

Jetty Road Redevelopment

AIMSUN Scenario Model Testing

City of Holdfast Bay

20190891
13 January 2021
Ref: 20190891R001



Building exceptional
outcomes together



Document History and Status

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Executive Summary

To be added after acceptance of report



1 Introduction

The City of Holdfast Bay (Council) engaged Tonkin to develop an AIMSUN model to assess the impacts of various options that are being considered for the redevelopment of Jetty Road at Glenelg.

The objective of this study is to compare the traffic operation of particular options for the proposed redevelopment of Jetty Road that Council is undertaking as a separate study.

The AIMSUN traffic modelling computer software package has been used to assess the traffic operation as it is the standard modelling software package used by The Department of Infrastructure and Transport (DIT) and that it allows for traffic to bypass areas of congestion which can be viewed readily.

1.1 Scope of Modelling

The AIMSUN modelling for this study has partially been undertaken to DIT's Micro-Simulation Modelling Guidelines of October 2017 and DIT's reference documents "Sub-Area Traffic Simulation Modelling Using MATSAM". The modelling will be undertaken in two stages as detailed below.

Stage 1 – Prepare, Run and Calibrate Existing Model

This stage commenced with the building and running of the existing model for two timeframes; a Thursday PM peak and a weekend peak. After review of traffic data, a Sunday afternoon between approximately 12.00 and 1.00PM was considered to be the most representative.

This stage also included the development of a trip table (origin / destination matrix) based on the traffic volume data collected. An Existing Modelling Report was then prepared to summarise the existing condition and modelling state.

As there was limited data to properly calibrate the model, Council had agreed to use the model for comparative purposes only.

Stage 2 - Prepare and Run Option Models

Following establishment and agreement of the existing state model, future models with the proposed options were developed and run with key outputs being used to compare the options. The options include closure or restriction of access for the section of Jetty Road between Colley Terrace and Moseley Street.

1.2 Report Summary

This report summarises the information regarding the modelling approach adopted details of the model construction, parameter selection, demand derivation, existing traffic operation and development / assessment of the options. This report is organised as follows:

Chapter 1: Introduction

Chapter 2: AIMSUN Modelling

Chapter 3: Traffic Data Collection

Chapter 4: Existing Model Form

Chapter 5: Existing Model Operation

Chapter 6: Future Option Assessment.

Chapter 7: Summary and Recommendations

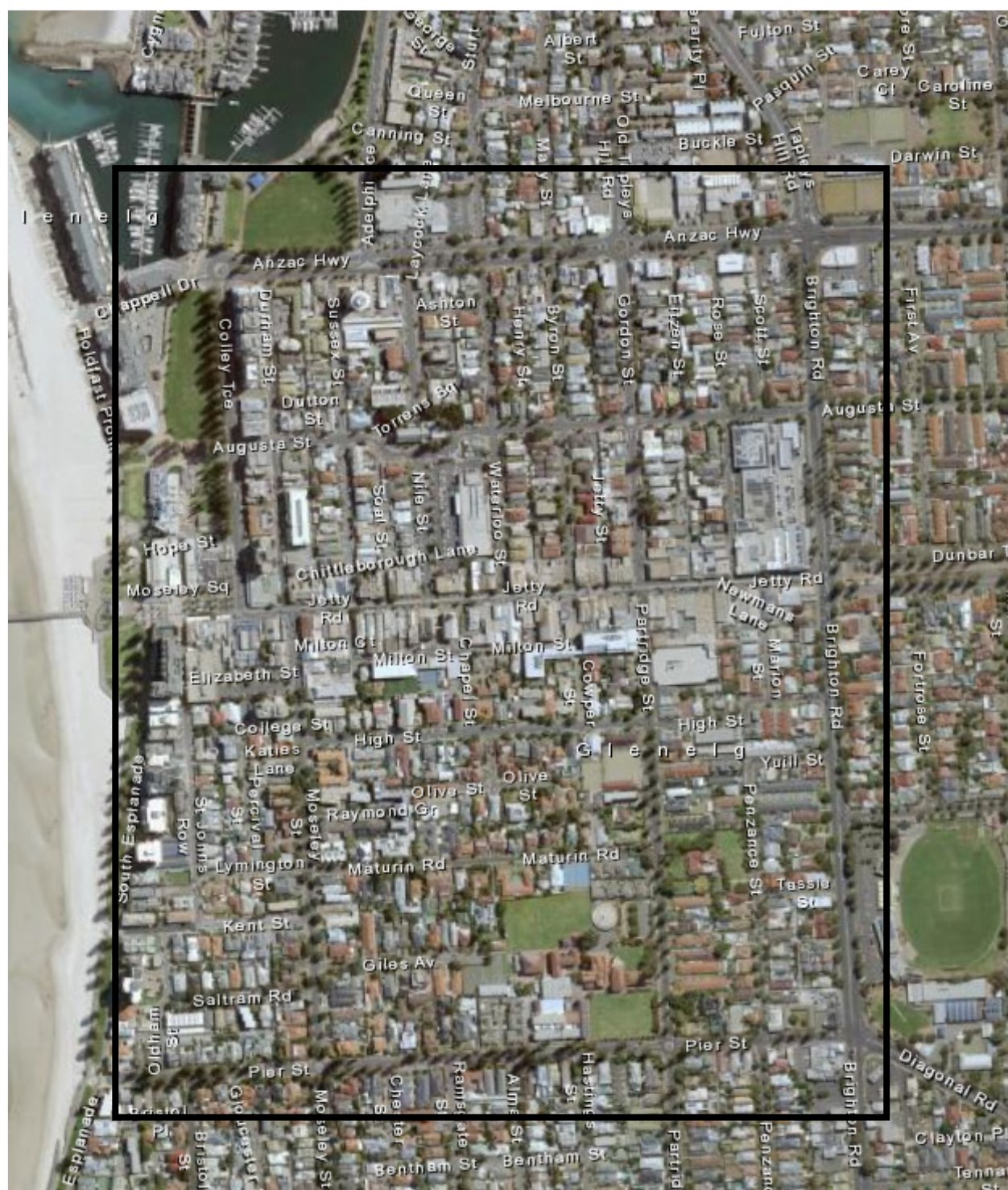


Figure 1.1 – Locality Plan



2 Aimsun Modelling

2.1 AIMSUN

The model package used for this commission was AIMSUN Next V8.4. All option testing should be undertaken using the same version of the software.

