Rozelle Village

Working Paper 3 - Calibration Report

18 January 2012

Prepared for

Pacific Investments Pty Ltd

Halcrow

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1 Introduction

Halcrow has been commissioned by Pacific Investments Pty Ltd to undertake traffic modelling for the redevelopment of Rozelle Village. The modelling has been undertaken to assess the traffic effects of a proposed development and to meet the Director Generals requirements (DGR).

The aim of this report is to present the calibration and validation of the traffic model to demonstrate that the base model adequately reflects the existing traffic behaviour. In order to test any future scenario it is important to have confidence in the base model and its ability to reflect the real world conditions.

The model has been created using Paramics with signals coded using the signal player plug-in.

The report structure has:

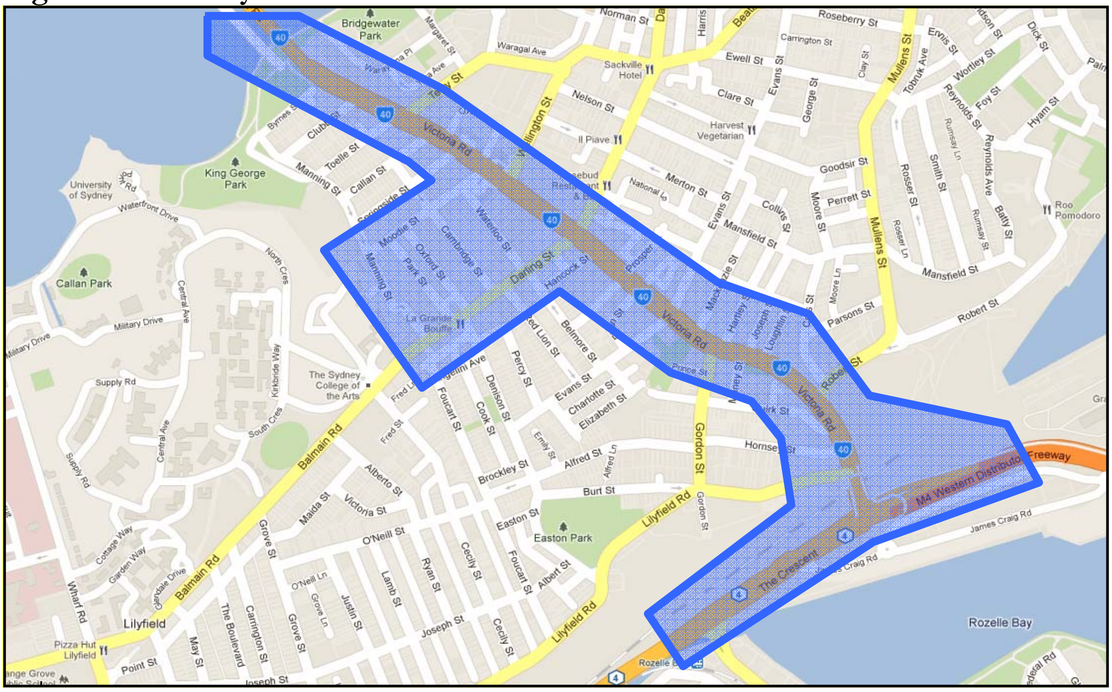
- Section 1 Introduction
- Section 2 Study Area Description
- Section 3 Model Inputs
- Section 4 Model Structure
- Section 4 Calibration and Validation
- Section 5 Conclusion

2 Background and Study Area Description

2.1 Study Area

The location of the study area is indicated in Figure 1. The study area is characterised by medium to low density residential developments with commercial shopping along Victoria Road and Darling Street.

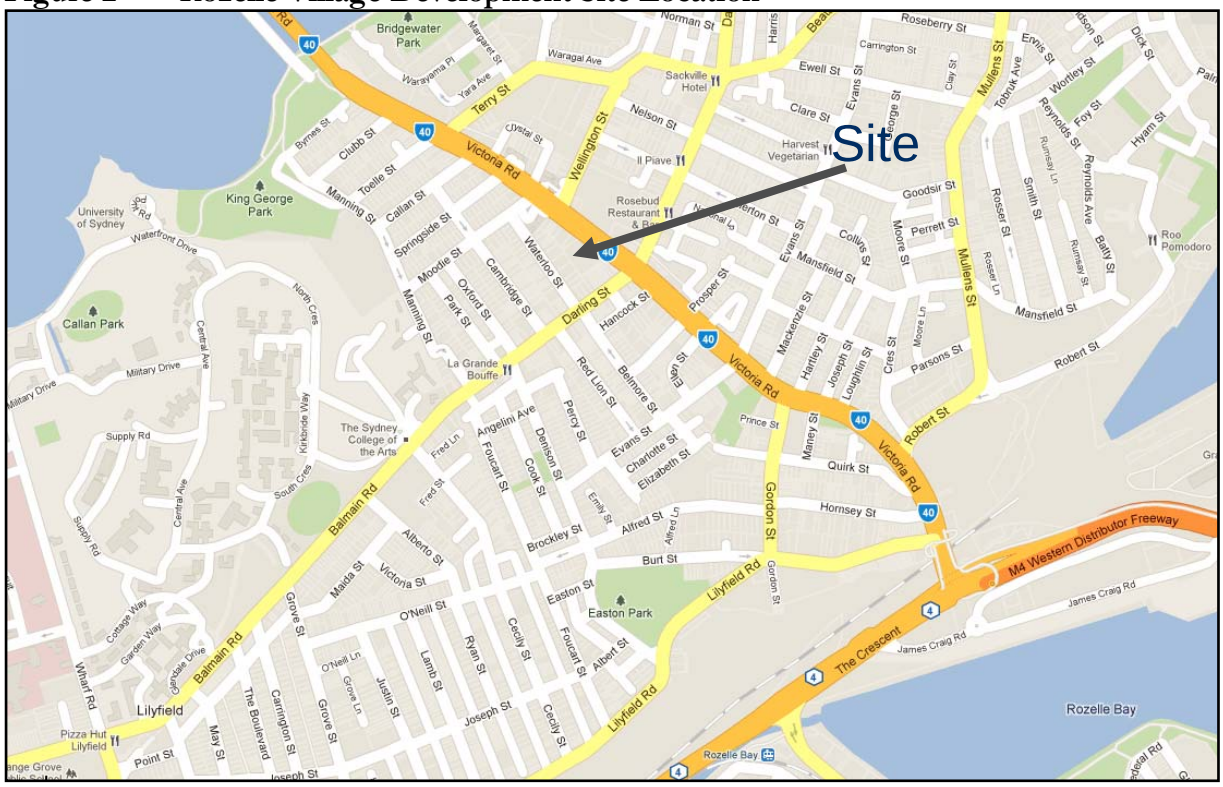
Figure 1 Study Area



2.2 Background

The development site is bound by Moodie Street to the North, Darling Street to the South, Victoria Road to the East and Waterloo Road to the West. The location is indicated in Figure 2.

Figure 2 Rozelle Village Development Site Location



2.3 Director Generals Requirements

The key requirements that relate to modelling are in Section 7 of the DGRs with the following sections:

- Undertake traffic modelling taking into account coordinated traffic signals, pedestrians, public transport (i.e. buses) and bus priority treatments. It should be noted that the RTA has advised that it will not accept decreases in the travel time performance of buses on Victoria Road.

- Key intersections to be examined and modelled include (but are not limited to):
    - All signalised intersection along Victoria Road between The Crescent and Iron Cove Bridge
    - Darling Street / Waterloo Street
    - The Crescent / James Craig Road
    - City West Link / The Crescent

Victoria Road is a major Sydney Arterial road that connects Parramatta to the City via the ANZAC Bridge. It is also a major trunk bus route between the city and the north west. In 2010 the inner-west bus way was opened that provides a peak hour bus lane from the Gladesville Bridge to the Crescent and has tidal flow arrangements at Darling Street. Victoria Road is generally 3 lanes in each direction with a 60km/h speed limit.

Darling Street is a collector road that feeds traffic to and from the Balmain peninsular and Rozelle. The intersection with Darling Street is a critical intersection to traffic flow on Victoria Road.

City West Link is a major arterial that links traffic to the Crescent and then Victoria Road or ANZAC Bridge. The intersection between the Crescent and Victoria Road features a grade separated eastbound through movement ("the mouse hole") and tidal flow lane arrangement from Victoria Road that allows 1 right turn lane in the morning peak and two right turn lanes in the evening peak.

Due to congestion on Victoria Road there are known "alternative" routes that use local roads to avoid queues on Victoria Road.

2.4 Base Line Road Conditions

2.4.1 Site Visits

Site visits were undertaken on 10 November 2011 (PM Peak), 11 November (AM Peak) and 19 November 2011 (Saturday Peak).

AM Peak

The indicative queuing is indicated in Figure 3 below. The Key Points

- Am Peak Tidal flow is in operation with bus lane
- Bus lane was moving relatively freely.
- Slow moving traffic City Bound.
- Congestion outbound from Drummoyne sometimes extended beyond the Iron Cove Bridge.

Figure 3 AM Congestion

PM Peak

The key queues are noted in Figure 4 below. The key points observed were:

- Traffic was moving relatively freely compared with the AM peak.
- The right turn citybound on Victoria Road to Darling Street at times extended beyond the Wellington Street.
- Long queue turning right outbound into Robert Street.

Figure 4 PM Congestion

Saturday Peak

The Saturday peak showed significant queues citybound from Darling Street. The section of road between Wellington Street and Darling Street City bound allows parking on Saturdays which restricts the through traffic to two lanes. The congestion was observed beyond the Iron Cove Bridge.

Figure 5 Saturday Congestion

3 Model Inputs and Description

3.1 Software

The modelling work was undertaken using Quadstone Paramics software that included the following.

3.1.1 Paramics Software

Paramics (version 6.7.1)

3.1.2 Azalient Software

Azalient Plugins (version P67)

3.2 Data

3.2.1 Summary

Table 3-1 below summarises the data inputs into the model.

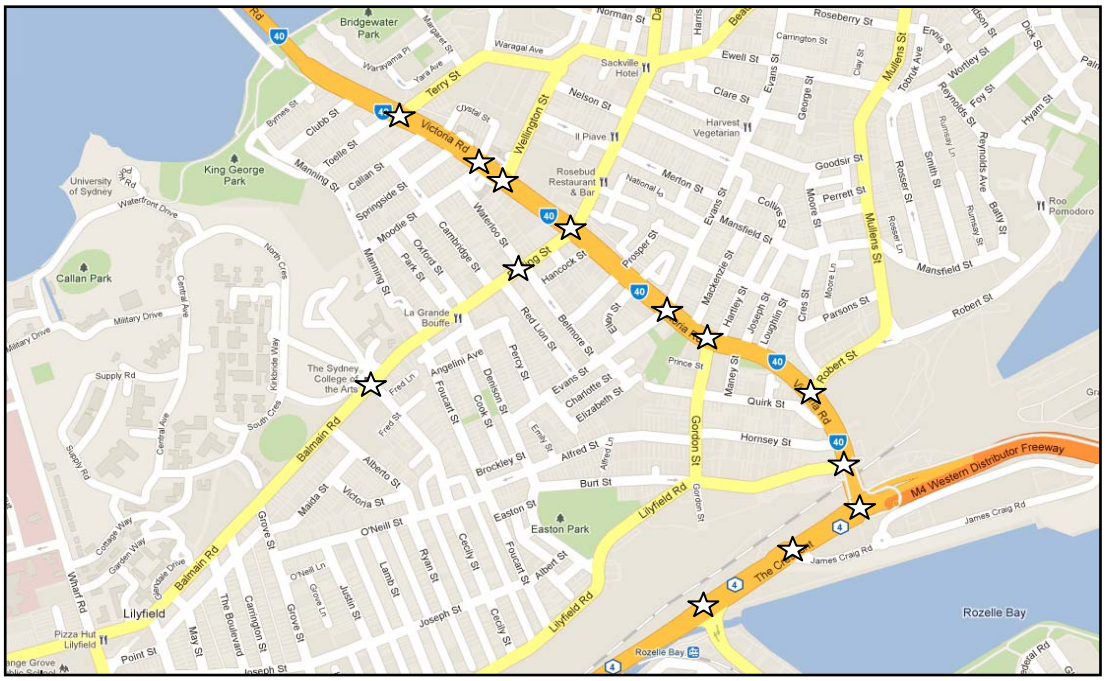
Table 3-1 Model Data

Data	Source	Date
Traffic Counts	Roar Data	8 September 2011
		10 September 2011
		15 September 2011
		17 September 2011
Travel Time Surveys (Buses)	AusTraffic	8 September 2011
		10 September 2011
Travel Time Surveys (Cars)	Halcrow	15 September 2011
		17 September 2011
SCATS History	RTA	8 September 2011
		10 September 2011

3.2.2 Counts

Traffic counts were commissioned by Halcrow and undertaken by Roar Data at the locations shown in Figure 6.

Figure 6 Traffic Count Locations



3.2.3 Travel Time Survey (buses)

Bus travel time surveys were undertaken on 8 September and 10 September. Buses were recorded as they past one of three timing points at:

- Terry Street (near bus stop)
- Darling Street (South-east)
- The Crescent (White Bay Hotel)

Travel times were recorded for a Thursday morning and afternoon and a Saturday midday peak.

3.2.4 Travel Time Survey (General Traffic)

To complement the bus travel times a floating car survey was undertaken along Victoria Road to measure the indicative travel time.

3.3 Paramics Files

3.3.1 RTA Standard Files

Configuration file

The standard RTA configuration file was adopted and run with the following random seed values:
7771, 560, 28, 86524, 2849

Vehicles File

The RTA standard vehicles file has been adopted for the models. Heavy vehicles have been separated into a heavy vehicle matrix. The vehicle proportions within the remaining "light" and "heavy" matrices are based on the RTA standard file.

Based on the ROAR Data surveys proportion of heavy vehicles on the study network was:

- 0.5% AM Peak; and
- 0.2% PM Peak
- 0.25% Saturday Peak

This shows that there is a low percentage of heavy vehicles in the network and fewer heavy vehicles on Saturday and in the afternoon peak.

The vehicle types and proportions used based on the standard file are indicated in Table 3-2 below.

Table 3-2 Vehicle Proportions

Vehicle Type	Description	Size	Matrix 1 Proportion	Matrix 2 Proportion
1	Car	Small	29%	-
2	Car	Medium	39%	-
3	Car	Large	23%	-
4	Taxi		1%	-
5	LGV		8%	-
6	(STA) Mini Bus		-	-
7	(Non STA) Mini Bus		-	-
8	(STA) Bus		-	-
9	(Non STA) Bus		-	-
10	(OD) Bus		-	2%
11	Rigid Truck	Light	-	10%
12	Rigid Truck	Medium	-	63%
13	Rigid Truck	Heavy	-	10%
14	Semi Trailer	Light	-	2%
15	Semi Trailer	Medium	-	11%
16	Semi Trailer	Heavy	-	2%
			100%	100%

Categories File

The categories file was based on the standard RTA categories file. No changes to the file were needed for the model.

3.4 Plugins

Plugins are additional software to the core functionality of Paramics that are used to provide more realistic operation of the models. The plugins used are discussed in section 5.7 of this report.

4 Methodology

4.1 Overview

This section of the report summarises the methodology used to build the base model. It describes how the collected data was used in model verification, calibration and validation.

4.2 Data Collection

Traffic turning counts were collected by Roar Data in September 2011. A travel time survey of buses was undertaken by AusTraffic using number plate matching at three locations in both directions along Victoria Road. A floating car survey was also undertaken to measure the general traffic travel times.

4.3 Traffic Count Data Balancing and Interrogation

The traffic count data was arranged in a diagram so that traffic flow mismatches and discrepancies could be identified. Generally the data was found to be consistent however, small discrepancies in the traffic volumes could be accounted for by queue storage in the network or traffic feeding from driveways or identified errors in the data collection.

Traffic volumes at Darling Street was assumed to be correct and were not changed in the balancing process.

As The Crescent was counted on a separate day there were some differences in the traffic counts between Robert Street and The Crescent.

4.4 Matrix Estimation

The origin destination (OD) traffic demands were developed using the Estimator module. Estimator was used to develop the OD matrices for the two periods in the morning peak and two periods in the afternoon peak.

As there was no pattern matrix an approximated pattern matrix was manually derived by estimating the likely traffic routeing based on local knowledge, site observation and turning counts. As this is essentially a corridor model this approach is deemed sufficient with no further need for OD surveys or reference to strategic modelling output.

The estimation periods based on the peak hours from the traffic surveys were:

Morning Peak
7:00-8:00am
8:00-9:00am

Afternoon Peak
4:00-5:00pm
5:00-6:00pm

Saturday Peak
4:00-5:00pm
5:00-6:00pm

4.5 Network Coding

The road network was coded based on the RTA's Victoria Road model. The model was cut at the Iron Cove Bridge and the additional section was added to Darling Street to the west.

4.6 Signal Timings

The model signal times are derived from recorded SCATS files and the averages are played back in the model through the Signal Player Plugin. Intersection cycle times were all rounded up to 140 seconds across the network to provide better coordination and offsets were adjusted between subsystems to reflect the traffic progression.

4.7 Calibration

Calibration of the base models is based on the comparison of traffic flows between the modelled and the observed. The model paramaters such as traffic demands signal timings and lane choice are adjusted until the model adequately reflects the observed conditions.

4.8 Validation

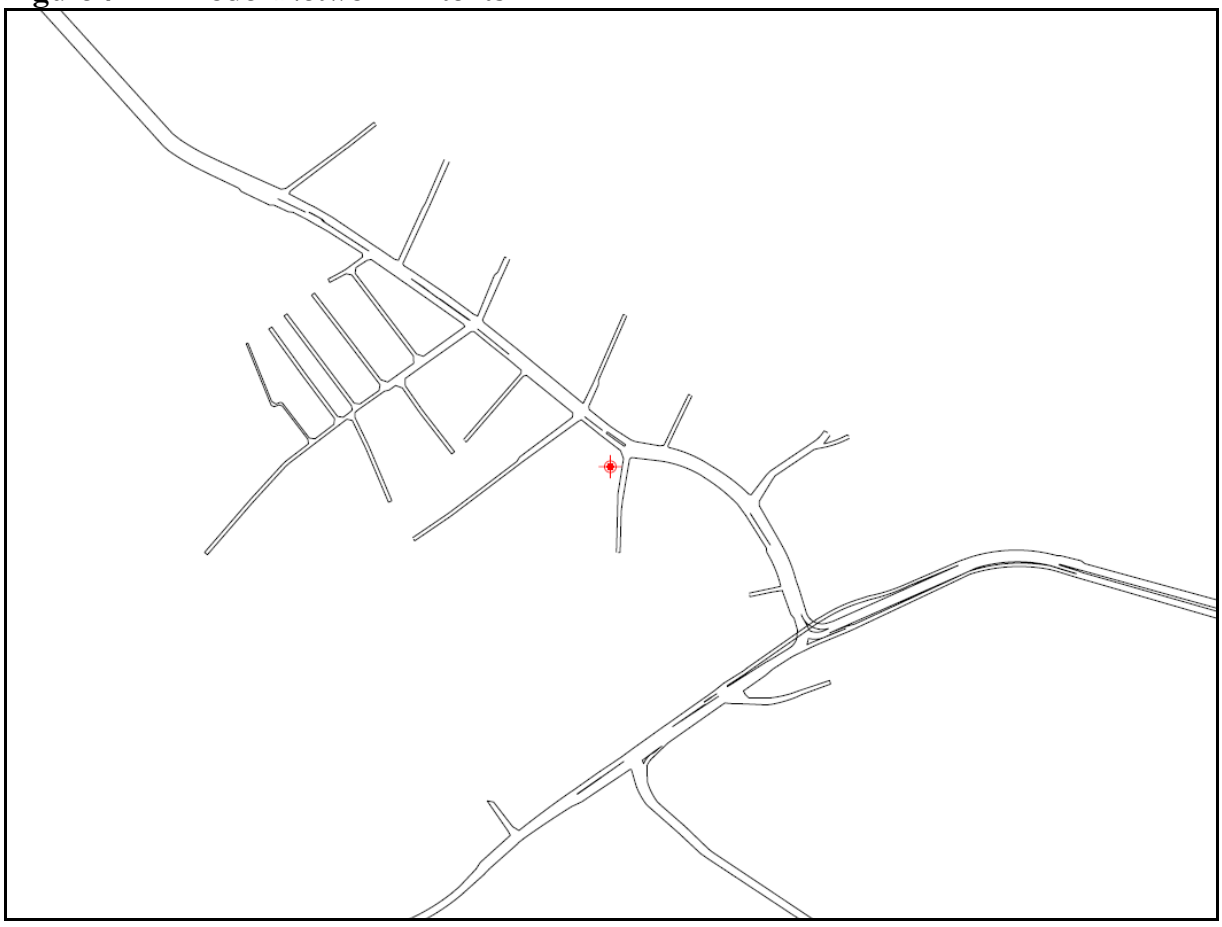
Validation is the use of a separate set of data to verify that the model is calibrated. In this case the models were compared qualitatively to the observed queuing and congestion behaviour and quantitatively to the observed travel times.

5 Model Structure

5.1 Network Extents

The model network is indicated in Figure 7. The model is based on the RTA's Victoria Road model for the Inner-west busway option 12. The network has been extended along Darling Street to include the side streets. The model is cut at Iron Cove Bridge in the North, ANZAC Bridge to the east and City West Link to the West.

Figure 7 Model Network Extents



5.2 Zones

The zoning plan is also shown in Figure 7. Zones are areas of the model where traffic is loaded onto, and taken off, the network. The origin destination matrix is defined by trips *to* and *from* zones. A zone is provided for every external approach in the model leading to a signalised intersection. In addition zones are provided between intersections to make up for gains and losses in traffic volumes between intersections due to the presence of parking and minor side streets.

5.3 Periods

Paramics allows for the setting up of time periods to reflect the changes in demand patterns in time. The models have 4 time periods.

Warm-up Period

Because the model starts with no traffic in the network a warm-up period is required to load traffic into the network. The warm-up period also allows adjusting vehicle volumes before the calibration periods.

Calibration Periods

The Calibration periods are the periods during which results from the model are taken and compared to observed values. In this model there are two calibration periods per peak period representing the peak two hours in both the weekday morning and evening.

Cool Down Period

The cool down period allows for the modelling of residual queues (those queues that exist after the peak period).

5.4 Profiles

The traffic release profiles for each zone were calculated from the surveys in 15 minute intervals. A general flat profile was used for zones where no data was available as this has been found to generally represent peak period traffic patterns in Sydney.

5.5 Assignment

The model has limited route choice and therefore the model has a very simple 'All or Nothing' approach to the traffic assignment with perturbation. Waterloo Street and Moodie Street connection has been included. Some traffic is allowed to avoid the Darling Street intersection by turning down.

5.6 Signal Timings

Signal timings are based on 15minute averages from SCATS. Where a phase is not called every cycle the models were adjusted to call phases as needed. The 'gap out' alternate phases at Darling Street were added to replicate the observed signal operation.

5.7 Plug-ins

Plugins is software that adds functionality to the core Paramics program. Some Plugins add reporting functionality, some help with the coding of the model while others may change the behaviour of the model to better represent Sydney traffic conditions.

Reporting Plug-ins

Level of Service

The level of Service Plugin is able to report the intersection delay by approach. The intersection can than be assigned a Level of Service (LoS) based on the RTA criteria.

Validator

The Validator Plugin is used to record the various calibration and validation statistics. Its primary purpose is to compare observed turn counts to modelled turn counts and travel times on selected routes.

Behaviour Plugins

Lane Choice

As the core Paramics only 'sees' maximum of two nodes ahead sometimes lane choice rules are required to force vehicles into their correct lane. This becomes critical in congested networks where lane discipline is essential. In this case, the use of lane

choices was found particularly crucial to model the lane usage behaviour for vehicles on Victoria Road heading toward the city as the manoeuvre early to the correct lane at the Crescent.

Signal Player

The signal player plugin was used to read into the model signal time averages recorded in the real world.

SCATS Pedestrians

The pedestrian crossing plugin mimics the delays to vehicles turning across a pedestrian crossing. Pedestrian crossings were coded at:

- Darling Street / Victoria Road
- Darling Street / Waterloo Street
- Victoria Road / Wellington Street

Builder

Trailmaker

Trailmaker builds paths that can be used by other Plugins such as the Validator travel time function.

6 Calibration and Validation

6.1 RTA Requirements

The following requirements of the RTA contract have been met for the following criteria.

