

# ***Glen Eira Transformative Concepts***

## Transformative Concepts Review



170055TIA001F-F

8 March 2017

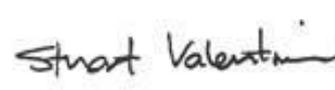
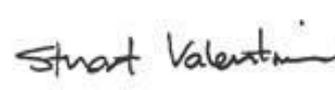
## onemilegrid

ABN: 79 168 115 679

(03) 9939 8250  
1/59 Keele Street

**COLLINGWOOD, VIC 3066**  
[www.onemilegrid.com.au](http://www.onemilegrid.com.au)

### DOCUMENT INFORMATION

<b>Prepared for</b>	Planisphere	<b>Report Date</b>	8 March 2017
<b>File Name</b>	170055TIA001F-F	<b>Reviewed by</b>	Stuart Valentine
<b>Prepared by</b>	Samuel Freeman	<b>Signature</b>	
<b>Signature</b>		<b>Signature</b>	

© One Mile Grid Pty Ltd. This document has been prepared by **onemilegrid** for the sole use and benefit of the client as per the terms of engagement. It may not be modified or altered, copied, reproduced, sold or transferred in whole or in part in any format to any person other than by agreement. **onemilegrid** does not assume responsibility or liability to any third party arising out of use or misuse of this document.

## CONTENTS

<b>1</b>	<b>INTRODUCTION.....</b>	<b>5</b>
<b>2</b>	<b>CARNEGIE.....</b>	<b>6</b>
<b>2.1</b>	<b>Existing Conditions.....</b>	<b>6</b>
2.1.1	Site Location.....	6
2.1.2	Council Car Parks.....	7
2.1.3	Existing Traffic Conditions.....	9
<b>2.2</b>	<b>Transformative Concepts.....</b>	<b>12</b>
2.2.1	Council Car Park Development.....	12
2.2.2	Pedestrian Friendly Laneway Network.....	13
2.2.3	Tram Line Extension.....	14
<b>3</b>	<b>MURRUMBEENA.....</b>	<b>16</b>
<b>3.1</b>	<b>Existing Conditions.....</b>	<b>16</b>
3.1.1	Site Location.....	16
3.1.2	Existing Traffic Conditions.....	18
<b>3.2</b>	<b>Transformative Concepts.....</b>	<b>20</b>
3.2.1	Pedestrianise Neerim Road.....	20
3.2.2	Bicycle Connection to Boyd Reserve.....	21
3.2.3	Link Road.....	21
<b>3.3</b>	<b>Beena Avenue &amp; Emily Street.....</b>	<b>25</b>
<b>4</b>	<b>HUGHESDALE.....</b>	<b>26</b>
<b>4.1</b>	<b>Existing Conditions.....</b>	<b>26</b>
4.1.1	Site Location.....	26
<b>4.2</b>	<b>Transformative Concepts.....</b>	<b>28</b>
<b>5</b>	<b>BENTLEIGH.....</b>	<b>29</b>
<b>5.1</b>	<b>Existing Conditions.....</b>	<b>29</b>
5.1.1	Site Location.....	29
5.1.2	Council Car Parks.....	30
5.1.3	Existing Traffic Conditions.....	32
<b>5.2</b>	<b>Transformative Concepts.....</b>	<b>36</b>
5.2.1	Bentleigh Plaza.....	36
5.2.2	Council Car Park Development.....	37
5.2.3	Pedestrianise Laneway & Streets.....	39
<b>6</b>	<b>ELSTERNWICK.....</b>	<b>42</b>
<b>6.1</b>	<b>Elsternwick.....</b>	<b>42</b>
6.1.1	Site Location.....	42
6.1.2	Council Car Parks.....	43
6.1.3	Existing Traffic Conditions.....	45
<b>6.2</b>	<b>Transformative Concepts.....</b>	<b>49</b>
6.2.1	Development of Council Owned Car Parks.....	49
6.2.2	Entertainment Precinct.....	51
6.2.3	Pedestrianise Lane & Streets.....	52

## TABLES

Table 1	Turning Movement Survey Times – Carnegie.....	9
Table 2	SIDRA Intersection Parameters.....	11
Table 3	Carnegie – Council Car Park Development.....	12
Table 4	Morton Avenue Alterations.....	13
Table 5	Turning Movement Survey Times – Carnegie.....	18
Table 6	Neerim Road.....	20
Table 7	Ardyne Street, Dunoon Street, Hobart Road & Link Road.....	22
Table 8	Beena Avenue / Emily Street.....	25

Table 9	Hughesdale .....	28
Table 10	Turning Movement Survey Times – Carnegie .....	32
Table 11	Bentleigh Plaza .....	36
Table 12	Bentleigh – Council Car Park Development .....	37
Table 13	Pedestrian Friendly Street & Laneway Network .....	39
Table 14	Turning Movement Survey Times – Carnegie .....	45
Table 15	Development of Council Owned Car Parks .....	49
Table 16	Carre Street and Staniland Grove .....	50
Table 17	Entertainment Precinct .....	51
Table 18	Beavis Street .....	52
Table 19	Downshire Road .....	53

## FIGURES

Figure 1	Site Location – Carnegie .....	6
Figure 2	Council Car Parks – Carnegie .....	7
Figure 3	Aerial Image – Carnegie .....	8
Figure 4	Carnegie Existing Traffic Volumes – AM Peak Hour .....	9
Figure 5	Carnegie Existing Traffic Volumes – PM Peak Hour .....	10
Figure 6	Tram Line Extension .....	15
Figure 7	Site Location – Murrumbeena .....	16
Figure 8	Aerial Image – Murrumbeena .....	17
Figure 9	Murrumbeena Existing Traffic Volumes – AM Peak Hour .....	18
Figure 10	Murrumbeena Existing Traffic Volumes – PM Peak Hour .....	19
Figure 11	Murrumbeena Street Treatment Recommendation .....	24
Figure 12	Site Location – Hughesdale .....	26
Figure 13	Aerial Image – Hughesdale .....	27
Figure 14	Site Location – Bentleigh .....	29
Figure 15	Council Car Parks – Bentleigh .....	30
Figure 16	Aerial Image – Bentleigh .....	31
Figure 17	Bentleigh Existing Traffic Volumes – AM Peak Hour .....	33
Figure 18	Bentleigh Existing Traffic Volumes – AM Peak Hour .....	33
Figure 19	Bentleigh Existing Traffic Volumes – AM Peak Hour .....	33
Figure 20	Bentleigh Existing Traffic Volumes – PM Peak Hour .....	34
Figure 21	Bentleigh Existing Traffic Volumes – PM Peak Hour .....	34
Figure 22	Bentleigh Existing Traffic Volumes – PM Peak Hour .....	34
Figure 23	Site Location – Elsternwick .....	42
Figure 24	Council Car Parks – Elsternwick .....	43
Figure 25	Aerial Image – Elsternwick .....	44
Figure 26	Elsternwick Existing Traffic Volumes – AM Peak Hour .....	46
Figure 27	Elsternwick Existing Traffic Volumes – AM Peak Hour .....	46
Figure 28	Elsternwick Existing Traffic Volumes – AM Peak Hour .....	46
Figure 29	Elsternwick Existing Traffic Volumes – PM Peak Hour .....	47
Figure 30	Elsternwick Existing Traffic Volumes – PM Peak Hour .....	47
Figure 31	Elsternwick Existing Traffic Volumes – PM Peak Hour .....	47

## APPENDICES

<b>APPENDIX A</b>	<b>SIDRA INTERSECTION RESULTS – CARNEGIE .....</b>	<b>54</b>
<b>APPENDIX B</b>	<b>SIDRA INTERSECTION RESULTS – MURRUMBEENA .....</b>	<b>55</b>
<b>APPENDIX C</b>	<b>SIDRA INTERSECTION RESULTS – BENTLEIGH .....</b>	<b>56</b>
<b>APPENDIX D</b>	<b>SIDRA INTERSECTION RESULTS – ELSTERNWICK .....</b>	<b>57</b>

# 1 INTRODUCTION

---

**onemilegrid** has been requested by Planisphere to undertake a review for Glen Eira City Council's Transformative Concepts.

The project scope is to review Council's Transformative Concepts, and advise and test traffic implications where applicable for the following centres:

- Carnegie;
- Murrumbeena;
- Hughesdale;
- Bentleigh; and
- Elsternwick.

As part of this assessment the subject areas have been inspected with due consideration of the key transformative concepts, traffic data has been sourced and relevant background reports have been reviewed.

## 2 CARNEGIE

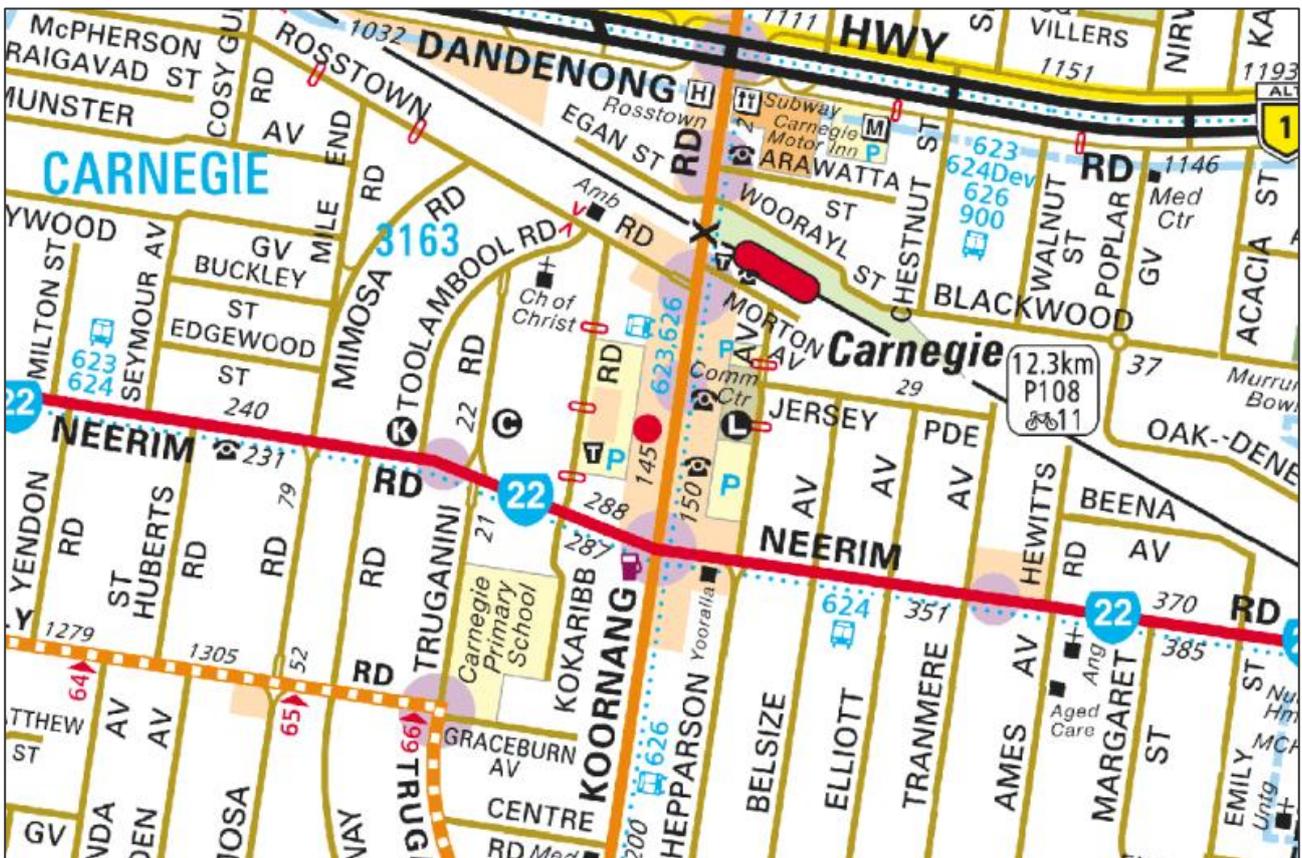
### 2.1 Existing Conditions

#### 2.1.1 Site Location

The subject area is located near and around the Carnegie Railway Station, as shown in Figure 1.

Land use in the vicinity of the subject area is mixed in nature, and includes commercial uses along Koornang Road, residential uses to the east and west of Koornang Road and public use areas such as car parks, the Carnegie Library and Carnegie Children's Multi-purpose Centre south of the train station.

**Figure 1 Site Location – Carnegie**



Copyright Melway Publishing

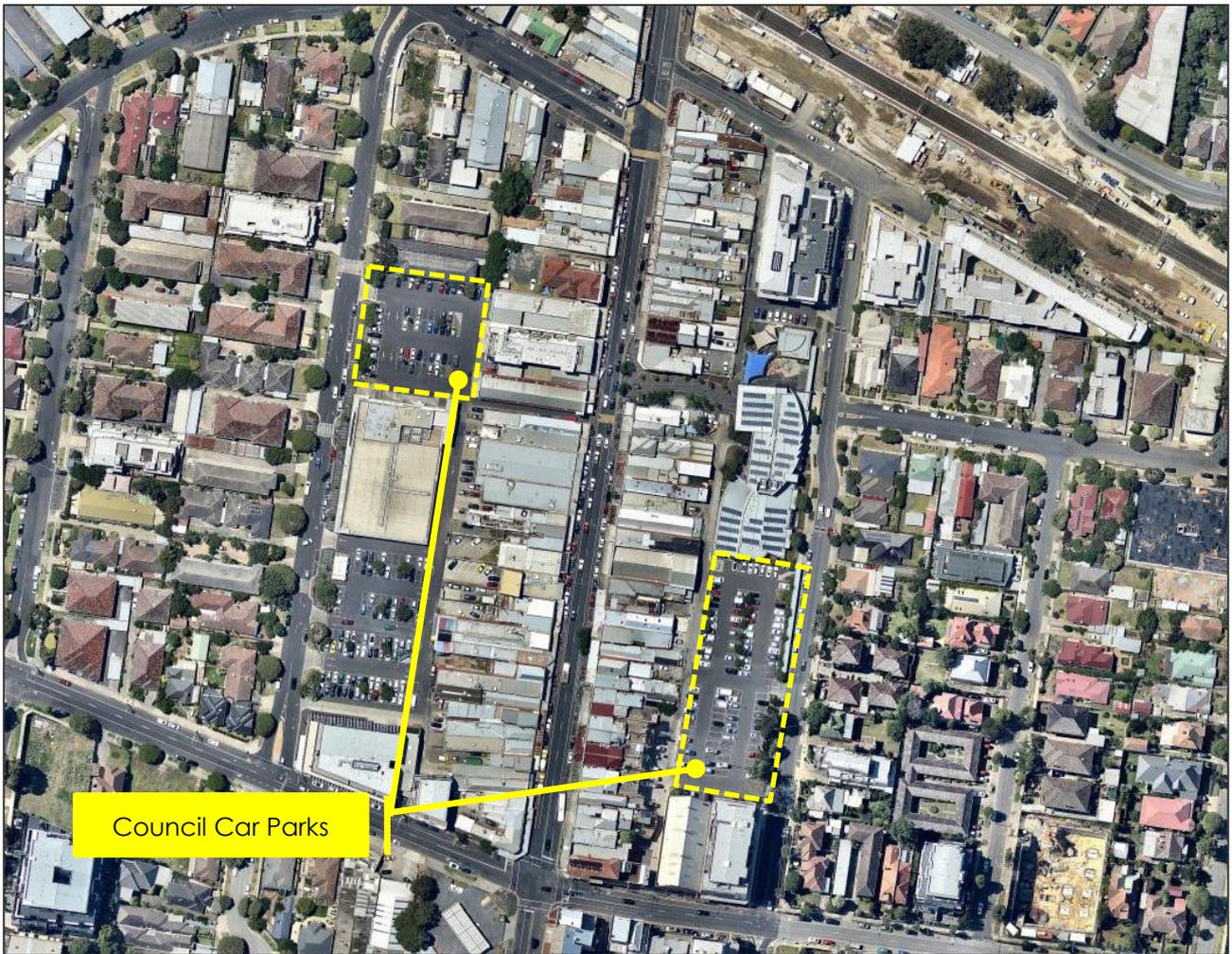
## 2.1.2 Council Car Parks

There are 2 Council car parks located in the precinct as shown Figure 2 and Figure 3. The car park to the west of Koornang Road is accessed via Kokaribb Road and contains 75 car parking spaces. The car park to east of Koornang Road, which is directly south of Carnegie Library and Carnegie Children's Multi-purpose Centre, is accessed via Shepparson Avenue and contains 118 car parking spaces.

**Figure 2 Council Car Parks – Carnegie**



Figure 3 Aerial Image – Carnegie



### 2.1.3 Existing Traffic Conditions

In order to ascertain recent and accurate traffic data, **onemilegrid** commissioned Trans Traffic Surveys to conduct traffic movement counts at the following intersections:

- Koornang Road / Morton Avenue;
- Morton Avenue / Shepparson Avenue; and
- Shepparson Avenue / Neerim Road.

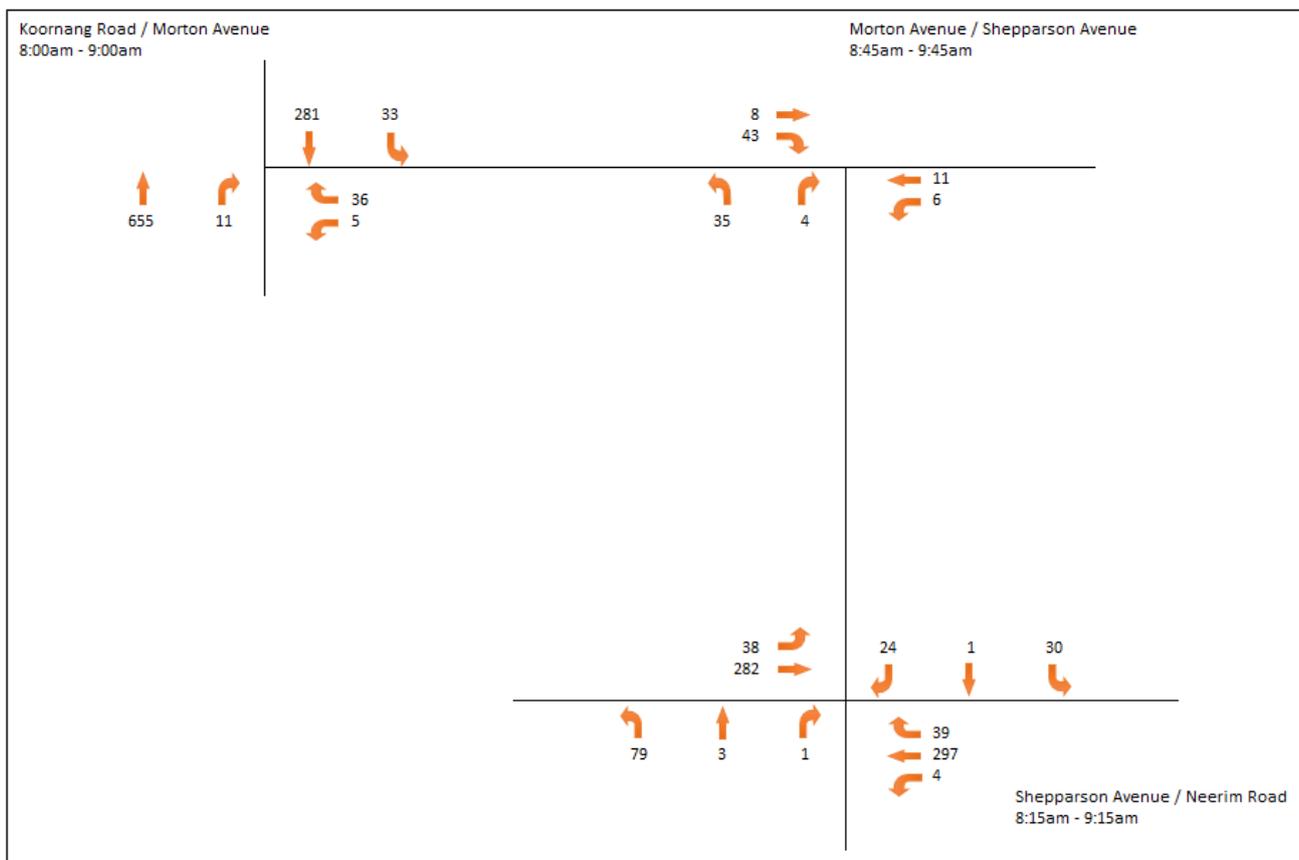
The turning movement counts were undertaken and recorded in 15 minute intervals on the following days and times:

**Table 1 Turning Movement Survey Times – Carnegie**

Day	Date	Time 1	Time 2	Interval
Tuesday	07/02/2017	7:00am – 10:00am	4:00pm – 7:00pm	15 minutes

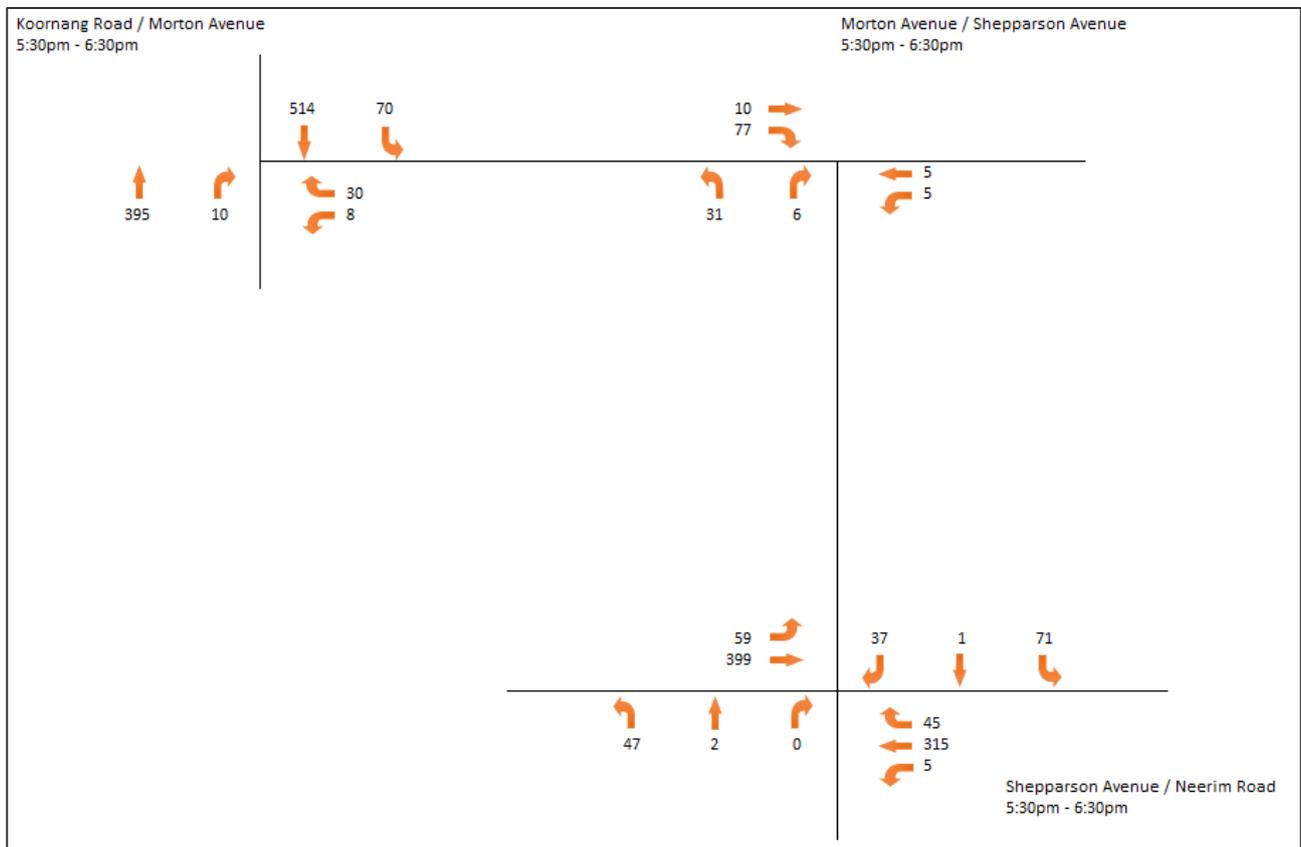
A summary of the AM peak hour counts for the primary intersections potentially impacted by works are shown in Figure 4. It should be noted that each intersection does not necessarily have the same AM peak hour.