To obtain statistically meaningful results the average network performance is taken from multiple simulation runs. Previous experience indicates that five model runs for each of the peak hour models are sufficient to obtain stable results for a network of this size, nature and purpose.

2.2 Base Model Network

The base model network, as shown in Figure 2.1 extends from Anzac Highway in the north, Pier Street in the south, Colley Terrace / Moseley Street to the west and Brighton Road to the east including all approaches to the main intersections.

The model was developed based on Google / Metromap aerial imagery and using the posted speed limits throughout the study area.

Following review and acceptance of the base model network, vehicle demand matrices were then developed for the sub-area model from the available traffic data. These were created for the peak hour only of the Thursday PM and Sunday PM peaks.

2.3 Scenario Demand

Base year (2019) demands were generated by Tonkin using available traffic count information (DIT and Council) together with an Origin Destination survey undertaken for Council. This survey was undertaken by Austraffic and essentially reviewed traffic patterns along Brighton Road without consideration of movement through the study area.

These were developed by Tonkin in the form of vehicle demand matrices for both PM model periods in 15-minute intervals. These matrices were developed separately for Cars and for Heavy Vehicles (Truck and Semi-trailer).

The scope of the study, and modelling, was primarily focussed on 2019 demand. As such, all options have been tested for 2019.

2.4 Model Periods

The AIMSUN model was developed based on a review of traffic data for these peak hour model periods.

- Thursday PM – 16:45 to 17:45
- Sunday PM – 11:45 to 12:45

Model durations of greater than one hour ensure the shoulders to the peaks of the background traffic and development traffic are adequately modelled. This allows the model to adequately accommodate peak hour spreading which could result with future growth within the study area.

On this basis the model has been developed for the following traffic periods:

- Thursday PM – 15:00 to 18:30
- Sunday AM/PM – 11:00 to 13:30.

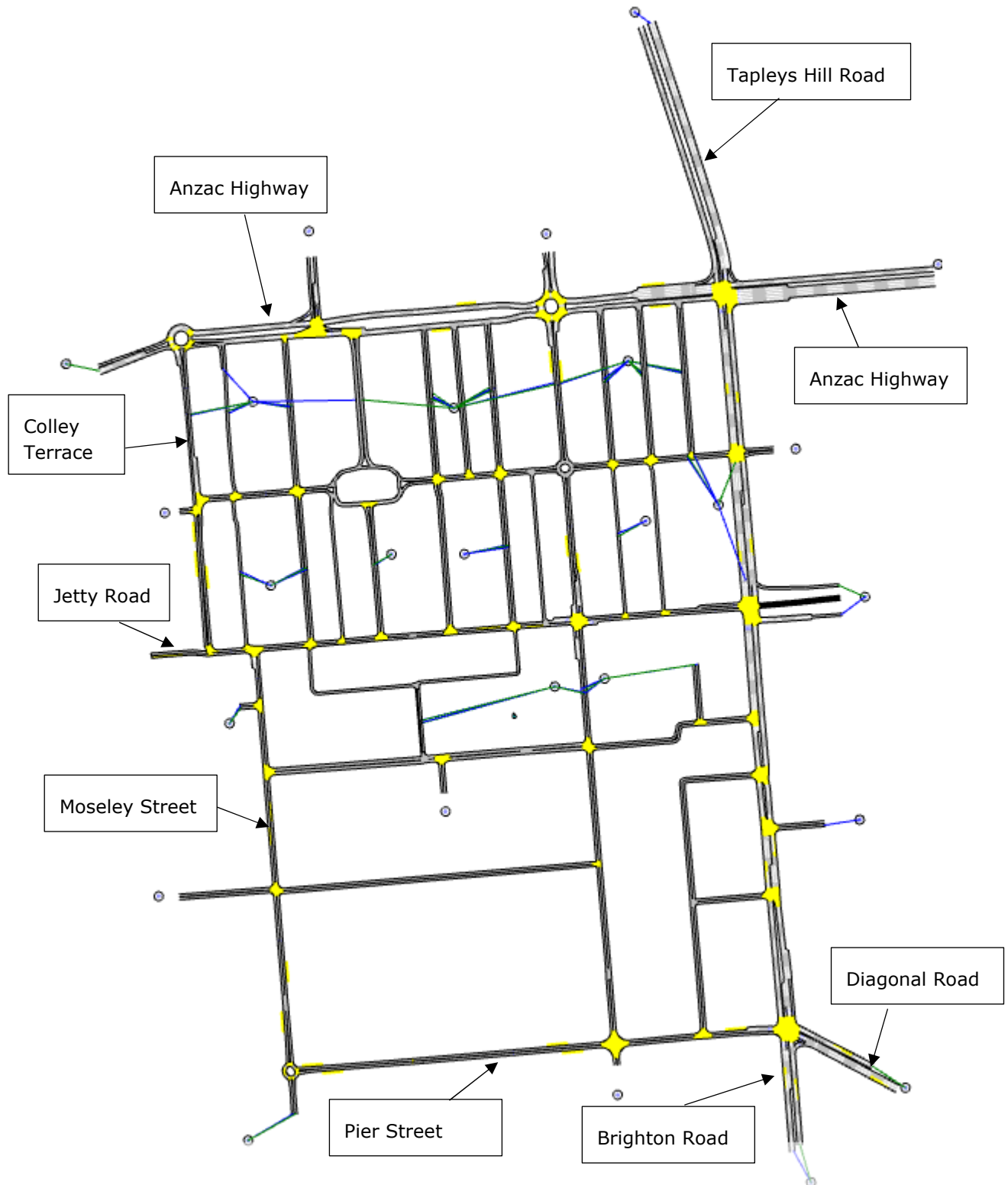


Figure 2.1 – Model layout



3 Traffic Data Collection

3.1 Survey Data

Manual turn count data was provided by DIT for the key signalised intersections within the study area in 2018. Council also provided a range of daily traffic count data (typically tube counts) that provided a daily and maximum peak volume that it had collected over a wide timeframe on the local road network. It included weekend and weekday traffic at different times throughout the year. This data was used to build the trip table and assist in the limited calibration of the model. This data was supplemented by obtaining SCATS data for the intersection.

