 sec	
Control Delay (Worst Movement)	12.1 sec	12.1 sec
Geometric Delay (Average)	4.7 sec	
Stop-Line Delay (Average)	1.8 sec	
Idling Time (Average)	0.6 sec	
Intersection Level of Service (LOS)	LOS A	
95% Back of Queue - Vehicles (Worst Lane)	6.5 veh	
95% Back of Queue - Distance (Worst Lane)	45.6 m	
Queue Storage Ratio (Worst Lane)	0.04	
Total Effective Stops	864 veh/h	1037 pers/h
Effective Stop Rate	0.59	0.59
Proportion Queued	0.48	0.48
Performance Index	45.3	45.3
Cost (Total)	823.39 \$/h	823.39 \$/h
Fuel Consumption (Total)	117.4 L/h	
Carbon Dioxide (Total)	276.0 kg/h	
Hydrocarbons (Total)	0.021 kg/h	
Carbon Monoxide (Total)	0.263 kg/h	
NOx (Total)	0.077 kg/h	

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Site Model Variability Index (Iterations 3 to N): 1.6 %

Number of Iterations: 6 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 2.0% 1.1% 0.5%

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	700,800 veh/y	840,960 pers/y
Delay	1,251 veh-h/y	1,501 pers-h/y
Effective Stops	414,944 veh/y	497,933 pers/y
Travel Distance	710,879 veh-km/y	853,055 pers-km/y
Travel Time	15,038 veh-h/y	18,046 pers-h/y
Cost	395,226 \$/y	395,226 \$/y
Fuel Consumption	56,371 L/y	
Carbon Dioxide	132,471 kg/y	
Hydrocarbons	10 kg/y	
Carbon Monoxide	126 kg/y	
NOx	37 kg/y	

# MOVEMENT SUMMARY

 **Site: 101 [Future AM: Church St/Swete St, Lidcombe ]**

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Church St E												
5	T1	226	0.0	0.277	6.2	LOS A	1.8	12.6	0.51	0.63	0.51	48.9
6	R2	54	0.0	0.277	8.9	LOS A	1.8	12.6	0.51	0.63	0.51	48.6
Approach		280	0.0	0.277	6.7	LOS A	1.8	12.6	0.51	0.63	0.51	48.8
North: Swete St												
7	L2	94	0.0	0.436	10.2	LOS A	3.1	21.5	0.79	0.90	0.85	45.1
9	R2	220	0.0	0.436	12.1	LOS A	3.1	21.5	0.79	0.90	0.85	42.8
Approach		314	0.0	0.436	11.5	LOS A	3.1	21.5	0.79	0.90	0.85	43.4
West: Church St W												
10	L2	235	0.0	0.606	5.1	LOS A	6.5	45.6	0.36	0.47	0.36	45.6
11	T1	631	0.0	0.606	4.3	LOS A	6.5	45.6	0.36	0.47	0.36	49.4
Approach		866	0.0	0.606	4.5	LOS A	6.5	45.6	0.36	0.47	0.36	48.3
All Vehicles		1460	0.0	0.606	6.4	LOS A	6.5	45.6	0.48	0.59	0.49	47.3

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

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

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

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Organisation: LYLE MARSHALL & PARTNERS PTY LTD | Processed: Saturday, 20 October 2018 6:19:46 PM

Project: Z:\LMA Jobs\SIDRA\1179-18 2 BACHELL AVENUE LIDCOMBE\1157-15 2 Bachell Avenue\_REVISSED SIDRA OP 2-19.10.18.sip8

# INTERSECTION SUMMARY

 Site: 101 [Future PM: Church St/Swete St, Lidcombe ]

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

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Travel Speed (Average)	43.8 km/h	43.8 km/h
Travel Distance (Total)	1830.0 veh-km/h	2196.0 pers-km/h
Travel Time (Total)	41.8 veh-h/h	50.1 pers-h/h
Demand Flows (Total)	1803 veh/h	2164 pers/h
Percent Heavy Vehicles (Demand)	0.0 %	
Degree of Saturation	0.911	
Practical Spare Capacity	-6.7 %	
Effective Intersection Capacity	1980 veh/h	
Control Delay (Total)	6.77 veh-h/h	8.13 pers-h/h
Control Delay (Average)	13.5 sec	13.5 sec
Control Delay (Worst Lane)	20.5 sec	
Control Delay (Worst Movement)	22.8 sec	22.8 sec
Geometric Delay (Average)	5.1 sec	
Stop-Line Delay (Average)	8.4 sec	
Idling Time (Average)	3.4 sec	
Intersection Level of Service (LOS)	LOS A	
95% Back of Queue - Vehicles (Worst Lane)	23.7 veh	
95% Back of Queue - Distance (Worst Lane)	166.2 m	
Queue Storage Ratio (Worst Lane)	0.13	
Total Effective Stops	1599 veh/h	1919 pers/h
Effective Stop Rate	0.89	0.89
Proportion Queued	0.77	0.77
Performance Index	73.4	73.4
Cost (Total)	1101.23 \$/h	1101.23 \$/h
Fuel Consumption (Total)	147.7 L/h	
Carbon Dioxide (Total)	347.0 kg/h	
Hydrocarbons (Total)	0.027 kg/h	
Carbon Monoxide (Total)	0.322 kg/h	
NOx (Total)	0.096 kg/h	

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

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

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Site Model Variability Index (Iterations 3 to N): 1.4 %

Number of Iterations: 5 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 2.2% 1.3% 0.7%

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	865,440 veh/y	1,038,528 pers/y
Delay	3,251 veh-h/y	3,901 pers-h/y
Effective Stops	767,662 veh/y	921,194 pers/y
Travel Distance	878,417 veh-km/y	1,054,101 pers-km/y
Travel Time	20,044 veh-h/y	24,053 pers-h/y
Cost	528,590 \$/y	528,590 \$/y
Fuel Consumption	70,886 L/y	
Carbon Dioxide	166,582 kg/y	
Hydrocarbons	13 kg/y	
Carbon Monoxide	154 kg/y	
NOx	46 kg/y	

# MOVEMENT SUMMARY

 **Site: 101 [Future PM: Church St/Swete St, Lidcombe ]**

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Church St E												
5	T1	774	0.0	0.911	20.1	LOS B	23.7	166.2	1.00	1.15	1.70	41.6
6	R2	128	0.0	0.911	22.8	LOS B	23.7	166.2	1.00	1.15	1.70	41.4
Approach		902	0.0	0.911	20.5	LOS B	23.7	166.2	1.00	1.15	1.70	41.5
North: Swete St												
7	L2	123	0.0	0.445	6.8	LOS A	3.2	22.1	0.61	0.72	0.61	47.0
9	R2	317	0.0	0.445	8.7	LOS A	3.2	22.1	0.61	0.72	0.61	44.5
Approach		440	0.0	0.445	8.2	LOS A	3.2	22.1	0.61	0.72	0.61	45.2
West: Church St W												
10	L2	178	0.0	0.389	5.5	LOS A	3.1	21.9	0.46	0.54	0.46	45.4
11	T1	283	0.0	0.389	4.7	LOS A	3.1	21.9	0.46	0.54	0.46	49.1
Approach		461	0.0	0.389	5.0	LOS A	3.1	21.9	0.46	0.54	0.46	47.6
All Vehicles		1803	0.0	0.911	13.5	LOS A	23.7	166.2	0.77	0.89	1.12	43.8

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

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

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

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Organisation: LYLE MARSHALL & PARTNERS PTY LTD | Processed: Saturday, 20 October 2018 6:19:46 PM

Project: Z:\LMA Jobs\SIDRA\1179-18 2 BACHELL AVENUE LIDCOMBE\1157-15 2 Bachell Avenue\_REVISSED SIDRA OP 2-19.10.18.sip8

# INTERSECTION SUMMARY

 **Site: 101 [Future AM: Church St/Railway St, Lidcombe ]**

AM Peak Hour: 7:45-8:45am

Site Category: (None)

Signals - Actuated Isolated Cycle Time = 138 seconds (Site Practical Cycle Time)