6.1.1 Intersection Validation

- Hourly turn count comparison has been undertaken and is presented in the section 6.3 of this report.
- Queue lengths have been compared in section 6.5
- Intersection delays were not recorded however modelled delays have been recorded for option testing.
- The cycle throughput should match if
  - cycle times and phase splits are similar to observed as indicated in the SCATS operation; and
  - turn count volumes are similar to the observed.
- Intersections have been calibrated and show a good correlation to the observed.

6.1.2 Cycle Utilisation

- SCATS operation.

6.1.3 Signal Optimisation

- Models were run using fixed time signals. The signal timings have been based on recorded times from SCATS.

6.1.4 Platoon Dispersion

- The Paramics default settings have been used and the platoon dispersal is a function of the software. In general observations of the model indicate adequate platoon dispersion.

6.1.5 Travel Times

- Travel time comparisons are covered in section 6.4.

6.1.6 Model Stability

- Model stability is covered in section 6.6 of this report.

6.1.7 Distribution of Errors

- Comments on errors have been included through out the report. However in summary the model show a good correlation to traffic volumes and queue lengths.

6.2 GEH Comparison

The model calibration exercise involved comparisons between modelled and observed turn counts.

The GEH statistic is used in the calibration of the model to compare the difference between observed counts and model counts. The GEH statistic is defined as follows:

$$GEH = \sqrt{\left(V_O - V_A\right)^2 / \left(0.5 \times \left(V_O + V_A\right)\right)}$$

Where Vo = observed traffic count and Va = assigned traffic count. The reason for using the GEH statistic rather than an absolute or relative flow difference is that it can cope with a wide range of traffic flows, whereas an absolute difference of 100 vehs/hr can be important in a flow of 200 vehs/hr but is largely irrelevant in a flow of several thousand vehs/hr.

The Rozelle Village base models were calibrated on the basis of classified turning movement counts. The counts for each modelled period were compared with the observed counts by hour.

In accordance with the calibration guidelines set out in Design Manual of Roads and Bridges Vol 12 – Traffic Appraisal of Road Schemes (DMRB12), the model should meet the following requirements to be considered well calibrated:

- No flows with GEH greater than 10
- 85% of all flows with GEH of less than 5

6.3 Turn Count Comparisons

Modelled and observed traffic turning counts have been compared for all intersections which were surveyed covering a total of 115 turning movements per model hour in morning peak period and 116 turning movements per model hour in evening peak period (Banned turn at Robert Street).

The GEH comparison summary for morning and evening peak period two hour periods for each individual turning count are summarised below.

Table 6-1 GEH Turn Count Comparison

Hour Beginning	Number of Movements with GEH Below			
	<3	<5	<10	>10
AM Peak				
07:00 – 8:00	93 (80%)	110 (95%)	115 (100%)	0
08:00 – 9:00	83 (72%)	105 (90%)	115 (100%)	0
PM Peak				
16:00-17:00	91 (77%)	109 (96%)	116 (100%)	0
17:00-18:00	83 (71%)	107 (92%)	116 (100%)	0
Saturday Peak				
11:00 – 12:00	103 (89%)	114 (99%)	116 (100%)	0
12:00 – 13:00	104(90%)	116 (100%)	116(100%)	0

Analysis of the GEH values for turning movement data in the models conforms to the DMRB standard. This shows that the model is well calibrated for the morning, evening and Saturday peak periods

A detailed list of all turning counts used in model calibration is presented in Appendix A.

6.4 Travel Time Validation

A comparison of the modelled travel times and the observed travel times is presented in the following tables. The observed travel times are the average of the runs undertaken between the specified hours on 15 and 17 of September.

6.4.1 AM Peak Travel Times

Table 6-2 shows the travel times in the AM peak. In the city bound direction the model showed higher travel times between Darling Street and the Crescent. In the second hour the travel times are more similar to the observed.

The outbound direction on the day of the survey was congested going to Drummoyne and therefore showed much higher travel times between Darling Street and Iron Cove Bridge. The bus travel times undertaken on a separate day do not show such high travel times for this section and are more consistent with the general traffic in the model.

Table 6-2 AM Travel Time Comparisons

Timing Point	**07:00 – 08:00**				**08:00 – 09:00**			
	Observed			Modelled	Observed			Modelled
	Min	Average	Max	Average	Min	Average	Max	Average
City Bound								
Iron Cove Bridge to Darling Street	1:56	2:23	2:50	2:36	3:10	3:27	3:35	3:21
Darling Street to the Crescent	1:14	1:15	1:15	3:24	2:03	2:54	3:45	3:48
Total	**3:10**	**3:38**	**4:05**	**6:00**	**5:13**	**6:21**	**7:20**	**7:08**
Out Bound								
The Crescent - Darling	1:55	2:20	2:07	1:45	1:00	2:12	5:00	2:12
Darling St – Iron Cove Bridge	0:35	3:00	5:25	0:47	1:20	5:08	7:35	0:50
Total	**2:30**	**5:20**	**7:32**	**2:31**	**2:20**	**7:20**	**12:35**	**3:02**

6.4.2 PM Peak Travel Times

The PM travel time comparison is shown in Table 6-3 below. The PM peak generally shows the model travel times lower than the observed general traffic times however bus travel times show a much closer correlation.

Table 6-3 PM Travel Time Comparison

Timing Point	**16:00 – 17:00**				**17:00 – 18:00**			
	Observed			Modelled	Observed			Modelled
	Min	Average	Max	Average	Min	Average	Max	Average
City Bound								
Iron Cove Bridge to Darling Street	1:00	1:12	1:25	1:14	2:20	2:20	2:20	1:14
Darling Street to the Crescent	2:07	2:54	3:50	1:45	2:15	2:15	2:15	1:53
Total	**3:07**	**4:06**	**5:15**	**2:59**	**4:35**	**4:35**	**4:35**	**3:07**
Out Bound								
The Crescent - Darling	1:40	2:50	3:26	2:05	2:09	2:09	2:09	1:51
Darling St – Iron Cove Bridge	0:50	0:53	0:55	0:47	0:54	0:54	0:54	0:46
Total	**2:30**	**3:43**	**4:21**	**2:52**	**3:03**	**3:03**	**3:03**	**2:37**

6.4.3 Saturday Peak Travel Times

The Saturday peak travel times are shown in Table 6-4 below. The Citybound travel times show a close correlation in the first hour.

Table 6-4 Saturday Travel Time Comparison

Timing Point	**11:00 – 12:00**				**12:00 – 13:00**			
	Observed			Modelled	Observed			Modelled
	Min	Average	Max	Average	Min	Average	Max	Average
City Bound								
Iron Cove Bridge to Darling Street	0:53	3:18	5:12	3:59	3:24	3:39	3:54	3:31
Darling Street to the Crescent	2:10	2:42	3:22	2:26	4:18	4:57	5:36	2:36
Total	**3:03**	**6:00**	**8:34**	**6:26**	**7:42**	**8:36**	**9:30**	**6:07**
Out Bound								
The Crescent - Darling	1:37	2:10	2:38	2:01	1:50	2:20	2:50	2:02
Darling St – Iron Cove Bridge	0:18	0:56	1:41	0:49	1:20	1:36	1:41	0:49
Total	**1:55**	**3:06**	**4:19**	**2:49**	**3:10**	**3:56**	**4:31**	**2:51**

6.5 Bus Travel Times

Bus surveys were undertaken matching number plates at Robert Street, Darling Street and near Terry Street. Observed travel times are matched to the model below.

6.5.1 AM Peak

The AM peak bus travel times show that the model is predicting travel times near the upper quartile of the observed travel time.

Table 6-5 AM Peak Bus Travel Times

	Observations			Modelled
	Lower Quartile	**Average**	**Upper Quartile**	**Average Modelled**
07:00 – 08:00				
Citybound				
Terry St - Darling St	1:26	1:49	2:10	1:58
Darling St - Robert St	1:38	2:07	2:24	2:28
Total	**3:16**	**3:57**	**4:25**	**4:57**
Outbound				
Terry St - Darling St	1:05	1:31	1:36	2:02
Darling St - Robert St	1:14	1:21	1:39	2:02
Total	**2:30**	**3:29**	**3:35**	**4:04**
08:00 – 09:00				
Citybound				
Terry St - Darling St	1:23	2:01	2:30	1:52
Darling St - Robert St	2:00	2:24	2:50	2:46
Total	**3:38**	**4:21**	**4:57**	**5:07**
Outbound				
Terry St - Darling St	0:48	1:24	2:10	2:17
Darling St - Robert St	1:05	1:17	2:24	2:03
Total	**2:02**	**2:39**	**4:25**	**4:20**

6.5.2 PM Peak

The bus travel times are shown in Table 6-6 below. The modelled first hour shows a close correlation to the average observations while the second hour is closer to the lower quartile.

Table 6-6 PM Peak Bus Travel Times

	Observations			Modelled
	Lower Quartile	**Average**	**Upper Quartile**	**Average Modelled**
16:00 – 17:00				
Citybound				
Terry St - Darling St	0:45	1:14	1:35	0:59
Darling St - Robert St	1:36	2:35	2:33	1:53
Total	**2:44**	**3:52**	**4:00**	**3:24**
Outbound				
Terry St - Darling St	1:49	2:08	2:32	2:14
Darling St - Robert St	1:02	1:43	2:00	1:44
Total	**3:16**	**3:46**	**4:12**	**3:55**
17:00 – 18:00				
Citybound				
Terry St - Darling St	0:50	1:27	1:46	1:10
Darling St - Robert St	2:59	3:30	3:57	2:05
Total	**3:49**	**4:51**	**5:51**	**3:43**
Outbound				
Terry St - Darling St	2:03	2:47	3:32	1:58
Darling St - Robert St	1:07	1:32	1:56	1:32
Total	**3:25**	**4:14**	**5:03**	**3:30**

6.5.3 Saturday Peak

Table 6-7 Saturday Peak Bus Travel times

	Observations			Modelled
	Lower Quartile	**Average**	**Upper Quartile**	**Average Modelled**
11:00 – 12:00				
Citybound				
Terry St - Darling St	3:53	4:37	5:04	5:08
Darling St - Robert St	1:43	2:19	2:40	2:40
Total	**1:54**	**2:20**	**2:34**	**2:06**
Outbound				
Terry St - Darling St	1:56	2:28	2:49	2:36
Darling St - Robert St	1:07	1:40	1:46	1:58
Total	**3:33**	**4:13**	**4:04**	**4:34**
12:00 – 13:00				
Citybound				
Terry St - Darling St	1:36	1:47	1:58	2:33
Darling St - Robert St	1:56	2:36	3:11	2:14
Total	**3:44**	**4:21**	**4:57**	**5:05**
Outbound				
Terry St - Darling St	3:11	3:37	4:06	3:12
Darling St - Robert St	1:46	1:38	2:00	1:17
Total	**4:46**	**5:17**	**5:58**	**4:29**

6.6 *Queue lengths*

The model has been validated on the basis of qualitative queue length observation. The details of this validation are presented below.

The key findings for the AM, PM and Saturday peak have been summarised in Tables 6-8, 6-9 and 6-10.

Table 6-8 AM Peak Queues

Key Location	Observed	Modelled
City Bound from the Crescent	Solid congestion city bound from Robert Street back to the Iron Cove Bridge	Modelled matches the observed queuing.
Outbound queues on Iron Cove Bridge	Slow moving traffic on Iron Cove Bridge outbound.	Traffic signals were coded in the model to reflect the capacity constraint at the Iron Cove Bridge.

Table 6-9 PM Peak Queues

Key Location	Observed	Modelled
Right Turn City Bound to Darling Street	Victoria Road operates reasonable well. The right turn to Darling Street was observed queuing beyond the Wellington Street at times.	The model reflects the long queues for the right turn at Darling Street.

Table 6-10 Sat Peak Queues

Key Location	Observed	Modelled
Citybound from Darling Street	Citybound Queuing from Darling Street to beyond the Iron Cove Bridge.	On Street Parking effects were modelled causing queuing that extended beyond the Iron Cove Bridge.

6.7 *Model Stability*

Multiple seed values were used to run the model to determine the stability of the Paramics model. The following graphs indicate the total number of hours travelled in the network by time. As more congestion builds the higher the Vehicle Hours Travelled (VHT) will be.

Seed values are a random starting point for the model and amongst a range of other model behaviours also influence the pattern that vehicles are released into the network. This introduction of small variation will change the model outcomes for any particular run.

Figure 8 indicates the five seed value runs for the AM peak. The patterns of all runs remain consistent and are closely correlating with 8% variability at 9:00am.

Figure 8 Vehicle Hours Travelled AM Peak

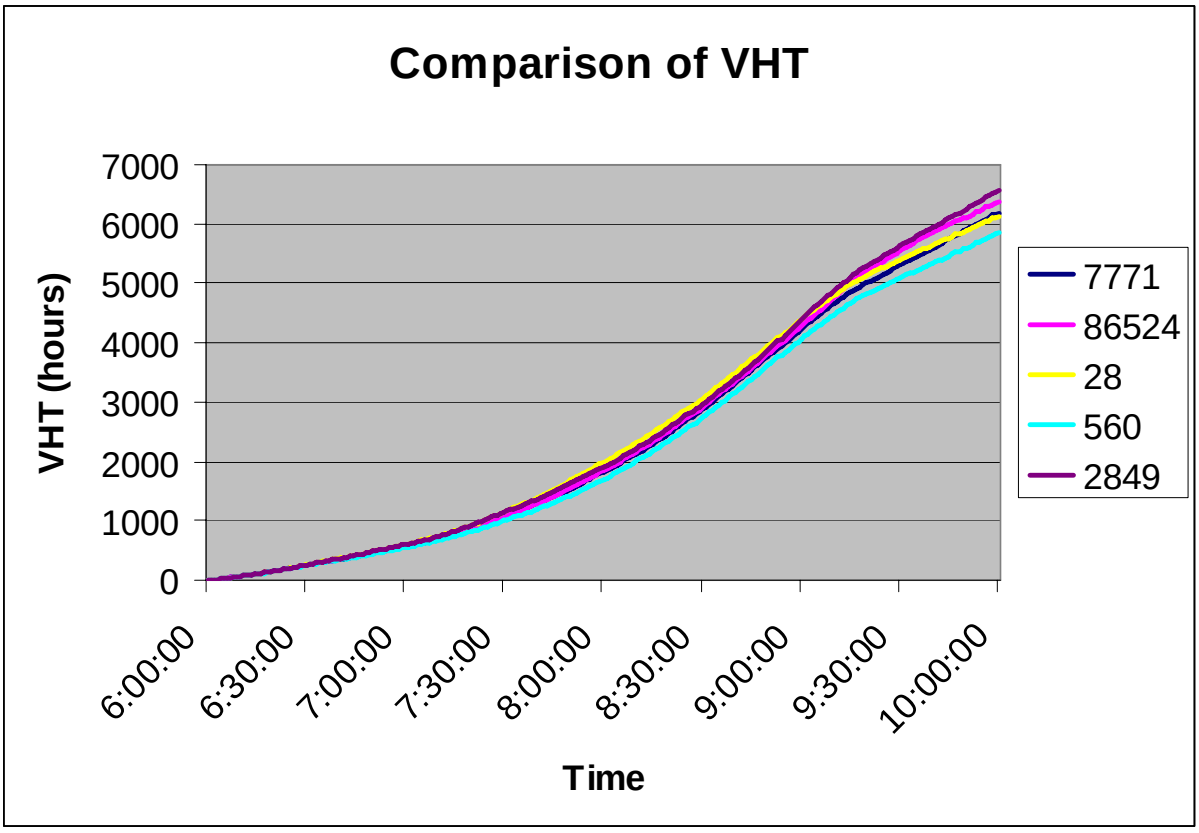


Figure 6 shows the five runs for the PM peak. The graph shows two groups of runs. By 6pm there is a variability of 8%.

Figure 9 Number of Vehicle in the Network PM Peak

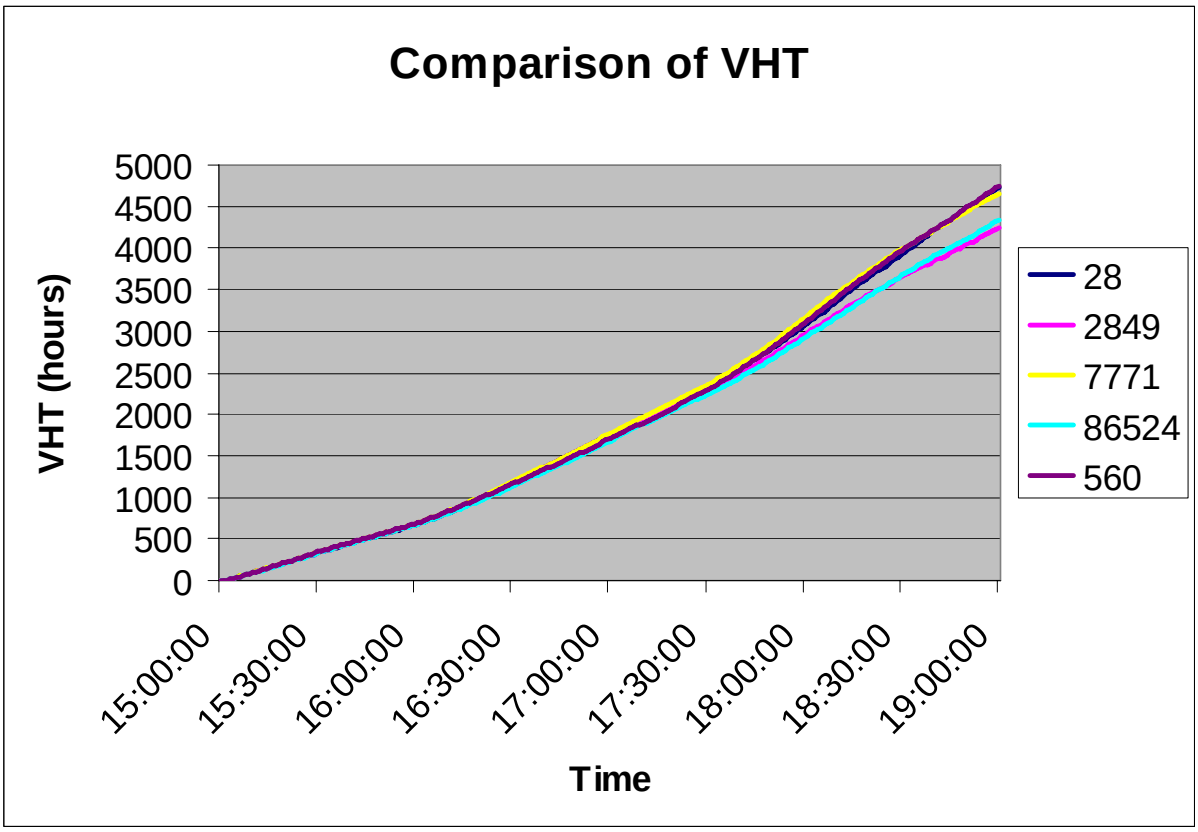
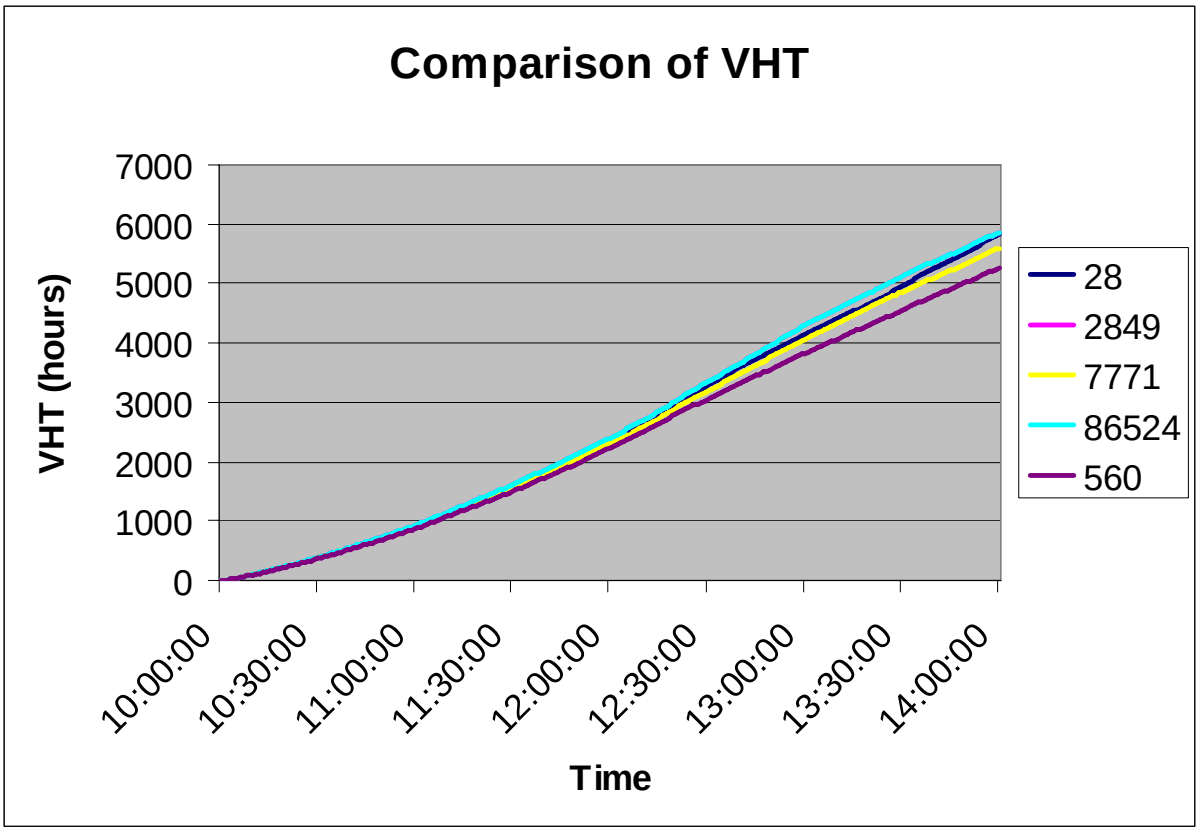


Figure 9 shows the five seed runs for the Saturday Peak. The graph shows that run 560 was an outlier with variability between the other 4 runs at 1pm being 6%

Figure 10 Saturday Peak Model



7 Conclusion

Halcrow has been commissioned by Pacific Investments Pty Ltd to undertake traffic modelling for the redevelopment of Rozelle Village. The location was modelled using Paramics with traffic signals controlled by the signal player plugin. The models were calibrated to observed conditions in 2011.

The models include Victoria Road from Iron Cove to The Crescent and The Crescent to City West Link as Well as Darling Street to the west of Victoria Road. They feature traffic signals based on recorded SCATS data, pedestrian crossings at key locations and bus routes.

A comparison of the observed and modelled traffic volumes indicates that the models are representative of the base conditions. Travel Times and queuing behaviours were found to be representative of the observed conditions.

It is concluded that the models are appropriate tools for the comparative assessment of the relative impacts of future development scenarios (ie. Rozelle Village).