**Figure 4 Carnegie Existing Traffic Volumes – AM Peak Hour**



A summary of the PM peak hour counts for the primary intersections potentially impacted by works are shown in Figure 5. It should be noted that each intersection does not necessarily have the same PM peak hour.

**Figure 5 Carnegie Existing Traffic Volumes – PM Peak Hour**



To assess the operation of the intersection the traffic volumes have been input into SIDRA Intersection, a traffic modelling software package.

The SIDRA Intersection software package has been developed to provide information on the capacity of an intersection with regard to a number of parameters. Those parameters considered relevant are, Degree of Saturation (DoS), 95th Percentile Queue, and Average Delay as described below.

**Table 2 SIDRA Intersection Parameters**

<i>Parameter</i>	<i>Description</i>														
Degree of Saturation (DoS)	The DoS represents the ratio of the traffic volume making a particular movement compared to the maximum capacity for that particular movement. The value of the DoS has a corresponding rating, as specified within the SIDRA manual, depending on the ratio as shown below.														
	<table border="1"> <thead> <tr> <th><i>Degree of Saturation</i></th> <th><i>Rating</i></th> </tr> </thead> <tbody> <tr> <td>Up to 0.60</td> <td>Excellent</td> </tr> <tr> <td>0.61 – 0.70</td> <td>Very Good</td> </tr> <tr> <td>0.71 – 0.80</td> <td>Good</td> </tr> <tr> <td>0.81 – 0.90</td> <td>Fair</td> </tr> <tr> <td>0.91 – 1.00</td> <td>Poor</td> </tr> <tr> <td>Above 1.00</td> <td>Very Poor</td> </tr> </tbody> </table>	<i>Degree of Saturation</i>	<i>Rating</i>	Up to 0.60	Excellent	0.61 – 0.70	Very Good	0.71 – 0.80	Good	0.81 – 0.90	Fair	0.91 – 1.00	Poor	Above 1.00	Very Poor
	<i>Degree of Saturation</i>	<i>Rating</i>													
	Up to 0.60	Excellent													
	0.61 – 0.70	Very Good													
	0.71 – 0.80	Good													
	0.81 – 0.90	Fair													
0.91 – 1.00	Poor														
Above 1.00	Very Poor														
It is noted that whilst the range of 0.91 – 1.00 is rated as 'poor', it is acceptable for critical movements at an intersection to be operating within this range during high peak periods, reflecting actual conditions in a significant number of suburban signalised intersections.															
Average Delay (seconds)	Average delay is the time delay that can be expected for all vehicles undertaking a particular movement in seconds.														
95th Percentile (95%ile) Queue	95%ile queue represents the maximum queue length in metres that can be expected in 95% of observed queue lengths in the peak hour														

The results of the existing conditions analysis for Carnegie is provided in Appendix A.

The results show that all intersections analysed are currently operating under 'excellent' conditions during both the morning and afternoon peak hours with minimal queues and delays experienced by motorists.

## 2.2 Transformative Concepts

### 2.2.1 Council Car Park Development

It is understood that Council has proposed to transform one of the existing car parks within the precinct in order to create a new centralised green park that encourages public interaction. Along with this, more public car parking is desired within one centralised car parking structure that includes a permanent market on the ground floor of the car park, a rooftop public multi-purpose recreational facility and a smaller green space on the ground floor.

A review of the points of consideration and subsequent recommendations to the transformative concepts are shown in Table 3 below.

**Table 3 Carnegie – Council Car Park Development**

	<i>Points for consideration</i>	<i>Recommendation</i>
Develop the two Council owned car parks to create a new centralised large green park.	The west car park contains approximately 70 car parking spaces, the east car park contains approximately 124 car parking spaces.	It is suggested that the east car park has the better development opportunity due to its larger footprint and the potential fewer levels required to provide adequate car parking spaces.
More public car parking within one centralised car parking structure, with:	Car parking must be provided to accommodate the spaces lost due to the closure of the other Council car park as well as the demand generated by the new uses, which can be determined once floor areas are finalised. It is noted that the area required for 1 car parking space and appropriate access and circulation is approximately 30m <sup>2</sup> .	The new centralised parking structure would be multistorey and can be integrated into a built form of the multipurpose structure to improve the public amenity compared to a standalone parking facility.
<ul style="list-style-type: none"> <li>➤ Permanent market on ground floor;</li> <li>➤ Rooftop public multi-purpose recreational facility; and</li> <li>➤ Smaller green space on the ground floor.</li> </ul>	The west car park is the smaller of the two car parks and therefore it potentially would require more levels to accommodate the required car parking spaces.	
	In order to accommodate car parking and additional facilities a multistorey building will be required.	Vehicle access to the multipurpose structure would be maintained from Shepparson Avenue.

<p>Appropriate pedestrian laneway connections from Koornang Road to these new facilities</p>	<p>Both car parks are already accessible from Koornang Road via pedestrian links located adjacent to the Koornang Road signalised pedestrian crossing, although the east car park does not have direct pedestrian access from Koornang Road, rather access is provided via a back of house service laneway.</p> <p>It is likely that land acquisition would be required to provide a more direct connection between Koornang Road and the eastern car park.</p>	<p>It would be desirable to provide additional pedestrian links from Koornang Road to the multipurpose structure.</p>
--	---	---

## 2.2.2 Pedestrian Friendly Laneway Network

It is proposed to create a pedestrian friendly street and laneway network by exploring a variety of options that involve alterations to Morton Avenue.

A review of the points of consideration and subsequent recommendations to the transformative concepts are shown in Table 4 below.

**Table 4 Morton Avenue Alterations**

	<i>Points for consideration</i>	<i>Recommendation</i>
<p>Full closure west of Shepparson Avenue</p>	<p>A number of properties take their vehicle access from this section of Morton Avenue. These access points would need to be maintained.</p> <p>Waste collection arrangements for buildings fronting this section of street would need to be confirmed, and appropriate arrangements would need to be made.</p> <p>It is understood that following the completion of the grade separation works, no railway station car park access will be provided from Morton Avenue. Instead, access to railway station car park will be provided via Woorayl Street.</p>	<p>It is suggested that a Shared Zone would be the most suitable arrangement for this location.</p> <p>There are a number of properties to which access needs to be maintained, which could be achieved under the Shared Zone arrangement.</p>
<p>One-way with extended footpath on southern side (maintain eastbound traffic operation)</p>	<p>Evidence of rat-running in the PM peak hour, with vehicles utilising Morton Avenue and Shepparson Road to travel between Koornang Road and Neerim Road. Maintaining an eastbound lane on Morton Avenue would allow this to continue.</p> <p>It is understood that following the completion of the grade separation works, no railway station car park access will be provided from Morton Avenue. Instead, access to railway station car park will be provided via Woorayl Street.</p>	<p>It is expected that the low-speed environment provided by the shared zone will discourage rat-running in both directions.</p> <p>There is opportunity to make Morton Avenue one-way as well as a shared zone. In this instance, it is preferable</p>

<p>One-way with extended footpath on southern side (maintain westbound traffic operation)</p>	<p>Evidence of rat-running from Neerim Road to Koornang Road during the AM peak hour, although less so than occurs in the opposite direction during the PM peak hour. This arrangement would prevent the PM peak hour rat-running but have little impact on rat running in the opposite direction.</p> <p>It is understood that following the completion of the grade separation works, no railway station car park access will be provided from Morton Avenue. Instead, access to railway station car park will be provided via Woorayl Street.</p>	<p>to maintain westbound traffic operation to ensure no rat-running in the PM peak hour in the eastbound direction which is more critical than the AM peak hour.</p>
<p>Shared space two-way</p>	<p>Shared Zone would provide pedestrian priority within a low speed environment (speed limit of 10 km/h) while maintaining current level of accessibility for land uses in the area.</p> <p>Low speed limit within the Shared Zone would likely discourage rat-running</p>	

### 2.2.3 Tram Line Extension

It is sought to extend the existing tram network (routes 3 & 67) to create a tram route along Koornang Road to Carnegie Station, as shown in Figure 6.

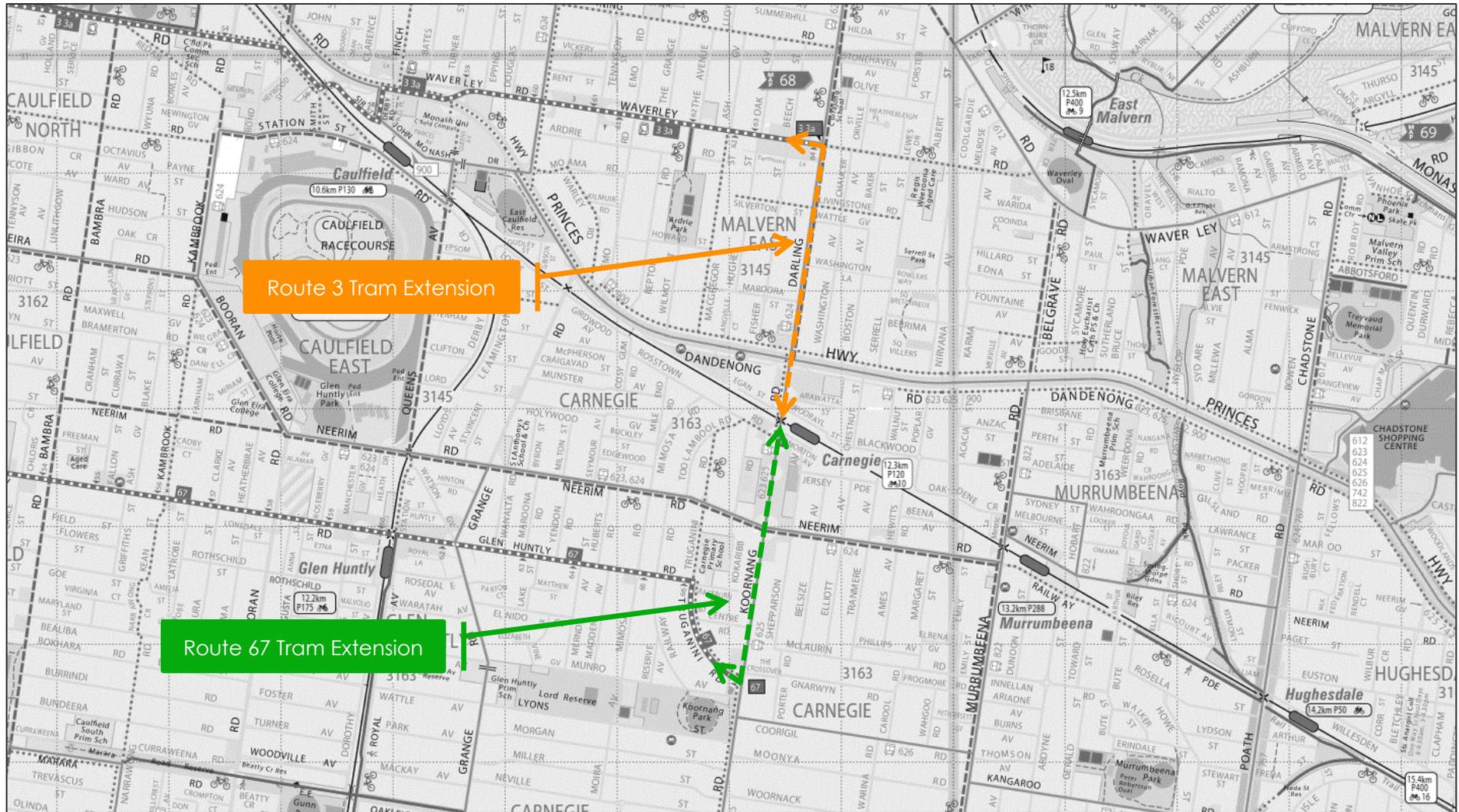
This would improve public transport system to the precinct with greater connectivity between train, tram and bus services.

Koornang Road is currently a two-lane two-way road for the majority of the section proposed to be shared with a new tram line. In order to facilitate a new tram line, a mixed-use road would have to be constructed, whereby vehicles and trams share the same lane.

All new trams stops would need to be DDA compliant and at regular intervals along Koornang Road.

Intersection and traffic signals along the route extensions would need to be modified to accommodate tram movements.

Figure 6 Tram Line Extension



### 3 MURRUMBEENA

#### 3.1 Existing Conditions

##### 3.1.1 Site Location

The subject area is located near and around the Murrumbeena Railway Station, as shown in Figure 7 and Figure 8.

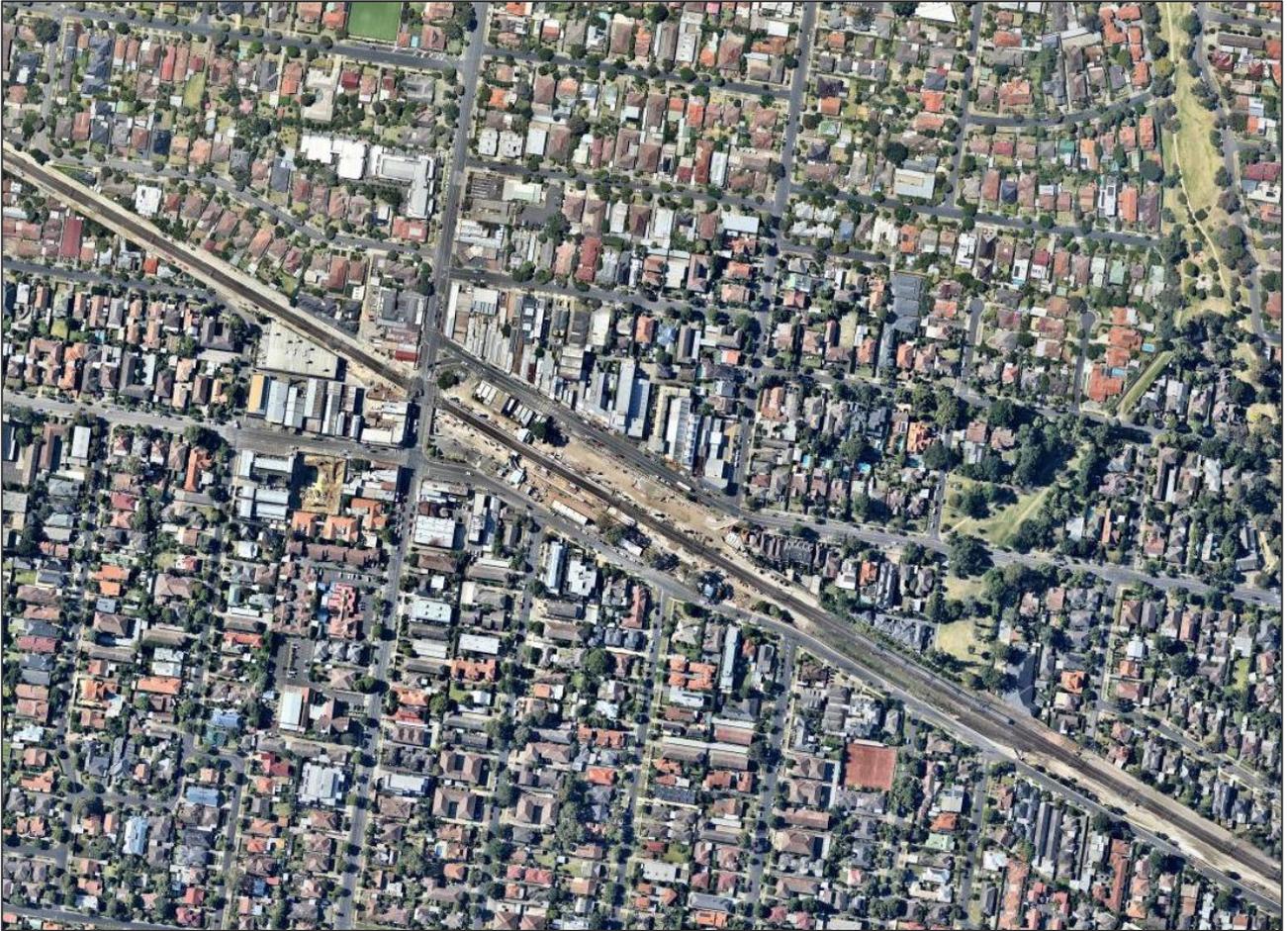
Land use in the immediate vicinity of the site is mixed in nature, and primarily includes residential uses in Murrumbeena as well as a commercial cluster around Murrumbeena Railway Station and railway car parking either side of the train tracks.

**Figure 7 Site Location – Murrumbeena**



Copyright Melway Publishing

Figure 8 Aerial Image – Murrumbeena



### 3.1.2 Existing Traffic Conditions

In order to ascertain recent and accurate traffic data, **onemilegrid** commissioned Trans Traffic Surveys to conduct traffic movement counts at the following intersections:

- Neerim Road / Murrumbeena Road;
- Murrumbeena Road / Melbourne Street;
- Melbourne Street / Hobart Road; and
- Hobart Road / Neerim Road.

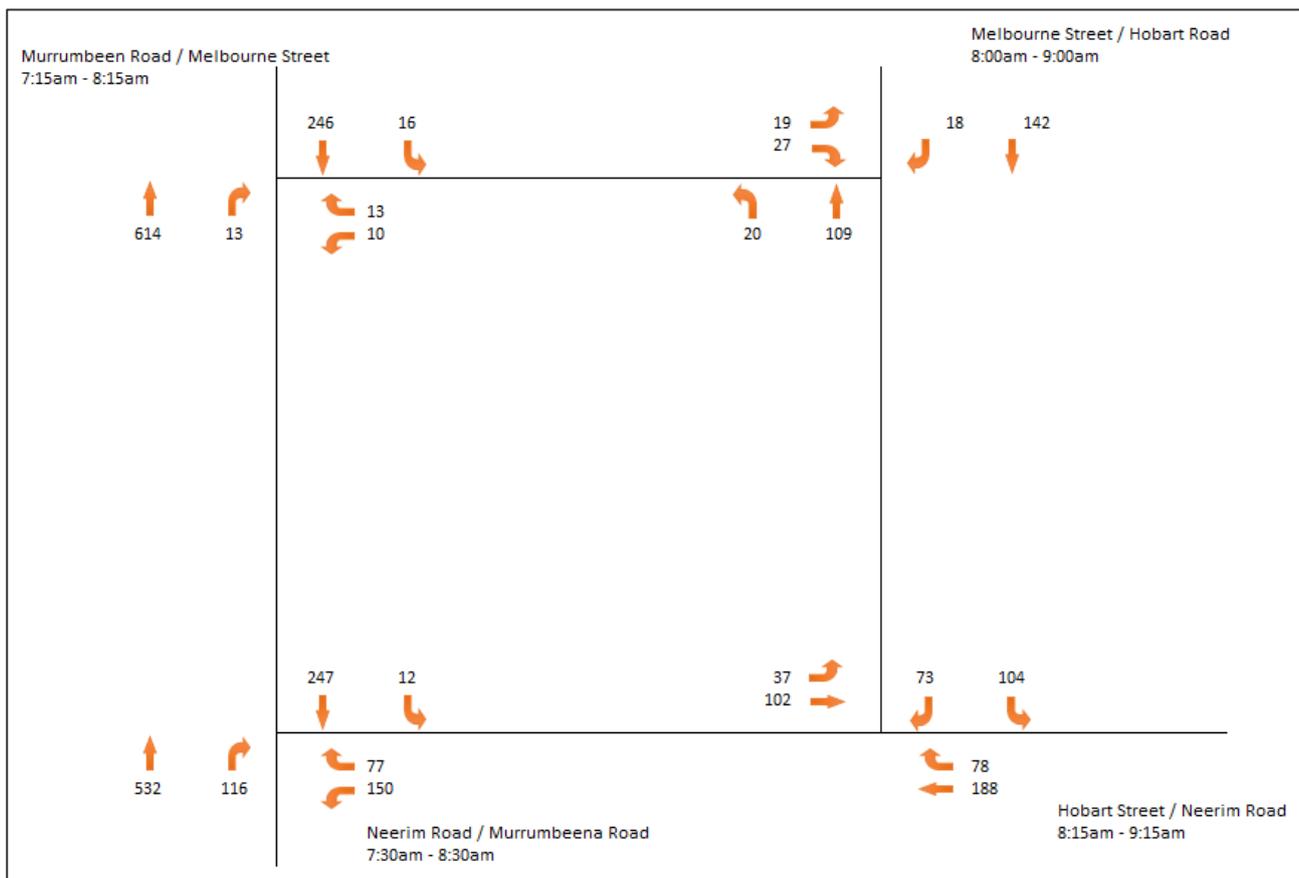
The turning movement counts were undertaken and recorded in 15 minute blocks on the following days and times:

**Table 5 Turning Movement Survey Times – Carnegie**

Day	Date	Time 1	Time 2	Interval
Tuesday	07/02/2017	7:00am – 10:00am	4:00pm – 7:00pm	15 minutes

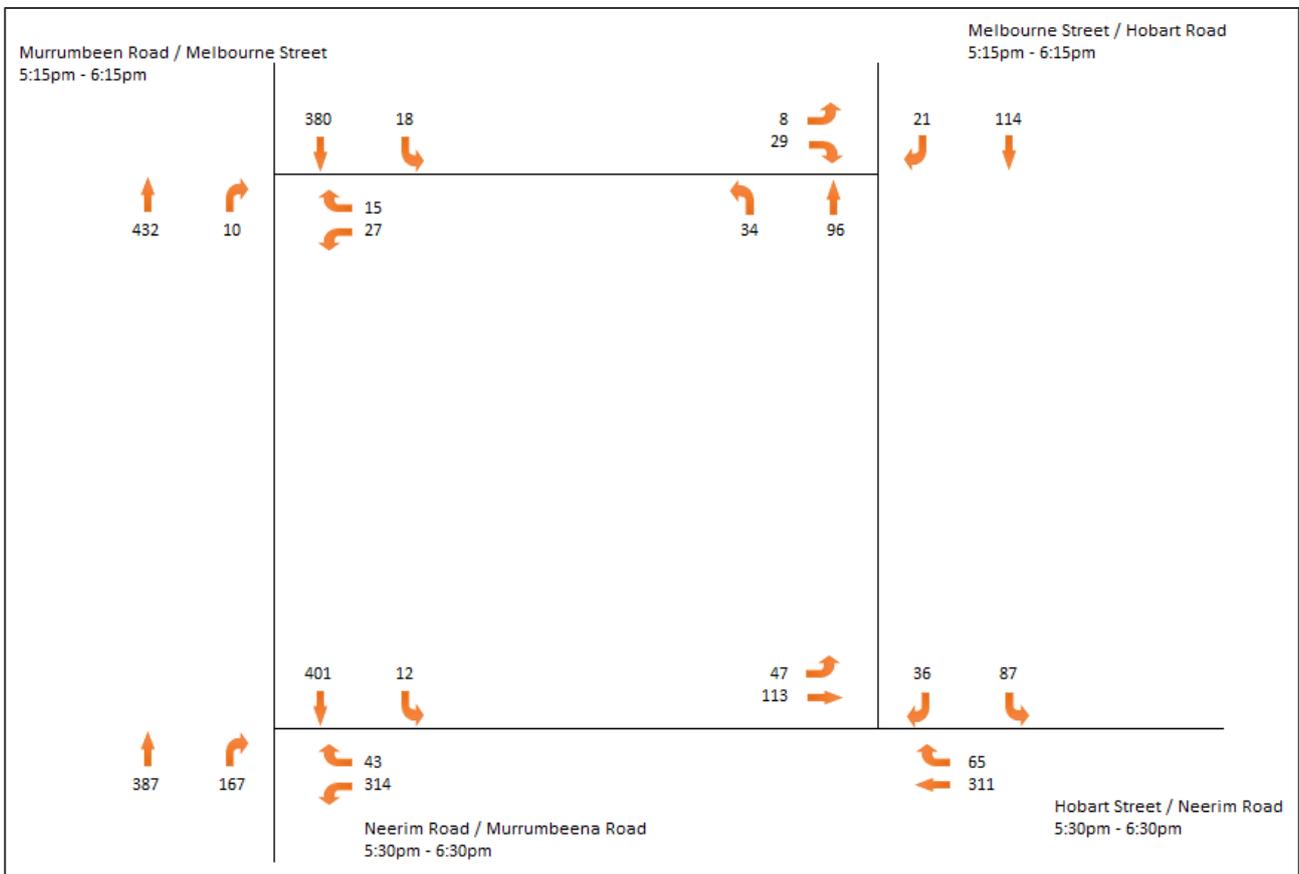
A summary of the AM peak hour counts for the major intersections surrounding the subject area is shown in Figure 9. It should be noted that each intersection does not necessarily have the same AM peak hour.

**Figure 9 Murrumbeena Existing Traffic Volumes – AM Peak Hour**



A summary of the PM peak hour counts for the major intersections surrounding the subject area is shown in Figure 10. It should be noted that each intersection does not necessarily have the same PM peak hour.

**Figure 10 Murrumbeena Existing Traffic Volumes – PM Peak Hour**



To assess the operation of the intersection the traffic volumes have been input into SIDRA Intersection, a traffic modelling software package.

The results of the existing conditions analysis for Murrumbeena is provided in Appendix B.

The results show that all intersections analysed are currently operating under 'excellent' conditions during both the morning and afternoon peak hours with minimal queues and delays experienced by motorists.

## 3.2 Transformative Concepts

### 3.2.1 Pedestrianise Neerim Road

It is proposed to transition Neerim Road to a pedestrian friendly area between Murrumbeena road and Hobart Street by diverting car routes, improving pedestrian accessibility and creating spaces for social and casual recreation.

A review of the points of consideration and subsequent recommendations to the transformative concepts are shown in Figure 6 below.

**Table 6 Neerim Road**

	<i>Points for consideration</i>	<i>Recommendation</i>
Full closure	<p>The arrangement would provide a full pedestrian mall, improving pedestrian amenity.</p> <p>There are a number of properties that take vehicle access from this section of road. These access points would need to be maintained.</p> <p>All traffic would be diverted to the neighbouring intersections; in particular Melbourne Street, Railway Parade and Hobart Street, or via the proposed new Link Road discussed in Section 3.2.3.</p>	<p>It is suggested that a one-way shared zone would be the most appropriate treatment for this section of Neerim Road. It will provide a pedestrianised, low volume and speed environment whilst maintaining local vehicle access.</p>
One-way with extended footpath (maintain eastbound traffic operation)	<p>Traffic movements counts conducted at the intersection surrounding this section of Neerim Road indicate there is capacity for vehicles to be redistributed without having significant impact on road network capacity.</p> <p>There would be scope to provide a one-way eastbound arrangement at this portion of Neerim Road, and widen the footpath on either side of the road.</p>	<p>Maintaining eastbound movements is considered to be the most appropriate one-way treatment as it is likely to encourage vehicles to exit the area via the proposed Link Road and the Railway Parade / Murrumbeena Road signals.</p>
One-way with extended footpath (maintain westbound traffic operation)	<p>Traffic movements counts conducted at the intersection surrounding this section of Neerim Road indicate there is capacity for vehicles to be redistributed without having significant impact on road network capacity.</p> <p>There would be scope to provide a one-way eastbound arrangement at this portion of Neerim Road, and widen the footpath on either side of the road.</p>	<p>It is suggested to install local area traffic management measures to keep through traffic out of residential streets.</p>
Shared space two-way	<p>Shared Zone would provide pedestrian priority within a low speed environment (speed limit of 10 km/h) while maintaining current level of accessibility for land uses in the area.</p> <p>Low speed environment will likely reduce traffic movements along that section of Neerim Road.</p>	<p>If Neerim Road is to be downgrade to improve pedestrian amenity, it is suggested to remove car park access from Neerim Road.</p>

### **3.2.2 Bicycle Connection to Boyd Reserve**

Boyd Reserve is located to the east of Murrumbeena Railway Station and currently has an off road shared path that extends through the park and ends near the northern side of the intersection between Neerim Road and Tucker Street.

There is an opportunity to extend this shared path to the south of Neerim Road and along the rail alignment. This would provide a connection from the shared path to on road bicycle lanes along Murrumbeena Road and improve bicycle connectivity within the precinct.

### **3.2.3 Link Road**

It is proposed to construct a new Link Road between Neerim Road north and Railway Parade as part of the works at Murrumbeena Road and Murrumbeena Station. The Link Road proposed to connect Neerim Road and Railway Parade between Hobart Street and Ardyne Street underneath the raised rail line.

The Level Crossing Removal Authority reviewed the proposed Link Road and predicted the anticipated traffic distribution that would occur once the Link Road was constructed.

In relation to the construction of the Link Road between Hobart Road to Ardyne Street, several treatment options have been considered in the area to prevent potential rat-running between Dandenong Road and Kangaroo Road via Hobart Street, the new Link Road and Ardyne Street.

A review of the points of consideration and subsequent recommendations to the treatment options are shown in Table 7 below.

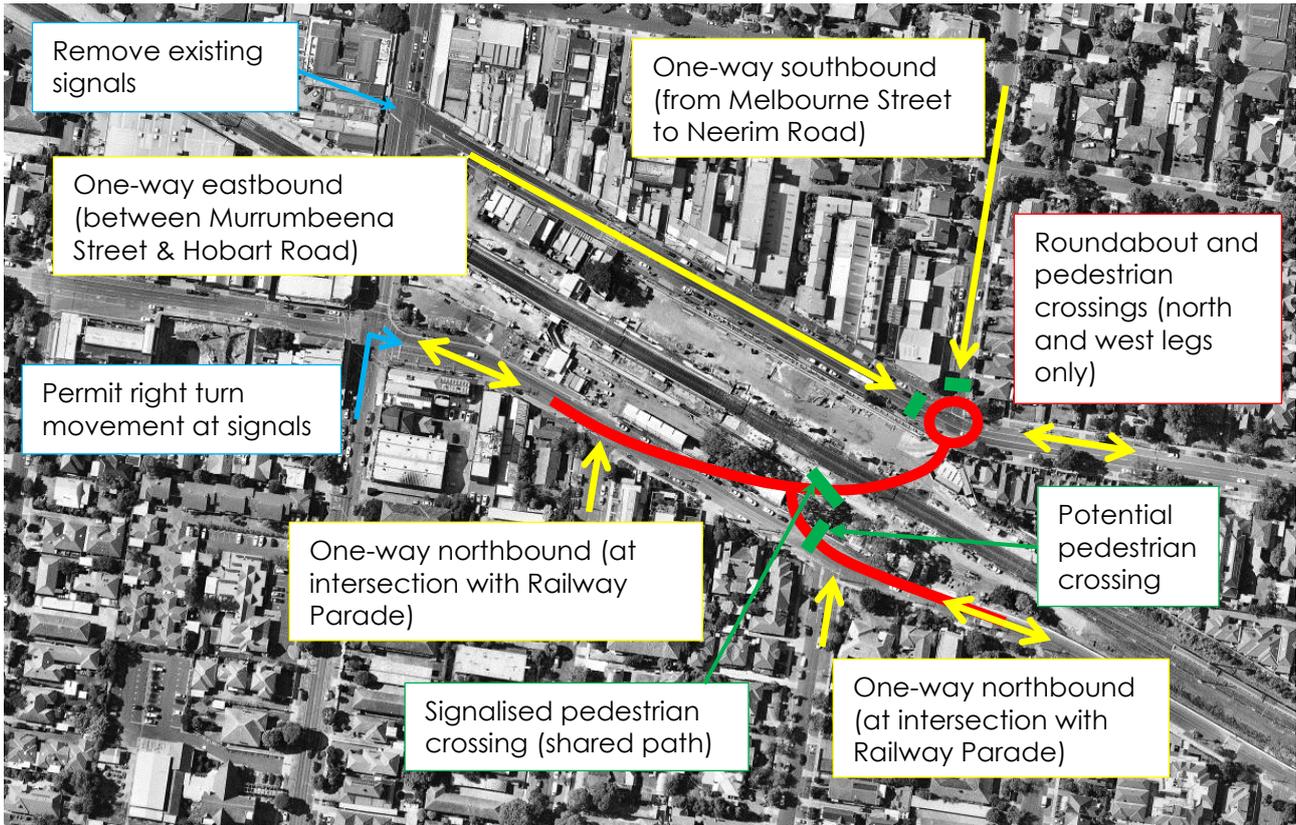
**Table 7 Ardyne Street, Dunoon Street, Hobart Road & Link Road**

	<i>Points for consideration</i>	<i>Recommendation</i>
Restrict southbound movement with signalised intersection at Ardyne Street and the new Link Road	This arrangement would prevent north to south rat-running in Ardyne Street but would do little to deter south to north movements unless coupled with other measures.	It is suggested to limit the Ardyne Street intersection to one-way northbound from Ardyne Street onto Railway Parade (and the same for the Dunoon Street / Railway Parade intersection).
Restrict access from the new Link Road to Ardyne Street through constructing a raised median island and banning northbound movements from Ardyne Street	This arrangement could be difficult to design as a raised median would have to restrict movements to Ardyne Street whilst simultaneously allowing right turn movements from the Link Road. May not be practically achievable.	To prevent rat-running from Kangaroo Road to Dandenong road it is suggested that a mid-block partial closure (one-way southbound only) on Hobart Road, between Melbourne Street and Omama Road could be implemented. The option of extending the one-way southbound portion of Hobart Road between Melbourne Street and Neerim Road could also be considered.
Restrict southbound movements by closing southbound entry to Ardyne Street and Dunoon Street	This could prevent rat-running in the south direction, however the option is still available via Toward Street and Gerald Street.  This arrangement will restrict resident access from Railway Parade for properties along Ardyne Street and Dunoon Street, however alternative routes for local access are available.	
Close vehicular entry from Railway Parade to Ardyne Street and Dunoon Street	This would prevent rat-running via these street, but would also affect local access for residents.  A turnaround area would need to be provided at the north end of Ardyne Street and Dunoon Street.	It is suggested to install a roundabout at the intersection of Hobart Road / Link Road / Neerim Road to improve pedestrian accessibility to amenities such as Boyd Reserve. The location of pedestrian crossings should be limited to the north and west legs of the roundabout only particularly considering the suggested eastbound Shared Zone arrangement of Neerim Road west of the intersection.
Install roundabout with raised pedestrian crossings and with a mid-block closure along Hobart Road	A roundabout would improve pedestrian accessibility to amenities such as Boyd Reserve.  Mid-block closure would ensure no rat-running from Kangaroo Road to Dandenong Road in the AM peak hour.  This arrangement would result in traffic continuing to utilise Murrumbeena Road for southbound trips.	

Install roundabout with raised pedestrian crossings and restricted access to Hobart Road	<p>A roundabout would improve pedestrian accessibility to amenities such as Boyd Reserve.</p> <p>This arrangement would result in traffic continuing to utilise Murrumbeena Road, particularly north</p>	<p>It is suggested to provide a reverse priority T intersection at Railway Parade / Link Road with Railway Parade (west) connecting to the Link Road (north) as the priority movement.</p>
Install roundabout with pedestrian crossing on all approaches	<p>This arrangement would improve pedestrian connectivity within the precinct.</p>	<p>To facilitate the above treatments, it is recommended to permit right turning vehicles at the signalled intersection of Murrumbeena Road and Railway Parade, and to remove the traffic signals at the Murrumbeena Road / Neerim Road intersection.</p>
Install roundabout with pedestrian crossing along the north and west approaches only at Neerim Road / Link Road / Hobart Street	<p>A roundabout would improve pedestrian accessibility to amenities such as Boyd Reserve.</p> <p>This arrangement would not impact of the primary movements of the roundabout.</p>	

A diagram representing the recommended street treatments for Murrumbeena outlined in Table 7 has been shown in Figure 11 below.

Figure 11 Murrumbeena Street Treatment Recommendation



### 3.3 Beena Avenue & Emily Street

A review of the points of consideration and subsequent recommendations to the transformative concepts are shown in Table 8 below.

**Table 8 Beena Avenue / Emily Street**

	<i>Points for consideration</i>	<i>Recommendation</i>
Full closure of Beena Avenue / Emily Street adjacent to railway land	Turnaround areas would need to be provided at both dead ends.  This arrangement would result in reduced access and street circulation for local residents.	It is possible to make this section of Beena Avenue / Emily Street one-way in either direction. However it is expected that the gains would be minimal.
One-way (maintain east-south traffic operation)	If made one-way along this section, the entirety of Beena Avenue / Emily Street would need to also be made one-way.  Minimal gains would be seen if implemented.	
One-way (maintain north-west traffic operation)	If made one-way along this section, the entirety of Beena Avenue / Emily Street would need to also be made one-way.  Minimal gains would be seen if implemented.	

## 4 HUGHESDALE

### 4.1 Existing Conditions

#### 4.1.1 Site Location

The subject area is located near and around Hughesdale Railway Station, as shown in Figure 14.

Land use in the immediate vicinity of the site is mixed in nature, and includes several commercial shops along Poath Road, residential uses to the north and south of the train tracks and Boyd Park which runs northwest from William Street.

**Figure 12 Site Location – Hughesdale**

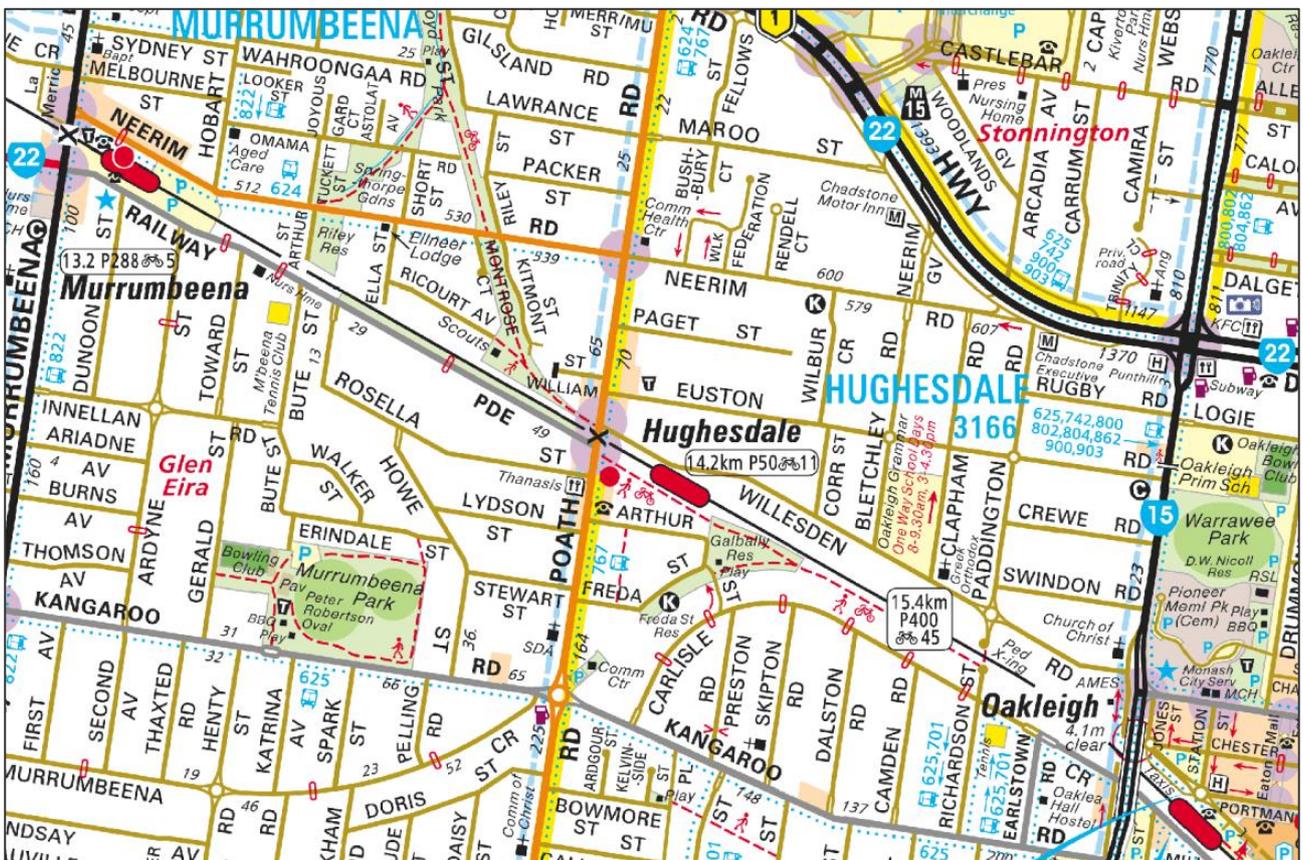
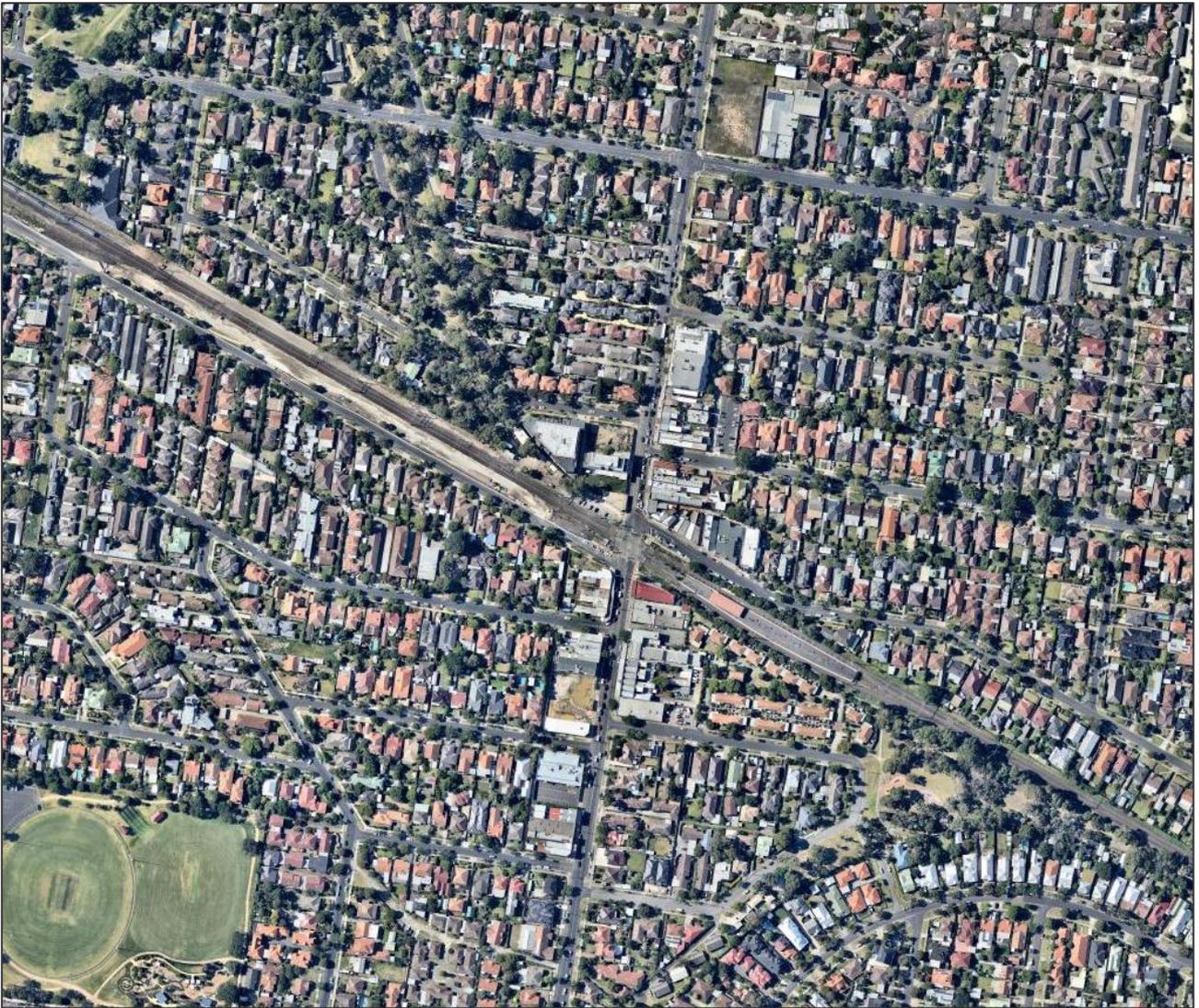


Figure 13 Aerial Image – Hughesdale



## 4.2 Transformative Concepts

A review of the points of consideration and subsequent recommendations to the transformative concepts are shown in Table 9 below.