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Travel Speed (Average)	17.7 km/h	17.7 km/h
Travel Distance (Total)	2004.5 veh-km/h	2405.3 pers-km/h
Travel Time (Total)	113.2 veh-h/h	135.9 pers-h/h
Demand Flows (Total)	1977 veh/h	2372 pers/h
Percent Heavy Vehicles (Demand)	0.0 %	
Degree of Saturation	1.121	
Practical Spare Capacity	-19.7 %	
Effective Intersection Capacity	1763 veh/h	
Control Delay (Total)	77.38 veh-h/h	92.85 pers-h/h
Control Delay (Average)	140.9 sec	140.9 sec
Control Delay (Worst Lane)	280.2 sec	
Control Delay (Worst Movement)	279.8 sec	279.8 sec
Geometric Delay (Average)	1.6 sec	
Stop-Line Delay (Average)	139.3 sec	
Idling Time (Average)	136.3 sec	
Intersection Level of Service (LOS)	LOS F	
95% Back of Queue - Vehicles (Worst Lane)	134.1 veh	
95% Back of Queue - Distance (Worst Lane)	938.5 m	
Queue Storage Ratio (Worst Lane)	1.15	
Total Effective Stops	2490 veh/h	2988 pers/h
Effective Stop Rate	1.26	1.26
Proportion Queued	0.80	0.80
Performance Index	233.5	233.5
Cost (Total)	3570.62 \$/h	3570.62 \$/h
Fuel Consumption (Total)	265.3 L/h	
Carbon Dioxide (Total)	623.4 kg/h	
Hydrocarbons (Total)	0.062 kg/h	
Carbon Monoxide (Total)	0.590 kg/h	
NOx (Total)	0.159 kg/h	

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

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

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Site Model Variability Index (Iterations 3 to N): 0.0 %

Number of Iterations: 2 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Main (Timing-Capacity) Iterations: 2.8% 0.4% 0.0%

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	948,960 veh/y	1,138,752 pers/y
Delay	37,141 veh-h/y	44,569 pers-h/y
Effective Stops	1,195,177 veh/y	1,434,213 pers/y
Travel Distance	962,137 veh-km/y	1,154,564 pers-km/y
Travel Time	54,346 veh-h/y	65,216 pers-h/y
Cost	1,713,897 \$/y	1,713,897 \$/y
Fuel Consumption	127,326 L/y	
Carbon Dioxide	299,217 kg/y	
Hydrocarbons	30 kg/y	
Carbon Monoxide	283 kg/y	
NOx	76 kg/y	



# MOVEMENT SUMMARY

 **Site: 101 [Future AM: Church St/Railway St, Lidcombe ]**

AM Peak Hour: 7:45-8:45am

Site Category: (None)

Signals - Actuated Isolated Cycle Time = 138 seconds (Site Practical Cycle Time)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Railway St E												
5	T1	587	0.0	0.273	17.9	LOS B	10.2	71.5	0.55	0.48	0.55	46.4
6	R2	203	0.0	0.754	70.2	LOS E	13.4	93.9	0.99	0.82	0.99	27.5
Approach		790	0.0	0.754	31.3	LOS C	13.4	93.9	0.66	0.56	0.66	39.4
North: Church St												
7	L2	281	0.0	0.279	23.5	LOS B	9.8	68.6	0.55	0.73	0.55	42.5
9	R2	23	0.0	0.034	36.3	LOS C	1.0	6.8	0.65	0.69	0.65	36.8
Approach		304	0.0	0.279	24.4	LOS B	9.8	68.6	0.56	0.73	0.56	42.0
West: Railway St W												
10	L2	69	0.0	1.121	269.8	LOS F	12.4	87.0	1.00	1.21	2.59	9.9
11	T1	814	0.0	1.121	279.8	LOS F	134.1	938.5	1.00	2.14	2.57	10.5
Approach		883	0.0	1.121	279.0	LOS F	134.1	938.5	1.00	2.06	2.58	10.5
All Vehicles		1977	0.0	1.121	140.9	LOS F	134.1	938.5	0.80	1.26	1.50	17.7

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

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

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

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Project: Z:\LMA Jobs\SIDRA\1179-18 2 BACHELL AVENUE LIDCOMBE\1157-15 2 Bachell Avenue\_REVISIED SIDRA OP 2-19.10.18.sip8

# INTERSECTION SUMMARY

 **Site: 101 [Future PM: Church St/Railway St, Lidcombe ]**

PM Peak Hour: 5:00-6:00pm

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 36 seconds (Site Optimum Cycle Time - Minimum Delay)

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Travel Speed (Average)	28.7 km/h	28.7 km/h
Travel Distance (Total)	2394.8 veh-km/h	2873.7 pers-km/h
Travel Time (Total)	83.4 veh-h/h	100.0 pers-h/h
Demand Flows (Total)	2362 veh/h	2834 pers/h
Percent Heavy Vehicles (Demand)	0.0 %	
Degree of Saturation	1.153	
Practical Spare Capacity	-22.0 %	
Effective Intersection Capacity	2048 veh/h	
Control Delay (Total)	42.83 veh-h/h	51.39 pers-h/h
Control Delay (Average)	65.3 sec	65.3 sec
Control Delay (Worst Lane)	308.8 sec	
Control Delay (Worst Movement)	308.8 sec	308.8 sec
Geometric Delay (Average)	1.9 sec	
Stop-Line Delay (Average)	63.4 sec	
Idling Time (Average)	49.6 sec	
Intersection Level of Service (LOS)	LOS E	
95% Back of Queue - Vehicles (Worst Lane)	47.6 veh	
95% Back of Queue - Distance (Worst Lane)	333.2 m	
Queue Storage Ratio (Worst Lane)	0.10	
Total Effective Stops	3191 veh/h	3829 pers/h
Effective Stop Rate	1.35	1.35
Proportion Queued	0.83	0.83
Performance Index	149.2	149.2
Cost (Total)	2517.53 \$/h	2517.53 \$/h
Fuel Consumption (Total)	244.8 L/h	
Carbon Dioxide (Total)	575.3 kg/h	
Hydrocarbons (Total)	0.053 kg/h	
Carbon Monoxide (Total)	0.612 kg/h	
NOx (Total)	0.160 kg/h	

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

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

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Site Model Variability Index (Iterations 3 to N): 0.0 %

Number of Iterations: 2 (Maximum: 10)

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

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	1,133,760 veh/y	1,360,512 pers/y
Delay	20,558 veh-h/y	24,669 pers-h/y
Effective Stops	1,531,468 veh/y	1,837,762 pers/y
Travel Distance	1,149,491 veh-km/y	1,379,389 pers-km/y
Travel Time	40,018 veh-h/y	48,022 pers-h/y
Cost	1,208,415 \$/y	1,208,415 \$/y
Fuel Consumption	117,516 L/y	
Carbon Dioxide	276,162 kg/y	
Hydrocarbons	26 kg/y	
Carbon Monoxide	294 kg/y	
NOx	77 kg/y	

# MOVEMENT SUMMARY

 **Site: 101 [Future PM: Church St/Railway St, Lidcombe ]**

PM Peak Hour: 5:00-6:00pm

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 36 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Railway St E												
5	T1	1001	0.0	0.513	6.7	LOS A	6.1	42.8	0.72	0.62	0.72	54.0
6	R2	357	0.0	1.153	308.8	LOS F	47.6	333.2	1.00	3.63	8.54	9.8
Approach		1358	0.0	1.153	86.1	LOS F	47.6	333.2	0.79	1.41	2.77	24.7
North: Church St												
7	L2	260	0.0	0.280	11.3	LOS A	2.7	19.1	0.62	0.74	0.62	49.4
9	R2	149	0.0	0.481	21.5	LOS B	2.6	18.1	0.95	0.78	0.95	43.3
Approach		409	0.0	0.481	15.0	LOS B	2.7	19.1	0.74	0.75	0.74	47.0
West: Railway St W												
10	L2	40	0.0	0.982	59.9	LOS E	9.8	68.4	1.00	1.61	3.72	31.0
11	T1	555	0.0	0.982	51.6	LOS D	11.4	80.0	1.00	1.62	3.37	32.4
Approach		595	0.0	0.982	52.2	LOS D	11.4	80.0	1.00	1.62	3.39	32.3
All Vehicles		2362	0.0	1.153	65.3	LOS E	47.6	333.2	0.83	1.35	2.58	28.7