Appendix A Turn Count Comparison

Table A-1 Turn Count Comparison 8:00am – 9:00am

Intersection	Approach	Movement	Location	Period	Observed	Modelled	Diff	%	GEH
Darling Street/Manning St	Eastbound	Through	9:6:7 [A]	2	619	593	-26	-4.2	1.06
Darling Street/Manning St	Westbound	Through	7:6:9 [A]	2	466	419	-47	-10.09	2.23
Darling Street/Manning St	Southbound	Left	5:6:7 [L]	2	8	9	1	12.5	0.34
Darling Street/Manning St	Southbound	Right	5:6:9 [R]	2	6	2	-4	-66.67	2
Darling Street/Park St	Southbound	Right	20:7:6 [R]	2	5	3	-2	-40	1
Darling Street/Park St	Southbound	Left	20:7:12 [L]	2	10	15	5	50	1.41
Darling Street/Park St	Westbound	Right	12:7:20 [R]	2	7	4	-3	-42.86	1.28
Darling Street/Park St	Westbound	Through	12:7:6 [L]	2	461	416	-45	-9.76	2.15
Darling Street/Park St	Eastbound	Through	6:7:12 [R]	2	607	586	-21	-3.46	0.86
Darling Street/Park St	Eastbound	Left	6:7:20 [L]	2	20	15	-5	-25	1.2
Darling Street/Denison St	Westbound	Through	8:12:7 [R]	2	458	412	-46	-10.04	2.21
Darling Street/Denison St	Westbound	Right	8:12:15 [L]	2	60	43	-17	-28.33	2.37
Darling Street/Denison St	Northbound	Right	15:12:8 [R]	2	5	2	-3	-60	1.6
Darling Street/Denison St	Northbound	Left	15:12:7 [L]	2	10	8	-2	-20	0.67
Darling Street/Denison St	Eastbound	Right	7:12:15 [R]	2	10	8	-2	-20	0.67
Darling Street/Denison St	Eastbound	Through	7:12:8 [L]	2	607	594	-13	-2.14	0.53
Darling Street/Oxford St	Southbound	Right	19:8:12 [R]	2	1	0	-1	-100	1.41
Darling Street/Oxford St	Southbound	Left	19:8:333z [L]	2	14	16	2	14.29	0.52
Darling Street/Oxford St	Westbound	Right	333z:8:19 [R]	2	3	2	-1	-33.33	0.63
Darling Street/Oxford St	Westbound	Through	333z:8:12 [L]	2	517	456	-61	-11.8	2.77
Darling Street/Oxford St	Eastbound	Through	12:8:333z [R]	2	553	548	-5	-0.9	0.21
Darling Street/Oxford St	Eastbound	Left	12:8:19 [L]	2	91	48	-43	-47.25	5.16
Darling Street/Cambridge St	Southbound	Right	18:333z:8 [R]	2	9	10	1	11.11	0.32
Darling Street/Cambridge St	Southbound	Left	18:333z:17 [L]	2	4	3	-1	-25	0.53
Darling Street/Cambridge St	Westbound	Right	17:333z:18 [R]	2	5	8	3	60	1.18
Darling Street/Cambridge St	Westbound	Through	17:333z:8 [L]	2	511	450	-61	-11.94	2.78
Darling Street/Cambridge St	Eastbound	Through	8:333z:17 [R]	2	527	532	5	0.95	0.22
Darling Street/Cambridge St	Eastbound	Left	8:333z:18 [L]	2	40	31	-9	-22.5	1.51

Intersection	Approach	Movement	Location	Period	Observed	Modelled	Diff	%	GEH
Darling Street/Red Lion St	Westbound	Through	4207:17:333z [R]	2	516	461	-55	-10.66	2.49
Darling Street/Red Lion St	Eastbound	Right	333z:17:13 [R]	2	62	78	16	25.81	1.91
Darling Street/Red Lion St	Eastbound	though	333z:17:4207 [L]	2	469	457	-12	-2.56	0.56
Darling Street/Waterloo St	Southbound	Right	341z:4207:17 [R]	2	9	10	1	11.11	0.32
Darling Street/Waterloo St	Southbound	Through	341z:4207:23 [L]	2	0	0	0	0	0
Darling Street/Waterloo St	Southbound	Left	341z:4207:655 [L]	2	16	19	3	18.75	0.72
Darling Street/Waterloo St	Westbound	Right	655:4207:341z [R]	2	33	37	4	12.12	0.68
Darling Street/Waterloo St	Westbound	Through	655:4207:17 [L]	2	527	451	-76	-14.42	3.44
Darling Street/Waterloo St	Westbound	Left	655:4207:23 [L]	2	0	0	0	0	0
Darling Street/Waterloo St	Northbound	Right	23:4207:655 [R]	2	15	9	-6	-40	1.73
Darling Street/Waterloo St	Northbound	Left	23:4207:341z [A]	2	6	1	-5	-83.33	2.67
Darling Street/Waterloo St	Eastbound	Through	17:4207:655 [R]	2	441	442	1	0.23	0.05
Darling Street/Waterloo St	Eastbound	Left	17:4207:341z [L]	2	28	15	-13	-46.43	2.8
Victoria Road / Terry St	Eastbound	Through	243:465:344z [R]	2	3301	3217	-84	-2.54	1.47
Victoria Road / Terry St	Eastbound	Left	243:465:477z [L]	2	335	266	-69	-20.6	3.98
Victoria Road / Terry St	Southbound	Left	477z:465:344z [A]	2	96	90	-6	-6.25	0.62
Victoria Road / Terry St	Westbound	Through	445z:465:243 [A]	2	2107	2035	-72	-3.42	1.58
Victoria Road / Terry St	Westbound	Right	344z:465:477z [A]	2	54	48	-6	-11.11	0.84
Victoria Road / Moodie St	Eastbound	Through	346z:30978:656 [A]	2	3397	3323	-74	-2.18	1.28
Victoria Road / Moodie St	Westbound	Through	656:30978:343z [R]	2	1974	1890	-84	-4.26	1.91
Victoria Road / Moodie St	Westbound	Left	656:30978:341z [L]	2	11	19	8	72.73	2.07
Victoria Road / Moodie St	Northbound	Left	341z:30978:343z [A]	2	187	198	11	5.88	0.79
Victoria Road / Wellington St	Eastbound	Through	30978:656:338z [A]	2	3397	3308	-89	-2.62	1.54
Victoria Road / Wellington St	Southbound	Right	451z:656:30978 [R]	2	517	448	-69	-13.35	3.14
Victoria Road / Wellington St	Southbound	Left	451z:656:338z [L]	2	60	77	17	28.33	2.05
Victoria Road / Wellington St	Westbound	Through	338z:656:30978 [A]	2	1468	1460	-8	-0.54	0.21
Victoria Road / Darling St	Eastbound	Right	338z:655:4207 [A]	2	256	267	11	4.3	0.68
Victoria Road / Darling St	Eastbound	Through	339z:655:337z [R]	2	3143	3057	-86	-2.74	1.54
Victoria Road / Darling St	Eastbound	Left	339z:655:334z [L]	2	58	45	-13	-22.41	1.81
Victoria Road / Darling St	Southbound	Westbound	334z:655:4207 [R]	2	239	187	-52	-21.76	3.56
Victoria Road / Darling St	Southbound	Left	334z:655:337z [L]	2	150	183	33	22	2.56

Intersection	Approach	Movement	Location	Period	Observed	Modelled	Diff	%	GEH
Victoria Road / Darling St	Westbound	Right	337z:655:334z [A]	2	73	44	-29	-39.73	3.79
Victoria Road / Darling St	Westbound	Through	340z:655:338z [R]	2	1245	1239	-6	-0.48	0.17
Victoria Road / Darling St	Westbound	Left	340z:655:4207 [L]	2	65	39	-26	-40	3.61
Victoria Road / Darling St	Northbound	Right	4207:655:337z [R]	2	5	3	-2	-40	1
Victoria Road / Darling St	Northbound	Through	4207:655:334z [A]	2	244	254	10	4.1	0.63
Victoria Road / Darling St	Northbound	Left	4207:655:338z [L]	2	223	215	-8	-3.59	0.54
Victoria Road / Prosper St	Eastbound	Through	337z:224:654 [A]	2	3298	3251	-47	-1.43	0.82
Victoria Road / Prosper St	Westbound	Through	654:224:337z [R]	2	1373	1355	-18	-1.31	0.49
Victoria Road / Prosper St	Westbound	Left	654:224:226 [L]	2	132	95	-37	-28.03	3.47
Victoria Road / Prosper St	Northbound	Left	226:224:337z [A]	2	10	2	-8	-80	3.27
Victoria Road / Evans St	Eastbound	Through	224:654:92 [R]	2	3270	3224	-46	-1.41	0.81
Victoria Road / Evans St	Eastbound	Left	224:654:470z [L]	2	28	25	-3	-10.71	0.58
Victoria Road / Evans St	Southbound	Right	470z:654:224 [R]	2	109	87	-22	-20.18	2.22
Victoria Road / Evans St	Southbound	Through	470z:654:449z [A]	2	66	52	-14	-21.21	1.82
Victoria Road / Evans St	Southbound	Left	470z:654:92 [L]	2	160	121	-39	-24.38	3.29
Victoria Road / Evans St	Westbound	Through	450z:654:224 [R]	2	1373	1327	-46	-3.35	1.25
Victoria Road / Evans St	Westbound	Left	450z:654:449z [L]	2	6	9	3	50	1.1
Victoria Road / Evans St	Northbound	Right	449z:654:92 [L]	2	1	0	-1	-100	1.41
Victoria Road / Evans St	Northbound	Through	449z:654:470z [R]	2	75	67	-8	-10.67	0.95
Victoria Road / Evans St	Northbound	Left	449z:654:224 [L]	2	23	28	5	21.74	0.99
Victoria Road / Gordon St	Eastbound	Through	757z:653:31032 [A]	2	3431	3320	-111	-3.24	1.91
Victoria Road / Gordon St	Westbound	Through	31032:653:92 [A]	2	1356	1315	-41	-3.02	1.12
Victoria Road / Gordon St	Northbound	Left	91:653:31032 [R]	2	318	283	-35	-11.01	2.02
Victoria Road / Gordon St	Northbound	Right	91:653:92 [L]	2	23	19	-4	-17.39	0.87
Victoria Road / Joseph St	Eastbound	Through	653:31032:31482 [R]	2	3704	3560	-144	-3.89	2.39
Victoria Road / Joseph St	Eastbound	left	653:31032:228 [L]	2	45	43	-2	-4.44	0.3
Victoria Road / Joseph St	Southbound	Left	228:31032:31482 [A]	2	25	12	-13	-52	3.02
Victoria Road / Joseph St	Westbound	Through	31482:31032:653 [A]	2	1356	1318	-38	-2.8	1.04
Victoria Road / Robert St	Eastbound	Through	31482:652:31012 [R]	2	3706	3552	-154	-4.16	2.56
Victoria Road / Robert St	Eastbound	Left	31482:652:31031 [L]	2	23	13	-10	-43.48	2.36
Victoria Road / Robert St	Southbound	Right	31031:652:31482 [R]	2	1	0	-1	-100	1.41

Intersection	Approach	Movement	Location	Period	Observed	Modelled	Diff	%	GEH
Victoria Road / Robert St	Southbound	Left	31031:652:31012 [L]	2	1019	849	-170	-16.68	5.56
Victoria Road / Robert St	Westbound	Right	31012:652:31031 [A]	2	526	406	-120	-22.81	5.56
Victoria Road / Robert St	Westbound	Through	34478:652:31482 [A]	2	1356	1319	-37	-2.73	1.01
Victoria Road / Lilyfield Rd	Eastbound	Through	31012:98:97 [A]	2	4725	4380	-345	-7.3	5.11
Victoria Road / Lilyfield Rd	Westbound	Through	97:98:31012 [R]	2	1821	1654	-167	-9.17	4.01
Victoria Road / Lilyfield Rd	Northbound	Left	81:98:31012 [A]	2	61	72	11	18.03	1.35
Victoria Road / Lilyfield Rd	Westbound	Left	97:98:81 [L]	2	247	256	9	3.64	0.57
Victoria Road / The Crescent	Eastbound	Right	97:651:31014 [A]	2	708	689	-19	-2.68	0.72
Victoria Road / The Crescent	Eastbound	Left	97:31004:31000 [A]	2	4017	3695	-322	-8.02	5.19
Victoria Road / The Crescent	Westbound	Right	31004:651:97 [A]	2	1512	1346	-166	-10.98	4.39
Victoria Road / The Crescent	Westbound	Through	31003:651a:31014 [A]	2	1527	1471	-56	-3.67	1.45
Victoria Road / The Crescent	Northbound	Left	31014:651:97 [A]	2	556	559	3	0.54	0.13
Victoria Road / The Crescent	"The Mouse Hole"		31017:351z:350z [A]	2	2400	2171	-229	-9.54	4.79
The Crescent / James Craig Drive	Westbound	Through	31016:3033:31023 [R]	2	2145	2109	-36	-1.68	0.78
The Crescent / James Craig Drive	Westbound	Left	31016:3033:31019 [L]	2	90	61	-29	-32.22	3.34
The Crescent / James Craig Drive	Northbound	Right	31020:31019:3033 [A]	2	34	27	-7	-20.59	1.27
The Crescent / James Craig Drive	Northbound	Left	31019:3033:31023 [L]	2	14	1	-13	-92.86	4.75
The Crescent / James Craig Drive	Eastbound	Right	31023:3033:31019 [A]	2	63	36	-27	-42.86	3.84
The Crescent / James Craig Drive	Eastbound	Through	1208:31023:197 [L]	2	2936	2692	-244	-8.31	4.6
The Crescent / City West Link	Westbound	Through	31023:1208:31025 [A]	2	1483	1423	-60	-4.05	1.57
The Crescent / City West Link	Westbound	Right	31023:1208a:114 [A]	2	676	686	10	1.48	0.38
The Crescent / City West Link	Northbound	Right	114:1208:31023 [R]	2	1123	885	-238	-21.19	7.51
The Crescent / City West Link	Northbound	Left	114:1208:31025 [L]	2	114	93	-21	-18.42	2.06
The Crescent / City West Link	Eastbound	Right	31025:1208:114 [A]	2	111	111	0	0	0
The Crescent / City West Link	Eastbound	Through	74:1208:31023 [A]	2	1876	1855	-21	-1.12	0.49

Table A-2 Turn Count Comparison 8:00am – 9:00am

Intersection	Approach	Movement	Location	Period	Observed	Modelled	Diff	%	GEH
Darling Street/Manning St	Eastbound	Through	9:6:7 [A]	3	593	621	28	4.72	1.14
Darling Street/Manning St	Westbound	Through	7:6:9 [A]	3	528	503	-25	-4.73	1.1
Darling Street/Manning St	Southbound	Left	5:6:7 [L]	3	6	4	-2	-33.33	0.89
Darling Street/Manning St	Southbound	Right	5:6:9 [R]	3	7	2	-5	-71.43	2.36
Darling Street/Park St	Southbound	Right	20:7:6 [R]	3	5	3	-2	-40	1
Darling Street/Park St	Southbound	Left	20:7:12 [L]	3	10	10	0	0	0
Darling Street/Park St	Westbound	Right	12:7:20 [R]	3	7	3	-4	-57.14	1.79
Darling Street/Park St	Westbound	Through	12:7:6 [L]	3	492	500	8	1.63	0.36
Darling Street/Park St	Eastbound	Through	6:7:12 [R]	3	579	608	29	5.01	1.19
Darling Street/Park St	Eastbound	Left	6:7:20 [L]	3	20	18	-2	-10	0.46
Darling Street/Denison St	Westbound	Through	8:12:7 [R]	3	489	489	0	0	0
Darling Street/Denison St	Westbound	Right	8:12:15 [L]	3	60	71	11	18.33	1.36
Darling Street/Denison St	Northbound	Right	15:12:8 [R]	3	5	14	9	180	2.92
Darling Street/Denison St	Northbound	Left	15:12:7 [L]	3	10	14	4	40	1.15
Darling Street/Denison St	Eastbound	Right	7:12:15 [R]	3	10	7	-3	-30	1.03
Darling Street/Denison St	Eastbound	Through	7:12:8 [L]	3	579	611	32	5.53	1.31
Darling Street/Oxford St	Southbound	Right	19:8:12 [R]	3	0	0	0	0	0
Darling Street/Oxford St	Southbound	Left	19:8:333z [L]	3	16	13	-3	-18.75	0.79
Darling Street/Oxford St	Westbound	Right	333z:8:19 [R]	3	3	0	-3	-100	2.45
Darling Street/Oxford St	Westbound	Through	333z:8:12 [L]	3	549	559	10	1.82	0.42
Darling Street/Oxford St	Eastbound	Through	12:8:333z [R]	3	500	570	70	14	3.03
Darling Street/Oxford St	Eastbound	Left	12:8:19 [L]	3	52	55	3	5.77	0.41
Darling Street/Cambridge St	Southbound	Right	18:333z:8 [R]	3	12	14	2	16.67	0.55
Darling Street/Cambridge St	Southbound	Left	18:333z:17 [L]	3	11	10	-1	-9.09	0.31
Darling Street/Cambridge St	Westbound	Right	17:333z:18 [R]	3	5	3	-2	-40	1
Darling Street/Cambridge St	Westbound	Through	17:333z:8 [L]	3	570	544	-26	-4.56	1.1
Darling Street/Cambridge St	Eastbound	Through	8:333z:17 [R]	3	453	539	86	18.98	3.86
Darling Street/Cambridge St	Eastbound	Left	8:333z:18 [L]	3	37	45	8	21.62	1.25
Darling Street/Red Lion St	Westbound	Through	4207:17:333z [R]	3	577	544	-33	-5.72	1.39

Intersection	Approach	Movement	Location	Period	Observed	Modelled	Diff	%	GEH
Darling Street/Red Lion St	Eastbound	Right	333z:17:13 [R]	3	20	21	1	5	0.22
Darling Street/Red Lion St	Eastbound	though	333z:17:4207 [L]	3	444	528	84	18.92	3.81
Darling Street/Waterloo St	Southbound	Right	341z:4207:17 [R]	3	14	8	-6	-42.86	1.81
Darling Street/Waterloo St	Southbound	Through	341z:4207:23 [L]	3	0	0	0	0	0
Darling Street/Waterloo St	Southbound	Left	341z:4207:655 [L]	3	24	24	0	0	0
Darling Street/Waterloo St	Westbound	Right	655:4207:341z [R]	3	37	42	5	13.51	0.8
Darling Street/Waterloo St	Westbound	Through	655:4207:17 [L]	3	576	533	-43	-7.47	1.83
Darling Street/Waterloo St	Westbound	Left	655:4207:23 [L]	3	0	0	0	0	0
Darling Street/Waterloo St	Northbound	Right	23:4207:655 [R]	3	6	5	-1	-16.67	0.43
Darling Street/Waterloo St	Northbound	Left	23:4207:341z [A]	3	7	0	-7	-100	3.74
Darling Street/Waterloo St	Eastbound	Through	17:4207:655 [R]	3	430	469	39	9.07	1.84
Darling Street/Waterloo St	Eastbound	Left	17:4207:341z [L]	3	38	58	20	52.63	2.89
Victoria Road / Terry St	Eastbound	Through	243:465:344z [R]	3	2755	2747	-8	-0.29	0.15
Victoria Road / Terry St	Eastbound	Left	243:465:477z [L]	3	379	342	-37	-9.76	1.95
Victoria Road / Terry St	Southbound	Left	477z:465:344z [A]	3	116	105	-11	-9.48	1.05
Victoria Road / Terry St	Westbound	Through	445z:465:243 [A]	3	1817	2059	242	13.32	5.5
Victoria Road / Terry St	Westbound	Right	344z:465:477z [A]	3	67	56	-11	-16.42	1.4
Victoria Road / Moodie St	Eastbound	Through	346z:30978:656 [A]	3	2871	2821	-50	-1.74	0.94
Victoria Road / Moodie St	Westbound	Through	656:30978:343z [R]	3	1818	1940	122	6.71	2.81
Victoria Road / Moodie St	Westbound	Left	656:30978:341z [L]	3	16	1	-15	-93.75	5.14
Victoria Road / Moodie St	Northbound	Left	341z:30978:343z [A]	3	166	174	8	4.82	0.61
Victoria Road / Wellington St	Eastbound	Through	30978:656:338z [A]	3	2871	2825	-46	-1.6	0.86
Victoria Road / Wellington St	Southbound	Right	451z:656:30978 [R]	3	458	414	-44	-9.61	2.11
Victoria Road / Wellington St	Southbound	Left	451z:656:338z [L]	3	70	43	-27	-38.57	3.59
Victoria Road / Wellington St	Westbound	Through	338z:656:30978 [A]	3	1376	1526	150	10.9	3.94
Victoria Road / Darling St	Eastbound	Right	338z:655:4207 [A]	3	293	275	-18	-6.14	1.07
Victoria Road / Darling St	Eastbound	Through	339z:655:337z [R]	3	2590	2525	-65	-2.51	1.29
Victoria Road / Darling St	Eastbound	Left	339z:655:334z [L]	3	58	46	-12	-20.69	1.66
Victoria Road / Darling St	Southbound	Westbound	334z:655:4207 [R]	3	253	231	-22	-8.7	1.41
Victoria Road / Darling St	Southbound	Left	334z:655:337z [L]	3	168	155	-13	-7.74	1.02
Victoria Road / Darling St	Westbound	Right	337z:655:334z [A]	3	146	92	-54	-36.99	4.95

Intersection	Approach	Movement	Location	Period	Observed	Modelled	Diff	%	GEH
Victoria Road / Darling St	Westbound	Through	340z:655:338z [R]	3	1118	1325	207	18.52	5.92
Victoria Road / Darling St	Westbound	Left	340z:655:4207 [L]	3	71	70	-1	-1.41	0.12
Victoria Road / Darling St	Northbound	Right	4207:655:337z [R]	3	2	2	0	0	0
Victoria Road / Darling St	Northbound	Through	4207:655:334z [A]	3	280	299	19	6.79	1.12
Victoria Road / Darling St	Northbound	Left	4207:655:338z [L]	3	214	195	-19	-8.88	1.33
Victoria Road / Prosper St	Eastbound	Through	337z:224:654 [A]	3	2760	2649	-111	-4.02	2.13
Victoria Road / Prosper St	Westbound	Through	654:224:337z [R]	3	1335	1437	102	7.64	2.74
Victoria Road / Prosper St	Westbound	Left	654:224:226 [L]	3	35	60	25	71.43	3.63
Victoria Road / Prosper St	Northbound	Left	226:224:337z [A]	3	30	39	9	30	1.53
Victoria Road / Evans St	Eastbound	Through	224:654:92 [R]	3	2736	2611	-125	-4.57	2.42
Victoria Road / Evans St	Eastbound	Left	224:654:470z [L]	3	24	22	-2	-8.33	0.42
Victoria Road / Evans St	Southbound	Right	470z:654:224 [R]	3	60	89	29	48.33	3.36
Victoria Road / Evans St	Southbound	Through	470z:654:449z [A]	3	98	57	-41	-41.84	4.66
Victoria Road / Evans St	Southbound	Left	470z:654:92 [L]	3	168	119	-49	-29.17	4.09
Victoria Road / Evans St	Westbound	Through	450z:654:224 [R]	3	1285	1395	110	8.56	3
Victoria Road / Evans St	Westbound	Left	450z:654:449z [L]	3	10	0	-10	-100	4.47
Victoria Road / Evans St	Northbound	Right	449z:654:92 [L]	3	0	0	0	0	0
Victoria Road / Evans St	Northbound	Through	449z:654:470z [R]	3	108	82	-26	-24.07	2.67
Victoria Road / Evans St	Northbound	Left	449z:654:224 [L]	3	25	17	-8	-32	1.75
Victoria Road / Gordon St	Eastbound	Through	757z:653:31032 [A]	3	2904	2739	-165	-5.68	3.11
Victoria Road / Gordon St	Westbound	Through	31032:653:92 [A]	3	1268	1372	104	8.2	2.86
Victoria Road / Gordon St	Northbound	Left	91:653:31032 [R]	3	329	249	-80	-24.32	4.71
Victoria Road / Gordon St	Northbound	Right	91:653:92 [L]	3	27	22	-5	-18.52	1.01
Victoria Road / Joseph St	Eastbound	Through	653:31032:31482 [R]	3	3231	2970	-261	-8.08	4.69
Victoria Road / Joseph St	Eastbound	left	653:31032:228 [L]	3	2	11	9	450	3.53
Victoria Road / Joseph St	Southbound	Left	228:31032:31482 [A]	3	200	184	-16	-8	1.15
Victoria Road / Joseph St	Westbound	Through	31482:31032:653 [A]	3	1268	1372	104	8.2	2.86
Victoria Road / Robert St	Eastbound	Through	31482:652:31012 [R]	3	3418	3099	-319	-9.33	5.59
Victoria Road / Robert St	Eastbound	Left	31482:652:31031 [L]	3	40	38	-2	-5	0.32
Victoria Road / Robert St	Southbound	Right	31031:652:31482 [R]	3	0	0	0	0	0
Victoria Road / Robert St	Southbound	Left	31031:652:31012 [L]	3	1121	1015	-106	-9.46	3.24