**Table 9 Hughesdale**

	<i>Points for consideration</i>	<i>Recommendation</i>
Create a new public space in William Street by linking Boyd Park with Poath and relocating car parking	It is noted that a number of land uses take access from William Street making it difficult to create a new public space.	It is recommended to extend Boyd Park south to Railway Parade to connect the shared path.
Extend Boyd Park and create a link to the railway station to provide a recreational space and improve connectivity of the area	It is considered there is scope to extend Boyd Park to the south connecting to public space adjacent to the rail line, which in turn would provide a pedestrian and cyclist connection through to Poath Road.	

## 5 BENTLEIGH

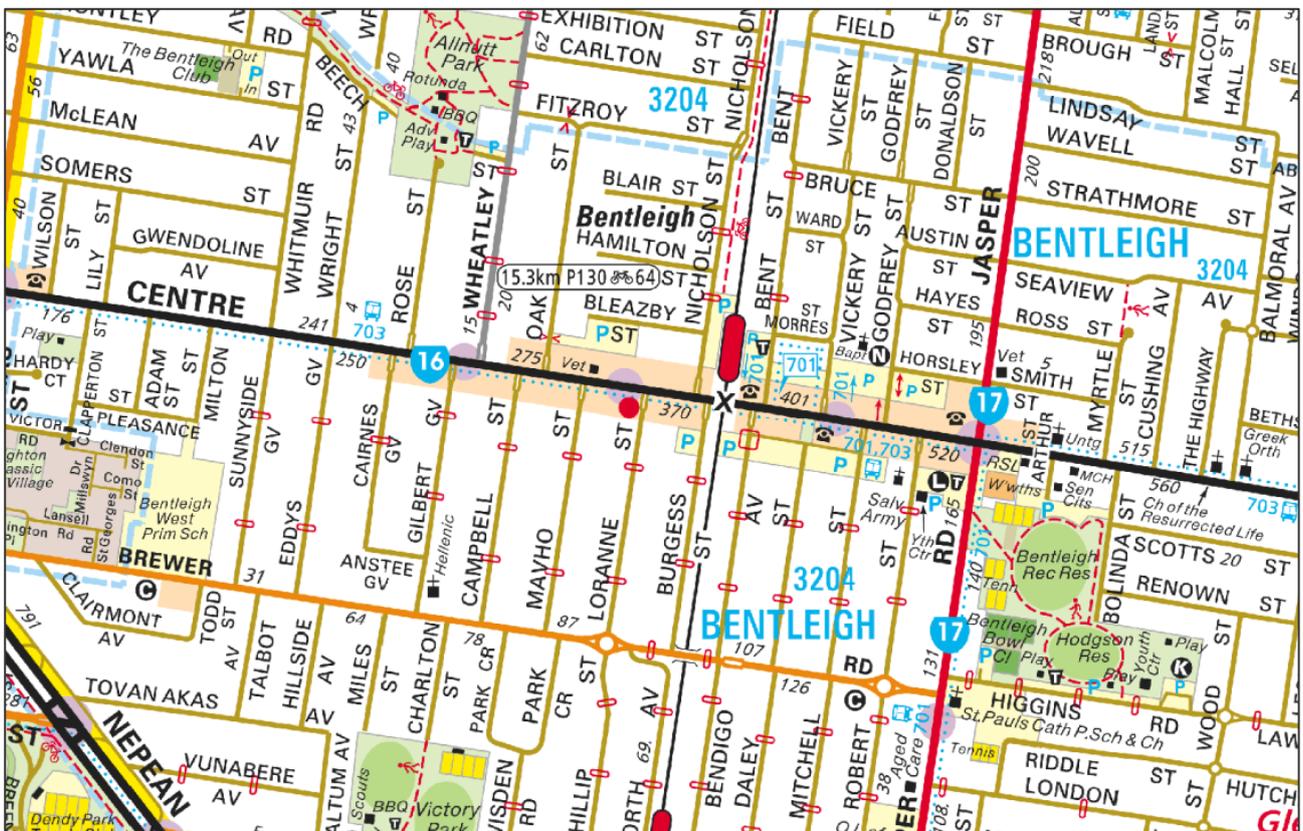
### 5.1 Existing Conditions

#### 5.1.1 Site Location

The subject area is located near and around Bentleigh Railway Station, as shown in Figure 14.

Land use in the immediate vicinity of the site is mixed in nature, and includes commercial uses and supermarkets along Centre Road, residential uses to the north and south of Centre Road and public use areas such as car parks and the Bentleigh Reserve.

**Figure 14 Site Location – Bentleigh**



Copyright Melway Publishing

## 5.1.2 Council Car Parks

There are 6 large Council car parks located in the precinct as shown Figure 15. Car parks 1, 2, 4 and 5 have between 140 and 170 spaces whilst car park 3 has 56 spaces and car park 6 has 83 spaces. All the Council owned car parks have multi access points from at least two different roads.

Further investigation is required to determine whether the car park to the rear of the Aldi supermarket (car park 1) is Council owned or partially or fully privately owned.

In addition to the large Council owned car parks, there are several smaller Council car parks located south of Centre Road which contain between 28 and 60 car parking spaces.

**Figure 15 Council Car Parks – Bentleigh**

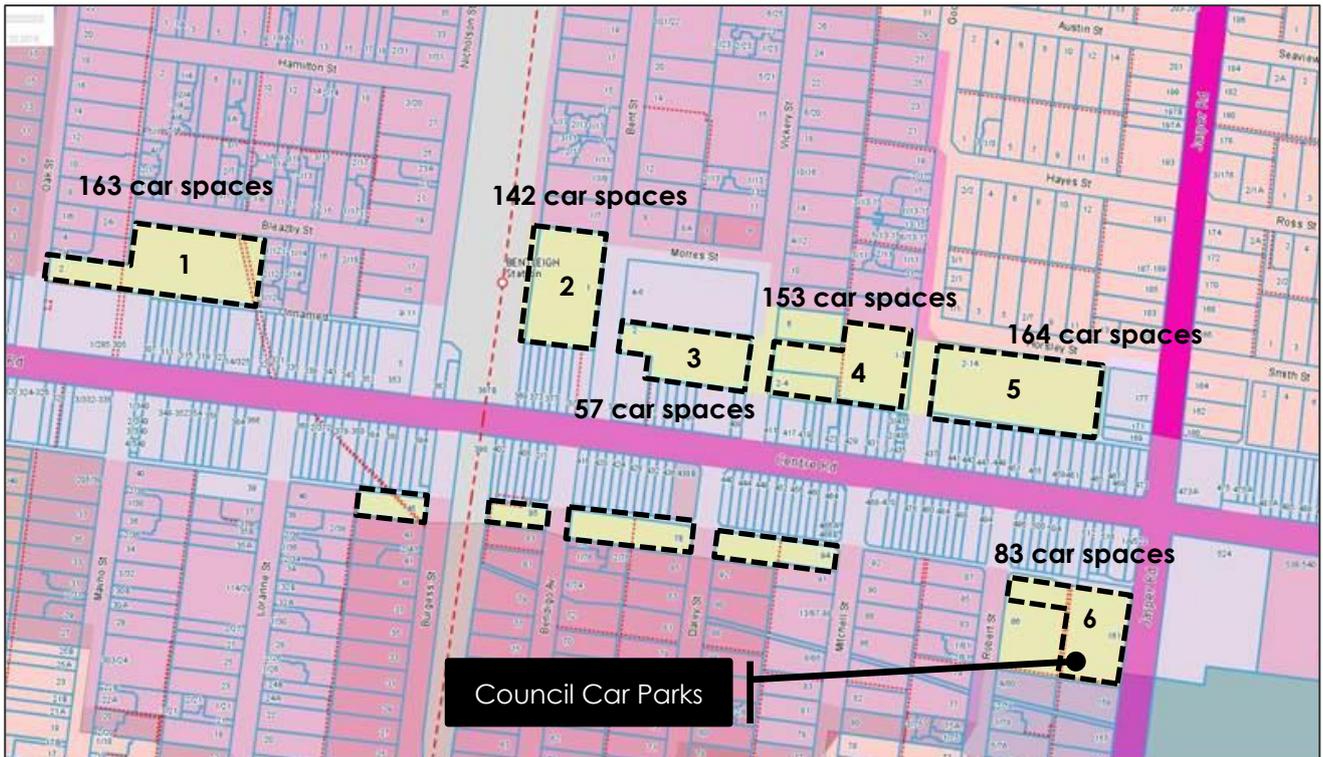


Figure 16 Aerial Image – Bentleigh



### 5.1.3 Existing Traffic Conditions

In order to ascertain recent and accurate traffic data, **onemilegrid** commissioned Trans Traffic Surveys to conduct traffic movement counts at the following intersections:

- Centre Road / Gilbert Grove;
- Centre Road / Campbell Street;
- Centre Road / Mavho Street;
- Centre Road / Lorraine Street;
- Centre Road / BURGESS Street;
- Centre Road / Mitchell Street;
- Centre Road / Robert Street;
- Centre Road / Bent Street;
- Centre Road / Vickery Street; and
- Centre Road / Godfrey Street.

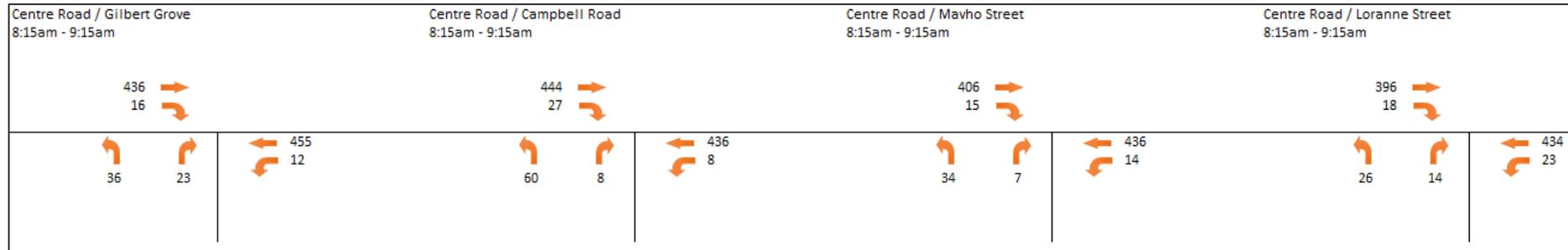
The turning movement counts were undertaken and recorded in 15 minute blocks on the following days and times:

**Table 10 Turning Movement Survey Times – Carnegie**

<i>Day</i>	<i>Date</i>	<i>Time 1</i>	<i>Time 2</i>	<i>Interval</i>
Tuesday	07/02/2017	7:00am – 10:00am	4:00pm – 7:00pm	15 minutes

A summary of the AM peak hour and PM peak hour counts for the major intersections surrounding the subject area is shown in Figure 17 to Figure 22. It should be noted that each intersection does not necessarily have the same AM or PM peak hour.

**Figure 17 Bentleigh Existing Traffic Volumes – AM Peak Hour**



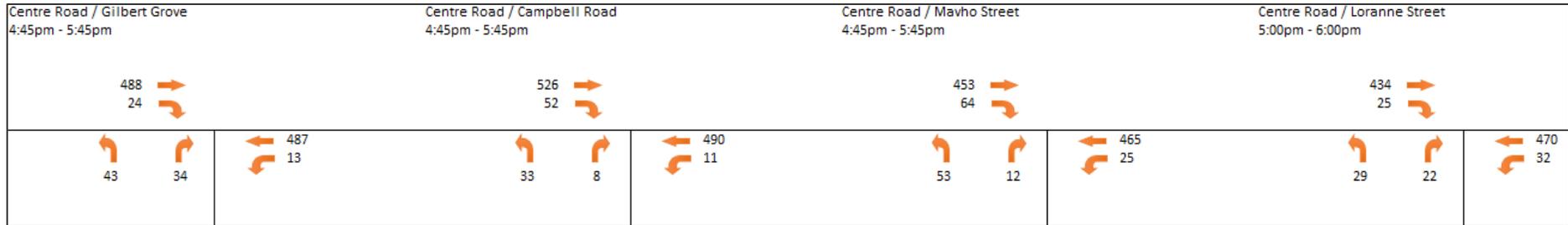
**Figure 18 Bentleigh Existing Traffic Volumes – AM Peak Hour**



**Figure 19 Bentleigh Existing Traffic Volumes – AM Peak Hour**



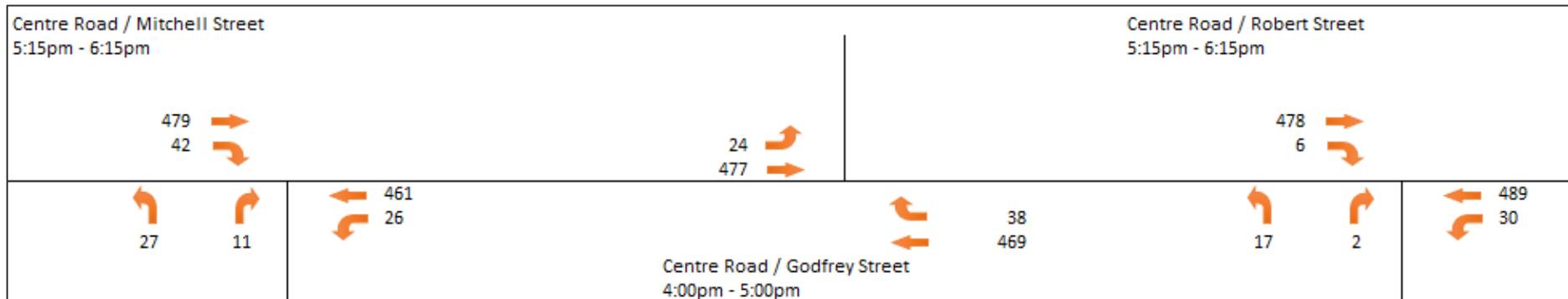
**Figure 20 Bentleigh Existing Traffic Volumes – PM Peak Hour**



**Figure 21 Bentleigh Existing Traffic Volumes – PM Peak Hour**



**Figure 22 Bentleigh Existing Traffic Volumes – PM Peak Hour**



To assess the operation of the intersection the traffic volumes have been input into SIDRA Intersection, a traffic modelling software package.

The results of the existing conditions analysis for Bentleigh is provided in Appendix C.

The results show that all intersections analysed are currently operating under 'excellent' conditions during both the morning and afternoon peak hours with minimal queues and delays experienced by motorists.

## 5.2 Transformative Concepts

### 5.2.1 Bentleigh Plaza

Council is considering extending Bentleigh Plaza and repurposing car park to create a more usable and inviting community town square through several different potential options.

A review of the points of consideration and subsequent recommendations to the transformative concepts are shown in Table 11 below.

**Table 11 Bentleigh Plaza**

	<i>Points for consideration</i>	<i>Recommendation</i>
Extend the plaza over Centre Road by full closure of Vickery Street	<p>There are various other access routes to the car parking areas either side of Vickery Street, such as the Bent Street accesses and the Godfrey Street access, as well as access from Horsley Street and Jasper Road.</p> <p>Review of existing traffic volumes and intersection operating conditions suggests that these alternative access points could readily accommodate traffic volumes currently catered for by the Vickery Street / Centre Road intersection.</p> <p>It is suggested that expanding the plaza over Centre Road to encompass the commercial frontage of Vickery Street could be readily accommodated from a traffic engineering perspective, and would improve pedestrian amenity and connectivity in the area, particularly when combined with the relocation of the signalised pedestrian crossing to better suit pedestrian desire lines. It would also improve the pedestrian access to bus services along Centre Road.</p>	It is considered that each of these components would be beneficial and are readily achievable.
Relocate pedestrian crossing to align with plaza, with kerb extensions and raised pedestrian platform	<p>It is considered that relocating the pedestrian crossing, particularly if the plaza extension is to be implemented, will better align the crossing to pedestrian desire lines.</p> <p>It is suggested that if the plaza extension is not implemented, there would still be some value (although not as much) in relocating the pedestrian crossing to align with the existing plaza, however in this case the crossing would need to be located towards the western end of the plaza to provide some separation from the Centre Road / Vickery Street intersection.</p>	
Reconfigure and extend car park to the north to address road closure of Vickery Street	<p>If the plaza extension were to be implemented, then the car parking area to the north could be reconfigured, with a consolidated car park layout likely to yield a greater number of spaces than the current arrangement, which is split by Vickery Street.</p>	

## 5.2.2 Council Car Park Development

Council is considering to repurposing the six large Council owned car parks either side of Centre Road to create several different alternative uses.

A review of the points of consideration and subsequent recommendations to the transformative concepts are shown in Table 12 below.

**Table 12 Bentleigh – Council Car Park Development**

	<i>Points for consideration</i>	<i>Recommendation</i>
Develop the six large Council owned car parks either side of Centre Road to create more public car parking within one centralised car parking structure	<p>In order to facilitate one centralised car parking structure, a multi deck car park would have to be constructed.</p> <p>It is noted that there are several smaller Council owned car parks on the south side of Centre Road, behind the commercial shops that front Centre Road.</p> <p>If Vickery Road were to be closed, it would be possible to combine car parks 3 &amp; 4 (see Section 5.1.2).</p> <p>The western car park (car park 1) services a different section of activity centre than the other car parks.</p> <p>The eastern car park north of the Centre Road (car park 5) is the only car park that does not directly abut residential properties and is a preferable option for a multi deck car park.</p>	<p>It is suggested to combine car parks 3 &amp; 4 to create a multi deck car if Vickery Road were to be fully closed. These car parks are the most centrally located and could cater for the greatest number of car spaces per level, potentially resulting in fewer levels.</p> <p>Another option is to utilise car park 5 to create a multi deck car park as it is separated from residential properties by Horsley Road.</p>

Develop the six large Council owned car parks either side of Centre Road to create a new centralised community hub building with library and other uses

This new facility would generate an additional parking demand in the area which would have to be met elsewhere.

Car parking demands for a library and potential other uses can be determined once floor areas are finalised.

Community hub or library could be design to incorporate car parking within the built form of the structure to improve the amenity in the precinct.

The car park adjacent to the railway station on the east side (car park 2) is preferable option for a community hub building as it has direct access to multiple public transport options and car parking is well serviced on the east side of the railway station.

The car park adjacent to the railway station on the east side (car park 2) could be utilised to construct a community hub building including a library. The location in respects to public transport coupled with the alternative car parking options on the east side of the railway line make it the preferred location in terms of accessibility.

The western car park (car park 1) should be retained to ensure parking is available on both sides of the railway line to cater for mobility impaired users of the precinct.

### 5.2.3 Pedestrianise Laneway & Streets

It is proposed to create a pedestrian friendly street and laneway network by exploring a variety of options that involve alterations to the surround road network.

A review of the points of consideration and subsequent recommendations to the transformative concepts are shown in Table 13 below.

**Table 13 Pedestrian Friendly Street & Laneway Network**

	<i>Points for consideration</i>	<i>Recommendation</i>
Formal vehicular connection linking Morres Street and Horsley Street	The provision of a formal link between Morres Street and Horsley Street would either require the acquisition of property between Vickery Street and Godfrey Street, or the reconfiguration of the existing car park which would result in a loss of parking.	Considering the existing traffic volumes in the area and the operations of existing intersections (which are well within their respective capacities) it is not considered necessary to provide a formal vehicle link between Morres Street and Horsley Street.
Full closure of the commercial length of Campbell Street	<p>The existing land use at the southwest corner of the Centre Road / Campbell Street intersection currently takes vehicle access from Campbell Street, which would need to be retained. It also appears that waste collection for this use occurs from the northern end of Campbell Street.</p> <p>If the road is to be closed completely, a turnaround area would need to be provided to the south of the closure. The turnaround area would typically be designed to accommodate vehicles up to an 8.8 m service vehicle. Alternatively, a connection through to either Gilbert Grove or Mavho Street would need to be provided.</p>	It is considered unfeasible to close the northern portion of these streets due to the requirement to provide either a turnaround area or a through connection to an adjacent street. It is considered that closing these streets to northbound traffic is not a feasible option for the same reason.
Extend Campbell Street footpath at the commercial frontage and provide one-way treatment (retain northbound traffic)	There would be scope to provide a one-way northbound arrangement at the northern end of Campbell Street, and widen the footpath on either side of the road.	It is suggested that each street could be converted to a one-way northbound operation in isolation, however if a treatment is to be installed on all three streets then it is suggested that a combination of Shared Zones and one-way

northbound configurations should be implemented to maintain a reasonable level of connectivity for local access.