In total, four intersections were surveyed as part of the 2014 & 2017 turn counts, recording turn counts by vehicle type in fifteen minute intervals. Intersections counted are listed below and presented in Figure 3.1 with purple rectangles. The Anzac Highway / Adelphi Terrace junction (purple triangle) volumes were calculated using SCATS data.

- Anzac Highway / Brighton Road / Tapleys Hill Road (TS125), 17th March 2017
- Brighton Road / Jetty Road (TS312), 6th June 2019
- Brighton Road / Diagonal Road (TS104), 21st September 2017
- Partridge Street / Jetty Road / Gordon Street (TS312), 29th October 2014



Figure 3.1 – Location of Traffic counts



Traffic data along Jetty Road at the junctions with Colley Terrace and Moseley Street from the Infraplan Study Report was also reviewed (light purple).

There is limited origin destination information for traffic movements in the study area. Council provided some data for movements that primarily occurred along the Tapleys Hill Road / Brighton Road corridor. However, this information was limited in use as;

- it did not coincide with the peak travel times modelled by AIMSUN and,
- it did not include a specific location within the Glenelg CBD area that could be identified for traffic to use. Locations were identified that could be assumed that travel would be through the study area (Gordon / Partridge or Colley / Moseley for trips long distance trips).

3.2 Traffic Signal Data

3.2.1 SCATS VS Information

To supplement the turn counts collected, SCATS VS data from signalised intersections within the study area and environs for the period 7th to 20th January 2019 was analysed. This was also supplemented by counts at TS125 (21st March 2019) and TS312 (28th March 2019)

The intersections where this data has been extracted are listed below.

- Anzac Highway / Brighton Road / Tapleys Hill Road (TS125),
- Brighton Road / Jetty Road (TS312),
- Brighton Road / Diagonal Road (TS104),
- Adelphi Terrace / Anzac Highway (TS375),
- Partridge Street / Jetty Road / Gordon Street (TS312).

3.2.2 SCATS Signal Information

DIT supplied operational summaries for each of the signalised intersections with details of phasing, turning movements, phase splits, intergreens, cycle length etc. Indicative timings have been used.

The signalised intersections and crossings are listed below.

- Anzac Highway / Brighton Road / Tapleys Hill Road (TS125)
- Brighton Road / Jetty Road (TS312)
- Brighton Road / Diagonal Road (TS104)
- Adelphi Terrace / Anzac Highway (TS375)
- Partridge Street / Jetty Road / Gordon Street (TS312)

All the above intersections were modelled in actuated mode for the model.

Adjustment of max out times was required at the actuated signalised intersections to obtain enough throughput for some particular phases.

3.3 Public Transport Data

Currently there exists a number of bus routes within the sub-area model, particularly along Jetty Road / Partridge Street and Colley Terrace. These buses were believed to create a significant impact to the modelling area and as such all calibration was undertaken using the 2019 Public Transport Plan. It is



noted that buses were included as heavy vehicles within the turn counts, but not within the demand matrices and as such validation of heavy vehicles within Aimsun would be incorrect.

3.4 Tram Data

The study area includes the Glenelg to RAH tram. The tram route is included as a line and it shares with the Jetty Road traffic. Tram schedules were obtained from the DIT website and incorporated into the model.

4 Model Form

4.1 Zone Structure

There is a degree of interdependence between the definitions of the study area/ zoning system and the network, such that one should not define one without reference to the other. Specific zones relate to car parks or key destinations within the Study area.

In total 26 zones have been applied to the model. The zone layout is shown in the figure below with zone centroids listed below.



Figure 4.1 – Existing Road Model layout



Internal Zone Centroids	Key External Zones	Other External Zones
Bayside Village Car Park	Adelphi Terrace	Holdfast Shores Carpark
Coles Carpark	Old Tapleys Hills Road	Maxwell Terrace
Beach house Carpark	Tapleys Hills Road	Moseley Street
Elizabeth Street Carpark	Anzac Highway	Rugless Terrace
GU Filmhouse Carpark	Brighton Road South	Partridge Street
Partridge Street Carpark	Diagonal Road	Augusta Street
LOCAL ZONE A		
LOCAL ZONE B		
LOCAL ZONE C		
LOCAL ZONE D		
LOCAL ZONE E		
LOCAL ZONE F		
LOCAL ZONE G		
LOCAL ZONE H		

4.2 Demand Matrix Development

In total, two vehicle demand matrices have been assigned to the network, each of which is assigned to a specific vehicle type:

- Cars
- Truck and Semis (Rigid Trucks and Semi-Trailers)

The vehicle demand matrices were generated from the traffic counts and were then reviewed against available turn count data and the Infraplan Study report.

As there is limited semi-trailer vehicles present in the turn count data, any counts of these were applied to the Truck matrix. As discussed above, buses were excluded as part of the Truck and Semi-trailer demand data.

The methodology for the creation of the demand matrices is detailed below.

- A one-hour matrix was generated from the traffic count data using real data sets for the modelled peak hours.
- The model was run with the one-hour trip matrix. The model was checked to ensure lane utilisation and in general, each of the models performed as was observed.



- The assigned matrix was then compared to the survey targets for the same peak hour period to check on suitability
- Checks were made of movement patterns and the trip tables to ensure logical movement was undertaken throughout the network.

For the development of the Sunday vehicle demand matrix, the base Thursday model was used and then a demand profile modified to suit available traffic count data for the key intersections and along Jetty Road. It should be noted that for the Sunday peak hour the overall traffic is less but also the distribution changes. In particular, there is less traffic travelling southbound on Brighton Road with slighter higher northbound traffic. In addition, there are greater demands on Moseley Street and Adelphi Terrace.

4.3 Traffic Demand Profiles

AIMSUM allows for traffic to enter the road network from various zones (referred to as centroids). Traffic is not uniformly distributed over the hour but there is a peak within the hour that can have a significant impact on traffic operation. This can be taken into consideration with AIMSUM as it allows traffic to build up to the peak flow and also dissipate in a considered manner.

Demand release profiles have been applied to dispense traffic demands in defined time intervals over the model periods to model this distribution. These profiles were developed based on the survey data and SCATS VS data which were collated in 15 minute intervals.