Intersection	Approach	Movement	Location	Period	Observed	Modelled	Diff	%	GEH
Victoria Road / Robert St	Westbound	Right	31012:652:31031 [A]	3	917	755	-162	-17.67	5.6
Victoria Road / Robert St	Westbound	Through	34478:652:31482 [A]	3	1268	1381	113	8.91	3.1
Victoria Road / Lilyfield Rd	Eastbound	Through	31012:98:97 [A]	3	4539	4105	-434	-9.56	6.6
Victoria Road / Lilyfield Rd	Westbound	Through	97:98:31012 [R]	3	2105	2069	-36	-1.71	0.79
Victoria Road / Lilyfield Rd	Northbound	Left	81:98:31012 [A]	3	80	84	4	5	0.44
Victoria Road / Lilyfield Rd	Westbound	Left	97:98:81 [L]	3	84	94	10	11.9	1.06
Victoria Road / The Crescent	Eastbound	Right	97:651:31014 [A]	3	801	786	-15	-1.87	0.53
Victoria Road / The Crescent	Eastbound	Left	97:31004:31000 [A]	3	3738	3315	-423	-11.32	7.12
Victoria Road / The Crescent	Westbound	Right	31004:651:97 [A]	3	1657	1705	48	2.9	1.17
Victoria Road / The Crescent	Westbound	Through	31003:651a:31014 [A]	3	1469	1530	61	4.15	1.58
Victoria Road / The Crescent	Northbound	Left	31014:651:97 [A]	3	532	459	-73	-13.72	3.28
The Crescent / James Craig Drive	Westbound	Through	31016:3033:31023 [R]	3	2194	2227	33	1.5	0.7
The Crescent / James Craig Drive	Westbound	Left	31016:3033:31019 [L]	3	76	89	13	17.11	1.43
The Crescent / James Craig Drive	Northbound	Right	31020:31019:3033 [A]	3	46	62	16	34.78	2.18
The Crescent / James Craig Drive	Northbound	Left	31019:3033:31023 [L]	3	14	15	1	7.14	0.26
The Crescent / James Craig Drive	Eastbound	Right	31023:3033:31019 [A]	3	48	62	14	29.17	1.89
The Crescent / James Craig Drive	Eastbound	Through	1208:31023:197 [L]	3	2673	2285	-388	-14.52	7.79
The Crescent / City West Link	Westbound	Through	31023:1208:31025 [A]	3	1378	1416	38	2.76	1.02
The Crescent / City West Link	Westbound	Right	31023:1208a:114 [A]	3	830	828	-2	-0.24	0.07
The Crescent / City West Link	Northbound	Right	114:1208:31023 [R]	3	984	739	-245	-24.9	8.35
The Crescent / City West Link	Northbound	Left	114:1208:31025 [L]	3	134	87	-47	-35.07	4.47
The Crescent / City West Link	Eastbound	Right	31025:1208:114 [A]	3	123	104	-19	-15.45	1.78
The Crescent / City West Link	Eastbound	Through	74:1208:31023 [A]	3	1737	1604	-133	-7.66	3.25
Victoria Road / The Crescent	"The Mouse Hole"		31017:351z:350z [A]	3	2173	1816	-357	-16.43	7.99

Table A-3 Turn Count Comparison 16:00 – 17:00

Intersection	Approach	Movement	Location	Period	Observed	Modelled	Diff	%	GEH
Darling Street/Manning St	Eastbound	Through	9:6:7 [A]	2	625	600	-25	-4	1.01
Darling Street/Manning St	Westbound	Through	7:6:9 [A]	2	653	589	-64	-9.8	2.57
Darling Street/Manning St	Southbound	Left	5:6:7 [L]	2	7	2	-5	-71.43	2.36
Darling Street/Manning St	Southbound	Right	5:6:9 [R]	2	10	9	-1	-10	0.32
Darling Street/Park St	Southbound	Right	20:7:6 [R]	2	5	0	-5	-100	3.16
Darling Street/Park St	Southbound	Left	20:7:12 [L]	2	10	9	-1	-10	0.32
Darling Street/Park St	Westbound	Right	12:7:20 [R]	2	7	6	-1	-14.29	0.39
Darling Street/Park St	Westbound	Through	12:7:6 [L]	2	648	591	-57	-8.8	2.29
Darling Street/Park St	Eastbound	Through	6:7:12 [R]	2	612	579	-33	-5.39	1.35
Darling Street/Park St	Eastbound	Left	6:7:20 [L]	2	20	17	-3	-15	0.7
Darling Street/Denison St	Westbound	Through	8:12:7 [R]	2	645	588	-57	-8.84	2.3
Darling Street/Denison St	Westbound	Right	8:12:15 [L]	2	60	45	-15	-25	2.07
Darling Street/Denison St	Northbound	Right	15:12:8 [R]	2	5	0	-5	-100	3.16
Darling Street/Denison St	Northbound	Left	15:12:7 [L]	2	10	10	0	0	0
Darling Street/Denison St	Eastbound	Right	7:12:15 [R]	2	20	13	-7	-35	1.72
Darling Street/Denison St	Eastbound	Through	7:12:8 [L]	2	602	571	-31	-5.15	1.28
Darling Street/Oxford St	Southbound	Right	19:8:12 [R]	2	8	0	-8	-100	4
Darling Street/Oxford St	Southbound	Left	19:8:333z [L]	2	14	16	2	14.29	0.52
Darling Street/Oxford St	Westbound	Right	333z:8:19 [R]	2	6	5	-1	-16.67	0.43
Darling Street/Oxford St	Westbound	Through	333z:8:12 [L]	2	697	633	-64	-9.18	2.48
Darling Street/Oxford St	Eastbound	Through	12:8:333z [R]	2	513	492	-21	-4.09	0.94
Darling Street/Oxford St	Eastbound	Left	12:8:19 [L]	2	94	77	-17	-18.09	1.84
Darling Street/Cambridge St	Southbound	Right	18:333z:8 [R]	2	19	25	6	31.58	1.28
Darling Street/Cambridge St	Southbound	Left	18:333z:17 [L]	2	33	25	-8	-24.24	1.49
Darling Street/Cambridge St	Westbound	Right	17:333z:18 [R]	2	33	23	-10	-30.3	1.89
Darling Street/Cambridge St	Westbound	Through	17:333z:8 [L]	2	684	614	-70	-10.23	2.75
Darling Street/Cambridge St	Eastbound	Through	8:333z:17 [R]	2	479	453	-26	-5.43	1.2
Darling Street/Cambridge St	Eastbound	Left	8:333z:18 [L]	2	47	50	3	6.38	0.43
Darling Street/Red Lion St	Westbound	Through	4207:17:333z [R]	2	717	637	-80	-11.16	3.07

Darling Street/Red Lion St	Westbound	Left	4207:17:13 [L]	2	45	46	1	2.22	0.15
Darling Street/Red Lion St	Eastbound	Right	333z:17:13 [R]	2	10	4	-6	-60	2.27
Darling Street/Red Lion St	Eastbound	though	333z:17:4207 [L]	2	502	470	-32	-6.37	1.45
Darling Street/Waterloo St	Southbound	Right	341z:4207:17 [R]	2	23	26	3	13.04	0.61
Darling Street/Waterloo St	Southbound	Left	341z:4207:25 [L]	2	31	31	0	0	0
Darling Street/Waterloo St	Westbound	Right	25:4207:341z [R]	2	82	67	-15	-18.29	1.74
Darling Street/Waterloo St	Westbound	Through	25:4207:17 [L]	2	692	597	-95	-13.73	3.74
Darling Street/Waterloo St	Northbound	Right	23:4207:25 [R]	2	4	7	3	75	1.28
Darling Street/Waterloo St	Northbound	Left	23:4207:341z [A]	2	24	1	-23	-95.83	6.51
Darling Street/Waterloo St	Northbound	Left	23:4207:17 [L]	2	47	60	13	27.66	1.78
Darling Street/Waterloo St	Eastbound	Through	17:4207:25 [R]	2	450	411	-39	-8.67	1.88
Darling Street/Waterloo St	Eastbound	Left	17:4207:341z [L]	2	58	53	-5	-8.62	0.67
Victoria Road / Terry St	Eastbound	Through	243:465:344z [R]	2	2266	2139	-127	-5.6	2.71
Victoria Road / Terry St	Eastbound	Left	243:465:477z [L]	2	382	365	-17	-4.45	0.88
Victoria Road / Terry St	Southbound	Left	477z:465:344z [A]	2	84	81	-3	-3.57	0.33
Victoria Road / Terry St	Westbound	Through	445z:465:243 [A]	2	2422	2371	-51	-2.11	1.04
Victoria Road / Terry St	Westbound	Right	344z:465:477z [A]	2	97	109	12	12.37	1.18
Victoria Road / Moodie St	Eastbound	Through	346z:30978:656 [A]	2	2350	2203	-147	-6.26	3.08
Victoria Road / Moodie St	Westbound	Through	656:30978:343z [R]	2	2183	2139	-44	-2.02	0.95
Victoria Road / Moodie St	Westbound	Left	656:30978:341z [L]	2	28	19	-9	-32.14	1.86
Victoria Road / Moodie St	Northbound	Left	341z:30978:343z [A]	2	334	333	-1	-0.3	0.05
Victoria Road / Wellington St	Eastbound	Through	30978:656:338z [A]	2	2349	2203	-146	-6.22	3.06
Victoria Road / Wellington St	Southbound	Right	451z:656:30978 [R]	2	487	473	-14	-2.87	0.64
Victoria Road / Wellington St	Southbound	Left	451z:656:338z [L]	2	78	62	-16	-20.51	1.91
Victoria Road / Wellington St	Westbound	Through	338z:656:30978 [A]	2	1723	1685	-38	-2.21	0.92
Victoria Road / Darling St	Eastbound	Right	338z:655:25 [A]	2	399	342	-57	-14.29	2.96
Victoria Road / Darling St	Eastbound	Through	339z:655:337z [R]	2	1887	1797	-90	-4.77	2.1
Victoria Road / Darling St	Eastbound	Left	339z:655:334z [L]	2	141	128	-13	-9.22	1.12
Victoria Road / Darling St	Southbound	Westbound	334z:655:25 [R]	2	268	204	-64	-23.88	4.17
Victoria Road / Darling St	Southbound	Left	334z:655:337z [L]	2	192	171	-21	-10.94	1.56
Victoria Road / Darling St	Westbound	Right	337z:655:334z [A]	2	228	204	-24	-10.53	1.63
Victoria Road / Darling St	Westbound	Through	340z:655:338z [R]	2	1569	1538	-31	-1.98	0.79

Victoria Road / Darling St	Westbound	Left	340z:655:25 [L]	2	107	114	7	6.54	0.67
Victoria Road / Darling St	Northbound	Right	25:655:337z [R]	2	6	0	-6	-100	3.46
Victoria Road / Darling St	Northbound	Through	25:655:334z [A]	2	323	294	-29	-8.98	1.65
Victoria Road / Darling St	Northbound	Left	25:655:338z [L]	2	155	148	-7	-4.52	0.57
Victoria Road / Prosper St	Eastbound	Through	337z:224:654 [A]	2	2085	1965	-120	-5.76	2.67
Victoria Road / Prosper St	Westbound	Through	654:224:337z [R]	2	1895	1839	-56	-2.96	1.3
Victoria Road / Prosper St	Westbound	Left	654:224:226 [L]	2	82	128	46	56.1	4.49
Victoria Road / Prosper St	Northbound	Left	226:224:337z [A]	2	10	6	-4	-40	1.41
Victoria Road / Evans St	Eastbound	Through	224:654:92 [R]	2	2060	1946	-114	-5.53	2.55
Victoria Road / Evans St	Eastbound	Left	224:654:470z [L]	2	25	18	-7	-28	1.51
Victoria Road / Evans St	Southbound	Right	470z:654:224 [R]	2	73	82	9	12.33	1.02
Victoria Road / Evans St	Southbound	Through	470z:654:449z [A]	2	144	121	-23	-15.97	2
Victoria Road / Evans St	Southbound	Left	470z:654:92 [L]	2	121	119	-2	-1.65	0.18
Victoria Road / Evans St	Westbound	Through	450z:654:224 [R]	2	1864	1843	-21	-1.13	0.49
Victoria Road / Evans St	Westbound	Left	450z:654:449z [L]	2	41	19	-22	-53.66	4.02
Victoria Road / Evans St	Northbound	Right	449z:654:92 [L]	2	0	0	0	0	0
Victoria Road / Evans St	Northbound	Through	449z:654:470z [R]	2	128	123	-5	-3.91	0.45
Victoria Road / Evans St	Northbound	Left	449z:654:224 [L]	2	40	43	3	7.5	0.47
Victoria Road / Gordon St	Eastbound	Through	757z:653:31032 [A]	2	2182	2070	-112	-5.13	2.43
Victoria Road / Gordon St	Westbound	Through	31032:653:92 [A]	2	1858	1827	-31	-1.67	0.72
Victoria Road / Gordon St	Northbound	Left	91:653:31032 [R]	2	157	156	-1	-0.64	0.08
Victoria Road / Gordon St	Northbound	Right	91:653:92 [L]	2	47	39	-8	-17.02	1.22
Victoria Road / Joseph St	Eastbound	Through	653:31032:31482 [R]	2	2299	2196	-103	-4.48	2.17
Victoria Road / Joseph St	Eastbound	left	653:31032:228 [L]	2	40	29	-11	-27.5	1.87
Victoria Road / Joseph St	Southbound	Left	228:31032:31482 [A]	2	35	46	11	31.43	1.73
Victoria Road / Joseph St	Westbound	Through	31482:31032:653 [A]	2	1858	1832	-26	-1.4	0.61
Victoria Road / Robert St	Eastbound	Through	31482:652:31012 [R]	2	2285	2205	-80	-3.5	1.69
Victoria Road / Robert St	Eastbound	Left	31482:652:31031 [L]	2	51	51	0	0	0
Victoria Road / Robert St	Southbound	Right	31031:652:31482 [R]	2	52	47	-5	-9.62	0.71
Victoria Road / Robert St	Southbound	Left	31031:652:31012 [L]	2	808	877	69	8.54	2.38
Victoria Road / Robert St	Westbound	Right	31012:652:31031 [A]	2	798	764	-34	-4.26	1.22
Victoria Road / Robert St	Westbound	Through	34478:652:31482 [A]	2	1806	1794	-12	-0.66	0.28

Victoria Road / Lilyfield Rd	Eastbound	Through	31012:98:97 [A]	2	3093	3086	-7	-0.23	0.13
Victoria Road / Lilyfield Rd	Westbound	Through	97:98:31012 [R]	2	2524	2476	-48	-1.9	0.96
Victoria Road / Lilyfield Rd	Northbound	Left	81:98:31012 [A]	2	80	97	17	21.25	1.81
Victoria Road / Lilyfield Rd	Westbound	Left	97:98:81 [L]	2	158	149	-9	-5.7	0.73
Victoria Road / The Crescent	Eastbound	Right	97:651:31014 [A]	2	768	739	-29	-3.78	1.06
Victoria Road / The Crescent	Eastbound	Left	97:31004:31000 [A]	2	2326	2353	27	1.16	0.56
Victoria Road / The Crescent	Westbound	Right	31004:651:97 [A]	2	1970	1886	-84	-4.26	1.91
Victoria Road / The Crescent	Westbound	Through	31003:651a:31014 [A]	2	1795	1814	19	1.06	0.45
Victoria Road / The Crescent	Northbound	Left	31014:651:97 [A]	2	712	745	33	4.63	1.22
Victoria Road / The Crescent	"The Mouse Hole"		31017:351z:350z [A]	2	2462	2406	-56	-2.27	1.14
The Crescent / James Craig Drive	Westbound	Through	31016:3033:31023 [R]	2	2539	2525	-14	-0.55	0.28
The Crescent / James Craig Drive	Westbound	Left	31016:3033:31019 [L]	2	27	28	1	3.7	0.19
The Crescent / James Craig Drive	Northbound	Right	31020:31019:3033 [A]	2	40	33	-7	-17.5	1.16
The Crescent / James Craig Drive	Northbound	Left	31019:3033:31023 [L]	2	8	3	-5	-62.5	2.13
The Crescent / James Craig Drive	Eastbound	Right	31023:3033:31019 [A]	2	7	10	3	42.86	1.03
The Crescent / James Craig Drive	Eastbound	Through	1208:31023:197 [L]	2	3142	3128	-14	-0.45	0.25
The Crescent / City West Link	Westbound	Through	31023:1208:31025 [A]	2	1749	1734	-15	-0.86	0.36
The Crescent / City West Link	Westbound	Right	31023:1208a:114 [A]	2	801	793	-8	-1	0.28
The Crescent / City West Link	Northbound	Right	114:1208:31023 [R]	2	904	865	-39	-4.31	1.31
The Crescent / City West Link	Northbound	Left	114:1208:31025 [L]	2	165	170	5	3.03	0.39
The Crescent / City West Link	Eastbound	Right	31025:1208:114 [A]	2	178	150	-28	-15.73	2.19
The Crescent / City West Link	Eastbound	Through	74:1208:31023 [A]	2	2245	2271	26	1.16	0.55

Table A-4 Turn Count Comparison 17:00 – 18:00

Intersection	Approach	Movement	Location	Period	Observed	Modelled	Diff	%	GEH
Darling Street/Manning St	Eastbound	Through	9:6:7 [A]	3	513	466	-47	-9.16	2.12
Darling Street/Manning St	Westbound	Through	7:6:9 [A]	3	578	540	-38	-6.57	1.61
Darling Street/Manning St	Southbound	Left	5:6:7 [L]	3	11	2	-9	-81.82	3.53
Darling Street/Manning St	Southbound	Right	5:6:9 [R]	3	17	23	6	35.29	1.34
Darling Street/Park St	Southbound	Right	20:7:6 [R]	3	5	0	-5	-100	3.16
Darling Street/Park St	Southbound	Left	20:7:12 [L]	3	10	13	3	30	0.88
Darling Street/Park St	Westbound	Right	12:7:20 [R]	3	7	2	-5	-71.43	2.36
Darling Street/Park St	Westbound	Through	12:7:6 [L]	3	573	540	-33	-5.76	1.4
Darling Street/Park St	Eastbound	Through	6:7:12 [R]	3	504	445	-59	-11.71	2.71
Darling Street/Park St	Eastbound	Left	6:7:20 [L]	3	20	27	7	35	1.44
Darling Street/Denison St	Westbound	Through	8:12:7 [R]	3	570	532	-38	-6.67	1.62
Darling Street/Denison St	Westbound	Right	8:12:15 [L]	3	60	52	-8	-13.33	1.07
Darling Street/Denison St	Northbound	Right	15:12:8 [R]	3	5	0	-5	-100	3.16
Darling Street/Denison St	Northbound	Left	15:12:7 [L]	3	10	9	-1	-10	0.32
Darling Street/Denison St	Eastbound	Right	7:12:15 [R]	3	20	11	-9	-45	2.29
Darling Street/Denison St	Eastbound	Through	7:12:8 [L]	3	494	451	-43	-8.7	1.98
Darling Street/Oxford St	Southbound	Right	19:8:12 [R]	3	3	0	-3	-100	2.45
Darling Street/Oxford St	Southbound	Left	19:8:333z [L]	3	8	6	-2	-25	0.76
Darling Street/Oxford St	Westbound	Right	333z:8:19 [R]	3	11	8	-3	-27.27	0.97
Darling Street/Oxford St	Westbound	Through	333z:8:12 [L]	3	627	584	-43	-6.86	1.75
Darling Street/Oxford St	Eastbound	Through	12:8:333z [R]	3	433	383	-50	-11.55	2.48
Darling Street/Oxford St	Eastbound	Left	12:8:19 [L]	3	66	70	4	6.06	0.49
Darling Street/Cambridge St	Southbound	Right	18:333z:8 [R]	3	16	15	-1	-6.25	0.25
Darling Street/Cambridge St	Southbound	Left	18:333z:17 [L]	3	28	19	-9	-32.14	1.86
Darling Street/Cambridge St	Westbound	Right	17:333z:18 [R]	3	16	7	-9	-56.25	2.65
Darling Street/Cambridge St	Westbound	Through	17:333z:8 [L]	3	621	578	-43	-6.92	1.76
Darling Street/Cambridge St	Eastbound	Through	8:333z:17 [R]	3	406	353	-53	-13.05	2.72
Darling Street/Cambridge St	Eastbound	Left	8:333z:18 [L]	3	33	41	8	24.24	1.32
Darling Street/Red Lion St	Westbound	Through	4207:17:333z [R]	3	637	586	-51	-8.01	2.06

Intersection	Approach	Movement	Location	Period	Observed	Modelled	Diff	%	GEH
Darling Street/Red Lion St	Westbound	Left	4207:17:13 [L]	3	45	49	4	8.89	0.58
Darling Street/Red Lion St	Eastbound	Right	333z:17:13 [R]	3	62	37	-25	-40.32	3.55
Darling Street/Red Lion St	Eastbound	though	333z:17:4207 [L]	3	372	339	-33	-8.87	1.75
Darling Street/Waterloo St	Southbound	Right	341z:4207:17 [R]	3	25	33	8	32	1.49
Darling Street/Waterloo St	Southbound	Left	341z:4207:25 [L]	3	40	27	-13	-32.5	2.25
Darling Street/Waterloo St	Westbound	Right	25:4207:341z [R]	3	82	93	11	13.41	1.18
Darling Street/Waterloo St	Westbound	Through	25:4207:17 [L]	3	609	572	-37	-6.08	1.52
Darling Street/Waterloo St	Northbound	Right	23:4207:25 [R]	3	10	6	-4	-40	1.41
Darling Street/Waterloo St	Northbound	Left	23:4207:341z [A]	3	16	2	-14	-87.5	4.67
Darling Street/Waterloo St	Northbound	Left	23:4207:17 [L]	3	48	31	-17	-35.42	2.7
Darling Street/Waterloo St	Eastbound	Through	17:4207:25 [R]	3	347	301	-46	-13.26	2.56
Darling Street/Waterloo St	Eastbound	Left	17:4207:341z [L]	3	28	44	16	57.14	2.67
Victoria Road / Terry St	Eastbound	Through	243:465:344z [R]	3	2302	2261	-41	-1.78	0.86
Victoria Road / Terry St	Eastbound	Left	243:465:477z [L]	3	476	487	11	2.31	0.5
Victoria Road / Terry St	Southbound	Left	477z:465:344z [A]	3	95	99	4	4.21	0.41
Victoria Road / Terry St	Westbound	Through	445z:465:243 [A]	3	2506	2632	126	5.03	2.49
Victoria Road / Terry St	Westbound	Right	344z:465:477z [A]	3	122	118	-4	-3.28	0.37
Victoria Road / Moodie St	Eastbound	Through	346z:30978:656 [A]	3	2397	2358	-39	-1.63	0.8
Victoria Road / Moodie St	Westbound	Through	656:30978:343z [R]	3	2307	2403	96	4.16	1.98
Victoria Road / Moodie St	Westbound	Left	656:30978:341z [L]	3	44	28	-16	-36.36	2.67
Victoria Road / Moodie St	Northbound	Left	341z:30978:343z [A]	3	321	352	31	9.66	1.69
Victoria Road / Wellington St	Eastbound	Through	30978:656:338z [A]	3	2396	2347	-49	-2.05	1.01
Victoria Road / Wellington St	Southbound	Right	451z:656:30978 [R]	3	524	557	33	6.3	1.42
Victoria Road / Wellington St	Southbound	Left	451z:656:338z [L]	3	98	87	-11	-11.22	1.14
Victoria Road / Wellington St	Westbound	Through	338z:656:30978 [A]	3	1827	1872	45	2.46	1.05
Victoria Road / Darling St	Eastbound	Right	338z:655:25 [A]	3	358	347	-11	-3.07	0.59
Victoria Road / Darling St	Eastbound	Through	339z:655:337z [R]	3	1912	1893	-19	-0.99	0.44
Victoria Road / Darling St	Eastbound	Left	339z:655:334z [L]	3	125	158	33	26.4	2.77
Victoria Road / Darling St	Southbound	Westbound	334z:655:25 [R]	3	259	260	1	0.39	0.06
Victoria Road / Darling St	Southbound	Left	334z:655:337z [L]	3	175	124	-51	-29.14	4.17
Victoria Road / Darling St	Westbound	Right	337z:655:334z [A]	3	288	250	-38	-13.19	2.32