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

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

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

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# INTERSECTION SUMMARY

▽ Site: 101 [Future AM: Church St/Railway St Bridge, Lidcombe]

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

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Travel Speed (Average)	45.3 km/h	45.3 km/h
Travel Distance (Total)	1401.3 veh-km/h	1681.5 pers-km/h
Travel Time (Total)	30.9 veh-h/h	37.1 pers-h/h
Demand Flows (Total)	1384 veh/h	1661 pers/h
Percent Heavy Vehicles (Demand)	0.0 %	
Degree of Saturation	0.515	
Practical Spare Capacity	55.3 %	
Effective Intersection Capacity	2686 veh/h	
Control Delay (Total)	2.42 veh-h/h	2.91 pers-h/h
Control Delay (Average)	6.3 sec	6.3 sec
Control Delay (Worst Lane)	16.6 sec	
Control Delay (Worst Movement)	16.6 sec	16.6 sec
Geometric Delay (Average)	4.6 sec	
Stop-Line Delay (Average)	1.7 sec	
Idling Time (Average)	1.0 sec	
Intersection Level of Service (LOS)	NA	
95% Back of Queue - Vehicles (Worst Lane)	2.2 veh	
95% Back of Queue - Distance (Worst Lane)	15.3 m	
Queue Storage Ratio (Worst Lane)	0.01	
Total Effective Stops	850 veh/h	1020 pers/h
Effective Stop Rate	0.61	0.61
Proportion Queued	0.12	0.12
Performance Index	36.1	36.1
Cost (Total)	755.95 \$/h	755.95 \$/h
Fuel Consumption (Total)	104.9 L/h	
Carbon Dioxide (Total)	246.6 kg/h	
Hydrocarbons (Total)	0.018 kg/h	
Carbon Monoxide (Total)	0.197 kg/h	
NOx (Total)	0.062 kg/h	

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection delay is not a good LOS measure due to zero delays associated with major road movements.  
 SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.  
 Site Model Variability Index (Iterations 3 to N): 0.0 %  
 Number of Iterations: 2 (Maximum: 10)  
 Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 0.0% 79.8% 0.0%

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	664,320 veh/y	797,184 pers/y
Delay	1,163 veh-h/y	1,395 pers-h/y
Effective Stops	408,149 veh/y	489,779 pers/y
Travel Distance	672,617 veh-km/y	807,141 pers-km/y
Travel Time	14,839 veh-h/y	17,807 pers-h/y
Cost	362,854 \$/y	362,854 \$/y
Fuel Consumption	50,360 L/y	
Carbon Dioxide	118,347 kg/y	
Hydrocarbons	8 kg/y	
Carbon Monoxide	94 kg/y	
NOx	30 kg/y	

# MOVEMENT SUMMARY

Site: 101 [Future AM: Church St/Railway St Bridge, Lidcombe]

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Railway Street Bridge												
1	L2	299	0.0	0.506	4.6	LOS A	0.0	0.0	0.00	0.55	0.00	46.5
3	R2	641	0.0	0.506	4.6	LOS A	0.0	0.0	0.00	0.55	0.00	46.1
Approach		940	0.0	0.506	4.6	NA	0.0	0.0	0.00	0.55	0.00	46.2
East: Church St E												
4	L2	251	0.0	0.135	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	46.6
Approach		251	0.0	0.135	4.6	NA	0.0	0.0	0.00	0.53	0.00	46.6
West: Church St W												
12	R2	193	0.0	0.515	16.6	LOS B	2.2	15.3	0.83	1.05	1.25	40.0
Approach		193	0.0	0.515	16.6	LOS B	2.2	15.3	0.83	1.05	1.25	40.0
All Vehicles		1384	0.0	0.515	6.3	NA	2.2	15.3	0.12	0.61	0.17	45.3

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

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

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

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

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# INTERSECTION SUMMARY

▽ Site: 101 [Future PM: Church St/Railway St Bridge, Lidcombe ]

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

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Travel Speed (Average)	45.0 km/h	45.0 km/h
Travel Distance (Total)	1597.3 veh-km/h	1916.7 pers-km/h
Travel Time (Total)	35.5 veh-h/h	42.6 pers-h/h
Demand Flows (Total)	1575 veh/h	1890 pers/h
Percent Heavy Vehicles (Demand)	0.0 %	
Degree of Saturation	0.678	
Practical Spare Capacity	18.0 %	
Effective Intersection Capacity	2324 veh/h	
Control Delay (Total)	3.11 veh-h/h	3.73 pers-h/h
Control Delay (Average)	7.1 sec	7.1 sec
Control Delay (Worst Lane)	23.1 sec	
Control Delay (Worst Movement)	23.1 sec	23.1 sec
Geometric Delay (Average)	4.6 sec	
Stop-Line Delay (Average)	2.5 sec	
Idling Time (Average)	1.6 sec	
Intersection Level of Service (LOS)	NA	
95% Back of Queue - Vehicles (Worst Lane)	3.2 veh	
95% Back of Queue - Distance (Worst Lane)	22.7 m	
Queue Storage Ratio (Worst Lane)	0.02	
Total Effective Stops	977 veh/h	1172 pers/h
Effective Stop Rate	0.62	0.62
Proportion Queued	0.12	0.12
Performance Index	41.8	41.8
Cost (Total)	870.86 \$/h	870.86 \$/h
Fuel Consumption (Total)	119.6 L/h	
Carbon Dioxide (Total)	281.1 kg/h	
Hydrocarbons (Total)	0.020 kg/h	
Carbon Monoxide (Total)	0.224 kg/h	
NOx (Total)	0.070 kg/h	

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection delay is not a good LOS measure due to zero delays associated with major road movements.  
 SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.  
 Site Model Variability Index (Iterations 3 to N): 0.0 %  
 Number of Iterations: 2 (Maximum: 10)  
 Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 0.0% 83.2% 0.0%

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	756,000 veh/y	907,200 pers/y
Delay	1,491 veh-h/y	1,789 pers-h/y
Effective Stops	468,885 veh/y	562,662 pers/y
Travel Distance	766,681 veh-km/y	920,017 pers-km/y
Travel Time	17,029 veh-h/y	20,434 pers-h/y
Cost	418,012 \$/y	418,012 \$/y
Fuel Consumption	57,426 L/y	
Carbon Dioxide	134,951 kg/y	
Hydrocarbons	10 kg/y	
Carbon Monoxide	108 kg/y	
NOx	34 kg/y	

# MOVEMENT SUMMARY

Site: 101 [Future PM: Church St/Railway St Bridge, Lidcombe ]

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Railway Street Bridge												
1	L2	364	0.0	0.333	4.6	LOS A	0.0	0.0	0.00	0.54	0.00	46.6
3	R2	254	0.0	0.333	4.6	LOS A	0.0	0.0	0.00	0.54	0.00	46.2
Approach		618	0.0	0.333	4.6	NA	0.0	0.0	0.00	0.54	0.00	46.4
East: Church St E												
4	L2	745	0.0	0.401	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	46.6
Approach		745	0.0	0.401	4.6	NA	0.0	0.0	0.00	0.53	0.00	46.6
West: Church St W												
12	R2	212	0.0	0.678	23.1	LOS B	3.2	22.7	0.91	1.18	1.67	37.4
Approach		212	0.0	0.678	23.1	LOS B	3.2	22.7	0.91	1.18	1.67	37.4
All Vehicles		1575	0.0	0.678	7.1	NA	3.2	22.7	0.12	0.62	0.22	45.0

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

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

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

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

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# INTERSECTION SUMMARY

 Site: 101 [Future AM: Railway St/Arthur St, Lidcombe]