<p>Extend Campbell Street footpath at the commercial frontage and provide one-way treatment (retain southbound traffic)</p>	<p>If a one-way southbound arrangement were to be provided on Campbell Street, a turnaround area or through connection to either Gilbert Grove or Mavho Street would need to be provided.</p>
<p>Convert the commercial frontage of Campbell Street to a Shared Zone</p>	<p>It is considered that there is scope to convert the northern end of Campbell Street to a Shared Zone. This would provide a pedestrian friendly environment with pedestrian priority while maintaining vehicular connectivity.</p>
<p>Full closure of the commercial length of Mavho Street</p>	<p>If the road is to be closed completely, a turnaround area would need to be provided to the south of the closure. The turnaround area would typically be designed to accommodate vehicles up to an 8.8 m service vehicle. Alternatively, a connection through to either Campbell Street or Loranne Street would need to be provided.</p> <p>There are no land uses that currently take access from this portion of Mavho Street, however it appears as though bins for some uses are collected from this area. It is considered that this could be managed through measures such as removable bollards to allow waste collection vehicle access.</p>
<p>Extend Mavho Street footpath at the commercial frontage and provide one-way treatment (retain northbound traffic)</p>	<p>There would be scope to provide a one-way northbound arrangement at the northern end of Mavho Street, and widen the footpath on either side of the road.</p>
<p>Extend Mavho Street footpath at the commercial frontage and provide one-way treatment (retain southbound traffic)</p>	<p>If a one-way southbound arrangement were to be provided on Mavho Street, a turnaround area or through connection to either Campbell Street or Loranne Street would need to be provided.</p>

Convert the commercial frontage of Loranne Street to a Shared Zone	It is considered that there is scope to convert the northern end of Mavho Street to a Shared Zone. This would provide a pedestrian friendly environment with pedestrian priority while maintaining vehicular connectivity.
Full closure of the commercial length of Loranne Street	<p>If the road is to be closed completely, a turnaround area would need to be provided to the south of the closure. The turnaround area would typically be designed to accommodate vehicles up to an 8.8 m service vehicle. Alternatively, a connection through to either Mavho Street or Burgess Street would need to be provided.</p> <p>Waste collection arrangements for adjacent uses would need to be considered and managed appropriately.</p>
Extend Loranne Street footpath at the commercial frontage and provide one-way treatment (retain northbound traffic)	There would be scope to provide a one-way northbound arrangement at the northern end of Loranne Street, and widen the footpath on either side of the road.
Extend Loranne Street footpath at the commercial frontage and provide one-way treatment (retain southbound traffic)	If a one-way southbound arrangement were to be provided on Loranne Street, a turnaround area or through connection to either Mavho Street or Burgess Street would need to be provided.
Convert the commercial frontage of Loranne Street to a Shared Zone	It is considered that there is scope to convert the northern end of Loranne Street to a Shared Zone. This would provide a pedestrian friendly environment with pedestrian priority while maintaining vehicular connectivity.

## 6 ELSTERNWICK

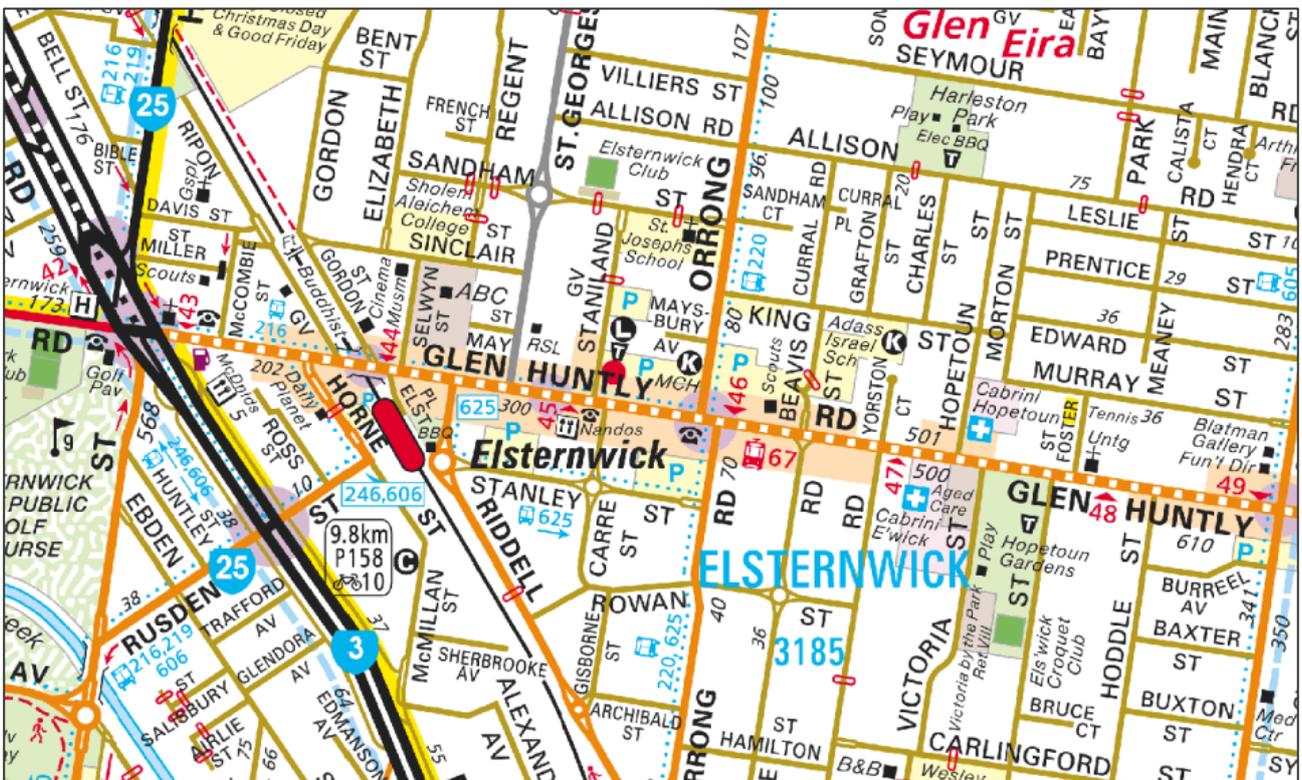
### 6.1 Elsternwick

#### 6.1.1 Site Location

The subject area is located near and around Elsternwick Railway Station, as shown in Figure 23.

Land use in the immediate vicinity of the site is mixed in nature, and includes commercial shops along Glen Huntly Road, residential uses to the north of south of the Glen Huntly Road commercial strip and Council owned car parks either side of Glen Huntly Road, east of Elsternwick Railway Station.

**Figure 23 Site Location – Elsternwick**



Copyright Melway Publishing

## 6.1.2 Council Car Parks

There are 4 Council car parks located in the precinct as shown Figure 24. The south western and south eastern car parks are accessed via Stanley Street and contain 78 and 126 car parking spaces respectively. Of the car parks located north of Glen Huntly Road, the south car park is access via Staniland Grove and Orrong Road and the north car park is accessed from Staniland Grove. The south car park contains 72 spaces and the north car park contains 88 car parking spaces.

**Figure 24 Council Car Parks – Elsterwick**



Figure 25 Aerial Image – Elsternwick



### 6.1.3 Existing Traffic Conditions

In order to ascertain recent and accurate traffic data, **onemilegrid** commissioned Trans Traffic Surveys to conduct traffic movement counts at the following intersections:

- Glen Huntly Road / Ripon Grove;
- Glen Huntly Road / Gordon Street;
- Glen Huntly Road / Selwyn Street;
- Glen Huntly Road / Riddell Parade;
- Glen Huntly Road / St. Georges Road;
- Glen Huntly Road / Staniland Grove;
- Glen Huntly Road / Carre Street;
- Glen Huntly Road / Orrong Road;
- Glen Huntly Road / Beavis Street; and
- Glen Huntly Road / Hopetoun Street.

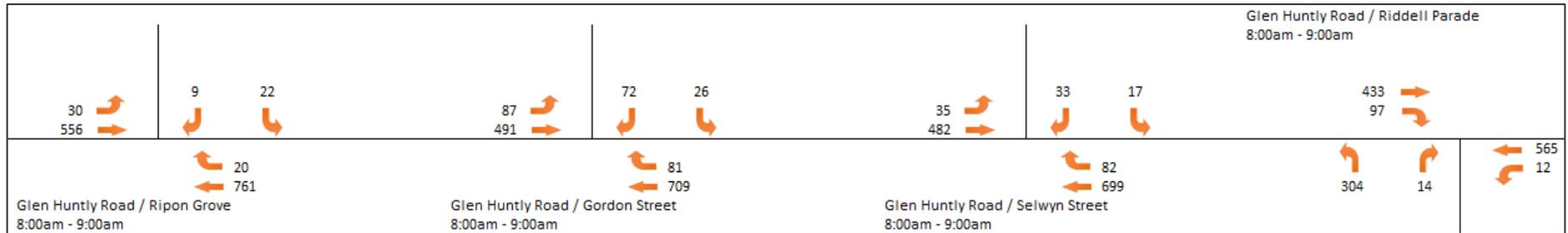
The turning movement counts were undertaken and recorded in 15 minute blocks on the following days and times:

**Table 14 Turning Movement Survey Times – Carnegie**

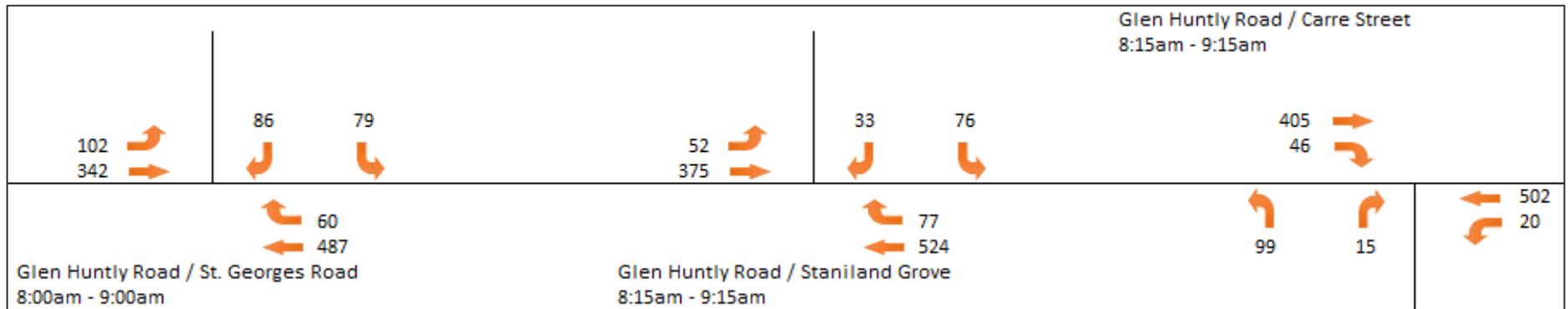
<i>Day</i>	<i>Date</i>	<i>Time 1</i>	<i>Time 2</i>	<i>Interval</i>
Tuesday	07/02/2017	7:00am – 10:00am	4:00pm – 7:00pm	15 minutes

A summary of the AM peak hour and PM peak hour counts for the major intersections surrounding the subject area is shown in Figure 26 to Figure 31. It should be noted that each intersection does not necessarily have the same AM or PM peak hour.

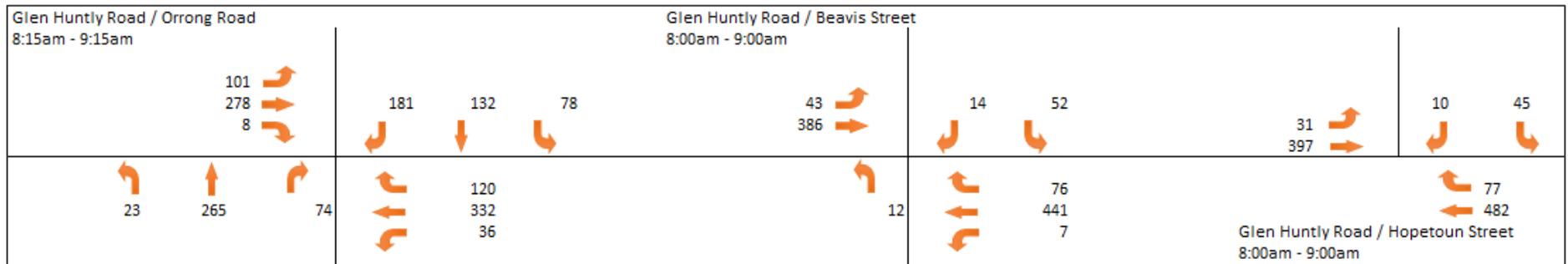
**Figure 26 Elsternwick Existing Traffic Volumes – AM Peak Hour**



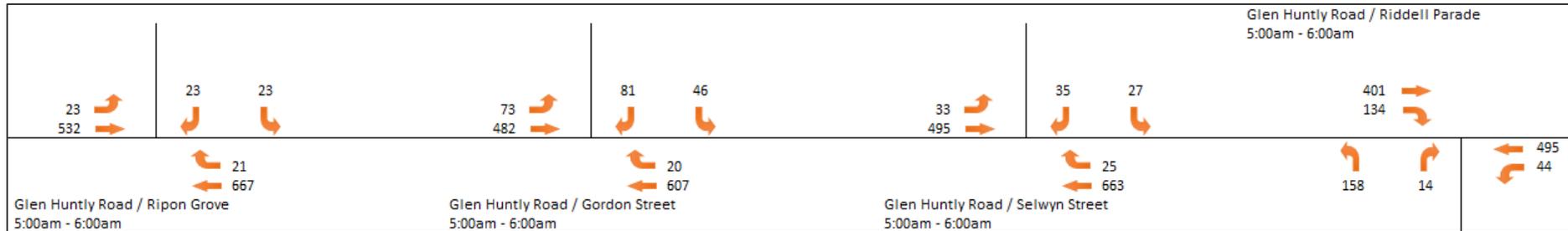
**Figure 27 Elsternwick Existing Traffic Volumes – AM Peak Hour**



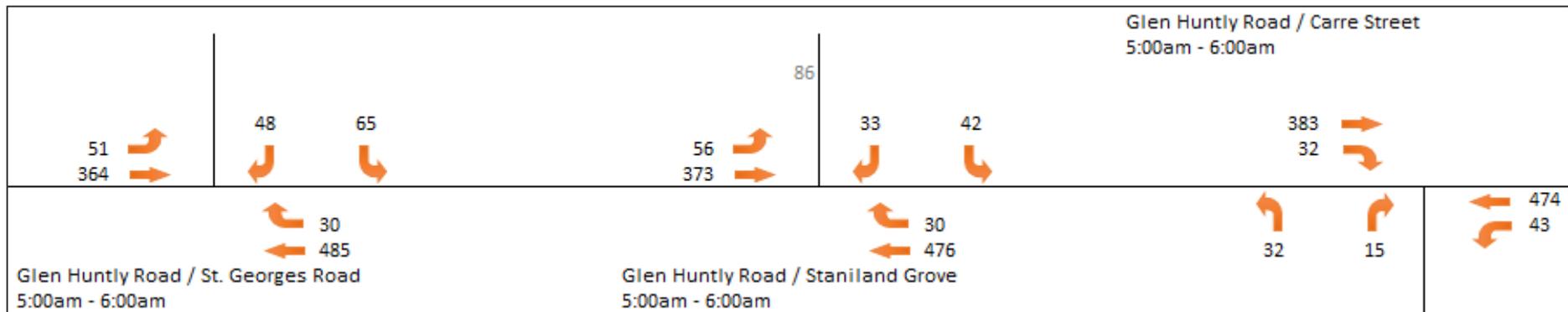
**Figure 28 Elsternwick Existing Traffic Volumes – AM Peak Hour**



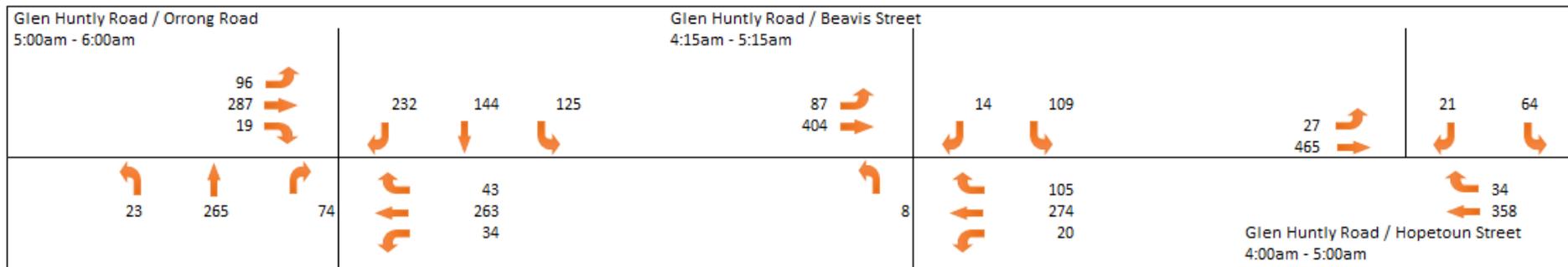
**Figure 29 Elsternwick Existing Traffic Volumes – PM Peak Hour**



**Figure 30 Elsternwick Existing Traffic Volumes – PM Peak Hour**



**Figure 31 Elsternwick Existing Traffic Volumes – PM Peak Hour**



To assess the operation of the intersection the traffic volumes have been input into SIDRA Intersection, a traffic modelling software package.

The results of the existing conditions analysis for Elsternwick is provided in Appendix D.

The results show that most intersections analysed are currently operating under 'excellent' conditions during both the morning and afternoon peak hours with minimal queues and delays experienced by motorists. The intersection of Glen Huntly Road and Orrong Road operates under 'fair' conditions in the morning peak hour and under 'good' conditions in the afternoon peak hour.

## 6.2 Transformative Concepts

### 6.2.1 Development of Council Owned Car Parks

Council is considering various options to repurpose the Council owned car parks in the precinct to create a new centralised public car park. A review of the points of consideration and subsequent recommendations to the transformative concepts are shown in Table 15 below.

**Table 15 Development of Council Owned Car Parks**

	<i>Points for consideration</i>	<i>Recommendation</i>
Develop the Council owned car parks to create a new centralised community hub building with library and other uses	If the existing library is to be retained, the northern car park could be developed to create the community hub. The community hub could be incorporated into the built form of a multipurpose facility which includes car parking and other uses.	The use of any of the three mentioned Council owned car parks could be utilised for a centralised community hub and/or multipurpose car parking structure depending on the preference of Council and the community.
More public car parking within one centralised car parking structure, with: <ul style="list-style-type: none"> <li>➤ Ground floor leasable tenancy; and</li> <li>➤ Rooftop public multi-purpose recreational facility.</li> </ul>	<p>Car parking should be provided to accommodate the spaces lost due to the closure of the other Council car park as well as the demand generated by the new uses, which can be determined once floor areas are finalised.</p> <p>The northern car park could be utilised for the multipurpose facility as it could incorporate the existing library into the overall facility. If the northern car park were used for a centralised car parking structure, the potential closure of the commercial portion of Staniland Grove would not be advised as access to the car park would be forced to be from the neighbouring residential street or through the adjacent southern car park instead of from Glen Huntly Road which would be preferred.</p> <p>The southeast car park is a viable option for the multipurpose facility as it provides access from Orrong Road which serves more as a collector road than a local access street, and has the largest foot print which potentially allows for fewer levels to meet the car parking demands. The laneway access to rear of commercial tenancies would have to be retained if this car park was developed.</p> <p>The southwest car park is also a viable option for the multipurpose facility as it well located in regard to public transport accessibility, being within close walking distance to train, tram and bus services. However, laneway access to adjacent commercial properties would need to be maintained and the site has direct frontage to a residential property.</p>	

Appropriate pedestrian laneway connections from Glen Huntly Road to these new facilities	<p>None of the car parks currently have formal pedestrian access from Glen Huntly Road, however convenient access is provided via side streets.</p> <p>It is likely that property acquisition would be required to create a direct pedestrian connection, particularly to the southwest car park.</p>
--	---

A review of the points of consideration and subsequent recommendations to the options regarding Carre Street and Staniland Grove are shown in Table 16 below.

**Table 16 Carre Street and Staniland Grove**

	<i>Points for consideration</i>	<i>Recommendation</i>
Close the commercial length of Carre Street to create a new green plaza space with canopy trees	<p>There is scope to close the commercial length of Carre Street, and consideration to closing it beyond the commercial frontage up to Stanley Street should also be given. A connection between the laneways that run behind the commercial uses either side of Carre Street would need to be provided.</p> <p>If only the commercial frontage is to be closed (i.e. not the section between Stanley Street and the rear access laneway) then the section between the laneway and Stanley Street should be downgraded, to serve as property access only.</p>	<p>It is considered that there would be benefit in closing Carre Street to vehicle traffic between Glen Huntly Road and Stanley Street to create a green plaza.</p>
Close the commercial length of Staniland Street to create a new green plaza space with canopy trees	<p>If the commercial length of Staniland Grove were to be closed, the car park between Staniland Grove and Orrong Road would need to serve as a thoroughfare. Alternatively, a turnaround area would need to be provided to the north of the closure. The turnaround area would typically be designed to accommodate vehicles up to 8.8 m service vehicles.</p>	<p>The closure of Staniland Street would be dependent on whether it is possible to accommodate an appropriate turnaround area or through connection to Orrong Road.</p>

## 6.2.2 Entertainment Precinct

Investigation into the creation of a cultural and entertainment precinct is being conducted through the consideration of a variety of options. A review of the points of consideration and subsequent recommendations to the transformative concepts are shown in Table 17 below.

**Table 17 Entertainment Precinct**

	<i>Points for consideration</i>	<i>Recommendation</i>
Close Gordon Street along the length of the commercial frontage and create a new road link across the railway line	<p>If the commercial frontage of Gordon Street were to be closed, then a turnaround area would need to be provided to the north.</p> <p>Vehicle connectivity to the angled car parking on the western side of Gordon Street would be affected.</p> <p>The provision of a road link over the rail would improve connectivity but may promote rat-running, particularly during the PM peak period.</p>	<p>It is considered that Ripon Grove could readily be converted to a one-way operation.</p> <p>It would be difficult to close the commercial frontage of Gordon Street due to the requirement to provide a turnaround area. It is suggested that a one-way northbound operation could be implemented on Gordon Street, with a widened footpath to improve pedestrian amenity. A one-way southbound operation could then be implemented on Selwyn Street.</p>
Make Ripon Grove one-way and extend eastern footpath	<p>It is considered that Ripon Grove could be converted to either a northbound only or southbound only operation between Glen Huntly Road and Davis Street.</p> <p>The angled parking provisions on the eastern side of the road may need to be reconfigured to suit the direction of travel and / or the extended footpath.</p>	<p>It is understood that a supermarket is contemplated at the southeast corner of the Selwyn Street. Sinclair Street intersection. If this is the case then it would be beneficial to maintain a two-way operation on Selwyn Street, to allow supermarket traffic to access the site directly via Selwyn Street and Glen Huntly Road.</p>
Make Selwyn Street one-way and extend footpath on eastern side	<p>There is scope to convert Selwyn Street to a one-way operation either northbound or southbound.</p> <p>Vehicle access to and from uses such as Sholem Aleichem College would need to be considered if these works were to be implemented in conjunction with the Gordon Street closure.</p>	

### 6.2.3 Pedestrianise Lane & Streets

Council is considering to create a pedestrian friendly street and laneway network by exploring a variety of options that involve alterations to the commercial lengths of Beavis Street and Downshire Road.