The demand release profiles were separated into private vehicles and commercial vehicles.

Table 4.1 – Thursday PM Peak Hour Demand Profile

Time Period Starting	Car Profile	Commercial profile
3.00	15	25
3.15	15	25
3.30	15	25
3.45	18	25
4.00	20	25
4.15	22	25
4.30	22	25
4.45	25	25
5.00	25	25
5.15	28	25
5.30	25	25
5.45	22	25
6.00	20	25
6.15	18	25



Table 4.2 – Sunday Peak Hour Demand Profile

Time Period Starting	Car Profile	Commercial profile
11.00	15	12.5
11.15	20	12.5
11.30	20	12.5
11.45	25	12.5
12.00	25	25
12.15	27	25
12.30	25	25
12.45	23	25
1.00	20	25
1.15	18	25

4.3.1 Vehicle Characteristics

Standard DIT Vehicle Parameters have been adopted to form vehicle types and kinematics.



5 Summary of Base Model Performance

DIT modelling requirements require a certain level of model performance to ensure that it is replicating as best as possible existing conditions. This section provides a summary of the key outcomes of the reporting.

5.1 Initial Modelling / Performance

For both modelling periods, the base matrix developed was run to identify key issues with the model. This review indicated that there was significant congestion along Jetty Road together with significant queues and reduced traffic on Colley Terrace and Anzac Highway west of Old Tapleys Hill Road.

In reviewing the model operation, the following details were identified with the model and changed to reflect actual conditions:

- Use of the posted speed limit did not take into consideration the impact of parking manoeuvres along the key roads within the Glenelg CBD area. Consequently, the travel speed was typically reduced by 10km/hr to allow for the impact of the parking. This was primarily undertaken on Jetty Road and the road sections either side of Jetty Road.
- Some turn movements at the signalised intersections were low and resulted in significant queues that blocked through traffic. A typical example of this is the right turn from Brighton Road into Anzac Highway. The key reason was the intersection phase times were insufficient to cater for the expected demands. The relevant phases were then modified to provide more time for the turns. This was also balanced against ensuring congestion levels were not altered too far along the main road.
- Traffic entering the model was directed toward particular roads within the Glenelg CBD area that caused significant queues that did not occur in practice. This was caused by each of the centroid connector providing the same percentage of demand into the model. The centroid distribution was modified to better reflect actual distribution within the study area.

5.2 Model Stability

The following replication seeds have been used in the modelling of each scenario, as per DIT standard;

- 6422;
- 12841;
- 17906;
- 18370;
- 22744.

The model replications are considered to be stable, with standard deviations of key parameters typically less than 10%.

Where standard deviations were larger, this was attributed to the relatively small scale of the model and the greater effect that seed variations could have on the results during the modelling period. All models were inspected to run successfully and deemed to be stable.

5.3 Overall Network Performance

A comparison of model wide delay times, mean queues, total distance travelled and total travel time over the peak hour has been provided below. These will be used to compare the existing operation with the proposed options.



Table 5.1 – Comparison of Average Statistics for Thursday and Sunday models.

Statistic	Period	Average	Minimum	Maximum
Delay Times (sec/km)	Thursday	96.8	89.2	104.9
	Sunday	76.0	73.5	78.8
Mean Queues (veh)	Thursday	164	150	178
	Sunday	132	124	139
Total Distance Travelled (km)	Thursday	27825	27763	27907
	Sunday	20431	20105	20828
Total Travel Time (hours)	Thursday	1272	1222	1322
	Sunday	834	781.7	862.7
Max Virtual Queue (veh)	Thursday	27	15	37
	Sunday	22	18	26
Input Flow	Thursday	24139	24092	24156
	Sunday	17501	17481	17525

A key point to note that the results vary depending on the modelled day. In particular, the Thursday has higher delays, queues and distance travelled due to the higher traffic volumes occurring through this modelled period. Furthermore, the variation in results is less for the Sunday compared to the Thursday. Both of these are expected as the volume of traffic is less and has a different distribution.

5.4 Thursday Model Operation

Thursday PM peak operation was review against descriptions provided in the Infraplan report, the existing traffic data and our knowledge of the area.

The key areas assessed in reviewing the model included the key signalised intersections as well as the Anzac Highway / Old Tapleys Hill Roundabout and the Colley Terrace/ Jetty Road / Moseley Street intersection. Typically, the operation is consistent with the demands and observed operation.

Traffic volumes along the major collector and arterial roads is within 5 to 10 percent of the recorded volumes.

It was noted that there are short periods of time in each of the replications where there are specific areas of congestion, but these typically dissipate prior to the end of the modelling period. The main locations were identified as being along Brighton Road (primarily due to the right turn into Anzac Highway) and Jetty Road between Partridge Street and Brighton Road. For the latter it is likely that some the congestion is due to the way AIMSUN models the tram / Maxwell Street approach that reduces available green time for Jetty Road.

The following figures provide an indication of the level of congestion within the model. These figures are snapshots of the congestion at particular locations and are considered representative.