Intersection	Approach	Movement	Location	Period	Observed	Modelled	Diff	%	GEH
Victoria Road / Darling St	Westbound	Through	340z:655:338z [R]	3	1678	1758	80	4.77	1.93
Victoria Road / Darling St	Westbound	Left	340z:655:25 [L]	3	73	64	-9	-12.33	1.09
Victoria Road / Darling St	Northbound	Right	25:655:337z [R]	3	6	2	-4	-66.67	2
Victoria Road / Darling St	Northbound	Through	25:655:334z [A]	3	242	228	-14	-5.79	0.91
Victoria Road / Darling St	Northbound	Left	25:655:338z [L]	3	149	117	-32	-21.48	2.77
Victoria Road / Prosper St	Eastbound	Through	337z:224:654 [A]	3	2093	2028	-65	-3.11	1.43
Victoria Road / Prosper St	Westbound	Through	654:224:337z [R]	3	2026	2083	57	2.81	1.26
Victoria Road / Prosper St	Westbound	Left	654:224:226 [L]	3	140	123	-17	-12.14	1.48
Victoria Road / Prosper St	Northbound	Left	226:224:337z [A]	3	10	6	-4	-40	1.41
Victoria Road / Evans St	Eastbound	Through	224:654:92 [R]	3	2082	2018	-64	-3.07	1.41
Victoria Road / Evans St	Eastbound	Left	224:654:470z [L]	3	11	12	1	9.09	0.29
Victoria Road / Evans St	Southbound	Right	470z:654:224 [R]	3	63	75	12	19.05	1.44
Victoria Road / Evans St	Southbound	Through	470z:654:449z [A]	3	144	95	-49	-34.03	4.48
Victoria Road / Evans St	Southbound	Left	470z:654:92 [L]	3	126	96	-30	-23.81	2.85
Victoria Road / Evans St	Westbound	Through	450z:654:224 [R]	3	2062	2121	59	2.86	1.29
Victoria Road / Evans St	Westbound	Left	450z:654:449z [L]	3	57	41	-16	-28.07	2.29
Victoria Road / Evans St	Northbound	Right	449z:654:92 [L]	3	0	0	0	0	0
Victoria Road / Evans St	Northbound	Through	449z:654:470z [R]	3	168	147	-21	-12.5	1.67
Victoria Road / Evans St	Northbound	Left	449z:654:224 [L]	3	41	16	-25	-60.98	4.68
Victoria Road / Gordon St	Eastbound	Through	757z:653:31032 [A]	3	2208	2117	-91	-4.12	1.96
Victoria Road / Gordon St	Westbound	Through	31032:653:92 [A]	3	2080	2127	47	2.26	1.02
Victoria Road / Gordon St	Northbound	Left	91:653:31032 [R]	3	172	185	13	7.56	0.97
Victoria Road / Gordon St	Northbound	Right	91:653:92 [L]	3	39	46	7	17.95	1.07
Victoria Road / Joseph St	Eastbound	Through	653:31032:31482 [R]	3	2340	2258	-82	-3.5	1.71
Victoria Road / Joseph St	Eastbound	left	653:31032:228 [L]	3	40	46	6	15	0.91
Victoria Road / Joseph St	Southbound	Left	228:31032:31482 [A]	3	75	70	-5	-6.67	0.59
Victoria Road / Joseph St	Westbound	Through	31482:31032:653 [A]	3	2080	2138	58	2.79	1.26
Victoria Road / Robert St	Eastbound	Through	31482:652:31012 [R]	3	2385	2240	-145	-6.08	3.02
Victoria Road / Robert St	Eastbound	Left	31482:652:31031 [L]	3	41	51	10	24.39	1.47
Victoria Road / Robert St	Southbound	Right	31031:652:31482 [R]	3	57	52	-5	-8.77	0.68
Victoria Road / Robert St	Southbound	Left	31031:652:31012 [L]	3	796	806	10	1.26	0.35

Intersection	Approach	Movement	Location	Period	Observed	Modelled	Diff	%	GEH
Victoria Road / Robert St	Westbound	Right	31012:652:31031 [A]	3	922	865	-57	-6.18	1.91
Victoria Road / Robert St	Westbound	Through	34478:652:31482 [A]	3	2023	2081	58	2.87	1.28
Victoria Road / Lilyfield Rd	Eastbound	Through	31012:98:97 [A]	3	3181	3042	-139	-4.37	2.49
Victoria Road / Lilyfield Rd	Westbound	Through	97:98:31012 [R]	3	2878	2831	-47	-1.63	0.88
Victoria Road / Lilyfield Rd	Northbound	Left	81:98:31012 [A]	3	87	90	3	3.45	0.32
Victoria Road / Lilyfield Rd	Westbound	Left	97:98:81 [L]	3	160	147	-13	-8.13	1.05
Victoria Road / The Crescent	Eastbound	Right	97:651:31014 [A]	3	720	755	35	4.86	1.29
Victoria Road / The Crescent	Eastbound	Left	97:31004:31000 [A]	3	2460	2309	-151	-6.14	3.09
Victoria Road / The Crescent	Westbound	Right	31004:651:97 [A]	3	2252	2204	-48	-2.13	1.02
Victoria Road / The Crescent	Westbound	Through	31003:651a:31014 [A]	3	1892	2011	119	6.29	2.69
Victoria Road / The Crescent	Northbound	Left	31014:651:97 [A]	3	786	780	-6	-0.76	0.21
Victoria Road / The Crescent	"The Mouse Hole"	0	31017:351z:350z [A]	3	2471	2513	42	1.7	0.84
The Crescent / James Craig Drive	Westbound	Through	31016:3033:31023 [R]	3	2662	2733	71	2.67	1.37
The Crescent / James Craig Drive	Westbound	Left	31016:3033:31019 [L]	3	25	23	-2	-8	0.41
The Crescent / James Craig Drive	Northbound	Right	31020:31019:3033 [A]	3	52	49	-3	-5.77	0.42
The Crescent / James Craig Drive	Northbound	Left	31019:3033:31023 [L]	3	21	12	-9	-42.86	2.22
The Crescent / James Craig Drive	Eastbound	Right	31023:3033:31019 [A]	3	9	0	-9	-100	4.24
The Crescent / James Craig Drive	Eastbound	Through	1208:31023:197 [L]	3	3226	3253	27	0.84	0.47
The Crescent / City West Link	Westbound	Through	31023:1208:31025 [A]	3	1837	1837	0	0	0
The Crescent / City West Link	Westbound	Right	31023:1208a:114 [A]	3	880	867	-13	-1.48	0.44
The Crescent / City West Link	Northbound	Right	114:1208:31023 [R]	3	927	950	23	2.48	0.75
The Crescent / City West Link	Northbound	Left	114:1208:31025 [L]	3	165	149	-16	-9.7	1.28
The Crescent / City West Link	Eastbound	Right	31025:1208:114 [A]	3	194	180	-14	-7.22	1.02
The Crescent / City West Link	Eastbound	Through	74:1208:31023 [A]	3	2308	2310	2	0.09	0.04

Table A-5 Turn Count Comparison Saturday 11:00am – 12:00pm

Intersection	Approach	Movement	Location	Period	Observed	Modelled	Diff	%	GEH
Darling Street/Manning St	Eastbound	Through	9:6:7 [A]	2	615	610	-5	-0.81	0.2
Darling Street/Manning St	Westbound	Through	7:6:9 [A]	2	704	720	16	2.27	0.6
Darling Street/Manning St	Southbound	Left	5:6:7 [L]	2	11	1	-10	-90.91	4.08
Darling Street/Manning St	Southbound	Right	5:6:9 [R]	2	10	1	-9	-90	3.84
Darling Street/Park St	Southbound	Right	20:7:6 [R]	2	5	0	-5	-100	3.16
Darling Street/Park St	Southbound	Left	20:7:12 [L]	2	10	1	-9	-90	3.84
Darling Street/Park St	Westbound	Right	12:7:20 [R]	2	7	3	-4	-57.14	1.79
Darling Street/Park St	Westbound	Through	12:7:6 [L]	2	699	720	21	3	0.79
Darling Street/Park St	Eastbound	Through	6:7:12 [R]	2	606	612	6	0.99	0.24
Darling Street/Park St	Eastbound	Left	6:7:20 [L]	2	20	0	-20	-100	6.32
Darling Street/Denison St	Westbound	Through	8:12:7 [R]	2	696	722	26	3.74	0.98
Darling Street/Denison St	Westbound	Right	8:12:15 [L]	2	60	62	2	3.33	0.26
Darling Street/Denison St	Northbound	Right	15:12:8 [R]	2	5	0	-5	-100	3.16
Darling Street/Denison St	Northbound	Left	15:12:7 [L]	2	10	0	-10	-100	4.47
Darling Street/Denison St	Eastbound	Right	7:12:15 [R]	2	10	0	-10	-100	4.47
Darling Street/Denison St	Eastbound	Through	7:12:8 [L]	2	606	612	6	0.99	0.24
Darling Street/Oxford St	Southbound	Right	19:8:12 [R]	2	5	0	-5	-100	3.16
Darling Street/Oxford St	Southbound	Left	19:8:333z [L]	2	10	0	-10	-100	4.47
Darling Street/Oxford St	Westbound	Right	333z:8:19 [R]	2	7	7	0	0	0
Darling Street/Oxford St	Westbound	Through	333z:8:12 [L]	2	751	784	33	4.39	1.19
Darling Street/Oxford St	Eastbound	Through	12:8:333z [R]	2	569	569	0	0	0
Darling Street/Oxford St	Eastbound	Left	12:8:19 [L]	2	42	43	1	2.38	0.15
Darling Street/Cambridge St	Southbound	Right	18:333z:8 [R]	2	18	14	-4	-22.22	1
Darling Street/Cambridge St	Southbound	Left	18:333z:17 [L]	2	10	0	-10	-100	4.47
Darling Street/Cambridge St	Westbound	Right	17:333z:18 [R]	2	10	14	4	40	1.15
Darling Street/Cambridge St	Westbound	Through	17:333z:8 [L]	2	740	777	37	5	1.34
Darling Street/Cambridge St	Eastbound	Through	8:333z:17 [R]	2	516	512	-4	-0.78	0.18
Darling Street/Cambridge St	Eastbound	Left	8:333z:18 [L]	2	63	57	-6	-9.52	0.77
Darling Street/Red Lion St	Westbound	Through	4207:17:333z [R]	2	750	791	41	5.47	1.48

Intersection	Approach	Movement	Location	Period	Observed	Modelled	Diff	%	GEH
Darling Street/Red Lion St	Westbound	Left	4207:17:13 [L]	2	45	3	-42	-93.33	8.57
Darling Street/Red Lion St	Eastbound	Right	333z:17:13 [R]	2	5	0	-5	-100	3.16
Darling Street/Red Lion St	Eastbound	though	333z:17:4207 [L]	2	521	511	-10	-1.92	0.44
Darling Street/Waterloo St	Southbound	Right	341z:4207:17 [R]	2	13	11	-2	-15.38	0.58
Darling Street/Waterloo St	Southbound	Left	341z:4207:655 [L]	2	31	36	5	16.13	0.86
Darling Street/Waterloo St	Westbound	Right	655:4207:341z [R]	2	59	50	-9	-15.25	1.22
Darling Street/Waterloo St	Westbound	Through	655:4207:17 [L]	2	743	721	-22	-2.96	0.81
Darling Street/Waterloo St	Northbound	Right	23:4207:655 [R]	2	13	0	-13	-100	5.1
Darling Street/Waterloo St	Northbound	Through	23:4207:341z [A]	2	15	0	-15	-100	5.48
Darling Street/Waterloo St	Northbound	Left	23:4207:17 [L]	2	39	60	21	53.85	2.98
Darling Street/Waterloo St	Eastbound	Through	17:4207:655 [R]	2	477	502	25	5.24	1.13
Darling Street/Waterloo St	Eastbound	Left	17:4207:341z [L]	2	44	8	-36	-81.82	7.06
Victoria Road / Terry St	Eastbound	Through	243:465:344z [R]	2	2516	2595	79	3.14	1.56
Victoria Road / Terry St	Eastbound	Left	243:465:477z [L]	2	447	423	-24	-5.37	1.15
Victoria Road / Terry St	Southbound	Left	477z:465:344z [A]	2	61	48	-13	-21.31	1.76
Victoria Road / Terry St	Westbound	Through	445z:465:243 [A]	2	3236	3171	-65	-2.01	1.15
Victoria Road / Terry St	Westbound	Right	344z:465:477z [A]	2	114	149	35	30.7	3.05
Victoria Road / Moodie St	Eastbound	Through	346z:30978:656 [A]	2	2577	2630	53	2.06	1.04
Victoria Road / Moodie St	Westbound	Through	656:30978:343z [R]	2	3208	3196	-12	-0.37	0.21
Victoria Road / Moodie St	Westbound	Left	656:30978:341z [L]	2	48	64	16	33.33	2.14
Victoria Road / Moodie St	Northbound	Left	341z:30978:343z [A]	2	142	133	-9	-6.34	0.77
Victoria Road / Wellington St	Eastbound	Through	30978:656:338z [A]	2	2577	2624	47	1.82	0.92
Victoria Road / Wellington St	Southbound	Right	451z:656:30978 [R]	2	487	489	2	0.41	0.09
Victoria Road / Wellington St	Southbound	Left	451z:656:338z [L]	2	48	106	58	120.83	6.61
Victoria Road / Wellington St	Westbound	Through	338z:656:30978 [A]	2	2769	2772	3	0.11	0.06
Victoria Road / Darling St	Eastbound	Right	338z:655:4207 [A]	2	429	421	-8	-1.86	0.39
Victoria Road / Darling St	Eastbound	Through	339z:655:337z [R]	2	2104	2205	101	4.8	2.18
Victoria Road / Darling St	Eastbound	Left	339z:655:334z [L]	2	92	97	5	5.43	0.51
Victoria Road / Darling St	Southbound	Westbound	334z:655:4207 [R]	2	309	281	-28	-9.06	1.63
Victoria Road / Darling St	Southbound	Left	334z:655:337z [L]	2	127	127	0	0	0
Victoria Road / Darling St	Westbound	Right	337z:655:334z [A]	2	143	140	-3	-2.1	0.25

Intersection	Approach	Movement	Location	Period	Observed	Modelled	Diff	%	GEH
Victoria Road / Darling St	Westbound	Through	340z:655:338z [R]	2	2512	2553	41	1.63	0.81
Victoria Road / Darling St	Westbound	Left	340z:655:4207 [L]	2	64	65	1	1.56	0.12
Victoria Road / Darling St	Northbound	Right	4207:655:337z [R]	2	3	0	-3	-100	2.45
Victoria Road / Darling St	Northbound	Through	4207:655:334z [A]	2	261	293	32	12.26	1.92
Victoria Road / Darling St	Northbound	Left	4207:655:338z [L]	2	257	236	-21	-8.17	1.34
Victoria Road / Prosper St	Eastbound	Through	337z:224:654 [A]	2	2234	2326	92	4.12	1.93
Victoria Road / Prosper St	Westbound	Through	654:224:337z [R]	2	2689	2724	35	1.3	0.67
Victoria Road / Prosper St	Westbound	Left	654:224:226 [L]	2	50	42	-8	-16	1.18
Victoria Road / Prosper St	Northbound	Left	226:224:337z [A]	2	30	20	-10	-33.33	2
Victoria Road / Evans St	Eastbound	Through	224:654:92 [R]	2	2202	2301	99	4.5	2.09
Victoria Road / Evans St	Eastbound	Left	224:654:470z [L]	2	32	20	-12	-37.5	2.35
Victoria Road / Evans St	Southbound	Right	470z:654:224 [R]	2	61	83	22	36.07	2.59
Victoria Road / Evans St	Southbound	Through	470z:654:449z [A]	2	150	129	-21	-14	1.78
Victoria Road / Evans St	Southbound	Left	470z:654:92 [L]	2	62	29	-33	-53.23	4.89
Victoria Road / Evans St	Westbound	Through	450z:654:224 [R]	2	2662	2681	19	0.71	0.37
Victoria Road / Evans St	Westbound	Left	450z:654:449z [L]	2	42	33	-9	-21.43	1.47
Victoria Road / Evans St	Northbound	Right	449z:654:92 [L]	2	0	0	0	0	0
Victoria Road / Evans St	Northbound	Through	449z:654:470z [R]	2	88	77	-11	-12.5	1.21
Victoria Road / Evans St	Northbound	Left	449z:654:224 [L]	2	16	18	2	12.5	0.49
Victoria Road / Gordon St	Eastbound	Through	757z:653:31032 [A]	2	2264	2323	59	2.61	1.23
Victoria Road / Gordon St	Westbound	Through	31032:653:92 [A]	2	2661	2697	36	1.35	0.7
Victoria Road / Gordon St	Northbound	Left	91:653:31032 [R]	2	150	168	18	12	1.43
Victoria Road / Gordon St	Northbound	Right	91:653:92 [L]	2	43	39	-4	-9.3	0.62
Victoria Road / Joseph St	Eastbound	Through	653:31032:31482 [R]	2	2389	2486	97	4.06	1.96
Victoria Road / Joseph St	Eastbound	left	653:31032:228 [L]	2	25	4	-21	-84	5.51
Victoria Road / Joseph St	Southbound	Left	228:31032:31482 [A]	2	80	73	-7	-8.75	0.8
Victoria Road / Joseph St	Westbound	Through	31482:31032:653 [A]	2	2661	2715	54	2.03	1.04
Victoria Road / Robert St	Eastbound	Through	31482:652:31012 [R]	2	2415	2548	133	5.51	2.67
Victoria Road / Robert St	Eastbound	Left	31482:652:31031 [L]	2	54	48	-6	-11.11	0.84
Victoria Road / Robert St	Southbound	Right	31031:652:31482 [R]	2	31	15	-16	-51.61	3.34
Victoria Road / Robert St	Southbound	Left	31031:652:31012 [L]	2	781	769	-12	-1.54	0.43

Intersection	Approach	Movement	Location	Period	Observed	Modelled	Diff	%	GEH
Victoria Road / Robert St	Westbound	Right	31012:652:31031 [A]	2	1035	903	-132	-12.75	4.24
Victoria Road / Robert St	Westbound	Through	34478:652:31482 [A]	2	2630	2734	104	3.95	2.01
Victoria Road / Lilyfield Rd	Eastbound	Through	31012:98:97 [A]	2	3196	3309	113	3.54	1.98
Victoria Road / Lilyfield Rd	Westbound	Through	97:98:31012 [R]	2	3636	3630	-6	-0.17	0.1
Victoria Road / Lilyfield Rd	Northbound	Left	81:98:31012 [A]	2	29	25	-4	-13.79	0.77
Victoria Road / Lilyfield Rd	Westbound	Left	97:98:81 [L]	2	314	282	-32	-10.19	1.85
Victoria Road / The Crescent	Eastbound	Right	97:651:31014 [A]	2	795	803	8	1.01	0.28
Victoria Road / The Crescent	Eastbound	Left	97:31004:31000 [A]	2	2401	2497	96	4	1.94
Victoria Road / The Crescent	Westbound	Right	31004:651:97 [A]	2	3086	3069	-17	-0.55	0.31
Victoria Road / The Crescent	Westbound	Through	31003:651a:31014 [A]	2	2148	2031	-117	-5.45	2.56
Victoria Road / The Crescent	Northbound	Left	31014:651:97 [A]	2	864	859	-5	-0.58	0.17
Victoria Road / The Crescent	"The Mouse Hole"		31017:351z:350z [A]	2	2404	2279	-125	-5.2	2.58
The Crescent / James Craig Drive	Westbound	Through	31016:3033:31023 [R]	2	2924	2829	-95	-3.25	1.77
The Crescent / James Craig Drive	Westbound	Left	31016:3033:31019 [L]	2	19	3	-16	-84.21	4.82
The Crescent / James Craig Drive	Northbound	Right	31019:3033:31017 [A]	2	45	43	-2	-4.44	0.3
The Crescent / James Craig Drive	Northbound	Left	31019:3033:31023 [L]	2	58	65	7	12.07	0.89
The Crescent / James Craig Drive	Eastbound	Right	31023:3033:31019 [A]	2	10	0	-10	-100	4.47
The Crescent / James Craig Drive	Eastbound	Through	198:3033:31017 [A]	2	2381	2246	-135	-5.67	2.81
The Crescent / City West Link	Westbound	Through	31023:1208:31025 [A]	2	1907	1853	-54	-2.83	1.25
The Crescent / City West Link	Westbound	Right	31023:1208a:114 [A]	2	1075	1036	-39	-3.63	1.2
The Crescent / City West Link	Northbound	Right	114:1208:31023 [R]	2	926	808	-118	-12.74	4.01
The Crescent / City West Link	Northbound	Left	114:1208:31025 [L]	2	128	133	5	3.91	0.44
The Crescent / City West Link	Eastbound	Right	31025:1208:114 [A]	2	164	157	-7	-4.27	0.55
The Crescent / City West Link	Eastbound	Through	74:1208:31023 [A]	2	2274	2314	40	1.76	0.84
The Crescent / James Craig Drive	Eastbound	Through	197:3033:31016 [A]	2	809	872	63	7.79	2.17
The Crescent / James Craig Drive	Northbound	Right	31019:3033:31016 [R]	2	33	4	-29	-87.88	6.74

Table A-6 Turn Count Comparison Satruday 12:00 – 13:00

Intersection	Approach	Movement	Location	Period	Observed	Modelled	Diff	%	GEH
Darling Street/Manning St	Eastbound	Through	9:6:7 [A]	3	506	446	-60	-11.86	2.75
Darling Street/Manning St	Westbound	Through	7:6:9 [A]	3	643	637	-6	-0.93	0.24
Darling Street/Manning St	Southbound	Left	5:6:7 [L]	3	9	4	-5	-55.56	1.96
Darling Street/Manning St	Southbound	Right	5:6:9 [R]	3	4	0	-4	-100	2.83
Darling Street/Park St	Southbound	Right	20:7:6 [R]	3	5	0	-5	-100	3.16
Darling Street/Park St	Southbound	Left	20:7:12 [L]	3	10	0	-10	-100	4.47
Darling Street/Park St	Westbound	Right	12:7:20 [R]	3	15	11	-4	-26.67	1.11
Darling Street/Park St	Westbound	Through	12:7:6 [L]	3	638	637	-1	-0.16	0.04
Darling Street/Park St	Eastbound	Through	6:7:12 [R]	3	495	449	-46	-9.29	2.12
Darling Street/Park St	Eastbound	Left	6:7:20 [L]	3	20	0	-20	-100	6.32
Darling Street/Denison St	Westbound	Through	8:12:7 [R]	3	648	648	0	0	0
Darling Street/Denison St	Westbound	Right	8:12:15 [L]	3	70	59	-11	-15.71	1.37
Darling Street/Denison St	Northbound	Right	15:12:8 [R]	3	5	5	0	0	0
Darling Street/Denison St	Northbound	Left	15:12:7 [L]	3	5	0	-5	-100	3.16
Darling Street/Denison St	Eastbound	Right	7:12:15 [R]	3	10	3	-7	-70	2.75
Darling Street/Denison St	Eastbound	Through	7:12:8 [L]	3	495	446	-49	-9.9	2.26
Darling Street/Oxford St	Southbound	Right	19:8:12 [R]	3	7	0	-7	-100	3.74
Darling Street/Oxford St	Southbound	Left	19:8:333z [L]	3	2	0	-2	-100	2
Darling Street/Oxford St	Westbound	Right	333z:8:19 [R]	3	3	1	-2	-66.67	1.41
Darling Street/Oxford St	Westbound	Through	333z:8:12 [L]	3	711	707	-4	-0.56	0.15
Darling Street/Oxford St	Eastbound	Through	12:8:333z [R]	3	481	448	-33	-6.86	1.53
Darling Street/Oxford St	Eastbound	Left	12:8:19 [L]	3	19	3	-16	-84.21	4.82
Darling Street/Cambridge St	Southbound	Right	18:333z:8 [R]	3	9	5	-4	-44.44	1.51
Darling Street/Cambridge St	Southbound	Left	18:333z:17 [L]	3	6	2	-4	-66.67	2
Darling Street/Cambridge St	Westbound	Right	17:333z:18 [R]	3	8	3	-5	-62.5	2.13
Darling Street/Cambridge St	Westbound	Through	17:333z:8 [L]	3	705	705	0	0	0
Darling Street/Cambridge St	Eastbound	Through	8:333z:17 [R]	3	432	400	-32	-7.41	1.57
Darling Street/Cambridge St	Eastbound	Left	8:333z:18 [L]	3	51	48	-3	-5.88	0.43
Darling Street/Red Lion St	Westbound	Through	4207:17:333z [R]	3	713	711	-2	-0.28	0.07