A review of the points of consideration and subsequent recommendations to the transformative concepts are shown in Table 18 and Table 19 below.

**Table 18 Beavis Street**

	<i>Points for consideration</i>	<i>Recommendation</i>
Full closure of commercial length of Beavis Street	<p>A number of properties take their vehicle access from this section of Beavis Street. These access points would need to be maintained.</p> <p>Waste collection arrangements for buildings fronting this section of street would need to be confirmed, and appropriate arrangements would need to be made.</p> <p>A turnaround around area would need to be provided at the end of Beavis Street or the car park would be required to become a thoroughfare which is not an ideal arrangement.</p>	<p>It is suggested that a one-way configuration (maintain southbound traffic operation) would be the most suitable arrangement for this location. This could be combined with a shared zone to further improve amenity.</p> <p>There are a number of properties to which access needs to be maintained, which could be achieved under the one-way arrangement.</p>
One-way with extended footpath on southern side (maintain northbound traffic operation)	<p>Vehicles exiting the Coles supermarket car park would likely do so onto Orrong Road.</p> <p>Turnaround area or through connection would be required at the end of Beavis Street.</p>	
One-way with extended footpath on southern side (maintain southbound traffic operation)	<p>This arrangement would allow for car park egress and no turnaround area would be required.</p> <p>This arrangement help maintain local connectivity.</p>	
Shared space two-way	<p>Shared Zone would provide pedestrian priority within a low speed environment (speed limit of 10 km/h) while maintaining current level of accessibility for land uses in the area.</p>	

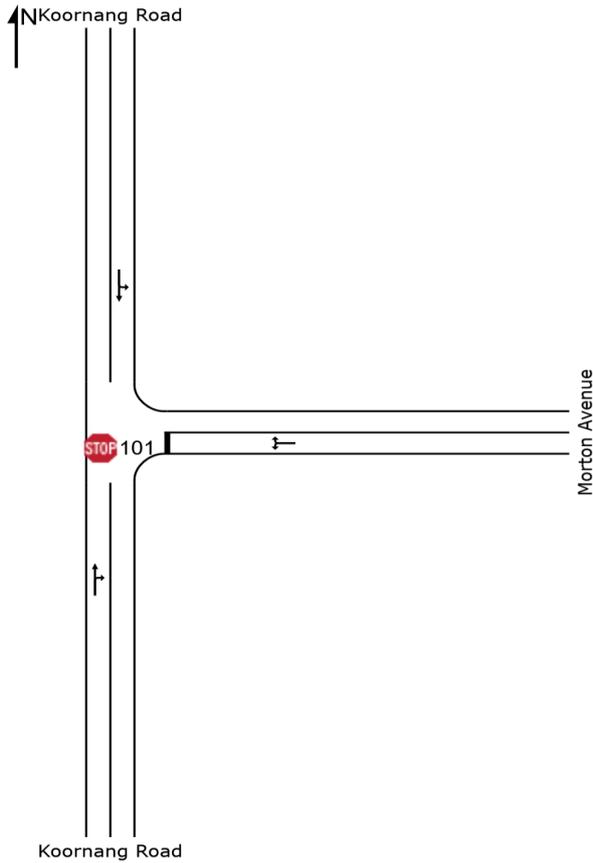
**Table 19 Downshire Road**

	<i>Points for consideration</i>	<i>Recommendation</i>
Full closure of commercial length of Downshire Road	<p>Downshire Road currently operates as a left in left out arrangement at the intersection with Glen Huntly Road.</p> <p>A number of properties take their vehicle loading access from this section of Downshire Road. This access point would need to be maintained.</p> <p>Waste collection arrangements for buildings fronting this section of street would need to be confirmed, and appropriate arrangements would need to be made.</p> <p>A turnaround around area would need to be provided at the end of Downshire Road.</p>	<p>It is suggested that a one-way northbound Shared Zone would be the most suitable arrangement for this location.</p> <p>There are a number of properties to which access needs to be maintained, which could be achieved under the one-way Shared Zone arrangement. This would create a low volume, low speed environment to improve pedestrian amenity.</p>
One-way with extended footpath on southern side (maintain northbound traffic operation)	<p>Low traffic numbers into Downshire Road from Glen Huntly Road indicate that traffic could easily be distributed to other local roads without much tangible effect.</p>	
One-way with extended footpath on southern side (maintain southbound traffic operation)	<p>Low traffic numbers from Downshire Road from Glen Huntly Road indicate that traffic could easily be distributed to other local roads without much tangible effect.</p> <p>A turnaround area would be required under this arrangement.</p>	
Shared space two-way	<p>Shared Zone would provide pedestrian priority within a low speed environment (speed limit of 10 km/h) while maintaining current level of accessibility for land uses in the area.</p>	

# **Appendix A    *SIDRA Intersection Results – Carnegie***

**Koornang Road / Morton Avenue**  
**AM Peak Hour, Existing Geometry, Existing Conditions**

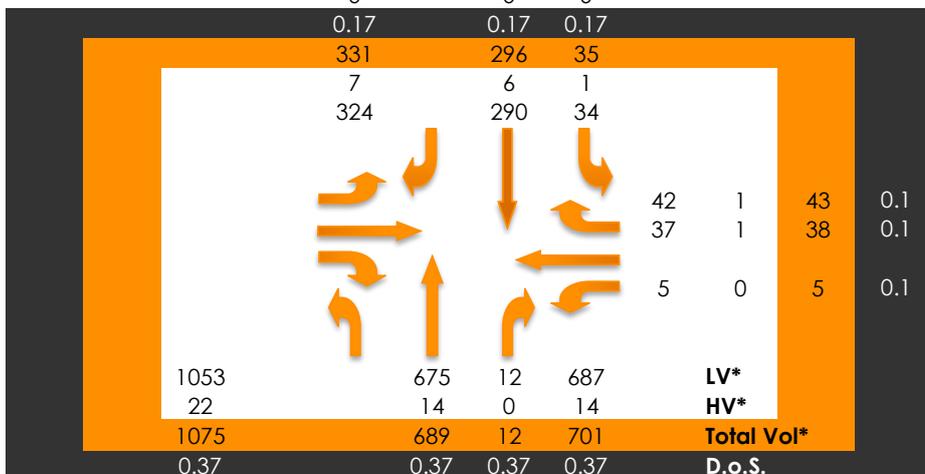
Two-Way Stop



**Koornang Road**

App	R	T	L
0		0	0
0		0	0
0.17		0.17	0.17

L  
T  
R  
App



**Morton Avenue**

2	7	<b>App</b>
2	8	<b>R</b>
		<b>T</b>
2	1	<b>L</b>

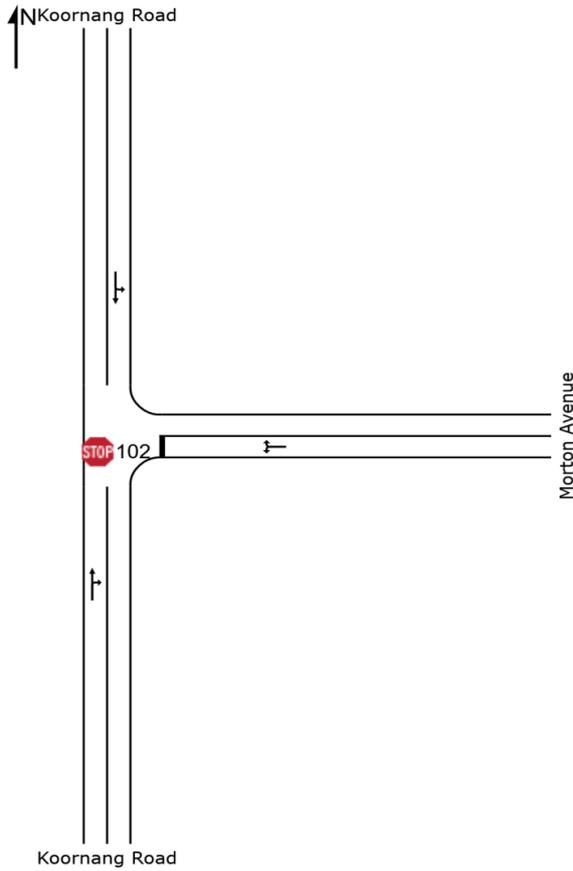
\*Output Volumes

Intersection

**Koornang Road**

**Koornang Road / Morton Avenue**  
**PM Peak Hour, Existing Geometry, Existing Conditions**

Two-Way Stop



**Koornang Road**

App	R	T	L
0		0	0
0		0	0



**Morton Avenue**

L	T	R	App	95th %ile Back of Queue (m)	Average Delay (sec)	App	R	T	L
2	6	6	3	40	0.09	2	6	App	
2	7	7	3	32	0.09	2	7	R	
2	3	3	3	8	0.09	2	3	T	
								L	

1059	408	11	417	LV*
22	8	0	9	HV*
1081	416	11	426	Total Vol*
0.32	0.23	0.23	0.23	D.o.S.

\*Output Volumes

95th %ile Back of Queue (m)  
 Average Delay (sec)

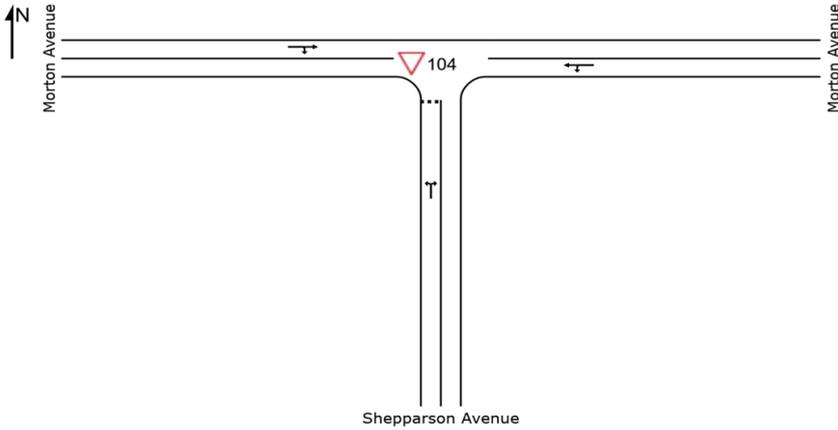
Intersection L T R App

**Koornang Road**



**Morton Avenue / Shepparson Avenue**  
**PM Peak Hour, Existing Geometry, Existing Conditions**

Give-Way/Yield



App R T L

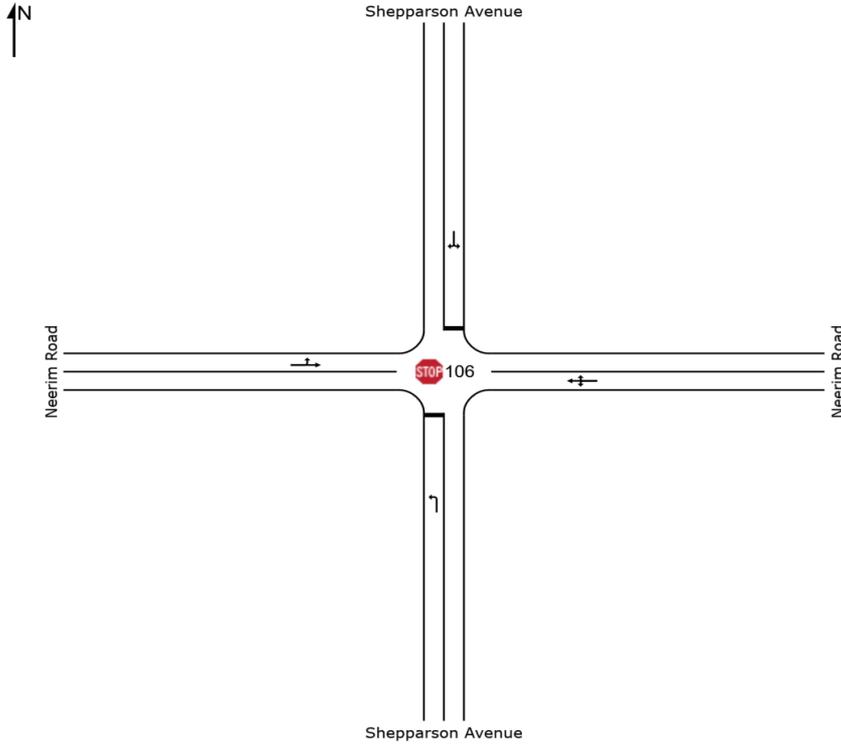
Morton Avenue				Morton Avenue				Morton Avenue				
L	T	R	App	L	T	R	App	L	T	R	App	
0	2	0	0	11	0	11	11	0	11	0	0	
0	2	0	0	81	2	79	5	0	5	0	0	
0	2	0	0	92	2	90	5	0	5	0	0	
				138	32	6	38	LV*				
				3	1	0	1	HV*				
				141	33	6	39	Total Vol*				
				0.05	0.03	0.03	0.03	D.o.S.				
				2	1	1	1	95th %ile Back of Queue (m)				
				0	0	0	0	Average Delay (sec)				
				Intersection	L	T	R	App	Shepparson Avenue			

\*Output Volumes



**Neerim Road / Shepparson Avenue**  
**PM Peak Hour, Existing Conditions, Existing Counts**

Two-Way Stop

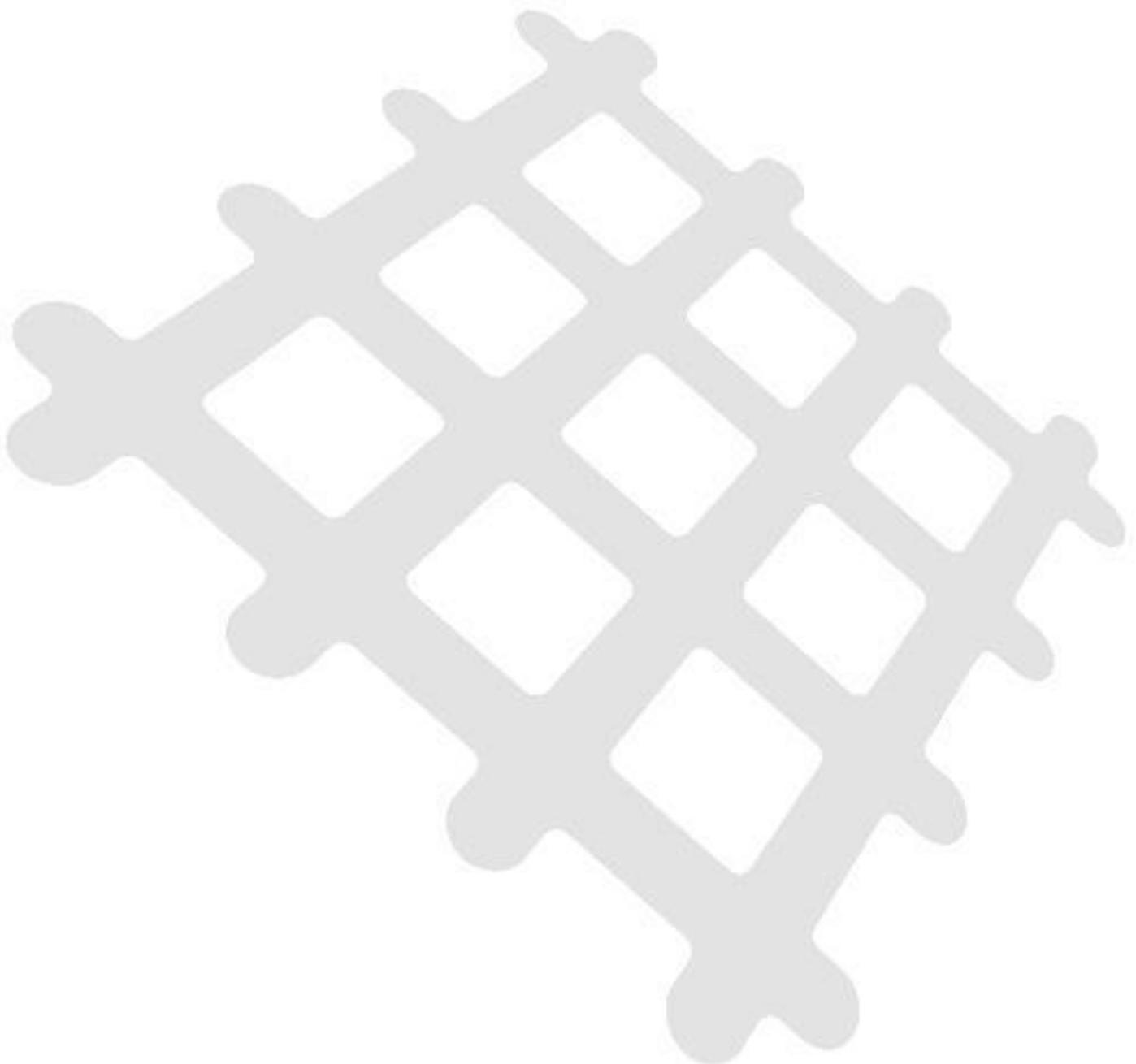


**Shepparson Avenue**

		Neerim Road		Intersection				Neerim Road								
		L	R	L	T	R	L	T	R	L	App					
L	0	0	0.25	62	1	61	114	39	75	376	8	384	0.22	4	1	App
T	0	0	0.25	420	8	412	2	1	2	46	1	47	0.22	4	2	R
R							112	38	73	325	7	332	0.22	4	1	T
App	0	0	0.25	482	10	472	5	5	5	5	0	5	0.22	4	2	L
				1008		48			48	<b>LV*</b>						
				21		1			1	<b>HV*</b>						
				1029		49			49	<b>Total Vol*</b>						
				0.25		0.05			0.05	<b>D.o.S.</b>						
				5		1			1	<b>95th %ile Back of Queue (m)</b>						
				1		1			1	<b>Average Delay (sec)</b>						
				<b>Intersection</b>												
				L	T	R	App									
				<b>Shepparson Avenue</b>												

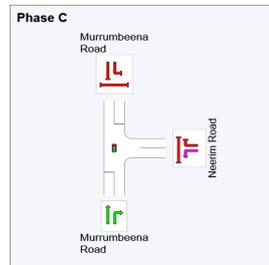
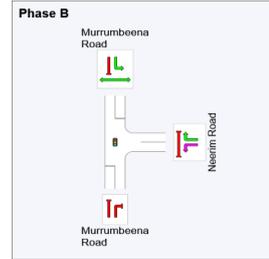
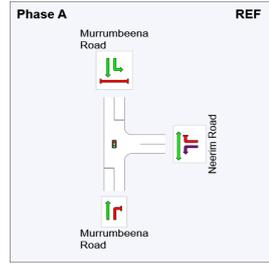
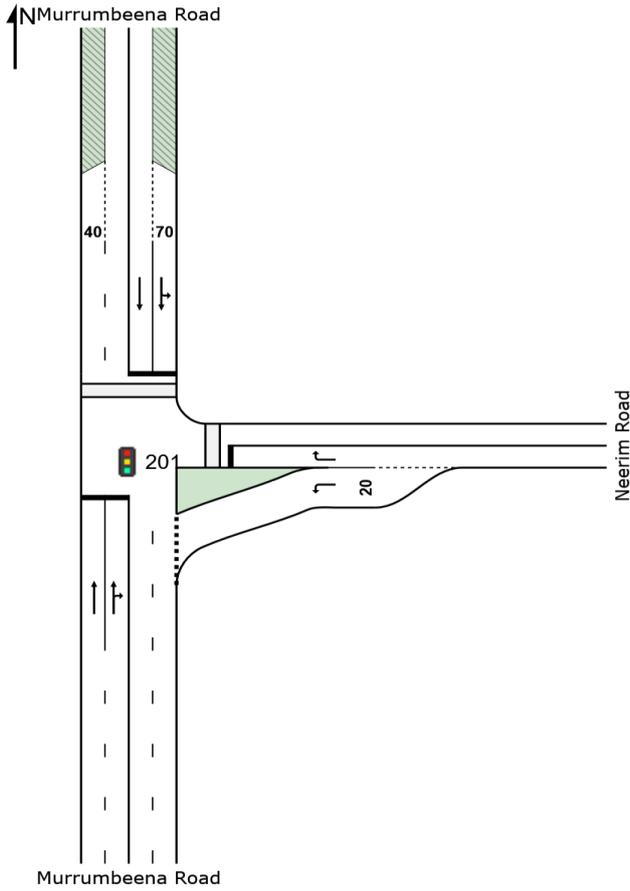
\*Output Volumes

# **Appendix B**     **SIDRA Intersection Results –** **Murrumbeena**



**Murrumbeena Road / Neerim Road**  
**AM Peak Hour, Existing Geometry, Existing Conditions**

**Signals**



Phase	Grn	Yel	Red	Total	%
A	15	4	2	21	23.33
B	9	4	2	15	16.67
C	48	4	2	54	60

**Murrumbeena Road**

App	R	T	L
37		37	36
39		39	39

90



**Neerim Road**

L	T	R	App								
				234	5	239	0.44	25	15	App	
				79	2	81	0.44	25	43	R	
				155	3	158	0.1	7	1	T	
										L	