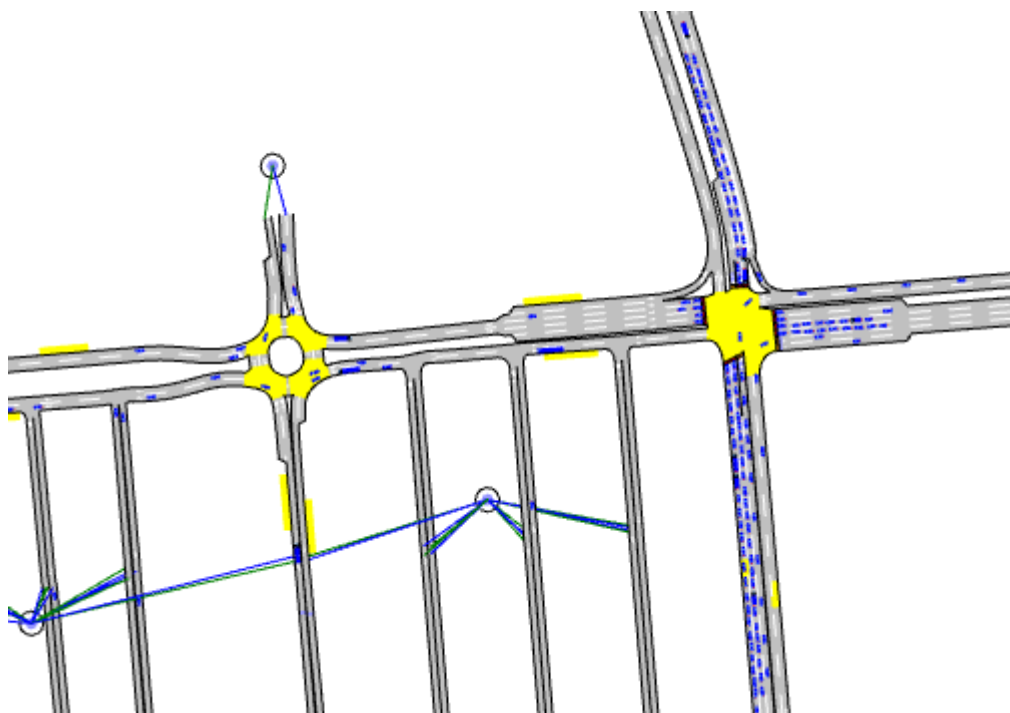


Figure 5.1 – Anzac Highway with Tapleys Hill and Old Tapleys intersection – Thursday PM