Darling Street/Red Lion St	Westbound	Left	4207:17:13 [L]	3	45	21	-24	-53.33	4.18
Darling Street/Red Lion St	Eastbound	Right	333z:17:13 [R]	3	5	0	-5	-100	3.16
Darling Street/Red Lion St	Eastbound	though	333z:17:4207 [L]	3	433	403	-30	-6.93	1.47
Darling Street/Waterloo St	Southbound	Right	341z:4207:17 [R]	3	19	28	9	47.37	1.86
Darling Street/Waterloo St	Southbound	Left	341z:4207:655 [L]	3	21	17	-4	-19.05	0.92
Darling Street/Waterloo St	Westbound	Right	655:4207:341z [R]	3	54	74	20	37.04	2.5
Darling Street/Waterloo St	Westbound	Through	655:4207:17 [L]	3	713	700	-13	-1.82	0.49
Darling Street/Waterloo St	Northbound	Right	23:4207:655 [R]	3	3	2	-1	-33.33	0.63
Darling Street/Waterloo St	Northbound	Through	23:4207:341z [A]	3	14	0	-14	-100	5.29
Darling Street/Waterloo St	Northbound	Left	23:4207:17 [L]	3	26	8	-18	-69.23	4.37
Darling Street/Waterloo St	Eastbound	Through	17:4207:655 [R]	3	383	390	7	1.83	0.36
Darling Street/Waterloo St	Eastbound	Left	17:4207:341z [L]	3	50	14	-36	-72	6.36
Victoria Road / Terry St	Eastbound	Through	243:465:344z [R]	3	2458	2516	58	2.36	1.16
Victoria Road / Terry St	Eastbound	Left	243:465:477z [L]	3	435	467	32	7.36	1.51
Victoria Road / Terry St	Southbound	Left	477z:465:344z [A]	3	84	86	2	2.38	0.22
Victoria Road / Terry St	Westbound	Through	445z:465:243 [A]	3	2857	2761	-96	-3.36	1.81
Victoria Road / Terry St	Westbound	Right	344z:465:477z [A]	3	112	101	-11	-9.82	1.07
Victoria Road / Moodie St	Eastbound	Through	346z:30978:656 [A]	3	2542	2591	49	1.93	0.97
Victoria Road / Moodie St	Westbound	Through	656:30978:343z [R]	3	2844	2696	-148	-5.2	2.81
Victoria Road / Moodie St	Westbound	Left	656:30978:341z [L]	3	21	44	23	109.52	4.03
Victoria Road / Moodie St	Northbound	Left	341z:30978:343z [A]	3	125	152	27	21.6	2.29
Victoria Road / Wellington St	Eastbound	Through	30978:656:338z [A]	3	2542	2581	39	1.53	0.77
Victoria Road / Wellington St	Southbound	Right	451z:656:30978 [R]	3	440	421	-19	-4.32	0.92
Victoria Road / Wellington St	Southbound	Left	451z:656:338z [L]	3	15	10	-5	-33.33	1.41
Victoria Road / Wellington St	Westbound	Through	338z:656:30978 [A]	3	2425	2321	-104	-4.29	2.13
Victoria Road / Darling St	Eastbound	Right	338z:655:4207 [A]	3	419	357	-62	-14.8	3.15
Victoria Road / Darling St	Eastbound	Through	339z:655:337z [R]	3	2040	2070	30	1.47	0.66
Victoria Road / Darling St	Eastbound	Left	339z:655:334z [L]	3	98	126	28	28.57	2.65
Victoria Road / Darling St	Southbound	Westbound	334z:655:4207 [R]	3	283	346	63	22.26	3.55
Victoria Road / Darling St	Southbound	Left	334z:655:337z [L]	3	93	100	7	7.53	0.71
Victoria Road / Darling St	Westbound	Right	337z:655:334z [A]	3	183	170	-13	-7.1	0.98
Victoria Road / Darling St	Westbound	Through	340z:655:338z [R]	3	2247	2137	-110	-4.9	2.35

Victoria Road / Darling St	Westbound	Left	340z:655:4207 [L]	3	65	72	7	10.77	0.85
Victoria Road / Darling St	Northbound	Right	4207:655:337z [R]	3	4	2	-2	-50	1.15
Victoria Road / Darling St	Northbound	Through	4207:655:334z [A]	3	225	230	5	2.22	0.33
Victoria Road / Darling St	Northbound	Left	4207:655:338z [L]	3	178	184	6	3.37	0.45
Victoria Road / Prosper St	Eastbound	Through	337z:224:654 [A]	3	2137	2166	29	1.36	0.63
Victoria Road / Prosper St	Westbound	Through	654:224:337z [R]	3	2480	2363	-117	-4.72	2.38
Victoria Road / Prosper St	Westbound	Left	654:224:226 [L]	3	100	71	-29	-29	3.14
Victoria Road / Prosper St	Northbound	Left	226:224:337z [A]	3	15	15	0	0	0
Victoria Road / Evans St	Eastbound	Through	224:654:92 [R]	3	2118	2160	42	1.98	0.91
Victoria Road / Evans St	Eastbound	Left	224:654:470z [L]	3	19	3	-16	-84.21	4.82
Victoria Road / Evans St	Southbound	Right	470z:654:224 [R]	3	34	81	47	138.24	6.2
Victoria Road / Evans St	Southbound	Through	470z:654:449z [A]	3	108	119	11	10.19	1.03
Victoria Road / Evans St	Southbound	Left	470z:654:92 [L]	3	83	49	-34	-40.96	4.19
Victoria Road / Evans St	Westbound	Through	450z:654:224 [R]	3	2529	2325	-204	-8.07	4.14
Victoria Road / Evans St	Westbound	Left	450z:654:449z [L]	3	64	42	-22	-34.38	3.02
Victoria Road / Evans St	Northbound	Right	449z:654:92 [L]	3	0	0	0	0	0
Victoria Road / Evans St	Northbound	Through	449z:654:470z [R]	3	103	92	-11	-10.68	1.11
Victoria Road / Evans St	Northbound	Left	449z:654:224 [L]	3	17	18	1	5.88	0.24
Victoria Road / Gordon St	Eastbound	Through	757z:653:31032 [A]	3	2201	2221	20	0.91	0.43
Victoria Road / Gordon St	Westbound	Through	31032:653:92 [A]	3	2566	2329	-237	-9.24	4.79
Victoria Road / Gordon St	Northbound	Left	91:653:31032 [R]	3	136	123	-13	-9.56	1.14
Victoria Road / Gordon St	Northbound	Right	91:653:92 [L]	3	27	25	-2	-7.41	0.39
Victoria Road / Joseph St	Eastbound	Through	653:31032:31482 [R]	3	2325	2350	25	1.08	0.52
Victoria Road / Joseph St	Eastbound	left	653:31032:228 [L]	3	12	1	-11	-91.67	4.31
Victoria Road / Joseph St	Southbound	Left	228:31032:31482 [A]	3	80	64	-16	-20	1.89
Victoria Road / Joseph St	Westbound	Through	31482:31032:653 [A]	3	2566	2315	-251	-9.78	5.08
Victoria Road / Robert St	Eastbound	Through	31482:652:31012 [R]	3	2355	2367	12	0.51	0.25
Victoria Road / Robert St	Eastbound	Left	31482:652:31031 [L]	3	50	43	-7	-14	1.03
Victoria Road / Robert St	Southbound	Right	31031:652:31482 [R]	3	43	44	1	2.33	0.15
Victoria Road / Robert St	Southbound	Left	31031:652:31012 [L]	3	750	711	-39	-5.2	1.44
Victoria Road / Robert St	Westbound	Right	31012:652:31031 [A]	3	1113	1097	-16	-1.44	0.48
Victoria Road / Robert St	Westbound	Through	34478:652:31482 [A]	3	2523	2234	-289	-11.45	5.93

Victoria Road / Lilyfield Rd	Eastbound	Through	31012:98:97 [A]	3	3105	3073	-32	-1.03	0.58
Victoria Road / Lilyfield Rd	Westbound	Through	97:98:31012 [R]	3	3602	3287	-315	-8.75	5.37
Victoria Road / Lilyfield Rd	Northbound	Left	81:98:31012 [A]	3	34	34	0	0	0
Victoria Road / Lilyfield Rd	Westbound	Left	97:98:81 [L]	3	277	282	5	1.81	0.3
Victoria Road / The Crescent	Eastbound	Right	97:651:31014 [A]	3	854	761	-93	-10.89	3.27
Victoria Road / The Crescent	Eastbound	Left	97:31004:31000 [A]	3	2251	2323	72	3.2	1.51
Victoria Road / The Crescent	Westbound	Right	31004:651:97 [A]	3	3172	2784	-388	-12.23	7.11
Victoria Road / The Crescent	Westbound	Through	31003:651a:31014 [A]	3	2180	2001	-179	-8.21	3.91
Victoria Road / The Crescent	Northbound	Left	31014:651:97 [A]	3	707	783	76	10.75	2.78
Victoria Road / The Crescent	"The Mouse Hole"	0	31017:351z:350z [A]	3	2107	2193	86	4.08	1.85
The Crescent / James Craig Drive	Westbound	Through	31016:3033:31023 [R]	3	3020	2748	-272	-9.01	5.06
The Crescent / James Craig Drive	Westbound	Left	31016:3033:31019 [L]	3	14	2	-12	-85.71	4.24
The Crescent / James Craig Drive	Northbound	Right	31019:3033:31017 [A]	3	26	20	-6	-23.08	1.25
The Crescent / James Craig Drive	Northbound	Left	31019:3033:31023 [L]	3	58	47	-11	-18.97	1.52
The Crescent / James Craig Drive	Eastbound	Right	31023:3033:31019 [A]	3	3	0	-3	-100	2.45
The Crescent / James Craig Drive	Eastbound	Through	198:3033:31017 [A]	3	2128	2167	39	1.83	0.84
The Crescent / City West Link	Westbound	Through	31023:1208:31025 [A]	3	2027	1873	-154	-7.6	3.49
The Crescent / City West Link	Westbound	Right	31023:1208a:114 [A]	3	1051	915	-136	-12.94	4.34
The Crescent / City West Link	Northbound	Right	114:1208:31023 [R]	3	769	821	52	6.76	1.84
The Crescent / City West Link	Northbound	Left	114:1208:31025 [L]	3	112	121	9	8.04	0.83
The Crescent / City West Link	Eastbound	Right	31025:1208:114 [A]	3	199	173	-26	-13.07	1.91
The Crescent / City West Link	Eastbound	Through	74:1208:31023 [A]	3	2008	2106	98	4.88	2.16
The Crescent / James Craig Drive	Eastbound	Through	197:3033:31016 [A]	3	646	747	101	15.63	3.83
The Crescent / James Craig Drive	Northbound	Right	31019:3033:31016 [R]	3	14	18	4	28.57	1

Rozelle Village

Working Paper No.4 - Paramics Modelling Results Report

10 February 2012

Prepared for

Pacific Investments Pty Ltd

Halcrow

Rozelle Village

Modelling Results

Prepared for
Pacific Investments Pty Ltd

This report has been issued and amended as follows:

Rev	Description	Date	Prepared by	Approved by
V01	Internal Draft	31/1/2012	SWR	JR
V02	Client Submission	1/2/2012	SWR	JR
V03	Draft Report	10/2/2012	SWR	JR

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Contents

1 Introduction

Halcrow has modelled the traffic effects of the proposed Rozelle Village redevelopment project in a Paramics micro-simulation traffic model for Pacific Investments Pty Ltd.

The use of a Paramics micro-simulation model has been undertaken to satisfy the requirements of the Director General's Requirements (DGRs) dated 5 April 2011 for the Environmental Assessment of the Rozelle Village development proposal, namely that traffic modelling take into account coordinated traffic signals, pedestrians, public transport (ie. buses) and bus priority treatments.

Paramics is also used to produce sets of numerical performance indicators such as road network 'level of service', intersection delay and vehicle travel time to compare different scenarios.

This report presents the results of the Paramics traffic modelling and documents the effects of the proposed development on the surrounding road network operation.

The assessment methodology, model construction and calibration of the Paramics modelling are the subject of separates reports, namely:

- Working Paper No.1 – Modelling Methodology Statement (ref JCATCKm01);
- Working Paper No.2 – Network Build (ref: JCATCKr01); and
- Working Paper No.3 – Calibration Report (ref: JCATCKr03).

2 Rozelle Village Development Proposal

2.1 Development Proposal Land Uses

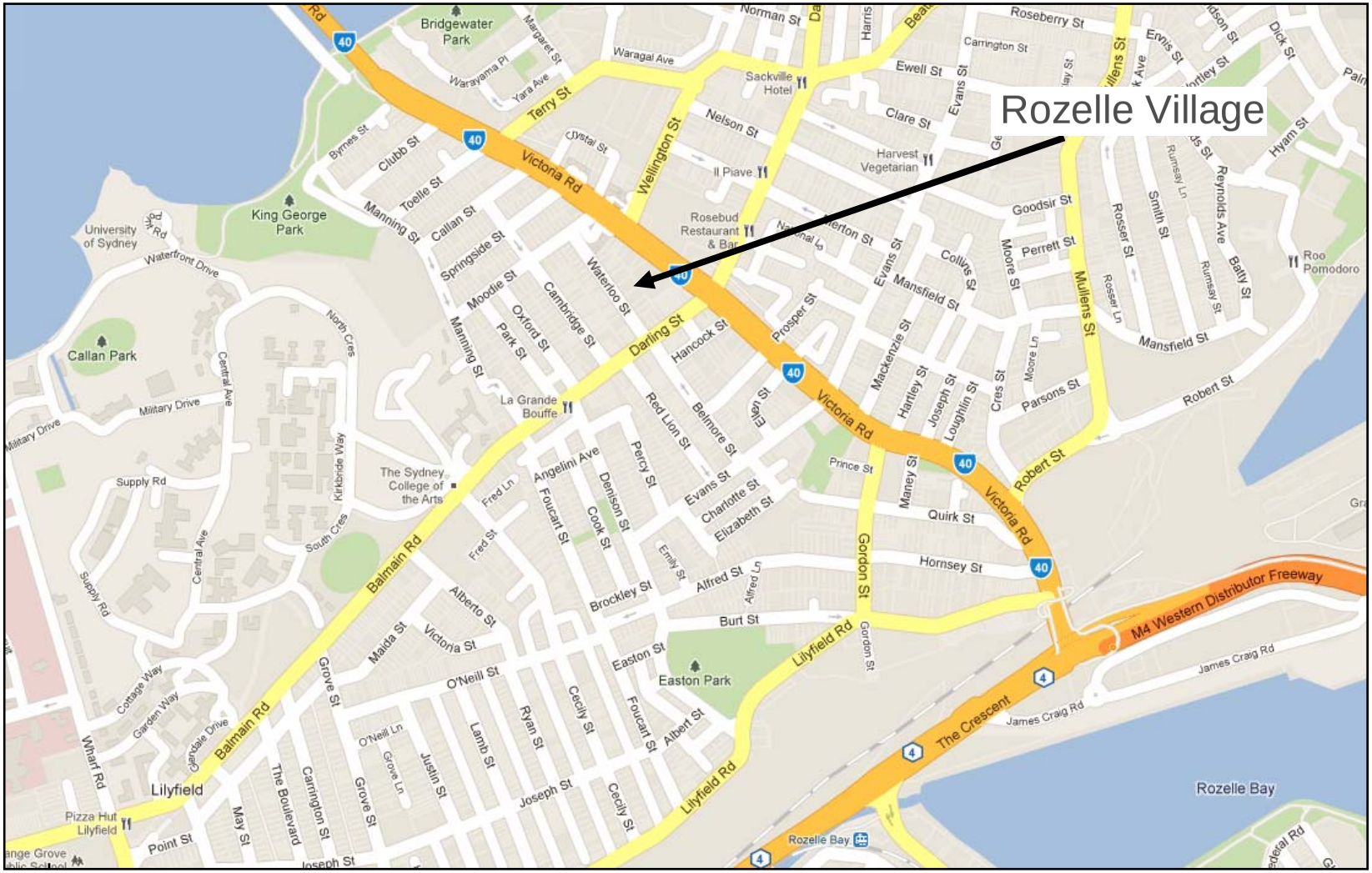
The Rozelle Village site is located on Victoria Road, Rozelle and is bound by Victoria Road, Darling Street, Waterloo Street and Moodie Street (see Figure 1).

The Rozelle Village development proposal is a mixed use redevelopment of the former Balmain Tigers Leagues Club in Rozelle.

The proposed mixed uses (as at 10/2/2012) included in the Pararmic modelling assessment are as following:

- Residential = 304 apartments
- Retail (8,324m2 GFA)
    - including a supermarket, major and specialty shops
- Restaurants (4,160m2 GFA)
- Commercial (1,696m2 GFA)
- Gymnasium (3,676m2 GFA)
- Club (2,400m2 GFA)
- Professional Medical Consulting Rooms (730m2 GFA)
- Child Care Centre (80 children)
- Community Centre (367m2 GFA)
- Basement Car Park (total = 834 car spaces)
    - Residential = 290 car spaces
    - Non-Residential = 544 car spaces
- Basement loading / service vehicle area

Figure 1 – Site Location



Source: maps.google.com.au

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2.2 Vehicle Access Arrangements

Two vehicle access points are proposed for the Rozelle Village development site. The main vehicle access will be located on Victoria Road and a secondary residents only access at Waterloo Street.

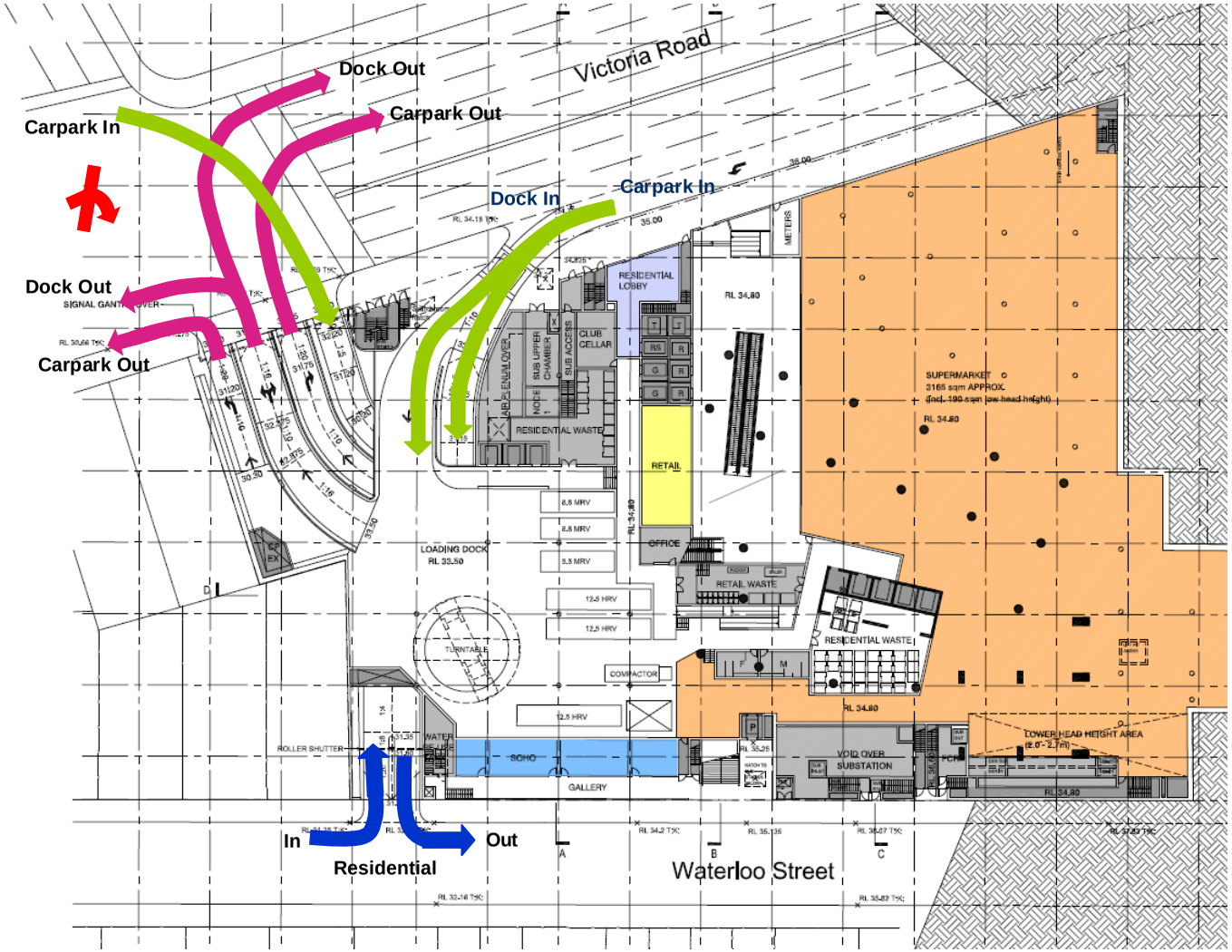
Essentially the Victoria Road access will provide access to all public car parking spaces (544 car spaces) for the development's non residential land uses such as the retail areas, gym, commercial etc and the site's loading dock facility.

This proposed vehicle access arrangement is consistent with the vehicle access objectives for the site set out in the *Leichardt Development Control Plan – Part D1.0 Site Specific Controls, Balmain Leagues Club Precinct* (2008).

The proposed Victoria Road entrance is modelled as a new (forth) approach to the Wellington / Victoria Road signalised intersection. The proposed new approach will have one left and one right turn lane from the car park while a central lane will be reserved for vehicles from the loading dock only.

The Waterloo access will be accessed by resident vehicles only and service residential parking spaces (290 car spaces). The Waterloo access is proposed as a priority controlled vehicle driveway. The indicative intersection layouts are presented in Figure 2.

Figure 2 – Modelled Site Access Arrangements



3 Modelling Inputs and Assumptions

3.1 Model Network

The Paramics model used in the assessment of the Rozelle Village development includes:

- Victoria Road from Iron Cove Bridge to The Crescent;
- The Crescent from City West Link to Anzac Bridge; and
- Darling Street from Manning Street to Victoria Road.

The model extents are shown on Figure 3. These models extents are consistent with the Director General's Requirements (DGRs) issued for the project (5 April 2011).

Figure 4 shows an outline of the road network as modelled in the Paramics model used in the assessment of the Rozelle Village development proposal.

The Paramics network is based on the Roads and Maritime Services' (RMS) Victoria Road model for the Inner-West Busway. This model was cut at Iron Cove Bridge keeping the southern section including Rozelle, The Crescent, City West Link and Anzac Bridge.

The model was then extended along Darling Street to include the intersections of Darling Street and Waterloo St, Cambridge St, Oxford Street, Park Street as shown in Figure 4.

The network has been further refined to reflect the on-street parking and lane arrangement for each model scenario. The following key differences have been included.

- **AM Peak** – This model includes the tidal flow and bus lane arrangements that are in place during the weekday morning peak.

Figure 3 – Modelled Network Area

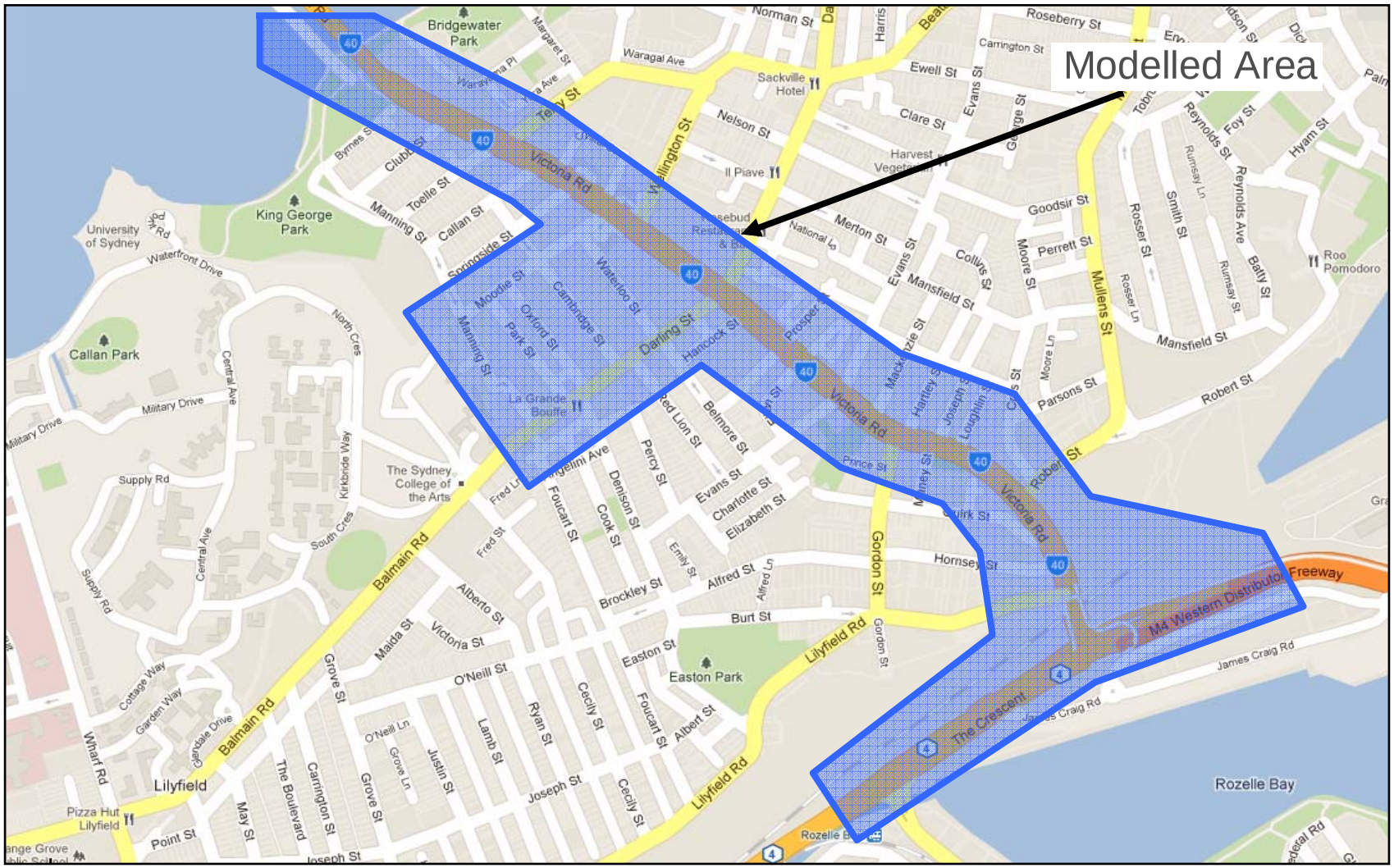


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Figure 4 - Paramics Model Network Extents

- **PM Peak** – Lane arrangements in the weekday afternoon peak with clearways and the double right turn at Darling Street.