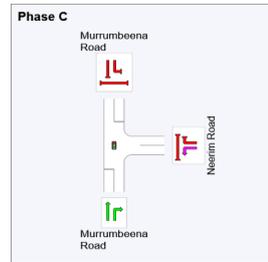
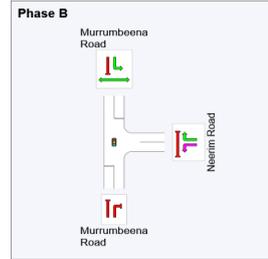
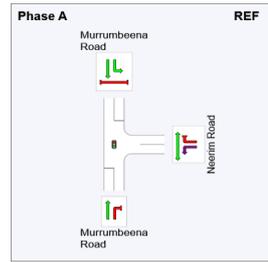
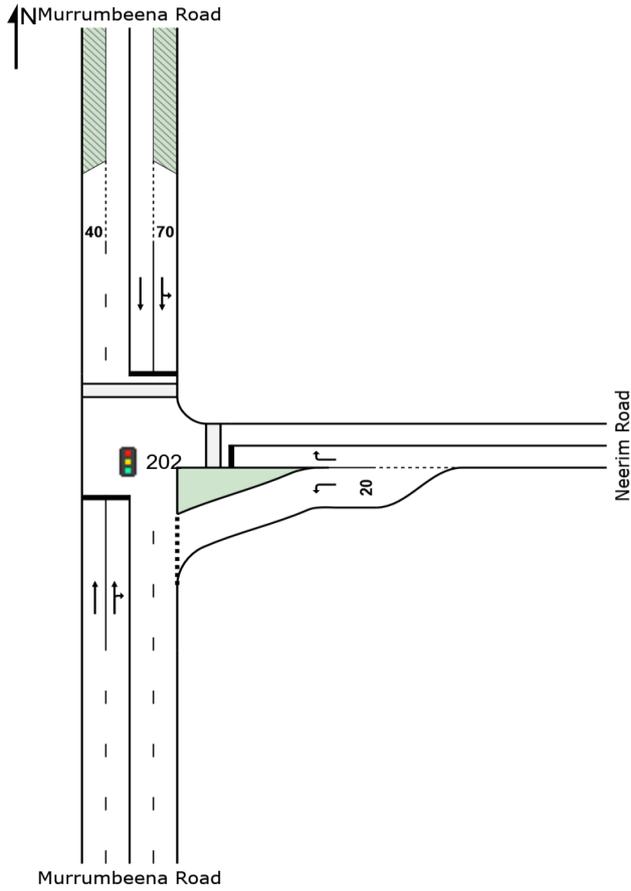
\*Output Volumes

1170		549	120	668	<b>LV*</b>
24		11	2	14	<b>HV*</b>
1194		560	122	682	<b>Total Vol*</b>
0.44		0.44	0.44	0.44	<b>D.o.S.</b>
84		84	84	84	<b>95th %ile Back of Queue (m)</b>
16		8	10	8	<b>Average Delay (sec)</b>
<b>Intersection</b>	<b>L</b>	<b>T</b>	<b>R</b>	<b>App</b>	

**Murrumbeena Road**

**Murrumbeena Road / Neerim Road**  
**PM Peak Hour, Existing Geometry, Existing Conditions**

**Signals**



Phase	Grn	Yel	Red	Total	%
A	24	4	2	30	33.33
B	6	4	2	12	13.33
C	42	4	2	48	53.33

**Murrumbeena Road**

App	R	T	L
29		29	29
57		57	56
0.42		0.42	0.42

**90**



**Neerim Road**

L	T	R	App	Count	Vol	Vol	Vol	Vol	Vol	Vol	Vol	Vol
			App	368	8	376	0.37	22	7	App		
			R	44	1	45	0.37	15	47	R		
			T	324	7	331	0.23	22	2	T		
			L							L		

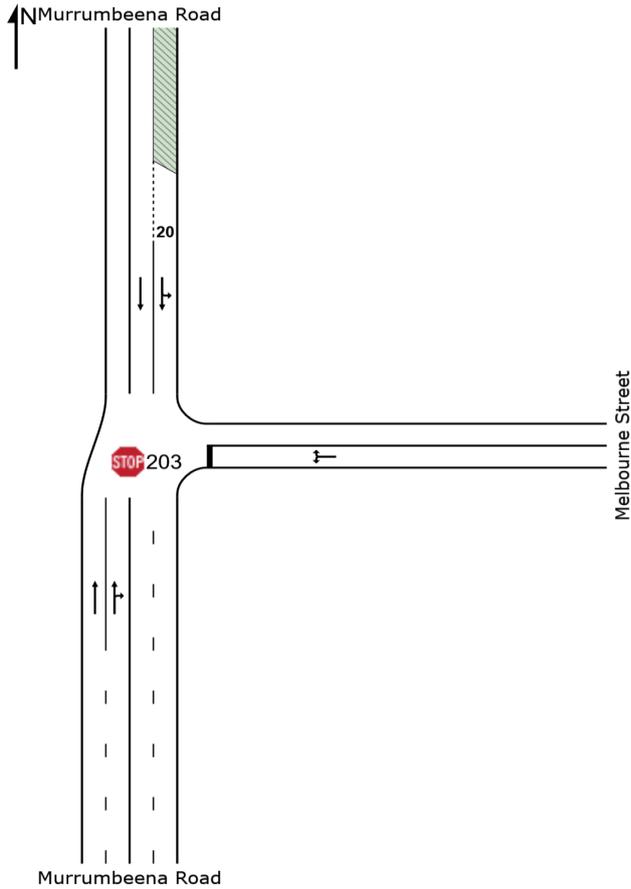
\*Output Volumes

1366	399	172	571	<b>LV*</b>
28	8	4	12	<b>HV*</b>
1394	407	176	583	<b>Total Vol*</b>
0.43	0.43	0.43	0.43	<b>D.o.S.</b>
78	78	78	78	<b>95th %ile Back of Queue (m)</b>
16	9	15	11	<b>Average Delay (sec)</b>
<b>Intersection</b>	<b>L</b>	<b>T</b>	<b>R</b>	<b>App</b>

**Murrumbeena Road**

**Murrumbeena Road / Melbourne Street**  
**AM Peak Hour, Existing Geometry, Existing Conditions**

Two-Way Stop



**Murrumbeena Road**

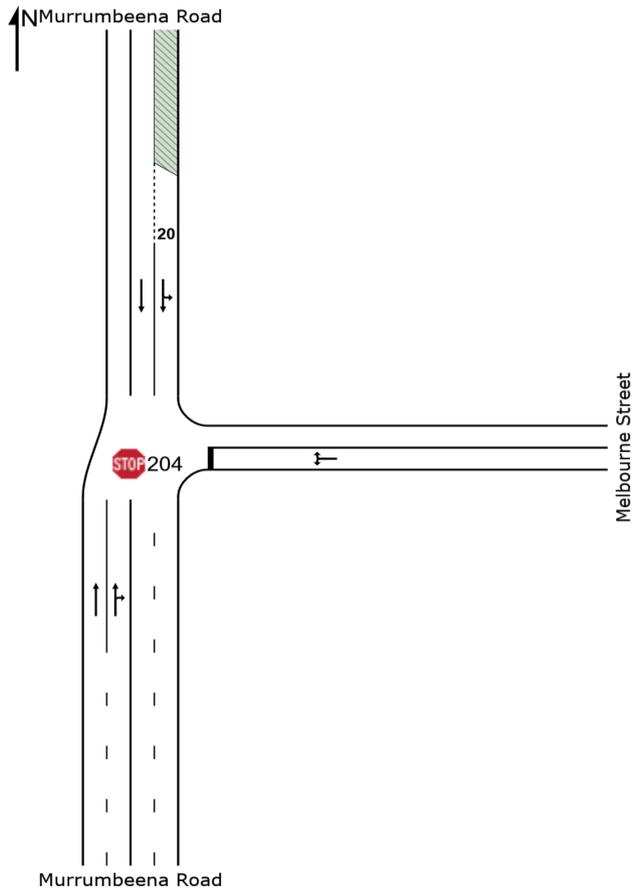
App	R	T	L
0		0	0
0		0	0
0.07		0.07	0.07

L T R App	Murrumbeena Road				Melbourne Street			App R T L			
	L	T	R	App	L	T	R				
	276	259	17		24	0	24	0.06	1	7	
	6	5	0		14	0	14	0.06	1	12	
	270	254	17		11	0	11	0.06	1	1	
	941	633	14	647	<b>LV*</b>						
	19	13	0	13	<b>HV*</b>						
	960	646	14	660	<b>Total Vol*</b>						
	0.29	0.29	0.29	0.29	<b>D.o.S.</b>						
	1	1	1	1	<b>95th %ile Back of Queue (m)</b>						
	0	0	2	0	<b>Average Delay (sec)</b>						
<b>Intersection</b>	<b>L</b>	<b>T</b>	<b>R</b>	<b>App</b>							

\*Output Volumes

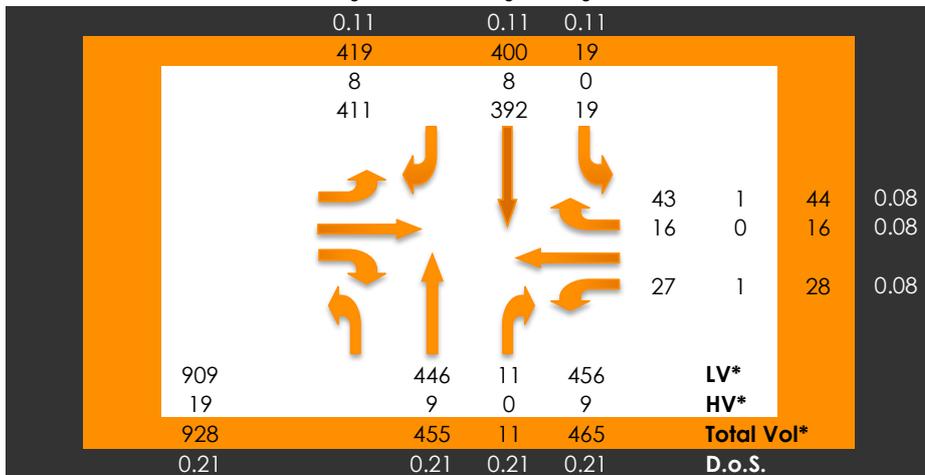
**Murrumbeena Road / Melbourne Street**  
**PM Peak Hour, Existing Geometry, Existing Conditions**

Two-Way Stop



**Murrumbeena Road**

App	R	T	L
0		0	0
0		0	0
0.11		0.11	0.11



Melbourne Street

L	T	R	App
2	4	10	1
2	1		

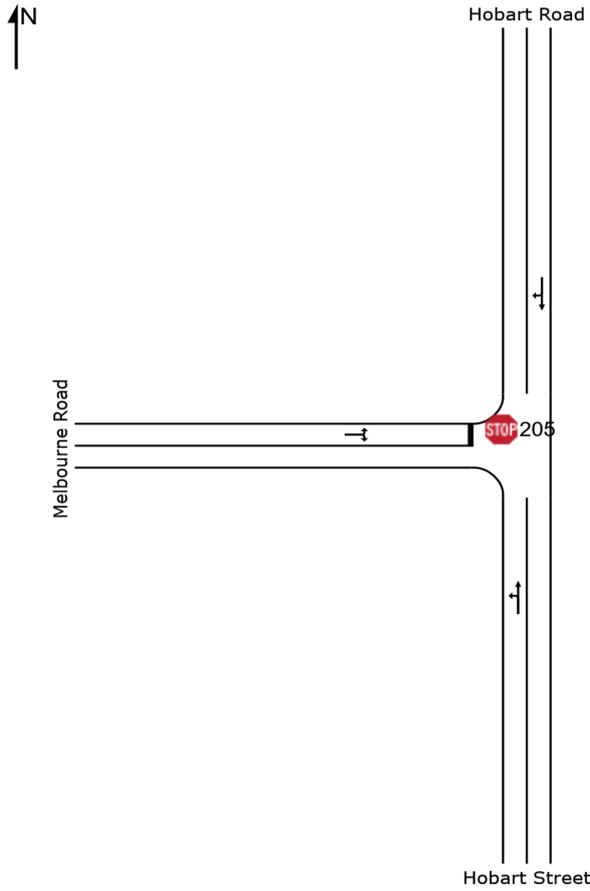
\*Output Volumes

Intersection

**Murrumbeena Road**

**Hobart Street / Melbourne Street**  
**AM Peak Hour, Existing Geometry, Existing Conditions**

Two-Way Stop



**Hobart Road**

App R T L

0 0 0

1 1 1

0.09 0.09 0.09

168 19 149

3 0 3

165 19 146

0 0 0

1 1 1

0.05 0.05 0.05

20 0 20

28 1 27

48 1 47

346 21 113 133

7 0 2 3

353 21 115 136

0.09 0.07 0.07 0.07

1 0 0 0

0 0 0 0

Intersection L T R App

**Hobart Street**

**Melbourne Road**

L 0 1

T 0 1

R 1 1

App 1 1

0.05 0.05 0.05

20 0 20

28 1 27

48 1 47

346 21 113 133

7 0 2 3

353 21 115 136

0.09 0.07 0.07 0.07

1 0 0 0

0 0 0 0

0.05 0.05 0.05

20 0 20

28 1 27

48 1 47

App

R

T

L

LV\*

HV\*

Total Vol\*

D.o.S.

95th %ile Back of Queue (m)

Average Delay (sec)

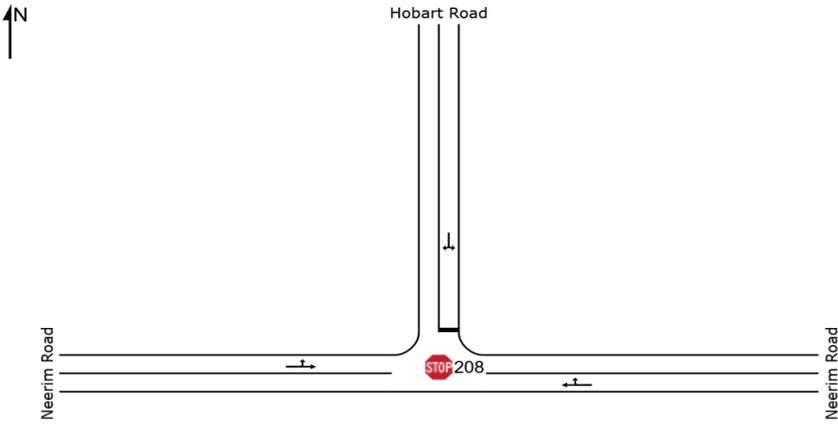
\*Output Volumes





Neerim Road / Hobart Road  
 PM Peak Hour, Existing Geometry, Existing Conditions

Two-Way Stop



Hobart Road

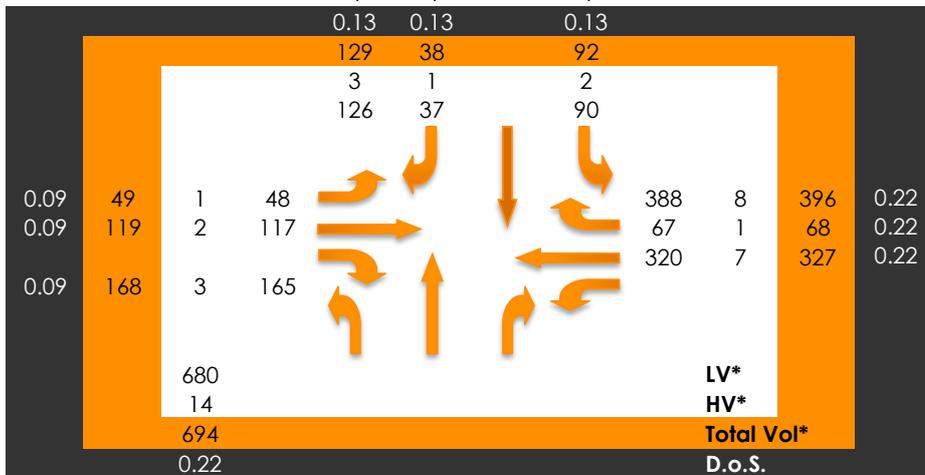
App	R	T	L
1	3		0
4	4		4

0.13	0.13		0.13
129	38		92

3	1		2
126	37		90

Neerim Road

L	0	0	0.09	49	1	48
T	0	0	0.09	119	2	117
R						
App	0	0	0.09	168	3	165



Neerim Road

4	0	App
4	1	R
4	0	T
		L

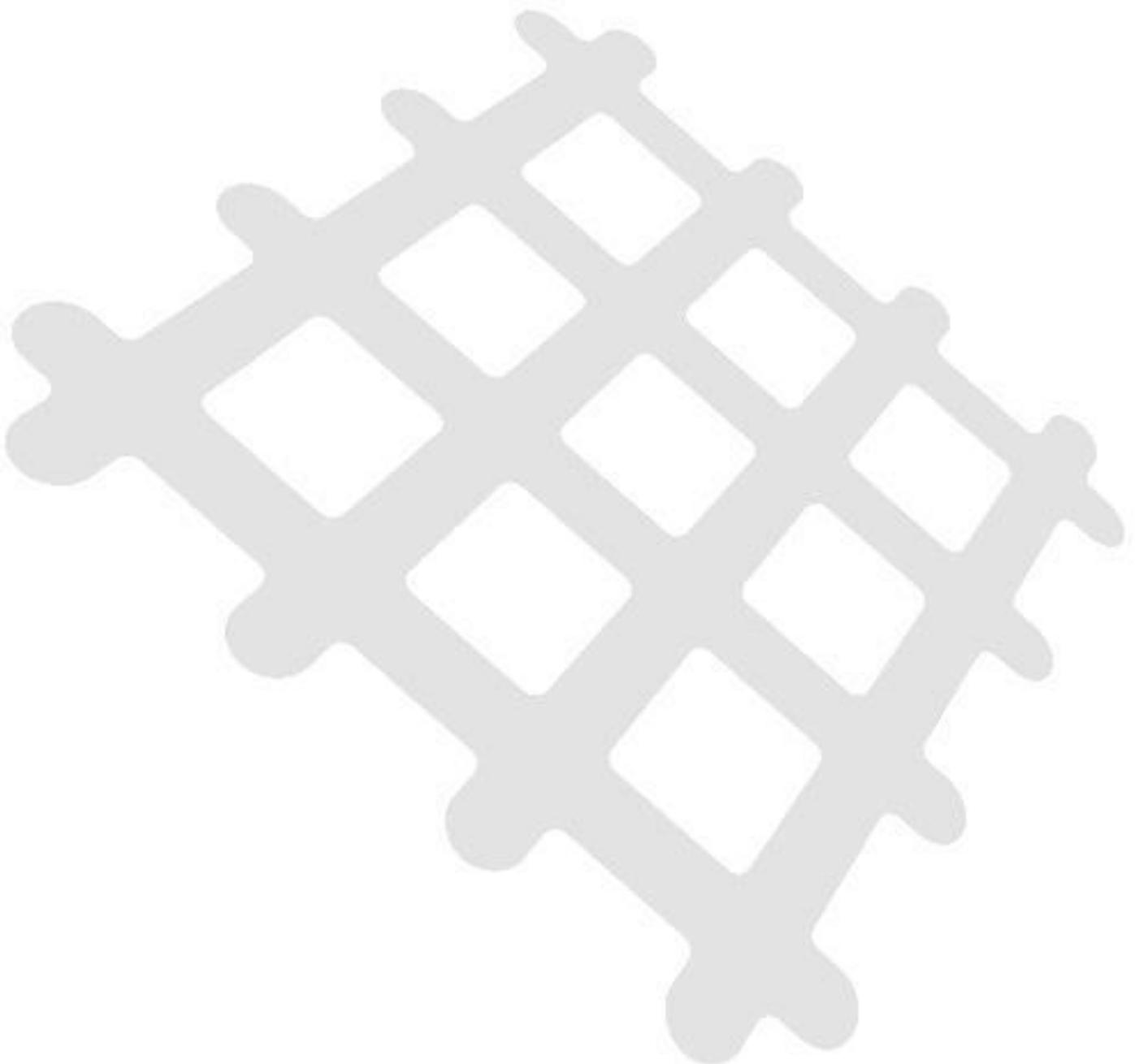
680	LV*
14	HV*
694	Total Vol*
0.22	D.o.S.