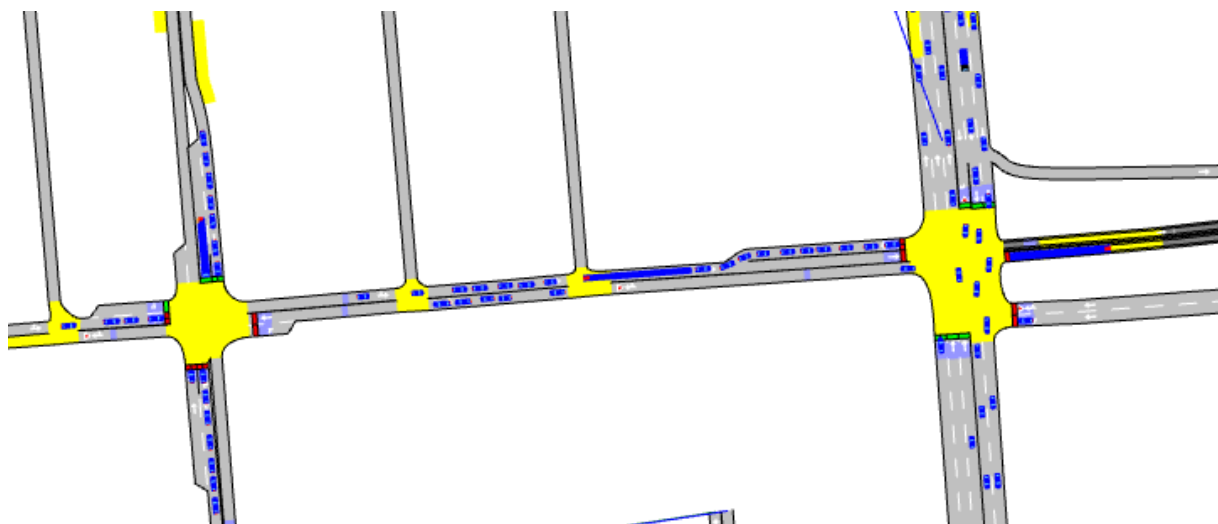


Figure 5.2 – Jetty Road / Brighton Road intersection – Thursday PM

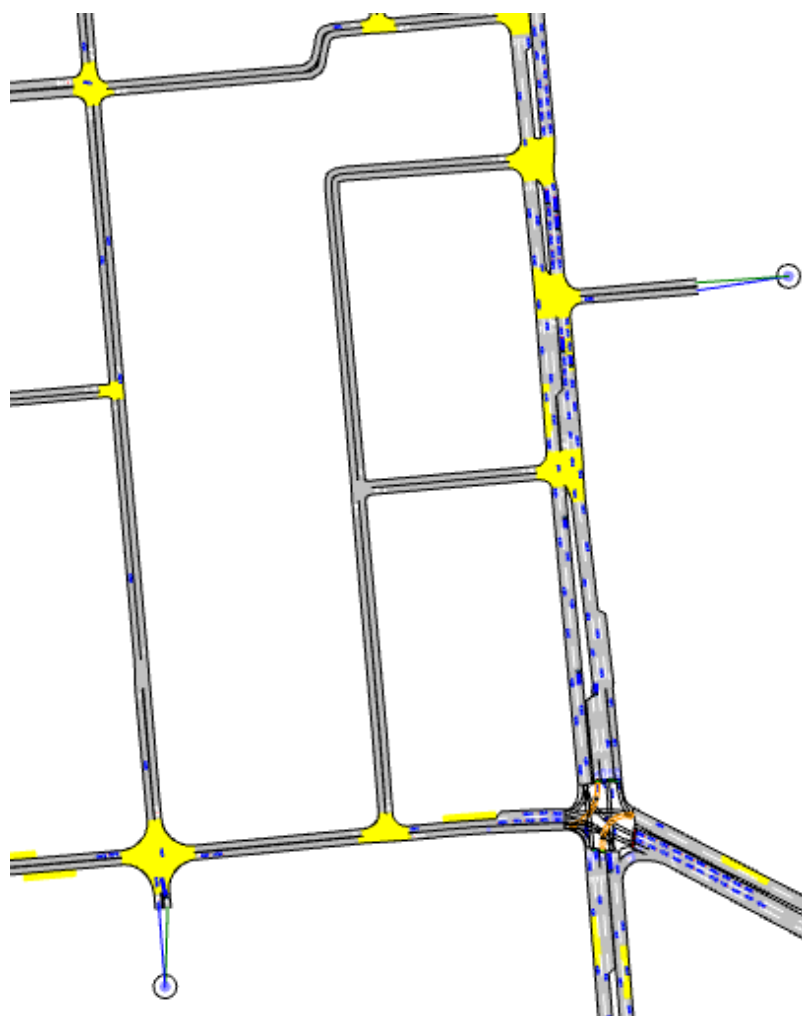


Figure 5.3 – Diagonal Road / Brighton Road intersection – Thursday PM

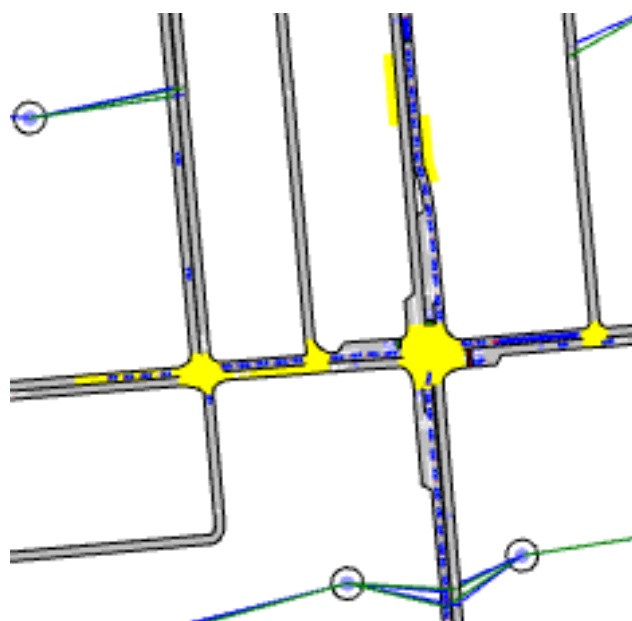


Figure 5.4 – Jetty Road / Partridge Street intersection – Thursday PM

5.5 Sunday Model Operation

Sunday operation was review against descriptions provided in the Infraplan report, the existing traffic data and our knowledge of the area.

The key areas assessed in reviewing the model included the key signalised intersections as well as the Anzac Highway / Old Tapleys Hill Roundabout and the Colley Terrace/ Jetty Road / Moseley Street intersection. Typically, the operation is consistent with the demands and observed operation. There was reduced queues in the vicinity of the Tapleys Hill Road / Brighton Road intersection with some increased delay on the northbound approach of Tapleys Hill Road at the Jetty Road intersection.

Traffic volumes along the major collector and arterial roads is within 10 to 15 percent of the recorded volumes. It should be noted that there is less information on traffic volumes for the Sunday peak and this is reflected in the model with traffic volume on Jetty Road varying greater than for the Thursday PM peak.

It was noted that there are short periods of time in each of the replications where there are specific areas of congestion, but dissipate prior to the end of the modelling period. These primarily occur along Jetty Road between Partridge Street and Brighton Road.

The following figures provide an indication of the level of congestion within the model.