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

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Travel Speed (Average)	53.0 km/h	53.0 km/h
Travel Distance (Total)	1973.7 veh-km/h	2368.4 pers-km/h
Travel Time (Total)	37.3 veh-h/h	44.7 pers-h/h
Demand Flows (Total)	1946 veh/h	2335 pers/h
Percent Heavy Vehicles (Demand)	0.0 %	
Degree of Saturation	0.606	
Practical Spare Capacity	61.8 %	
Effective Intersection Capacity	3212 veh/h	
Control Delay (Total)	3.33 veh-h/h	4.00 pers-h/h
Control Delay (Average)	6.2 sec	6.2 sec
Control Delay (Worst Lane)	56.9 sec	
Control Delay (Worst Movement)	113.7 sec	113.7 sec
Geometric Delay (Average)	5.5 sec	
Stop-Line Delay (Average)	0.7 sec	
Idling Time (Average)	0.5 sec	
Intersection Level of Service (LOS)	NA	
95% Back of Queue - Vehicles (Worst Lane)	0.5 veh	
95% Back of Queue - Distance (Worst Lane)	3.2 m	
Queue Storage Ratio (Worst Lane)	0.00	
Total Effective Stops	1140 veh/h	1368 pers/h
Effective Stop Rate	0.59	0.59
Proportion Queued	0.01	0.01
Performance Index	43.1	43.1
Cost (Total)	1003.25 \$/h	1003.25 \$/h
Fuel Consumption (Total)	158.1 L/h	
Carbon Dioxide (Total)	371.6 kg/h	
Hydrocarbons (Total)	0.031 kg/h	
Carbon Monoxide (Total)	0.443 kg/h	
NOx (Total)	0.114 kg/h	

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

NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Site Model Variability Index (Iterations 3 to N): 0.0 %

Number of Iterations: 3 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 96.4% 96.8% 0.0%

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	934,080 veh/y	1,120,896 pers/y
Delay	1,598 veh-h/y	1,918 pers-h/y
Effective Stops	547,115 veh/y	656,538 pers/y
Travel Distance	947,361 veh-km/y	1,136,833 pers-km/y
Travel Time	17,891 veh-h/y	21,469 pers-h/y
Cost	481,560 \$/y	481,560 \$/y
Fuel Consumption	75,898 L/y	
Carbon Dioxide	178,361 kg/y	
Hydrocarbons	15 kg/y	
Carbon Monoxide	212 kg/y	
NOx	55 kg/y	



# MOVEMENT SUMMARY

 Site: 101 [Future AM: Railway St/Arthur St, Lidcombe]

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

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Railway St												
1	L2	9	0.0	0.606	5.7	LOS A	0.0	0.0	0.00	0.59	0.00	53.5
3	R2	1116	0.0	0.606	5.6	LOS A	0.0	0.0	0.00	0.59	0.00	53.2
Approach		1125	0.0	0.606	5.6	NA	0.0	0.0	0.00	0.59	0.00	53.2
East: Arthur St E												
4	L2	800	0.0	0.431	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	53.5
5	T1	9	0.0	0.145	56.8	LOS E	0.4	2.9	0.95	0.95	0.95	31.0
Approach		809	0.0	0.431	6.2	NA	0.4	2.9	0.01	0.58	0.01	53.1
West: Arthur St W												
11	T1	8	0.0	0.174	28.5	LOS B	0.5	3.2	0.95	1.01	0.97	31.0
12	R2	4	0.0	0.174	113.7	LOS F	0.5	3.2	0.95	1.01	0.97	30.9
Approach		12	0.0	0.174	56.9	LOS E	0.5	3.2	0.95	1.01	0.97	30.9
All Vehicles		1946	0.0	0.606	6.2	NA	0.5	3.2	0.01	0.59	0.01	53.0

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

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

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

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

# INTERSECTION SUMMARY

 Site: 101 [Future PM: Railway St/Arthur St, Lidcombe]

PM Peak Hour: 4:45-5:45pm  
 Site Category: (None)  
 Stop (Two-Way)

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Travel Speed (Average)	50.6 km/h	50.6 km/h
Travel Distance (Total)	2174.3 veh-km/h	2609.2 pers-km/h
Travel Time (Total)	43.0 veh-h/h	51.6 pers-h/h
Demand Flows (Total)	2143 veh/h	2572 pers/h
Percent Heavy Vehicles (Demand)	0.0 %	
Degree of Saturation	0.720	
Practical Spare Capacity	11.1 %	
Effective Intersection Capacity	2977 veh/h	
Control Delay (Total)	5.74 veh-h/h	6.89 pers-h/h
Control Delay (Average)	9.6 sec	9.6 sec
Control Delay (Worst Lane)	154.6 sec	
Control Delay (Worst Movement)	236.1 sec	236.1 sec
Geometric Delay (Average)	7.0 sec	
Stop-Line Delay (Average)	2.6 sec	
Idling Time (Average)	2.4 sec	
Intersection Level of Service (LOS)	NA	
95% Back of Queue - Vehicles (Worst Lane)	2.4 veh	
95% Back of Queue - Distance (Worst Lane)	16.5 m	
Queue Storage Ratio (Worst Lane)	0.01	
Total Effective Stops	1791 veh/h	2150 pers/h
Effective Stop Rate	0.84	0.84
Proportion Queued	0.02	0.02
Performance Index	53.9	53.9
Cost (Total)	1174.39 \$/h	1174.39 \$/h
Fuel Consumption (Total)	179.0 L/h	
Carbon Dioxide (Total)	420.7 kg/h	
Hydrocarbons (Total)	0.036 kg/h	
Carbon Monoxide (Total)	0.501 kg/h	
NOx (Total)	0.131 kg/h	

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

NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Site Model Variability Index (Iterations 3 to N): 0.0 %

Number of Iterations: 2 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 0.0% 97.4% 0.0%

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	1,028,640 veh/y	1,234,368 pers/y
Delay	2,754 veh-h/y	3,305 pers-h/y
Effective Stops	859,801 veh/y	1,031,761 pers/y
Travel Distance	1,043,667 veh-km/y	1,252,400 pers-km/y
Travel Time	20,638 veh-h/y	24,765 pers-h/y
Cost	563,707 \$/y	563,707 \$/y
Fuel Consumption	85,936 L/y	
Carbon Dioxide	201,949 kg/y	
Hydrocarbons	17 kg/y	
Carbon Monoxide	241 kg/y	
NOx	63 kg/y	

# MOVEMENT SUMMARY

 Site: 101 [Future PM: Railway St/Arthur St, Lidcombe]

PM Peak Hour: 4:45-5:45pm  
 Site Category: (None)  
 Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Railway St												
1	L2	7	0.0	0.464	5.6	LOS A	0.0	0.0	0.00	0.59	0.00	53.5
3	R2	854	0.0	0.464	5.6	LOS A	0.0	0.0	0.00	0.59	0.00	53.3
Approach		861	0.0	0.464	5.6	NA	0.0	0.0	0.00	0.59	0.00	53.3
East: Arthur St E												
4	L2	1241	0.0	0.668	8.2	LOS A	0.0	0.0	0.00	1.00	0.00	51.8
5	T1	5	0.0	0.028	26.7	LOS B	0.1	0.6	0.83	1.02	0.83	41.6
Approach		1246	0.0	0.668	8.3	LOS A	0.1	0.6	0.00	1.00	0.00	51.7
West: Arthur St W												
11	T1	21	0.0	0.720	96.4	LOS F	2.4	16.5	0.97	1.13	1.49	16.9
12	R2	15	0.0	0.720	236.1	LOS F	2.4	16.5	0.97	1.13	1.49	16.9
Approach		36	0.0	0.720	154.6	LOS F	2.4	16.5	0.97	1.13	1.49	16.9
All Vehicles		2143	0.0	0.720	9.6	NA	2.4	16.5	0.02	0.84	0.03	50.6

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

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

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

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

# INTERSECTION SUMMARY

 **Site: 101 [Future AM: Church St/Bachell Ave, Lidcombe ]**

AM Peak Hour: 7:30-8:30am

Site Category: (None)

Signals - Fixed Time Isolated    Cycle Time = 36 seconds (Site Optimum Cycle Time - Minimum Delay)