- **Saturday Peak** – With the same lane arrangement at the PM Peak the Saturday peak reflects the effects of parking along Victoria Road on weekends. This is achieved through closing the kerbside lane to vehicles.

3.2 Modelled Scenarios

A total of six modelling scenarios have been run in the assessment of the Rozelle Village development proposal.

The modelled scenarios are summarised in Table 3-1.

Table 3-1 Modelling Scenarios

	Base Case	With Development [1.]
Thursday AM Peak	7am – 9am	7am – 9am
Thursday Peak	4pm-6pm	4pm-6pm
Saturday Midday	11am-1pm	11am-1pm

Note: 1. "With Development" includes consideration of other developments including Carrier Site and White Bay.

As documented in the *Rozelle Village Working Paper 3 - Calibration Report* (JCATCKr03) the "base case" traffic flows have been based on traffic count surveys and bus travel time surveys undertaken in September 2011.

It is noted that the scenarios modelled as part of the this assessment of the Rozelle Village development proposal are consistent with the scenarios modelled by ARUP for Leichhardt Council as part of the formulation of the site specific DCP for the "Balmain Tigers Site.

3.3 Modelled Rozelle Village Development Traffic Generation

3.3.1 Traffic Generation Summary

The site specific controls set out in *Leichhardt DCP D1.0* seek to "*reflect the site's proximity to public transport and promote choice in available transport modes and reduce dependency on cars*".

Constraints on the amount on site parking provision will limit the ability of customers, residents and tenants to travel to and from the site by car. This constraint will operate in tandem with the effects of the high degree of walk in business plus the community bus and home delivery service to reduce retail traffic generation.

Furthermore there are a number of site specific factors which will influence the traffic generation potential of the proposed development. These factors include:

- Passing trade
- Multi purpose trips associated with the mixed use development
- Individual site uses have peak traffic periods at different times of the day / week.

These factors are discussed further in following sections.

A summary of the traffic generation estimates of the Rozelle Village development proposal used in the Paramics Modelling is provided in Table 3-2. A detailed breakdown is provided in Appendix A to this report.

Table 3-2 Summary of Rozelle Village Development Traffic Generation

	Residential Uses	Non Residential Uses	Total
Weekday AM Peak			
Inbound	18	134	151
Outbound	70	114	185
Total	88	248	336
Weekday PM Peak			
Inbound	70	263	334
Outbound	18	211	228
Total	88	474	562
Weekend Midday			
Inbound	44	214	258
Outbound	44	214	258
Total	88	428	516

3.3.2 Retail

The RTA traffic generation rates [1] for a retail use with an unconstrained parking situation would generate 7.6 vehicle trips per hour per 100m^2 and 5.6 parking spaces per 100m^2 of lettable floor area for a centre with between 10,000 and 20,000m^2 of retail space. Thus each parking space would generate 1.4 vehicle trips per hour. Use of RTA traffic and parking generation rates in the range of 10,000 to 20,000m^2 is appropriate because the retail space on the site would operate in combination with that on the strip on Darling Street.

The RTA has recently undertaken a range of surveys[2] of various retail developments as part of their updating of the RTA guidelines.

[1] RTA Guide to Traffic Generating Development (2002)
[2] Trip Generation and Parking Demand Surveys of Shopping Centres (September 2011) prepared by Halcrow for RTA.

These surveys indicated a trip generation per parking space to be :

- AM Peak Period : 0.54 vehicle trips per peak hour (40% of PM peak period_
- PM Peak Period : 1.36 vehicle trips per peak hour
- Saturday Midday : 1.34 vehicle trips per peak hour

These rates have been applied to the proposed Rozelle Village land use mix (see Appendix A) and used in the Paramics modelling.

3.3.3 Restaurant

The RTA guidelines estimate a peak hour traffic generation for restaurants of 0.33 vehicle trips per parking space. As parking for restaurants is constrained within the Leichhardt DCP site specific controls, the application of 0.33 vehicle trips per hour per space has been applied to the Rozelle Village development proposal.

It is noted that the restaurants peak activity is likely to occur during the evening and weekend periods. There will be little to no demand for restaurants during the weekday AM peak period. The traffic generation estimates used in the modelling reflect this demand.

3.3.4 Gymnasium

Like retail land uses the traffic generation potential of the gymnasium will be affected by constrained parking provisions in accordance with Leichhardt DCP.

The DCP parking provision of 4.5 spaces / 100m2 represents a provision of 60% of the RTA's desirable parking provision rate.

The RTA guidelines estimate a traffic generation rate of 1.2 vehicle trips per parking space for gymnasiums.

A daily and weekly profile of patronage for an existing gymnasium similar to the proposed gym has been used to estimate the traffic generation of the proposed gym. The patronage profile is shown in Appendix B. The profile indicates that peak demand for the gym occurs outside of the peak traffic periods on the road network.

The traffic generation rates used in the Paramics modelling reflect the proportional demands for differing time periods as per the existing gymnasium.

3.3.5 Office / Commercial / Community Centre

As for the retail, reduced parking provision will significantly reduce commercial space traffic generation. Calculating traffic generation in a manner similar to that undertaken above for the retail area, RTA requirements are for one space per 2.5 spaces/100m^2 of office space and the peak hourly traffic generation rate is 2 vehicle trips/100m^2 of floor space. Thus the traffic generation per space is 0.8 vehicle trips per peak hour.

3.3.6 Residential

The *Leichhardt DCP's* site specific controls for the maximum parking rate for residential development is considerably lower than that suggested by the RTA Guide for metropolitan subregional centres.

Therefore the use of the RTA's traffic generation rate of 0.29 trips per apartment per peak hour is considered to be an appropriate (if not conservatively high) rate to apply to the proposed residential uses in the Rozelle Village development.

Notwithstanding the above, the RTA's rate of 0.29 trips per unit per hour has been used in the Paramics modelling for all 3 peak period scenarios.

3.3.7 Club

The previously surveyed evening peak traffic generation of the club was found to be 85 vehicle trips per hour during the evening peak period. With the new club reduced in size to 56% of the existing club, its traffic generation would reduce to about 48 vehicle trips per hour. This reduction would also allow for combined shopping/club visits.

3.3.8 Passing Trade – Intercepted Trips

Estimated traffic entering and exiting the site would not be entirely new traffic to the external road network. A significant proportion of trips would be "diverted" or "intercepted" traffic that would have passed the site anyway.

This is particularly the case for the Rozelle Village site where there are significant volumes of traffic passing the site (passing trade) along Victoria Road.

Passing trade would be particularly relevant for the following proposed site uses:

- Retail
- Gymnasium

Furthermore, as Victoria Road currently experiences congestion at peak times of the day, the ability and desirability of new traffic to access the site during peak periods would be reduce the proportion of new traffic accessing the site for retail purposes.

For the purpose of assessment, the Paramics modelling has assumed the following percentages for passing trade:

- AM Peak : 60% retail and 40% gym
- PM Peak : 60% retail and 40% gym
- Saturday Midday 20% retail and 20% gym

The percentages for passing trade have been applied to traffic approaching and departing along Victoria Road. As such the assessment allows for destination traffic

arriving from and departing to areas such as the Balmain Peninsula (Darling Street east) and the Inner West (Darling Street west).

3.4 Other Development Traffic Generation

3.4.1 Carrier Site (Terry Street)

In 2007 the draft Masterplan for the Terry Street (Carrier) site included the following:

- 10,703m2 of retail floor space;
- 13,771m2 of commercial floor space (including a gym)
- 40,120m2 of residential floor space approx.

This had an estimated traffic generation potential of some 888 vehicles per hour during the peak periods.

Since this time the Terry Street site development potential has been significantly reduced, reflecting in part the Council's findings that only one supermarket was required for the precinct (now proposed for the Rozelle Village site).

In November 2010 a planning proposal was submitted to Council by Anka Property Group. The proposal included:

- 1,300m2 neighbourhood retail / commercial uses
- Child care centre
- 450m2 light industrial / commercial
- 195 residential apartments

This proposal was estimated to generate between 150 – 200 vehicles per peak hour.

Subsequently it is understood that the residential component of the Carrier site development proposal has been further reduced to 179 apartments resulting in a peak hour traffic generation potential of 130 – 180 vehicles trips per hour.

Based on these recent development proposals it was assumed that the Carrier site would generate 150 vehicle movements per peak hour. No allowance for passing trade was applied to the site's traffic generation as the specifics of the retail / commercial uses are not known.

3.4.2 White Bay Cruise Terminal

The proposal for the White Bay Cruise Terminal essentially seeks to relocate the existing cruise passenger terminal at Darling Harbour (DH8) to White Bay.

Based on the planning proposal for White Bay Terminal it is understood that when ships are docked, the terminal generates traffic during the AM peak commuter period but minimal traffic in the PM peak.

Thus with regard to Rozelle Village development, the cruise terminal will not be generating significant levels of traffic at the same time as the peak demand for Rozelle Village which is weekday PM peak and Saturday midday.

Furthermore, traffic currently accessing the existing cruise facility at Darling Harbour are travelling past the Rozelle Village site and have been accounted for in the traffic surveys undertaken as part of this study.

3.5 Traffic Distribution

Traffic distribution to and from the Rozelle Village site has been estimated using a number of sources of information including:

- Journey to Work data (2006);
- Rozelle Village Economic Impact Assessment (February 2012)

Journey to Work is a data set that is created from the census data. It details for the morning peak the origin of trips and the destination of trips. It is useful for understanding the how trips in Rozelle relate to other attractors.

To relate the journey to work data to site traffic distribution the data was dived into two categories of trips within Leichhardt LGA and Trips out side Leichhardt LGA where the site is located. For the trips out side Leichhardt Sydney was divided into three general areas. That is:

- North West, - Anywhere north of the Parramatta river or north of a line between Penrith and Parramatta and west of a line that runs roughly from North Sydney to Palm beach.

- East, - Anywhere east of a line that runs roughly from North Sydney to Palm Beach, Sydney CBD and east of a line that runs from Glebe to Sydney Airport.

- South West, - Anywhere south of the Parramatta River and the line between Parramatta and Penrith and west of a line that runs from Glebe to Sydney Airport.

Trips within Leichhardt were further disaggregated into postcode areas. The result of this was a distribution by destination and a distribution by origin.

Traffic going to and from the North West was assigned to Iron Cove Bridge, East to Anzac Bridge and South West to Darling Street and City West Link. Local trips were divided among the local streets.

The journey to work data set was applied to the following proposed site uses:

- Residential
- Commercial
- Gymnasium

For the other site uses consideration was given to the economic assessment which considered the areas of where the likely market catchments (spend areas) would be located. This allowed a more rigorous consideration of the origins and destinations of the retail and restaurant trips will come from and go to.

The trip distributions for each of the modelled scenarios are shown in Appendix C.

3.6 Site Access (Victoria Road) Intersection Signal Timings

An additional signal phase was added to the Victoria Road / Wellington Street intersection to allow vehicles to leave the proposed Rozelle Village car park. The additional phase was called "C phase".

The as modelled intersection phasing for the Victoria Road site access intersection is shown in Figure 5.

Time for the C phase was taken from A phase (ie the through movement along Victoria Road). This was undertaken such that pedestrian walk times across Victoria Road running during the B phase would be maintained.

The timing for the C phase was adjusted to allow the vehicles from the car park to egress.

Table 3-3 below shows the signal timings that were selected as the appropriate signals and were used to generate the modelling results presented in this report.

Table 3-3 Wellington Street Signal Timing (sec)

	A Phase	B Phase	C Phase (Exit From Rozelle Village Car Park)
Weekday AM Peak	90	35	15
Weekday PM Peak	86	34	20
Saturday Midday	85	30	25

Note: Phase times include inter green time.

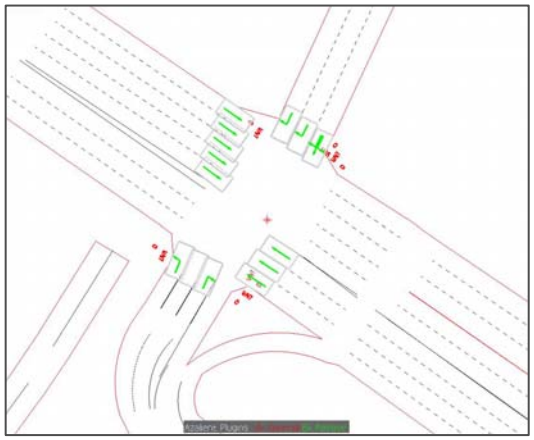
3.7 On Street Parking

3.7.1 Victoria Road

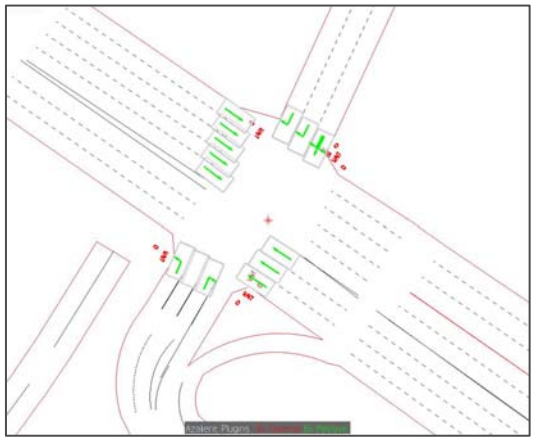
Site observations indicated that parking that is currently allowed on the northern side (Balmain side) of Victoria Road between Wellington Street and Darling Street outside of

Figure 4 – Intersection Phases - Victoria Rd / Site Access

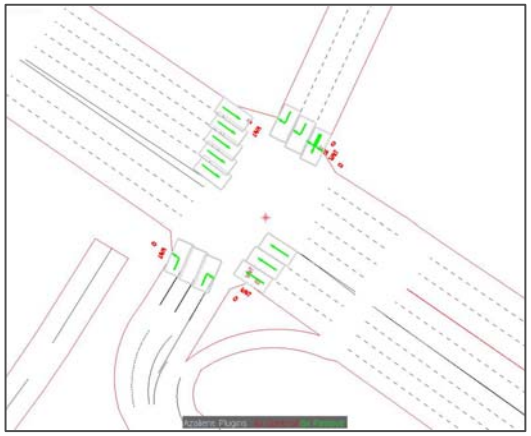
Phase A



Phase B



Phase C



peak AM and PM periods. That is vehicles can park on this section of Victoria Road during Saturday periods.

The Saturday model indicated that this parking creates significant delays to Victoria Road citybound in the base (no development) scenario. Vehicle queues from Darling Street along Victoria Road were observed to extend beyond the Iron Cove Bridge during the Saturday midday peak.

Such congestion would make it hard for traffic from the proposed Rozelle Village development to leave the site via the Victoria Road site access.

In modelling the effects of the development it was assumed that parking along this section of Victoria Road would be banned. This would have benefits both for the back ground traffic as well as the site generated traffic.

It is noted that the RMS has submitted a proposal to Leichhardt Council to enforce 24 hour per day clearway restrictions along Victoria Road between The Crescent and the Iron Cove Bridge.

3.7.2 Darling Street

On street parking in Darling Street is permitted at various times between Victoria Road and Waterloo Street / Belmore Street.

The modelled existing (base case) and with development parking arrangements along Darling Street between Victoria Road and Waterloo Street / Belmore Street are summarised in Table 3-4.

It is noted that like the parking on Victoria Road, parking on Darling Street currently generates an adverse impact on traffic flows along Darling Street and in particular the turning movements to and from Victoria Road.

The remove of parking on both sides of Darling Road to the west of Victoria Road as shown in Table 3-4 would improve intersection operation with or without the proposed Rozelle Village development.

Table 3-4 Modelled Darling Street On Street Parking Controls between Victoria Rd / Waterloo St

Darling Street Parking	Existing (Base)	With Development
Waterloo St Side (4 spaces)		
- AM peak weekdays	Banned	Banned
- PM peak weekdays	Banned	Banned
- Saturday Midday	Permitted	Banned
Belmore St Side (6 spaces)		
- AM peak weekdays	Permitted	Permitted
- PM peak weekdays	Banned	Banned
- Saturday Midday	Permitted	Banned

4 Modelling Results

4.1 Road Network Intersection Operation

The intersection level of service has been recorded across the 2 hr calibration period of model.

Level of service is based on the average vehicle delay at the intersection as described in Table 4-1.

Table 4-1 – Level of Service Criteria

Level of Service	Average Delay per Vehicle (secs/veh)	Signals & Roundabouts	Give Way & Stop Signs
A	less than 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
F	> 70	Extra capacity required	Extreme delay, traffic signals or other major treatment required

Adapted from RTA Guide to Traffic Generating Developments, 2002.

As Paramics is a network model, delays caused by downstream intersections may cause queues to extend upstream. This means an intersection that in theory has enough capacity if it were to be considered in isolation will experience higher delays due to downstream blocking effects.

Alternatively, upstream congestion may result in an intersection appearing to operate at good levels of service because traffic is being starved at the stop line due to this upstream congestion. For this reason these reported delays may differ from results

produced by an analytical model such as Sidra unless attempts have been made to model theses blocking and starving effects.

The level of service results for each modelled scenario are presented below in Tables 4.2 to 4.4.

In the AM peak the level of service shows high delays at Terry Street in the base and development Scenario. This delay is related to the congestion caused down stream at Darling Street. The model indicates an increase in this delay under the development scenario. Other intersections remain relatively consistent with the base model.

Table 4-2 AM Peak Intersection Performance Level of Service

Location	Base		Development	
	Av Delay	**LoS**	**Av Delay**	**LoS**
Terry Street and Victoria Road	119	F	139	F
Darling Street and Victoria Road	60	E	57	E
The Crescent / Victoria Road	83	F	101	F
The Crescent / City West Link	67	E	66	E
Wellington Street/ Victoria Road	41	C	44	D
Waterloo Street / Darling Street	21	B	31	C
Evans Street / Victoria Road	43	D	36	C
Gordon Street / Victoria Road	34	C	35	C
Robert Street / Victoria Road	61	E	64	E
James Craig Road / The Crescent	16	B	16	B

The PM peak shows small increases in delay at intersections across the network.

Table 4-3 PM Peak Intersection Performance Level of Service

Location	Base		Development	
	Av Delay	**LoS**	**Av Delay**	**LoS**
Terry Street and Victoria Road	13	A	24	B
Darling Street and Victoria Road	50	D	63	E
The Crescent / Victoria Road	109	F	103	F
The Crescent / City West Link	58	E	58	E
Wellington Street/ Victoria Road	15	B	39	C
Waterloo Street / Darling Street	14	A	15	B
Evans Street / Victoria Road	17	B	20	B
Gordon Street / Victoria Road	15	B	29	C
Robert Street / Victoria Road	35	C	37	C
James Craig Road / The Crescent	17	B	13	A

In the Saturday Peak a base scenario with no parking along Victoria Road between Wellington Street and Darling Street was included for comparative purposes. The models indicate that by removing the parking improves the Citybound traffic significantly.

Table 4-4 Sat Peak Intersection Performance Level of Service

Location	Base		Base + No Parking		Development	
	Av Delay	**LoS**	**Av Delay**	**LoS**	**Av Delay**	**LoS**
Terry Street and Victoria Road	165	F	15	B	17	B
Darling Street and Victoria Road	67	E	61	E	66	E
The Crescent / Victoria Road	48	D	48	D	75	F
The Crescent / City West Link	49	D	49	D	56	D
Wellington Street/ Victoria Road	45	D	23	B	33	C
Waterloo Street / Darling Street*	67	E	44	D	18	B
Evans Street / Victoria Road	18	B	18	B	24	B
Gordon Street / Victoria Road	15	B	14	A	14	A
Robert Street / Victoria Road	35	C	33	C	26	B
James Craig Road / The Crescent	9	A	9	A	28	B

*Signal Times for Waterloo Street were optimised for the Development

4.2 Bus Travel Time – Victoria Road

4.2.1 Weekday AM Peak Period

Bus Travel times for the AM peak are indicated in Table 4-5 and Table 4-6. The bus travel times are recorded from bus stops near Terry Street, Darling Street and Robert Street. The models indicate a minimal effect on buses under the development scenario with an average increase in travel time of 20 seconds citybound in the first hour and 10 seconds outbound.

The second hour from 8:00 – 9:00am was closer to the base scenario with no increase citybound and only 8 seconds outbound.

Table 4-5 Bus Travel Times (07:00 – 08:00)

	Base	Development
Citybound		
Terry St - Darling St	1:58	2:01
Darling St - Robert St	2:28	2:36
Total	**4:26**	**4:37**
Outbound		
Robert St - Darling St	2:02	2:01
Darling St - Terry St	2:02	2:07
Total	**4:04**	**4:08**

Table 4-6 Bus Travel Times (08:00 – 09:00)

	Base	Development
Citybound		
Terry St - Darling St	1:52	1:54
Darling St - Robert St	2:46	2:43
Total	**4:38**	**4:37**
Outbound		
Robert St - Darling St	2:17	2:18
Darling St - Terry St	2:03	2:14
Total	**4:20**	**4:32**

4.2.2 Weekday PM Peak Period

The PM peak bus travel times are shown in Table 4-7 and Table 4-8. In the Citybound direction the model shows an increase in travel time of 16 seconds in the first hour and 20 seconds in the second hour.

The outbound direction shows an increase in travel time of about 30 seconds in both hours.

Table 4-7 Bus Travel Times (16:00 – 17:00)

	Base	Development
Citybound		
Terry St - Darling St	0:59	1:08
Darling St - Robert St	1:53	2:00
Total	**2:52**	**3:08**
Outbound		
Robert St - Darling St	2:14	2:17
Darling St - Terry St	1:44	2:03
Total	**3:55**	**4:21**

Table 4-8 Bus Travel times (17:00 – 18:00)

	Base	Development
Citybound		
Terry St - Darling St	1:10	1:30
Darling St - Robert St	2:05	2:06
Total	**3:16**	**3:36**
Outbound		
Robert St - Darling St	1:58	2:11
Darling St - Terry St	1:32	1:55
Total	**3:30**	**4:06**

4.2.3 Saturday Midday

The Saturday base model was run with and without parking between Wellington Street and Darling Street. The models showed that removing the parking will improve travel

time for buses in the citybound direction. The modelled bus travel times are shown in Table 4-9 and Table 4-10 below.

Compared to the 'base no parking scenario' in the citybound direction the model indicates that there will be a about a 21 second increase in bus travel times in the first hour and no change in the second hour. In the outbound direction bus travel times increase by about 22 seconds in the first hour and about 12 seconds in the second hour compared to the base case.