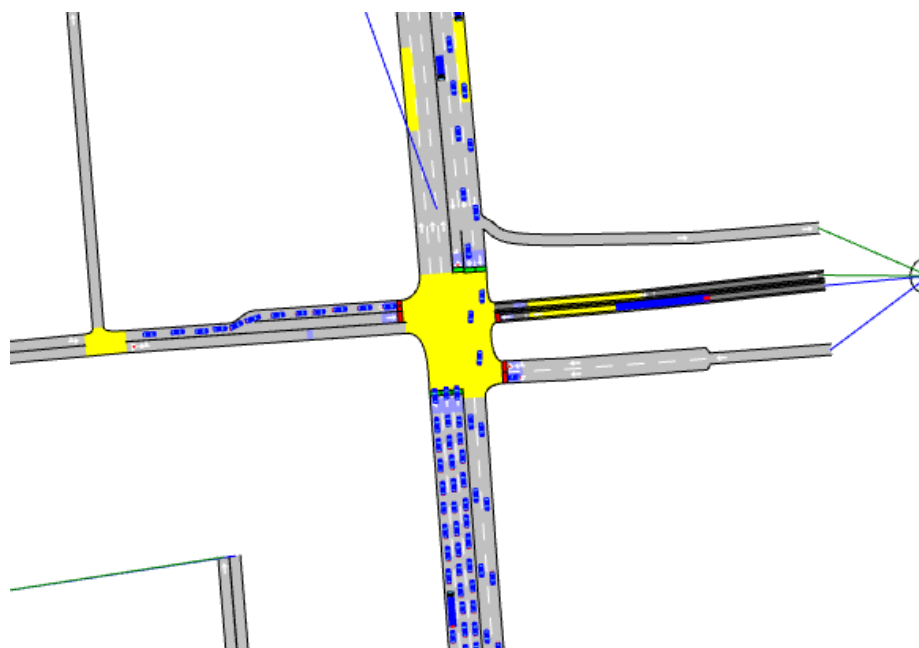


Figure 5.5 – Jetty Road / Brighton Road intersection – Sunday PM

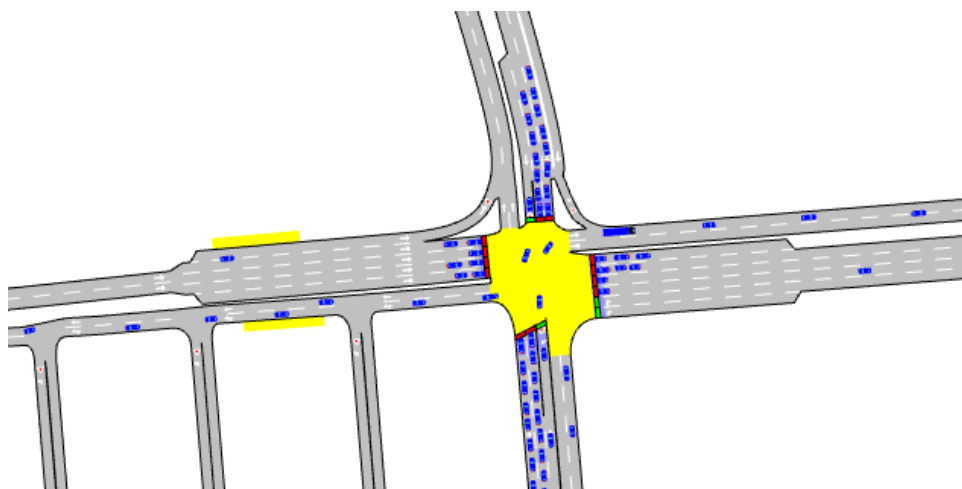


Figure 5.6 – Anzac Highway / Brighton Road – Sunday PM

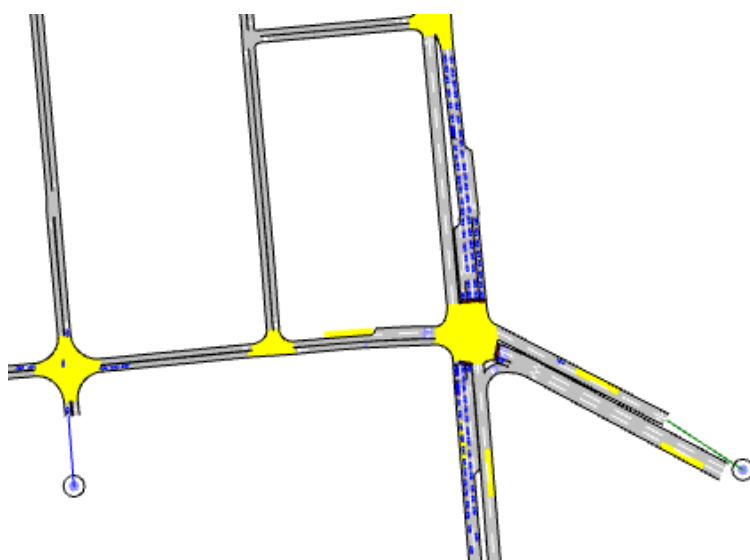


Figure 5.7 – Brighton Road / Diagonal Road – Sunday PM

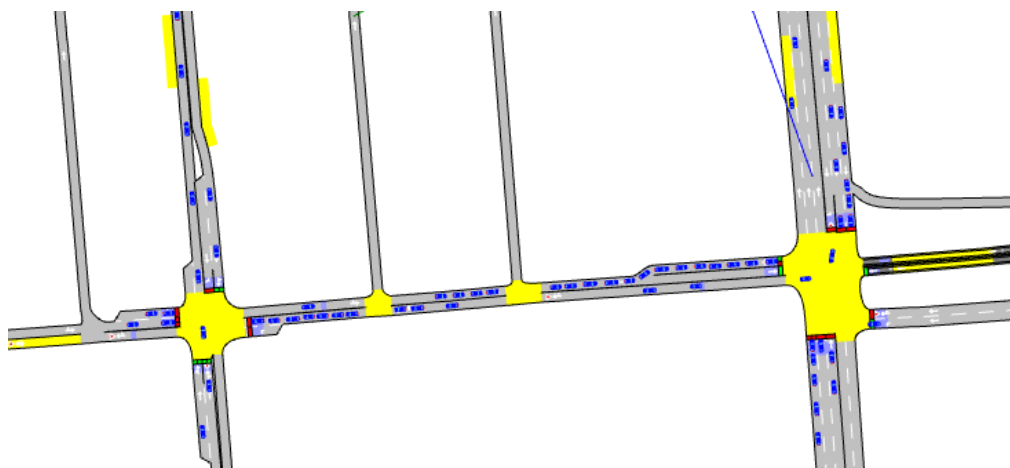


Figure 5.8 – Jetty Road between Partridge Street and Brighton Road – Sunday PM

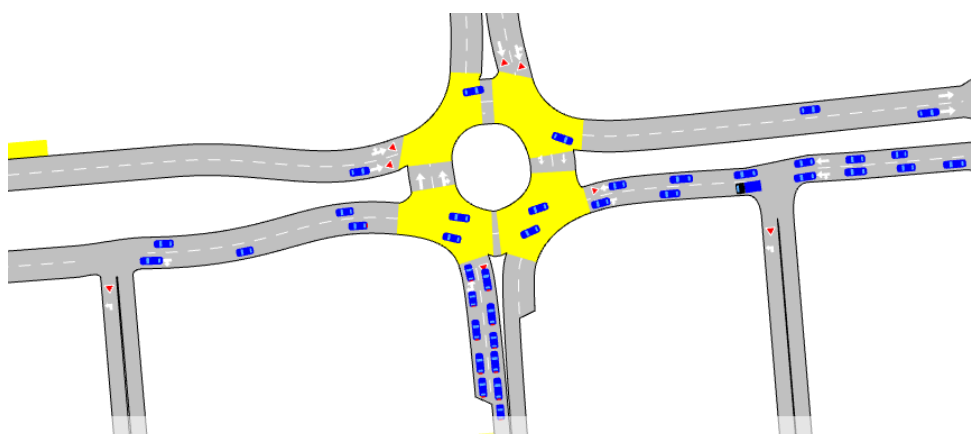


Figure 5.9 – Anzac Highway / Old Tapleys Hill Road – Sunday PM

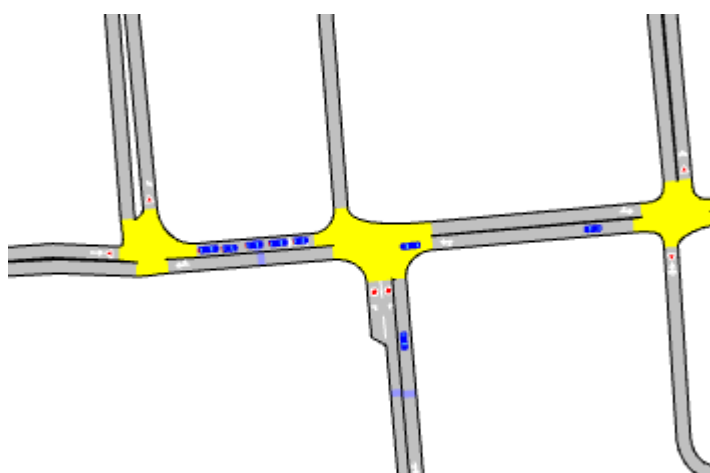


Figure 5.10 – Jetty Road / Colley Terrace / Moseley Street – Sunday PM



5.6 Summary of Existing Model Performance

Reviewing the operation of the AIMSUN models indicates that the model is replicating existing conditions satisfactorily. Modifications were made to the following model inputs to better reflect actual operation, congestion levels and traffic demands:

- Input speeds on key roads (Jetty Road etc) to allow for the impact of parking on capacity / travel speeds.
- Traffic signal phase times were modified to reflect actual traffic counts, however with consideration of impact on actual congestion levels.

Traffic volumes on the arterial roads appear to be within DIT traffic modelling guidelines (within 1 to 5% for key movements). This is expected as there is sufficient traffic volume data available to provide the required comparisons.