Intersection Performance - Hourly Values			
Performance Measure	Vehicles	Pedestrians	Persons
Travel Speed (Average)	49.0 km/h	3.1 km/h	48.3 km/h
Travel Distance (Total)	1421.8 veh-km/h	1.6 ped-km/h	1707.7 pers-km/h
Travel Time (Total)	29.0 veh-h/h	0.5 ped-h/h	35.3 pers-h/h
Demand Flows (Total)	1397 veh/h	50 ped/h	1726 pers/h
Percent Heavy Vehicles (Demand)	0.0 %		
Degree of Saturation	0.717	0.025	
Practical Spare Capacity	25.5 %		
Effective Intersection Capacity	1948 veh/h		
Control Delay (Total)	4.82 veh-h/h	0.17 ped-h/h	5.95 pers-h/h
Control Delay (Average)	12.4 sec	12.5 sec	12.4 sec
Control Delay (Worst Lane)	23.7 sec		
Control Delay (Worst Movement)	23.7 sec	12.5 sec	23.7 sec
Geometric Delay (Average)	4.5 sec		
Stop-Line Delay (Average)	7.9 sec		
Idling Time (Average)	4.7 sec		
Intersection Level of Service (LOS)	LOS A	LOS B	
95% Back of Queue - Vehicles (Worst Lane)	4.3 veh		
95% Back of Queue - Distance (Worst Lane)	30.0 m		
Queue Storage Ratio (Worst Lane)	0.03		
Total Effective Stops	1044 veh/h	42 ped/h	1295 pers/h
Effective Stop Rate	0.75	0.84	0.75
Proportion Queued	0.73	0.84	0.73
Performance Index	43.8	0.7	44.6
Cost (Total)	816.89 \$/h	12.66 \$/h	829.55 \$/h
Fuel Consumption (Total)	118.8 L/h		
Carbon Dioxide (Total)	279.2 kg/h		
Hydrocarbons (Total)	0.024 kg/h		
Carbon Monoxide (Total)	0.330 kg/h		
NOx (Total)	0.086 kg/h		

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

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Site Model Variability Index (Iterations 3 to N): 0.0 %

Number of Iterations: 2 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Main (Timing-Capacity) Iterations: 7.6%    0.0%    0.0%

Intersection Performance - Annual Values			
Performance Measure	Vehicles	Pedestrians	Persons
Demand Flows (Total)	670,560 veh/y	24,000 ped/y	828,672 pers/y
Delay	2,311 veh-h/y	84 ped-h/y	2,857 pers-h/y
Effective Stops	501,258 veh/y	20,042 ped/y	621,551 pers/y
Travel Distance	682,459 veh-km/y	766 ped-km/y	819,716 pers-km/y
Travel Time	13,929 veh-h/y	247 ped-h/y	16,962 pers-h/y
Cost	392,106 \$/y	6,079 \$/y	398,184 \$/y
Fuel Consumption	57,024 L/y		
Carbon Dioxide	134,007 kg/y		
Hydrocarbons	12 kg/y		
Carbon Monoxide	158 kg/y		
NOx	41 kg/y		

# MOVEMENT SUMMARY

 **Site: 101 [Future AM: Church St/Bachell Ave, Lidcombe ]**

AM Peak Hour: 7:30-8:30am

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 36 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Church St E												
5	T1	88	0.0	0.407	5.4	LOS A	2.7	18.8	0.57	0.46	0.57	54.7
6	R2	207	0.0	0.407	13.6	LOS A	2.7	18.8	0.82	0.76	0.82	47.8
Approach		295	0.0	0.407	11.2	LOS A	2.7	18.8	0.75	0.67	0.75	49.6
North: Bachell Ave												
7	L2	116	0.0	0.125	10.8	LOS A	1.1	7.8	0.56	0.70	0.56	49.8
9	R2	222	0.0	0.717	23.7	LOS B	4.3	30.0	0.99	0.91	1.26	42.2
Approach		338	0.0	0.717	19.3	LOS B	4.3	30.0	0.85	0.84	1.02	44.5
West: Church St W												
10	L2	584	0.0	0.522	7.9	LOS A	3.3	23.4	0.58	0.72	0.58	52.2
11	T1	180	0.0	0.554	16.3	LOS B	3.2	22.4	0.96	0.79	1.01	47.3
Approach		764	0.0	0.554	9.9	LOS A	3.3	23.4	0.67	0.74	0.68	51.0
All Vehicles		1397	0.0	0.717	12.4	LOS A	4.3	30.0	0.73	0.75	0.78	49.0

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

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

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate	
P2	East Full Crossing	50	12.5	LOS B	0.0	0.0	0.84	0.84	
All Pedestrians		50	12.5	LOS B			0.84	0.84	

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 ]**

PM Peak Hour: 5:00-6:00pm

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 70 seconds (Site Optimum Cycle Time - Minimum Delay)

Intersection Performance - Hourly Values			
Performance Measure	Vehicles	Pedestrians	Persons
Travel Speed (Average)	40.1 km/h	3.2 km/h	39.8 km/h
Travel Distance (Total)	1924.2 veh-km/h	1.6 ped-km/h	2310.6 pers-km/h
Travel Time (Total)	48.0 veh-h/h	0.5 ped-h/h	58.1 pers-h/h
Demand Flows (Total)	1896 veh/h	50 ped/h	2325 pers/h
Percent Heavy Vehicles (Demand)	0.0 %		
Degree of Saturation	0.897	0.010	
Practical Spare Capacity	0.3 %		
Effective Intersection Capacity	2113 veh/h		
Control Delay (Total)	15.21 veh-h/h	0.16 ped-h/h	18.41 pers-h/h
Control Delay (Average)	28.9 sec	11.5 sec	28.5 sec
Control Delay (Worst Lane)	44.5 sec		
Control Delay (Worst Movement)	46.9 sec	11.5 sec	46.9 sec
Geometric Delay (Average)	4.1 sec		
Stop-Line Delay (Average)	24.8 sec		
Idling Time (Average)	20.1 sec		
Intersection Level of Service (LOS)	LOS C	LOS B	
95% Back of Queue - Vehicles (Worst Lane)	27.6 veh		
95% Back of Queue - Distance (Worst Lane)	192.9 m		
Queue Storage Ratio (Worst Lane)	0.07		
Total Effective Stops	1729 veh/h	29 ped/h	2103 pers/h
Effective Stop Rate	0.91	0.57	0.90
Proportion Queued	0.74	0.57	0.73
Performance Index	95.3	0.7	95.9
Cost (Total)	1425.65 \$/h	12.30 \$/h	1437.95 \$/h
Fuel Consumption (Total)	174.4 L/h		
Carbon Dioxide (Total)	409.8 kg/h		
Hydrocarbons (Total)	0.036 kg/h		
Carbon Monoxide (Total)	0.463 kg/h		
NOx (Total)	0.122 kg/h		

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

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Site Model Variability Index (Iterations 3 to N): 8.5 %

Number of Iterations: 8 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Main (Timing-Capacity) Iterations: 10.0% 12.3% 3.3%

Intersection Performance - Annual Values			
Performance Measure	Vehicles	Pedestrians	Persons
Demand Flows (Total)	910,080 veh/y	24,000 ped/y	1,116,096 pers/y
Delay	7,300 veh-h/y	76 ped-h/y	8,837 pers-h/y
Effective Stops	829,919 veh/y	13,743 ped/y	1,009,646 pers/y
Travel Distance	923,599 veh-km/y	766 ped-km/y	1,109,084 pers-km/y
Travel Time	23,024 veh-h/y	240 ped-h/y	27,869 pers-h/y
Cost	684,313 \$/y	5,903 \$/y	690,215 \$/y
Fuel Consumption	83,696 L/y		
Carbon Dioxide	196,685 kg/y		
Hydrocarbons	18 kg/y		
Carbon Monoxide	222 kg/y		
NOx	59 kg/y		