Table 4-9 Bus Travel Time (11:00 – 12:00)

	Base	Base + No Parking	Development
Citybound			
Terry St - Darling St	2:47	1:40	1:55
Darling St - Robert St	2:16	2:13	2:19
Total	**5:03**	**3:53**	**4:14**
Outbound			
Robert St - Darling St	2:41	2:39	2:47
Darling St - Terry St	1:54	2:02	2:10
Total	**4:34**	**4:42**	**4:57**

Table 4-10 Bus Travel Time (12:00 – 13:00)

	Base	Base + No Parking	Development
Citybound			
Terry St - Darling St	2:45	1:48	1:52
Darling St - Robert St	2:21	2:27	2:17
Total	**5:06**	**4:15**	**4:09**
Outbound			
Robert St - Darling St	2:38	2:32	3:01
Darling St - Terry St	1:48	1:48	1:36
Total	**4:25**	**4:20**	**4:37**

4.3 General Traffic Travel Time

4.3.1 Weekday AM Peak Period

The general traffic travel times are indicated in Table 4-11 and Table 4-12. It shows that the effect on general traffic travel times from Iron Cove Bridge to the Crescent would be minimal.

In the second hour there is a reduction in travel times of about 30 seconds. This is due to some traffic being held back beyond the model allowing better flow of traffic east of Darling Street.

Table 4-11 General Traffic Travel Time (07:00 – 08:00)

	Base	Development
CityBound		
Iron Cove - Darling Street	2:36	2:36
Darling Street - The Crescent	3:24	3:22
Total	**6:00**	**5:58**
Outbound		
The Crescent - Darling	1:45	1:46
Darling St - Iron Cove	0:47	0:53
Total	**2:31**	**2:39**

Table 4-12 General Traffic Travel Time (08:00 – 09:00)

	Base	Development
CityBound		
Iron Cove - Darling Street	3:21	3:08
Darling Street - The Crescent	3:48	3:29
Total	**7:08**	**6:36**
Outbound		
The Crescent - Darling	2:12	2:15
Darling St - Iron Cove	0:50	0:54
Total	**3:02**	**3:08**

4.3.2 Weekday PM Peak Period

The general traffic travel times for the PM peak are shown in Table 4-13 and Table 4-14. They correspond to the bus travel times. The citybound travel times show an increase of about 30 seconds to 1 minute while the outbound direction increases by about 10 to 24 seconds.

Table 4-13 General Traffic Travel Time (16:00 – 17:00)

	Base	Development
CityBound		
Iron Cove - Darling Street	1:14	1:52
Darling Street - The Crescent	1:45	1:45
Total	**2:59**	**3:36**
Outbound		
The Crescent - Darling	2:05	2:17
Darling St - Iron Cove	0:47	0:45
Total	**2:52**	**3:02**

Table 4-14 General Traffic Travel Time (17:00 – 18:00)

	Base	Development
CityBound		
Iron Cove - Darling Street	1:14	2:12
Darling Street - The Crescent	1:53	1:54
Total	**3:07**	**4:06**
Outbound		
The Crescent - Darling	1:51	2:23
Darling St - Iron Cove	0:46	0:41
Total	**2:37**	**3:04**

4.3.3 Saturday Midday Peak Period

The General Traffic travel times are presented in Table 4-15 and Table 4-16 below. The model shows an improvement in travel time of 2 minutes citybound when the parking along Victoria Road is removed between Wellington Street and Darling Street.

With the development the citybound travel times increased on average by 30 seconds in the first hour and 20 seconds in the second. The outbound travel times increased by some 8 seconds in the first hour and 34 seconds in the second hour.

Table 4-15 General Traffic Travel Times (11:00 – 12:00)

	Base	Base + No Parking	Development
CityBound			
Iron Cove - Darling Street	3:59	1:21	1:54
Darling Street - The Crescent	2:26	2:37	2:41
Total	**6:26**	**3:58**	**4:35**
Outbound			
The Crescent - Darling	2:01	1:56	2:08
Darling St - Iron Cove	0:49	0:49	0:45
Total	**2:49**	**2:45**	**2:53**

Table 4-16 General Traffic Travel Times (12:00 – 13:00)

	Base	Base + No Parking	Development
CityBound			
Iron Cove - Darling Street	3:31	1:34	1:45
Darling Street - The Crescent	2:36	2:31	2:41
Total	**6:07**	**4:05**	**4:26**
Outbound			
The Crescent - Darling	2:02	1:56	2:32
Darling St - Iron Cove	0:49	0:50	0:47
Total	**2:51**	**2:46**	**3:19**

4.4 Traffic Flow Changes

Changes in traffic volumes are presented on Table 4-17, Table 4-18 and Table 4-19 for the AM, PM and Saturday Peaks respectively. The volume changes are minimal along Victoria Road and are generally within the daily variation of traffic.

Changes in traffic on local streets occur mainly on Moodie and Waterloo Street however these traffic volumes are within the range that could normally be expected on a residential street during a peak hour.

Table 4-17 AM Peak Traffic Volume Changes

Road	Street 1	Street 2	Direction	Base		Development	
				7-8	**8-9**	**7-8**	**8-9**
Victoria Road	Iron Cove Bridge		Eastbound	3599	3163	3454	2947
			Westbound	2143	1881	2193	1973
Terry Street	East of Victoria Rd		Northbound	320	458	412	467
			Southbound	77	105	82	100
Victoria Road	Terry St	Wellington St	Eastbound	3376	2895	3148	2688
			Westbound	2204	1956	2262	2097
Moodie Street	West of Victoria Rd		Northbound	225	152	210	171
			Southbound	11	2	53	50
Wellington St	East of Victoria Rd		Southbound	607	528	723	723
Victoria Road	Wellington Street	Darling St	Eastbound	3163	2672	3101	2625
			Westbound	1478	1412	1602	1518
Darling Street	East of Victoria Rd		Northbound	349	457	355	421
			Southbound	393	391	381	403
Waterloo St	Darling Street	Moodie St	Southbound	41	36	126	127
			Northbound	68	89	56	99
Darling Street	Waterloo Street	Victoria Rd	Eastbound	494	466	562	514
			Westbound	524	566	485	611
Darling Street	West of Manning St		Eastbound	636	602	711	634
			Westbound	443	521	513	626
Victoria Road	Darling Street	Evans St	Eastbound	3314	2731	3213	2737
			Westbound	1354	1383	1401	1471
Victoria Road	North of Robert St		Eastbound	3580	3308	3585	3322
			Westbound	1312	1323	1380	1406
Victoria Road	The Crescent	Robert St	Eastbound	4413	4324	4431	4318
			Westbound	1744	2075	1800	2192
Anzac Bridge			Eastbound	5920	5570	5897	5700
			Westbound	2820	3146	2973	3156
The Crescent	James Craig Rd	Victoria Rd	Eastbound	544	483	565	531
			Westbound	2109	2300	2150	2223

Table 4-18 PM Peak Traffic Volume Changes

Road	Street 1	Street 2	Direction	Base		Development	
				4-5	**5-6**	**4-5**	**5-6**
Victoria Road	Iron Cove Bridge		Eastbound	2953	2914	3003	2953
			Westbound	3182	2676	3024	2871
Terry Street	East of Victoria Rd		Northbound	591	554	721	702
			Southbound	48	70	82	107
Victoria Road	Terry St	Wellington St	Eastbound	2569	2539	2604	2563
			Westbound	3350	2771	3307	3039
Moodie Street	West of Victoria Rd		Northbound	158	173	150	172
			Southbound	66	52	142	149
Wellington St	East of Victoria Rd		Southbound	633	402	505	623
Victoria Road	Wellington Street	Darling St	Eastbound	2199	2169	2236	2186
			Westbound	2739	2250	2886	2473
Darling Street	East of Victoria Rd		Northbound	512	482	527	545
			Southbound	438	415	449	424
Waterloo St	Darling Street	Moodie St	Southbound	48	35	101	88
			Northbound	56	90	84	138
Darling Street	Waterloo Street	Victoria Rd	Eastbound	503	410	638	562
			Westbound	816	732	751	826
Darling Street	West of Manning St		Eastbound	584	432	707	620
			Westbound	799	586	733	690
Victoria Road	Darling Street	Evans St	Eastbound	2228	2156	2268	2172
			Westbound	2714	2285	2757	2407
Victoria Road	North of Robert St		Eastbound	2518	2404	2530	2482
			Westbound	2673	2283	2738	2334
Victoria Road	The Crescent	Robert St	Eastbound	3209	3037	3313	3205
			Westbound	3631	3318	3705	3323
Anzac Bridge			Eastbound	4583	4544	4716	4634
			Westbound	5113	4871	5158	4785
The Crescent	James Craig Rd	Victoria Rd	Eastbound	905	812	910	802
			Westbound	2834	2800	2836	2806

Table 4-19 Saturday Midday Peak Traffic Volume Changes

Road	Street 1	Street 2	Direction	Base		Base + No Parking		Development	
				11-12	**12-1**	**11-12**	**12-1**	**11-12**	**12-1**
Victoria Road	Iron Cove Bridge		Eastbound	2463	2670	2673	2577	2788	2687
			Westbound	2430	2455	2388	2474	2419	2634
Terry Street	East of Victoria Rd		Northbound	441	616	472	621	559	678
			Southbound	84	89	100	91	80	101
Victoria Road	Terry St	Wellington St	Eastbound	2177	2270	2414	2086	2471	2291
			Westbound	2505	2594	2494	2600	2559	2809
Moodie Street	West of Victoria Rd		Northbound	362	279	324	265	355	335
			Southbound	16	38	21	28	69	79
Wellington St	East of Victoria Rd		Southbound	527	583	531	587	657	783
Victoria Road	Wellington Street	Darling St	Eastbound	1891	1991	2062	1876	2160	2001
			Westbound	1693	1856	1734	1868	1787	1990
Darling Street	East of Victoria Rd		Northbound	594	584	598	661	704	665
			Southbound	365	385	359	414	428	442
Waterloo St	Darling Street	Moodie St	Southbound	53	66	63	51	125	135
			Northbound	134	142	110	145	138	164
Darling Street	Waterloo Street	Victoria Rd	Eastbound	435	338	451	439	546	510
			Westbound	632	644	722	657	845	859
Darling Street	West of Manning St		Eastbound	606	428	558	556	689	618
			Westbound	567	549	641	538	819	742
Victoria Road	Darling Street	Evans St	Eastbound	1936	1999	2078	1893	2175	2002
			Westbound	1818	2053	1884	2046	1917	2089
Victoria Road	North of Robert St		Eastbound	2285	2274	2312	2160	2476	2277
			Westbound	1770	2085	1835	2138	1833	2168
Victoria Road	The Crescent	Robert St	Eastbound	3049	3044	3128	2965	3289	3054
			Westbound	2551	2945	2605	2942	2574	3019
Anzac Bridge			Eastbound	4770	4879	4799	4808	4862	4861
			Westbound	3659	4271	3747	4159	3799	4262
The Crescent	James Craig Rd	Victoria Rd	Eastbound	732	746	747	776	721	803
			Westbound	2482	2655	2589	2567	2684	2631

Appendix A Rozelle Village Traffic Generation Estimates

Schedules - 9/2/2012 Thursday AM

Halcrow Estimates

Land Use	Area/No.	Parking Provision	Generation Rate (trips per parking space)	Land Use Generation	Vehicles In	Vehicles Out
Apartments	304					
1 bed	112		0.29	32	6	26
2 bed	178		0.29	52	10	41
3 bed	14		0.29	4	1	3
Total	**304**	**290**		**88**	**18**	**71**
Retail						
Supermarket	3630	60	0.54	32	16	16
Specialty	4694	65	0.54	35	18	18
Restaurant (incl. outdoor)	3076	114	0	0	0	0
Food Court Restaurant	1084	39	0	0	0	0
Total	**12484**	**278**		**68**	**34**	**34**
Gym						
Gym	3676					
Total		**165**	**0.75**	**124**	**68**	**56**
Medical Centre	730	10	0.8	8	4	4
Total				**8**	**4**	**4**
Child Care Centre	755	0				
Children	80		0.4	32	16	16
Staff	12					
Total				**32**	**16**	**16**
Commercial/community centre						
Commercial/SOHO	1696	15	0.8	12	10	2
Commercial/community centre	367	6	0.8	5	2	2
Total		21		17	12	5
Cinema	0					
Cinema Office	0					
Total		**0**				
Club (total)	2400		see previous use	0	0	0
licensed floor area						
Lounge/Bar Area						
Dining						
Total		**70**				
TOTAL	**34684**	**834**		**336**	**151**	**185**
Non Residential				**248**	**134**	**114**

Club

Previous GFA	4250
Previous Parking	
Previous Traf Gen v/h	85
Proposed GFA	2400
Proposed Parking	
Proposed Traf Gen v/h	48

Thursday PM 9/2/2012

Halcrow Estimates

Land Use	Area/No.	Parking Provision	Generation Rate (trips per parking space)	Land Use Generation	Vehicles In	Vehicles Out
Apartments	304					
1 bed	112		0.29	32	26	6
2 bed	178		0.29	52	41	10
3 bed	14		0.29	4	3	1
Total	**304**	**290**		**88**	**71**	**18**
Retail						
Supermarket	3630	60	1.36	82	41	41
Specialty	4694	65	1.36	88	44	44
Restaurant (incl. outdoor)	3076	114	0.33	38	34	4
Food Court Restaurant	1084	39	0.33	13	6	6
Total	**12484**	**278**		**220**	**125**	**95**
Gym						
Gym	3676					
Total		**165**	**0.9**	**149**	**89**	**59**
Medical Centre	730	10	0.8	8	4	4
Total				**8**	**4**	**4**
Child Care Centre	755	0				
Children	80		0.4	32	16	16
Staff	12					
Total				**32**	**16**	**16**
Commercial/community centre						
Commercial/SOHO	1696	15	0.8	12	2	10
Commercial/community centre	367	6	0.8	5	2	2
Total		21		17	5	12
Cinema	0					
Cinema Office	0					
Total		**0**				
Club (total)	2400		see previous use	48	24	24
licensed floor area						
Lounge/Bar Area						
Dining	650					
Total		**70**				
TOTAL	**35334**	**834**		**562**	**334**	**228**
Non Residential				**474**	**263**	**211**

Club

Previous GFA	4250
Previous Parking	
Previous Traf Gen v/h	85
Proposed GFA	2400
Proposed Parking	
Proposed Traf Gen v/h	48

SATURDAY - 9/2/2012

Halcrow Estimates

Land Use	Area/No.	Parking Provision	Generation Rate (trips per parking space)	Land Use Generation	Vehicles In	Vehicles Out
Apartments	304					
1 bed	112		0.29	32	26	6
2 bed	178		0.29	52	41	10
3 bed	14		0.29	4	3	1
Total	**304**	**290**		**88**	**44**	**44**
Retail						
Supermarket	3630	60	1.34	80	40	40
Specialty	4694	65	1.34	87	44	44
Restaurant (incl. outdoor)	3076	114	0.33	38	19	19
Food Court Restaurant	1084	39	0.33	13	6	6
retail using Gym spaces		0	1.34	0	0	0
Total	**12484**	**278**		**218**	**109**	**109**
Gym						
Gym	3676					
Total		**165**	**0.9**	**149**	**74**	**74**
Medical Centre	730	10	0.8	8	4	4
Total				**8**	**4**	**4**
Child Care Centre	755	0				
Children	80		0	0	0	0
Staff	12					
Total				**0**	**0**	**0**
Commercial/community centre						
Commercial/SOHO	1696	15	0	0	0	0
Commercial/community centre	367	6	0.8	5	2	2
Total		21		5	2	2
Cinema	0					
Cinema Office	0					
Total		**0**				
Club (total)	2400		see previous use	48	24	24
licensed floor area						
Lounge/Bar Area						
Dining						
Total		**70**				
TOTAL	**34684**	**834**		**515**	**258**	**258**

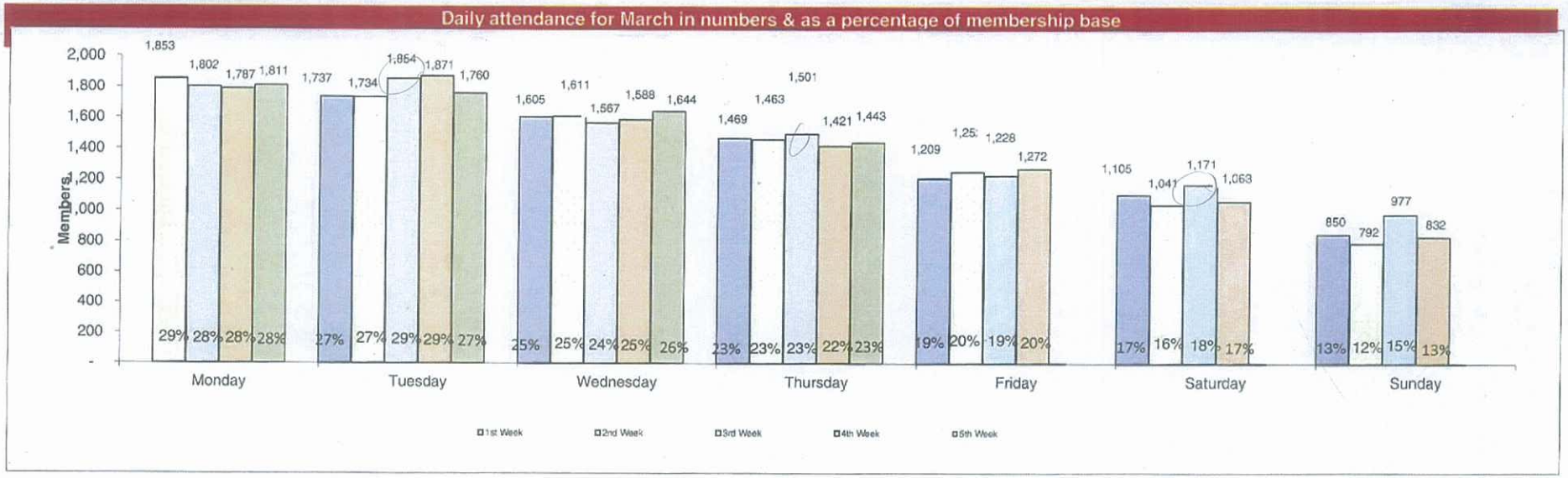
Non Residential	**427**	**214**	**214**

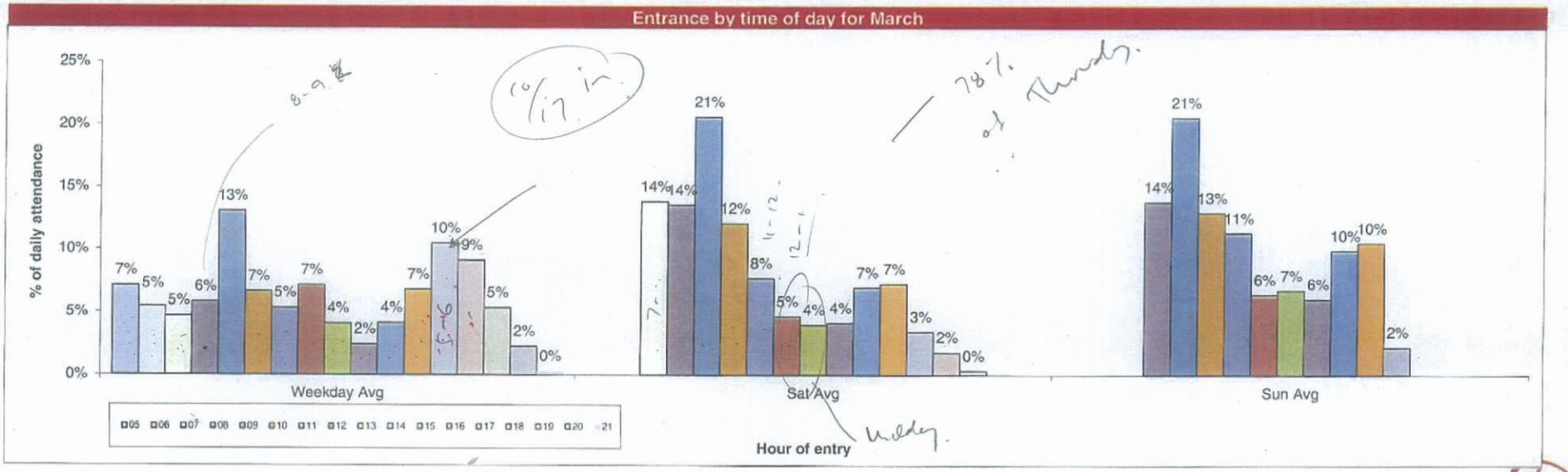
Club

Previous GFA	4250
Previous Parking	
Previous Traf Gen v/h	85
Proposed GFA	2400
Proposed Parking	
Proposed Traf Gen v/h	48

Appendix B Gymnasium Patronage Profile

Membership Base: Activity cont'd





Appendix C Modelled Traffic Distribution

WEEKDAY AM PEAK - Site Generation Traffic Distribution

To the Site

	Wellington/ North	Terry Street	Iron Cove Bridge	Moodie St	Darling St East	Darling St West	Anzac Bridge	City West Link
Retail	62%	0%	43%				12%	
Gym	66%	%	63%		0%	27%	4%	3%
Residential	0%	0%	16%	4%	4%	76%	18%	12%
Carrier Site			16%	4%	3%	27%	43%	7%

From the Site

	Wellington/ North	Terry Street	Iron Cove Bridge	Moodie St	Darling St East	Darling St West	Anzac Bridge	City West Link
Retail	0%	0%	14%	0%	20%	33%	22%	11%
Gym	0%	0%	7%	0%	3%	27%	54%	9%
Residential			17%	4%	3%	76%		
To Carrier Site			17%	4%	3%	27%	42%	7%

Note: % of traffic at Wellington includes % from Iron Cove (as shown in table) + traffic from the peninsula via Wellington

WEEKDAY PM PEAK - Site Generation Traffic Distribution

To the Site

	Wellington/ North	Terry Street	Iron Cove Bridge	Moodie St	Darling St East	Darling St West	Anzac Bridge	City West Link
Retail	42%	0%	20%			34%	22%	2%
Gym	10%	%	7%		0%	34%	54%	2%
Residential	0%	0%	17%	4%	3%	34%	42%	2%
To Carrier Site			17%	4%	3%	34%	42%	0%

From the Site

	Wellington/ North	Terry Street	Iron Cove Bridge	Moodie St	Darling St East	Darling St West	Anzac Bridge	City West Link
Retail	0%	11%	51%	0%	14%	20%	4%	0%
Gym	0%	0%	63%	0%	10%	20%	4%	3%
Residential			17%	4%	3%	76%		
Carrier Site			16%	3%	4%	47%	18%	12%

Note: % of traffic at Wellington includes % from Iron Cove (as shown in table) + traffic from the peninsula via

WEEKEND (Saturday) Midday PEAK - Site Generation Traffic Distribution

To the Site

	Wellington/ North	Terry Street	Iron Cove Bridge	Moodie St	Darling St East	Darling St West	Anzac Bridge	City West Link
Retail	50%	0%	20%			43%	7%	0%
Gym	54%	0%	25%		0%	40%	5%	1%
Residential	0%	0%	25%	5%	19%	25%	25%	1%
To Carrier Site			26%	4%	35%	3%	25%	7%

From the Site

	Wellington/ North	Terry Street	Iron Cove Bridge	Moodie St	Darling St East	Darling St West	Anzac Bridge	City West Link
Retail	0%	12%	20%	0%	20%	40%	7%	1%
Gym	0%	12%	20%	0%	20%	40%	7%	1%
Residential		10%	30%	4%	10%	46%		
Carrier Site			20%	4%	4%	46%	18%	8%

Note: % of traffic at Wellington includes % from Iron Cove (as shown in table) + traffic from the peninsula via

Appendix C Leichhardt Bicycle Routes Map

Source: Leichhardt Council Website

http://www.leichhardt.nsw.gov.au/IgnitionSuite/uploads/docs/LMC%20Bicycle%20Map%202009.pdf

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Bicycle Routes

The bicycle routes are not generally segregated and include shared paths (pedestrians and cyclists), off road and on road, mixed traffic and recreational routes.

Cyclists are encouraged to plan their routes before riding them and ride to the conditions.

Legend

- RTA Links - On Road
- RTA Links - Shared Path
- Strategic Links - On Road
- Strategic Links - Shared Path
- Local Links - On Road
- Local Links - Shared Path
- Council Connector
- Proposed Route
- Proposed Connector
- Traffic Signal

N

0 200 400 600 800 1,000

Meters

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K:\Projects\Community\090811_BicycleMapping\BicycleMapping.mxd

Appendix D RMS Victoria Road Clearway Proposal

Source: RMS Website

http://www.rta.nsw.gov.au/roadprojects/projects/sydney_region/southern_sydney/victoria_road_clearway/index.html

Victoria Road clearways proposal

Buses on Victoria Road between Iron Cove Bridge and The Crescent