\*Output Volumes

95th %ile Back of Queue (m)  
 Average Delay (sec)

Intersection L T R App

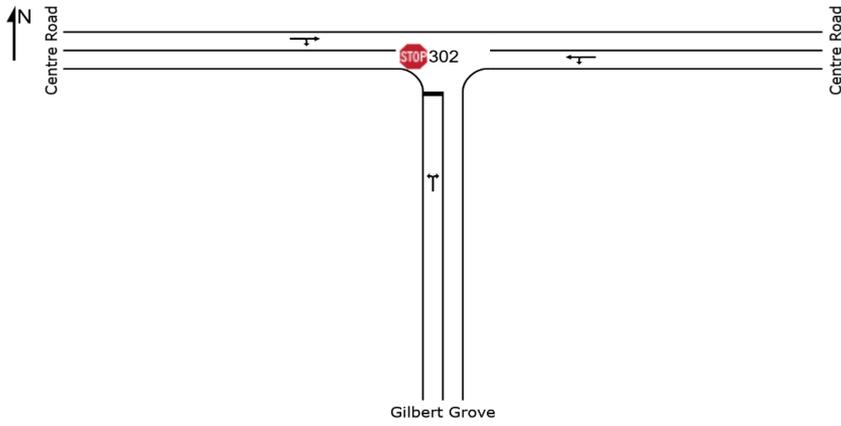
# ***Appendix C    SIDRA Intersection Results – Bentleigh***





Centre Road / Gilbert Grove  
 PM Peak Hour, Existing Geometry, Existing Conditions

Two-Way Stop



App R T L

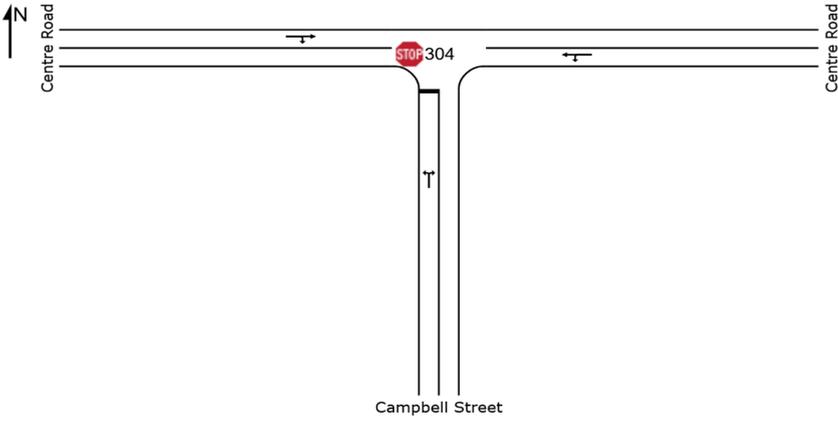
Centre Road		Intersection				Centre Road				
L	T	App	R	T	L	App	R	T	L	
0	3	0.29	514	10	504	515	11	526	0.27	
3	3	0.29	25	1	24	503	10	513	0.27	
0	3	0.29	539	11	528	14	0	14	0.27	
			1123	44	35	79	<b>LV*</b>			
			23	1	1	2	<b>HV*</b>			
			1146	45	36	81	<b>Total Vol*</b>			
			0.29	0.16	0.16	0.16	<b>D.o.S.</b>			
			4	4	4	4	<b>95th %ile Back of Queue (m)</b>			
			1	3	10	6	<b>Average Delay (sec)</b>			
			<b>Intersection</b>	<b>L</b>	<b>T</b>	<b>R</b>	<b>App</b>			
			<b>Gilbert Grove</b>							

\*Output Volumes



**Centre Road / Campbell Street**  
**PM Peak Hour, Existing Geometry, Existing Conditions**

Two-Way Stop



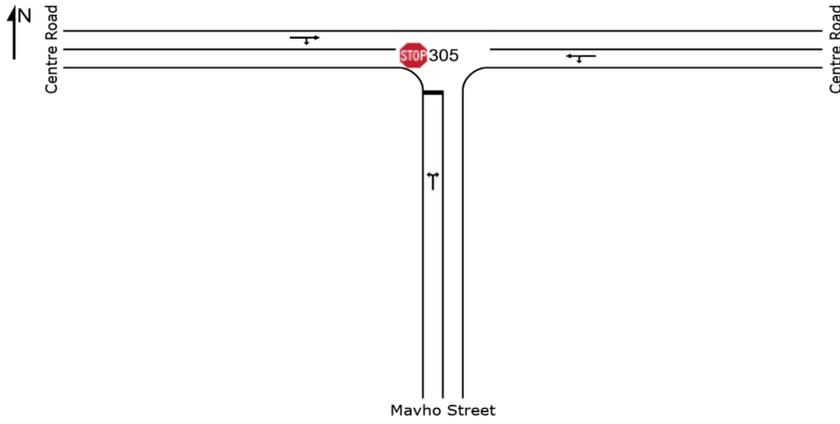
App R T L

Centre Road								Centre Road					
L	T	R	App	L	T	R	App	L	T	R	App		
1	7	3	1	554	11	543	516	11	527	0.27	0	0	App
0.34	0.34	0.34	0.34	55	1	54	506	10	516	0.27	0	0	R
0.34	0.34	0.34	0.34	608	12	596	12	0	12	0.27	0	0	T
				1155	34	8	42						L
				24	1	0	1						LV*
				1179	35	8	43						HV*
				0.34	0.07	0.07	0.07						Total Vol*
				7	2	2	2						D.o.S.
				1	3	11	4						95th %ile Back of Queue (m)
				Intersection	L	T	R	App					Average Delay (sec)

\*Output Volumes

Centre Road / Mavho Street  
 AM Peak Hour, Existing Geometry, Existing Conditions

Two-Way Stop



App R T L

Centre Road								Centre Road								
L	T	R	App	L	T	R	App	L	T	R	App					
0	2	2	0	0.24	427	9	418	465	9	474	0.25	0	0	App		
2	2	2	0	0.24	16	0	16	450	9	459	0.25	0	0	R		
0	2	2	0	0.24	443	9	434	15	0	15	0.25	0	0	T		
					941	35	7	42	<b>LV*</b>							
					19	1	0	1	<b>HV*</b>							
					<b>960</b>	<b>36</b>	<b>7</b>	<b>43</b>	<b>Total Vol*</b>							
					<b>0.25</b>	<b>0.06</b>	<b>0.06</b>	<b>0.06</b>	<b>D.o.S.</b>							
					2	2	2	2	<b>95th %ile Back of Queue (m)</b>							
					0	2	7	3	<b>Average Delay (sec)</b>							
				<b>Intersection</b>	<b>L</b>	<b>T</b>	<b>R</b>	<b>App</b>								
				<b>Mavho Street</b>												

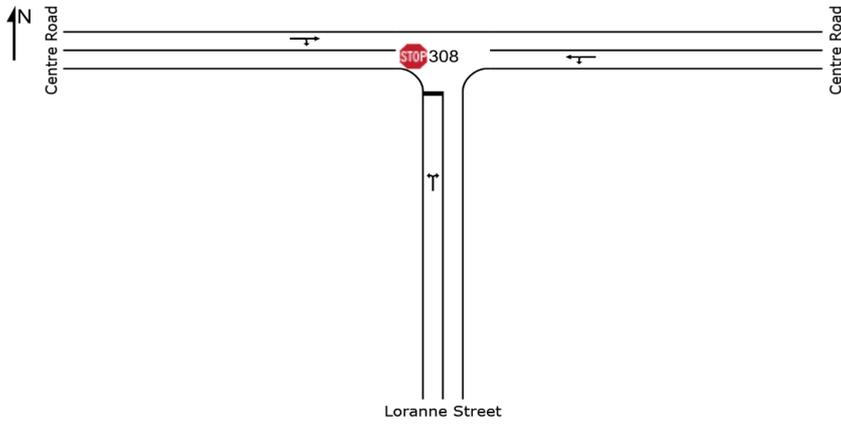
\*Output Volumes





**Centre Road / Laranne Street**  
**PM Peak Hour, Existing Geometry, Existing Conditions**

Two-Way Stop



App R T L

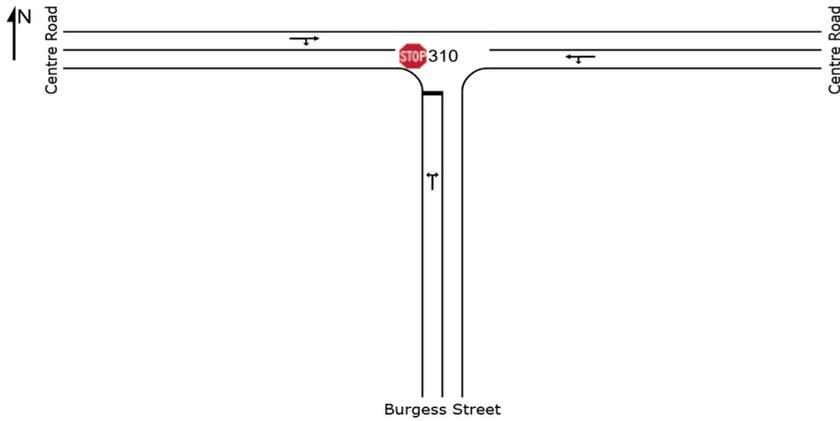
Centre Road		Loranne Street				Centre Road					
L	T	App	R	T	L	LV*	HV*	Total Vol*	D.o.S.	95th %ile Back of Queue (m)	Average Delay (sec)
0	3	0.26	457	9	448	517	11	528	0.28	0	0
3	3	0.26	26	1	25	485	10	495	0.28	0	0
0	3	0.26	483	10	473	33	1	34	0.28	0	0
			1044	30	23	53					
			21	1	0	1					
			1065	31	23	54					
			0.28	0.1	0.1	0.1					
			3	2	2	2					
			0	3	8	5					
			Intersection	L	T	R	App				

\*Output Volumes



Centre Road / Burgess Street  
 PM Peak Hour, Existing Geometry, Existing Conditions

Two-Way Stop



App R T L

Centre Road						Centre Road						
L	T	R	App									
0	3	0.31	551	11	540	521	11	532	0.28	0	0	App
3	3	0.31	24	0	24	514	11	525	0.28	0	0	R
0	3	0.31	575	12	563	6	0	6	0.28	0	0	T
												L
			1104	17	4	21		LV*				
			23	0	0	0		HV*				
			1127	17	4	21		Total Vol*				
			0.31	0.03	0.03	0.03		D.o.S.				
			3	1	1	1		95th %ile Back of Queue (m)				
			0	3	9	4		Average Delay (sec)				
			Intersection	L	T	R	App					
				Burgess Street								

\*Output Volumes



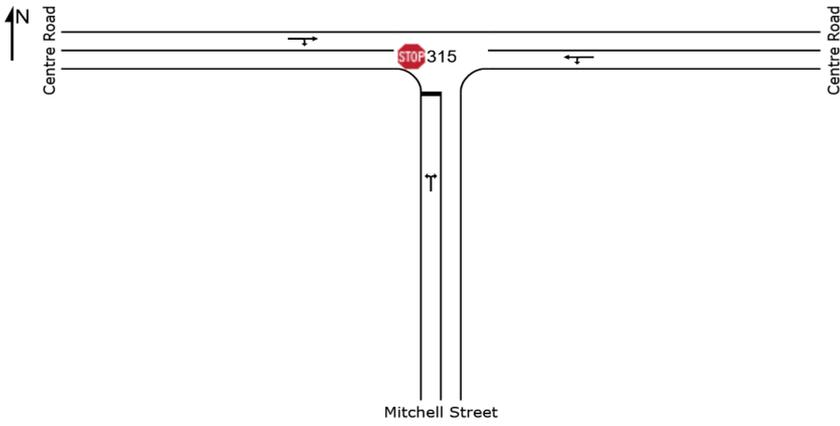






**Centre Road / Mitchell Street**  
**AM Peak Hour, Existing Geometry, Existing Conditions**

Two-Way Stop



App R T L

Centre Road								Centre Road							
L	T	R	App									App	R	T	L
0	2	3	0	0.24	418	8	410	529	11	540	0.28	0	0	0	0
0	2	2	0	0.24	22	0	22	504	10	514	0.28	0	0	0	0
0	2	2	0	0.24	440	9	431	25	1	26	0.28	0	0	0	0
					988		17		12	27		<b>LV*</b>			
					20		0		0	1		<b>HV*</b>			
					<b>1008</b>		<b>17</b>		<b>12</b>	<b>28</b>		<b>Total Vol*</b>			
					<b>0.28</b>		<b>0.05</b>		<b>0.05</b>	<b>0.05</b>		<b>D.o.S.</b>			
					2		1		1	1		<b>95th %ile Back of Queue (m)</b>			
					0		3		7	4		<b>Average Delay (sec)</b>			
					<b>Intersection</b>		<b>L</b>		<b>T</b>	<b>R</b>		<b>App</b>			
												<b>Mitchell Street</b>			

\*Output Volumes



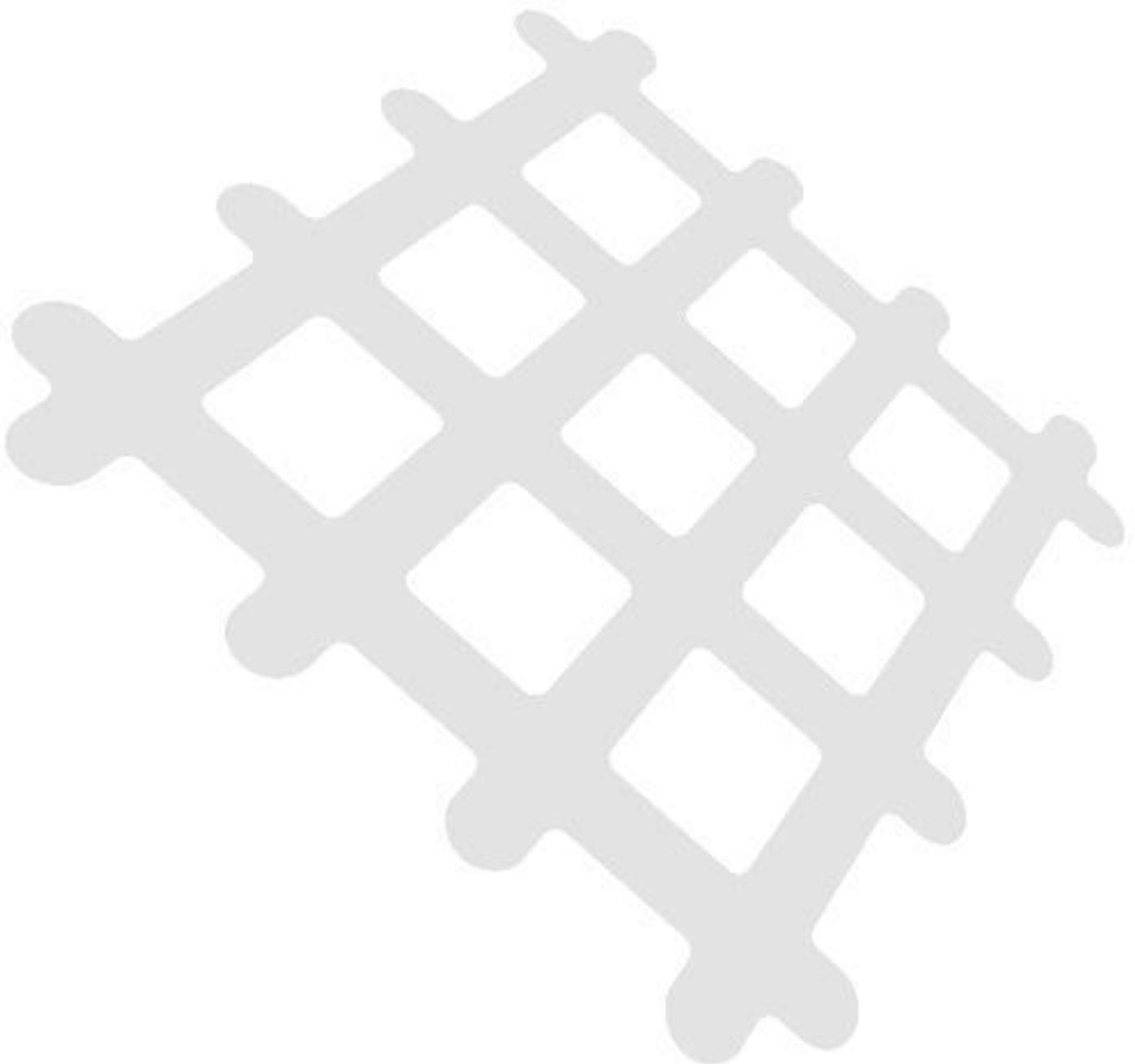








# ***Appendix D    SIDRA Intersection Results – Elsternwick***







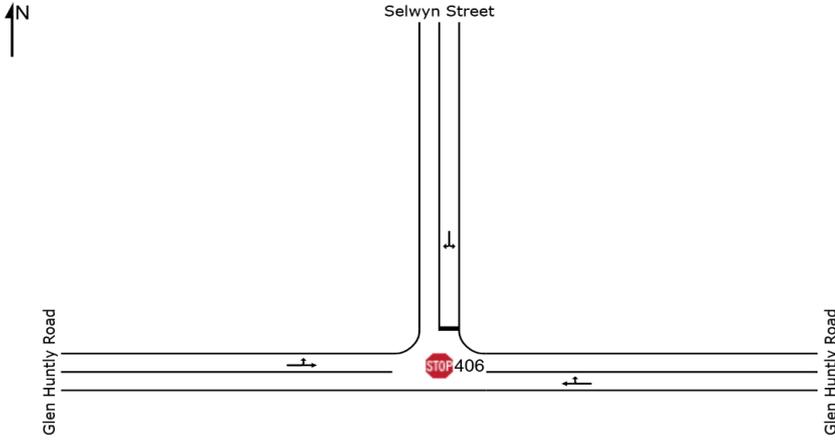






**Glen Huntly Road / Selwyn Street**  
**PM Peak Hour, Existing Geometry, Existing Conditions**

Two-Way Stop



**Selwyn Street**

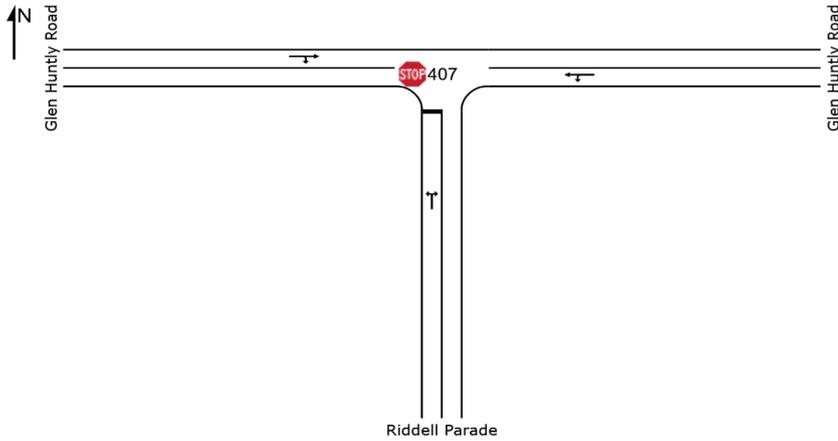
App	R	T	L
9	14		3
4	4		4
0.18	0.18		0.18

Glen Huntly Road												Glen Huntly Road					
L	0	0	0.32	35	1	34	1	1	1	710	14	724	0.43	4	0	App	
T	0	0	0.32	521	10	511	10	10	10	25	1	26	0.43	4	4	R	
R																T	
App	0	0	0.32	556	11	545	11	11	11	684	14	698	0.43	4	0	L	
				1318							LV*						
				27							HV*						
				1345							Total Vol*						
				0.43							D.o.S.						
				4							95th %ile Back of Queue (m)						
				1							Average Delay (sec)						
		Intersection		L	T	R	App										

\*Output Volumes

**Glen Huntly Road / Riddell Parade**  
**AM Peak Hour, Existing Geometry, Existing Conditions**

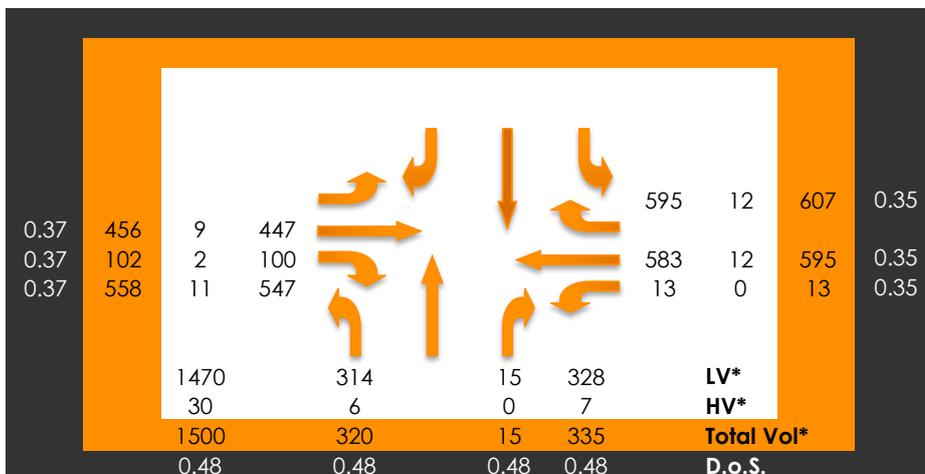
Two-Way Stop



App R T L

Glen Huntly Road

L 2 12 0.37  
 T 4 12 0.37  
 R 2 12 0.37  
 App



Glen Huntly Road

App R T L  
 0 0 App  
 0 0 R  
 0 0 T  
 0 0 L

\*Output Volumes

Intersection

Riddell Parade

















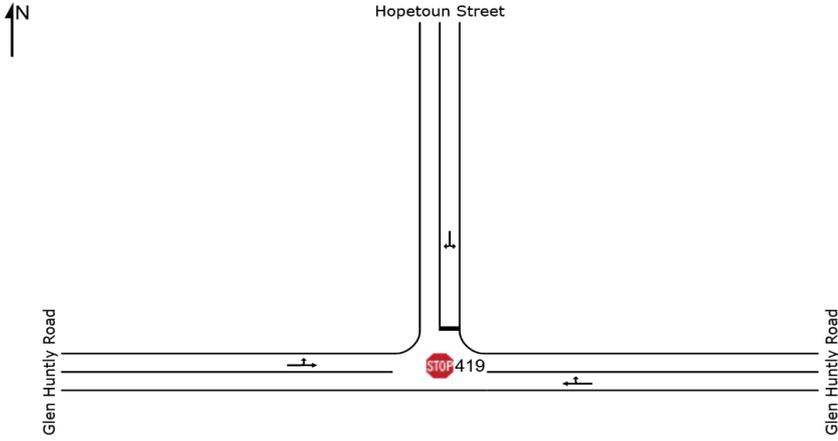






**Glen Huntly Road / Hopetoun Street**  
**AM Peak Hour, Existing Geometry, Existing Conditions**

Two-Way Stop



**Hopetoun Street**

		Hopetoun Street														
		App	R	T	L											
		3	8		2											
		2	2		2											
		0.08	0.08		0.08											
		58	11		47											
		1	0		1											
		57	11		46											
<b>Glen Huntly Road</b>												<b>Glen Huntly Road</b>				
L	0	0	0.26	33	1	32				576	12	588	0.37	8	1	<b>App</b>
T	0	0	0.26	418	8	410				79	2	81	0.37	8	3	<b>R</b>
R										497	10	507	0.37	8	1	<b>T</b>
App	0	0	0.26	451	9	442										<b>L</b>
						1075										
						22										
						1097										
						0.37										
						8										
						1										
						1075										
						22										
						1097										
						0.37										
						8										
						1										
						1075										
						22										
						1097										
						0.37										
						8										
						1										
						1075										
						22										
						1097										
						0.37										
						8										
						1										
						1075										
						22										
						1097										
						0.37										
						8										
						1										
						1075										
						22										
						1097										
						0.37										
						8										
						1										
						1075										
						22										
						1097										
						0.37										
						8										
						1										
						1075										
						22										
						1097										
						0.37										
						8										
						1										
						1075										
						22										
						1097										
						0.37										
						8										
						1										
						1075										
						22										
						1097										
						0.37										
						8										
						1										
						1075										
						22										
						1097										
						0.37										
						8										
						1										
						1075										
						22										
						1097										
						0.37										
						8										
						1										
						1075										
						22										
						1097										
						0.37										
						8										
						1										
						1075										
						22										
						1097										
						0.37										
						8										
						1										
						1075										
						22										
						1097										
						0.37										
						8										
						1										
						1075										
						22										
						1097										
						0.37										
						8										
						1										
						1075										
						22										
						1097										
						0.37										
						8										
						1										
						1075										
						22										
						1097										
						0.37										
						8										
						1										
						1075										
						22										
						1097										
						0.37										
						8										
						1										
						1075										
						22										
						1097										
						0.37										
						8										
						1										
						1075										
						22										
						1097										
						0.37										
						8										
						1										
						1075										
						22										
						1097										
						0.37										
						8										
						1										
						1075										
						22										
						1097										
						0.37										
						8										
						1										
						1075										
						22										
						1097										
						0.37										
						8										
						1										
						1075										
						22										
						1097										
						0.37										
						8										
						1										
						1075										
						22										
						1097										
						0.37										
						8										
						1										
						1075										
						22										
						1097										
						0.37										
						8										
						1										
						1075										
						22										
						1097										
						0.37										
						8										
						1										
						1075										
						22										
						1097										
						0.37										
						8										
						1										
						1075										
						22										
						1097										
						0.37										
						8										
						1										
						1075										
						22										
						1097										
						0.37										
						8										
						1										
						1075										
						22										
						1097										
						0.37										
						8										
						1										
						1075										
						22										
						1097										
						0.37	</									