# MOVEMENT SUMMARY

 **Site: 101 [Future PM: Church St/Bachell Ave, Lidcombe ]**

PM Peak Hour: 5:00-6:00pm

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 70 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Church St E												
5	T1	298	0.0	0.890	33.8	LOS C	13.0	90.7	0.92	0.98	1.51	38.0
6	R2	144	0.0	0.890	46.9	LOS D	13.0	90.7	1.00	1.18	1.91	34.3
Approach		442	0.0	0.890	38.0	LOS C	13.0	90.7	0.95	1.04	1.64	36.7
North: Bachell Ave												
7	L2	291	0.0	0.219	9.2	LOS A	3.3	23.3	0.36	0.68	0.36	50.9
9	R2	732	0.0	0.889	33.9	LOS C	27.6	192.9	0.84	0.97	1.14	37.7
Approach		1023	0.0	0.889	26.9	LOS B	27.6	192.9	0.70	0.88	0.92	40.7
West: Church St W												
10	L2	231	0.0	0.178	6.6	LOS A	1.1	7.6	0.26	0.62	0.26	53.4
11	T1	200	0.0	0.897	44.5	LOS D	8.4	58.6	1.00	1.10	1.68	34.7
Approach		431	0.0	0.897	24.2	LOS B	8.4	58.6	0.60	0.84	0.92	42.7
All Vehicles		1896	0.0	0.897	28.9	LOS C	27.6	192.9	0.74	0.91	1.09	40.1

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

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

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Pedestrian ped	Queue Distance m	Prop. Queued	Effective Stop Rate	
P2	East Full Crossing	50	11.5	LOS B	0.1	0.1	0.57	0.57	
All Pedestrians		50	11.5	LOS B			0.57	0.57	

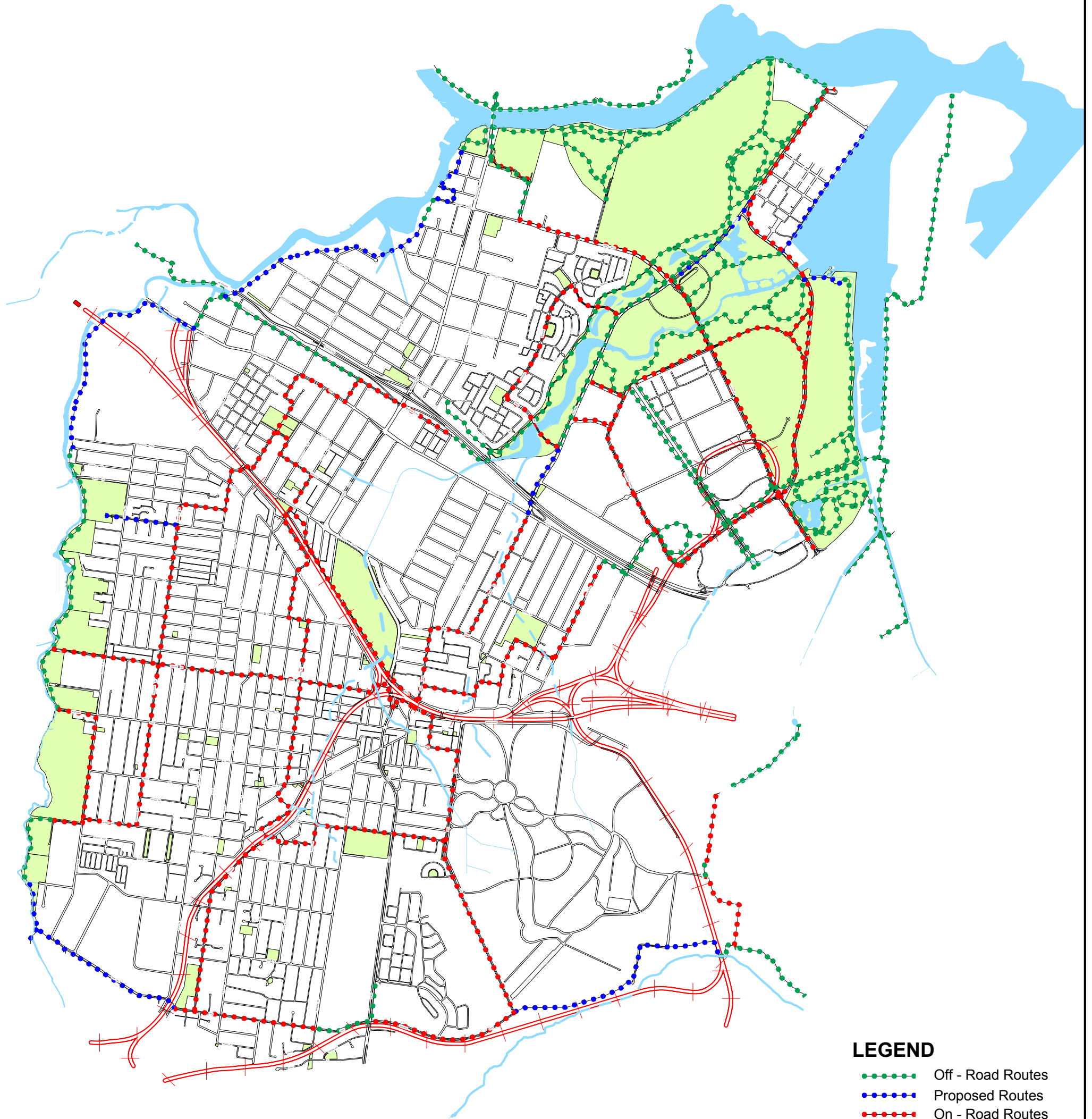
Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

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.

## APPENDIX D





**LEGEND**

- Off - Road Routes
- Proposed Routes
- On - Road Routes
- + + + + + Railway Line
- Waterways
- Parks



Scale 1:30000@A3

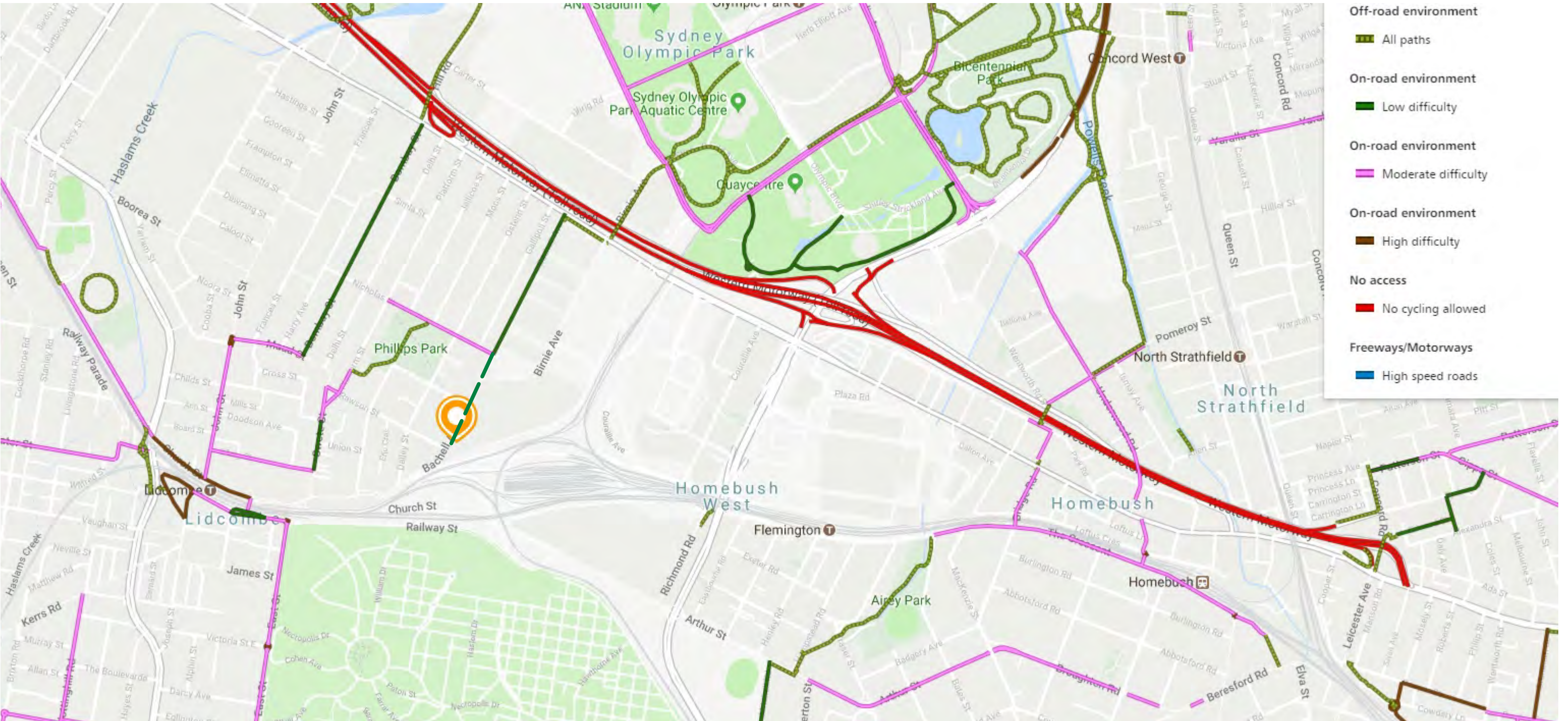
# Auburn LGA Cycling Routes



Map projection: UTM  
 Coordinate System:  
 GDA/MGA 1994 Zone 56  
 File Name: Cycle Routes  
 Date: 14/12/2009

**LEGEND**

- Off-road environment
  - All paths
- On-road environment
  - Low difficulty
  - Moderate difficulty
  - High difficulty
- No access
  - No cycling allowed
- Freeways/Motorways
  - High speed roads



SOURCE TRANSPORT FOR NSW CYCLEPATH FINDER

- - - POSSIBLE FUTURE ON ROAD CONNECTION IN BACHELL AVENUE

**EXISTING AND FUTURE BICYCLE PATHS**

## **APPENDIX E**

## DRAFT ACTION PLAN

### GENERAL ACTIONS

Action	Timeline	By whom
Promotion including: Promote "Walk To Work Day" or " Ride To Work Day", Car Share incentives for employees such as car share scheme. Display boards in prominent locations to show public transport maps and timetables.	On Occupation	Corporation Owners/ Business

### WALKING

Action	Timeline	By whom
Produce a map showing safe walking routes to and from the site with times, distances to local facilities, such as shops and bus stops	On Occupation	Corporation Owners

### CYCLING

Action	Timeline	By whom
Provide sufficient cycle parking to meet peak needs, which is easily accessible and secure	On Occupation	Developer
Provide cycle parking for visitors	On Occupation	Developer
Ensure cycle parking is clearly visible or provide signage to direct people to cycle bays	On Occupation	Developer
Produce a map showing quiet cycle routes in the area	On Occupation	Developer

### PUBLIC TRANSPORT

Action	Timeline	By whom
Develop a map showing public transport routes in the area	On Occupation	Developer
Put up a noticeboard with leaflets and maps showing the main public transport routes to and from the site	On Occupation	Developer

## **APPENDIX F**

## Appendix F

### Possible Mitigation Measure at Church Street/ Railway Street developments

The Nearmap image in **Figure 8** 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 to A in the PM peak hour.

Left turn slip lane from west approach to Church Street north. 60 metres.

No	Location	Sign/ Control	Peak Hour	Level Of Service (LoS)	Degree of Saturation (DoS)	Average Delay (Av)	Critical Movement
1	Church Street/ Railway Street	S	AM	A	0.626	14.5	North Approach Church Street RHT 32.7 secs
1	Church Street/ Railway Street	S	PM	A	0.669	13.8	North Approach Church Street RHT 31.2 secs

The mitigation measure is illustrated in **Figure 9**.

# INTERSECTION SUMMARY

 **Site: 101 [Future Mitigation AM: Church St/Railway St, Lidcombe - Copy]**

AM Peak Hour: 7:45-8:45am

Site Category: (None)

Signals - Actuated Isolated Cycle Time = 57 seconds (Site Practical Cycle Time)

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Travel Speed (Average)	48.2 km/h	48.2 km/h
Travel Distance (Total)	2005.1 veh-km/h	2406.1 pers-km/h
Travel Time (Total)	41.6 veh-h/h	49.9 pers-h/h
Demand Flows (Total)	1977 veh/h	2372 pers/h
Percent Heavy Vehicles (Demand)	0.0 %	
Degree of Saturation	0.626	
Practical Spare Capacity	43.7 %	
Effective Intersection Capacity	3157 veh/h	
Control Delay (Total)	7.94 veh-h/h	9.52 pers-h/h
Control Delay (Average)	14.5 sec	14.5 sec
Control Delay (Worst Lane)	32.7 sec	
Control Delay (Worst Movement)	32.7 sec	32.7 sec
Geometric Delay (Average)	1.6 sec	
Stop-Line Delay (Average)	12.8 sec	
Idling Time (Average)	9.8 sec	
Intersection Level of Service (LOS)	LOS A	
95% Back of Queue - Vehicles (Worst Lane)	9.8 veh	
95% Back of Queue - Distance (Worst Lane)	68.6 m	
Queue Storage Ratio (Worst Lane)	0.08	
Total Effective Stops	1237 veh/h	1484 pers/h
Effective Stop Rate	0.63	0.63
Proportion Queued	0.68	0.68
Performance Index	62.9	62.9
Cost (Total)	1146.10 \$/h	1146.10 \$/h
Fuel Consumption (Total)	159.9 L/h	
Carbon Dioxide (Total)	375.8 kg/h	
Hydrocarbons (Total)	0.032 kg/h	
Carbon Monoxide (Total)	0.448 kg/h	
NOx (Total)	0.108 kg/h	

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

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

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Site Model Variability Index (Iterations 3 to N): 2.6 %

Number of Iterations: 3 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Main (Timing-Capacity) Iterations: 2.6% 1.1% 2.6%

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	948,960 veh/y	1,138,752 pers/y
Delay	3,810 veh-h/y	4,572 pers-h/y
Effective Stops	593,676 veh/y	712,411 pers/y
Travel Distance	962,432 veh-km/y	1,154,919 pers-km/y
Travel Time	19,975 veh-h/y	23,970 pers-h/y
Cost	550,126 \$/y	550,126 \$/y
Fuel Consumption	76,768 L/y	
Carbon Dioxide	180,404 kg/y	
Hydrocarbons	15 kg/y	
Carbon Monoxide	215 kg/y	
NOx	52 kg/y	

# MOVEMENT SUMMARY

 **Site: 101 [Future Mitigation AM: Church St/Railway St, Lidcombe - Copy]**

AM Peak Hour: 7:45-8:45am

Site Category: (None)

Signals - Actuated Isolated Cycle Time = 57 seconds (Site Practical Cycle Time)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Railway St E												
5	T1	587	0.0	0.220	3.7	LOS A	3.0	21.2	0.39	0.33	0.39	56.5
6	R2	203	0.0	0.445	26.7	LOS B	5.0	34.8	0.87	0.79	0.87	40.9
Approach		790	0.0	0.445	9.6	LOS A	5.0	34.8	0.51	0.45	0.51	51.5
North: Church St												
7	L2	281	0.0	0.332	16.8	LOS B	5.1	35.5	0.66	0.76	0.66	46.0
9	R2	23	0.0	0.118	32.7	LOS C	0.6	4.3	0.91	0.70	0.91	38.4
Approach		304	0.0	0.332	18.0	LOS B	5.1	35.5	0.68	0.75	0.68	45.3
West: Railway St W												
10	L2	69	0.0	0.057	7.2	LOS A	0.4	2.8	0.32	0.62	0.32	52.9
11	T1	814	0.0	0.626	18.4	LOS B	9.8	68.6	0.88	0.75	0.88	46.0
Approach		883	0.0	0.626	17.6	LOS B	9.8	68.6	0.83	0.74	0.83	46.5
All Vehicles		1977	0.0	0.626	14.5	LOS A	9.8	68.6	0.68	0.63	0.68	48.2

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

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

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

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# INTERSECTION SUMMARY

 **Site: 101 [Future Mitigation PM: Church St/Railway St, Lidcombe - Copy]**

PM Peak Hour: 5:00-6:00pm

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 50 seconds (Site Optimum Cycle Time - Minimum Delay)

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Travel Speed (Average)	48.6 km/h	48.6 km/h
Travel Distance (Total)	2395.6 veh-km/h	2874.7 pers-km/h
Travel Time (Total)	49.3 veh-h/h	59.2 pers-h/h
Demand Flows (Total)	2362 veh/h	2834 pers/h
Percent Heavy Vehicles (Demand)	0.0 %	
Degree of Saturation	0.669	
Practical Spare Capacity	34.6 %	
Effective Intersection Capacity	3533 veh/h	
Control Delay (Total)	9.03 veh-h/h	10.84 pers-h/h
Control Delay (Average)	13.8 sec	13.8 sec
Control Delay (Worst Lane)	31.2 sec	
Control Delay (Worst Movement)	31.2 sec	31.2 sec
Geometric Delay (Average)	1.9 sec	
Stop-Line Delay (Average)	11.9 sec	
Idling Time (Average)	8.5 sec	
Intersection Level of Service (LOS)	LOS A	
95% Back of Queue - Vehicles (Worst Lane)	8.0 veh	
95% Back of Queue - Distance (Worst Lane)	55.9 m	
Queue Storage Ratio (Worst Lane)	0.06	
Total Effective Stops	1558 veh/h	1870 pers/h
Effective Stop Rate	0.66	0.66
Proportion Queued	0.72	0.72
Performance Index	74.9	74.9
Cost (Total)	1362.40 \$/h	1362.40 \$/h
Fuel Consumption (Total)	192.1 L/h	
Carbon Dioxide (Total)	451.4 kg/h	
Hydrocarbons (Total)	0.039 kg/h	
Carbon Monoxide (Total)	0.538 kg/h	
NOx (Total)	0.131 kg/h	

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

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

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Site Model Variability Index (Iterations 3 to N): 0.0 %

Number of Iterations: 2 (Maximum: 10)

Largest change in Lane Degrees of Saturation for the last three Main (Timing-Capacity) Iterations: 11.2% 0.0% 0.0%

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	1,133,760 veh/y	1,360,512 pers/y
Delay	4,336 veh-h/y	5,203 pers-h/y
Effective Stops	747,944 veh/y	897,533 pers/y
Travel Distance	1,149,869 veh-km/y	1,379,843 pers-km/y
Travel Time	23,679 veh-h/y	28,414 pers-h/y
Cost	653,952 \$/y	653,952 \$/y
Fuel Consumption	92,202 L/y	
Carbon Dioxide	216,675 kg/y	
Hydrocarbons	19 kg/y	
Carbon Monoxide	258 kg/y	
NOx	63 kg/y	

# MOVEMENT SUMMARY

 **Site: 101 [Future Mitigation PM: Church St/Railway St, Lidcombe - Copy]**

PM Peak Hour: 5:00-6:00pm

Site Category: (None)

Signals - Fixed Time Isolated Cycle Time = 50 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Railway St E												
5	T1	1001	0.0	0.401	4.7	LOS A	6.0	41.7	0.52	0.46	0.52	55.7
6	R2	357	0.0	0.641	22.9	LOS B	8.0	55.9	0.92	0.84	0.95	42.7
Approach		1358	0.0	0.641	9.5	LOS A	8.0	55.9	0.62	0.56	0.63	51.6
North: Church St												
7	L2	260	0.0	0.259	12.2	LOS A	3.4	24.0	0.57	0.73	0.57	48.8
9	R2	149	0.0	0.669	31.2	LOS C	3.9	27.3	1.00	0.86	1.17	39.0
Approach		409	0.0	0.669	19.1	LOS B	3.9	27.3	0.73	0.77	0.79	44.7
West: Railway St W												
10	L2	40	0.0	0.040	8.2	LOS A	0.3	2.0	0.43	0.63	0.43	52.2
11	T1	555	0.0	0.647	20.7	LOS B	6.6	46.4	0.96	0.83	1.03	44.8
Approach		595	0.0	0.647	19.8	LOS B	6.6	46.4	0.93	0.82	0.99	45.2
All Vehicles		2362	0.0	0.669	13.8	LOS A	8.0	55.9	0.72	0.66	0.75	48.6

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

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

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

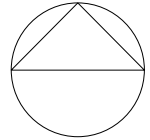
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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NORTH



SOURCE: NEARMAPS

LEGEND



FUTURE  
SLIP LANE LOCATION  
MITIGATION WORKS

FIGURE 8  
RAILWAY STREET AND  
CHURCH STREET  
INTERSECTION

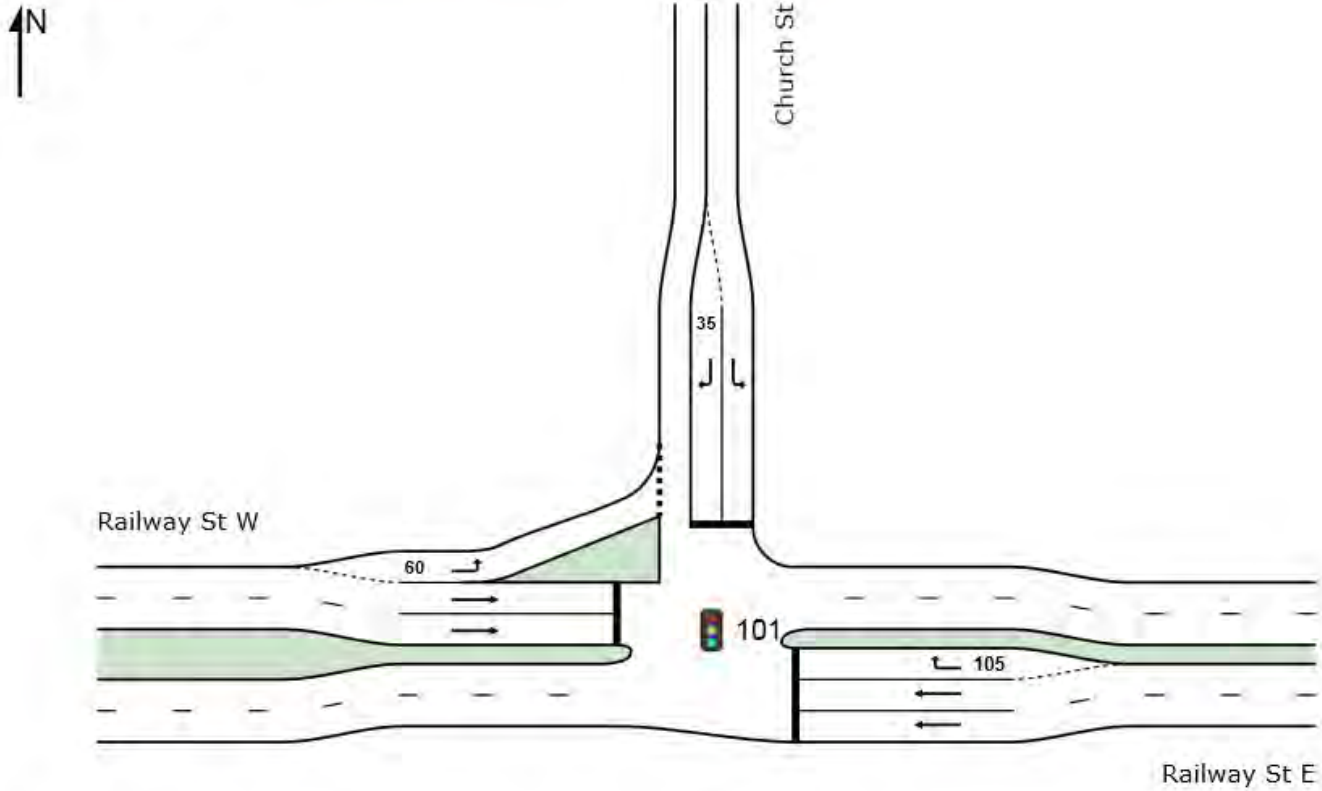
## SITE LAYOUT

Site: 101 [Future Mitigation AM: Church St/Railway St, Lidcombe - Copy]

AM Peak Hour: 7:45-8:45am

Site Category: (None)

Signals - Actuated Isolated



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FIGURE 9  
FUTURE MITIGATION  
AT CHURCH STREET AND RAILWAY STREET  
LIDCOMBE