As there is no Origin-Destination data available for the CBD area and in particular the western end of Jetty Road, the traffic volumes are expected to vary more. The modelling indicates that traffic volumes are within 10 to 15% of the count information indicated in the Infraplan report.

In reviewing the operation of both the Thursday and Sunday models the level of congestion at key locations is considered satisfactory with queue lengths approaching distances that were observed on-site. It is noted that for the Thursday and Sunday models the queues and congestion from the peak period had dissipated during the following 30 minute period.

The AIMSUN model developed for the Glenelg precinct is considered to satisfactory to provide a basis for the comparison of options for the redevelopment of Jetty Road.



6 Jetty Road Option Assessment

6.1 Introduction

This section details the identification, development and assessment of the options developed for the redevelopment of Jetty Road between Colley Terrace and Moseley Street.

The City of Holdfast Bay has identified three options for the redevelopment of Jetty Road as indicated below:

Option 1 – Shared Zone

This option provides for a shared zone along Jetty Road between Moseley Street and Colley Terrace. In this option access is maintained for all vehicles however the travel speed along Jetty Road is reduced to 10km/hr between Colley Terrace and Moseley Street. There are no changes proposed to existing bus routes.

Option 2 – Modified Colley Terrace

This option retains full access at Colley Terrace for public transport vehicles (buses and trams) but restricts access to private and commercial vehicles to only those travelling west along Jetty Road. Southbound vehicles on Colley Terrace are diverted onto Augusta Street and all northbound private vehicles on Moseley Street are diverted to Jetty Road.

Option 3 – Closure of Jetty Road / Colley Terrace junction

This option provides for the full closure to all vehicles (except trams) of Jetty Road between Colley Terrace and Moseley Street.

Council, at the presentation of the base model, requested that a sub-option be developed and assessed that retained access for buses and trams. This option has been identified as Option 3A for reporting purposes.

6.2 Option development

The following provides details of the changes to the base model required to develop each of the options.

6.2.1 Option 1 – Shared Zone

Essentially there is no physical change to the base network for this option. The changes made relate to the speed of the individual sections as indicated below:

- Jetty Road between Colley Terrace and Moseley Street – speed reduced to 10km/hr (from 30km/hr)
- Colley Terrace immediately to the north of Jetty Road (25m) – speed reduced to 10km/hr (from 30km/hr)
- Moseley Street from Jetty Road to car park zone - speed reduced to 30km/hr (from 40km/hr)

The changes are shown in Figure 6.1.

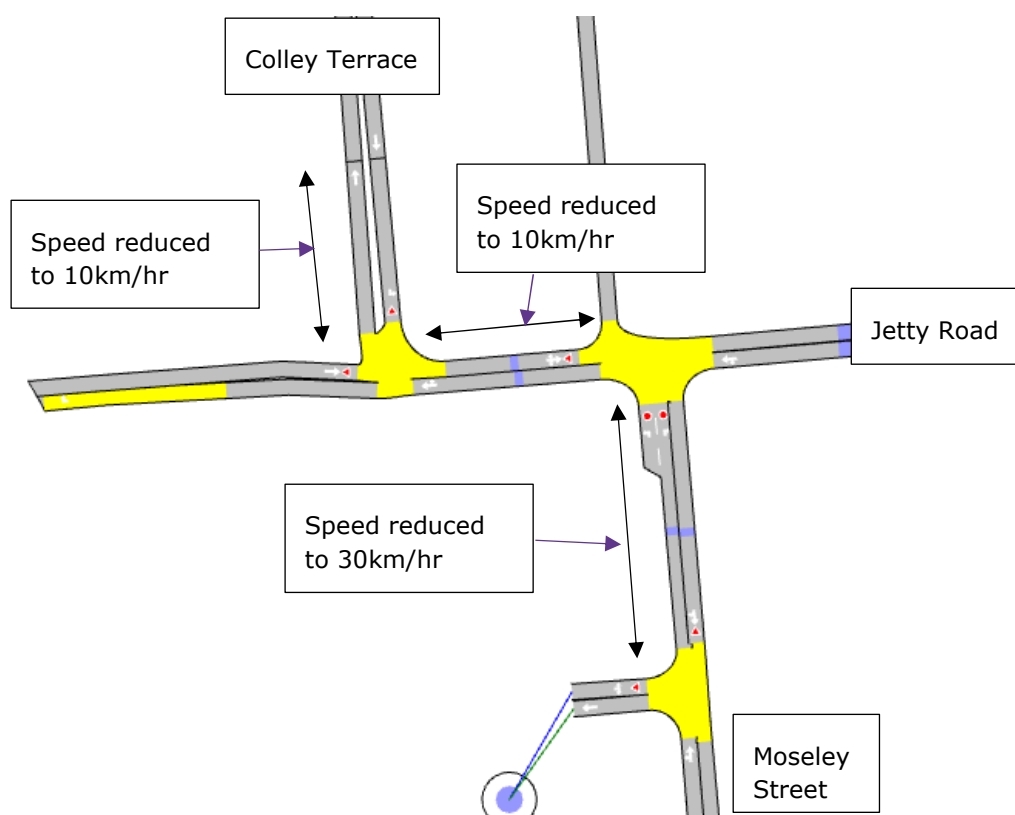


Figure 6.1 – Option 1 – identified changes to Base Model

6.2.2 Option 2 – Modified Colley Terrace

For this option there are a number of physical changes to the base model. The changes made relate to the speed of the individual sections as indicated below:

- At Augusta Street / Colley Terrace junction the layout is changed so that only buses can travel southbound towards Jetty Road with remaining traffic either entering the centroid (car park) or travelling east along Augusta Street.
- The input speed for Colley Terrace between Augusta Street and Jetty Road is reduced to 30km/hr
- Jetty Road between Colley Terrace and Moseley Street – speed reduced to 10km/hr (from 30km/hr)
- Denham Street is closed at its junction with Jetty Road
- Moseley Street approach to Jetty Road is modified so that only buses can turn left into Jetty Road. All remaining traffic turns right into Jetty Road.
- The input speed for Moseley Street from the car park to Jetty Road is reduced to 30km/hr (from 40km/hr).

The changes made to the base model are shown in Figure 6.2.

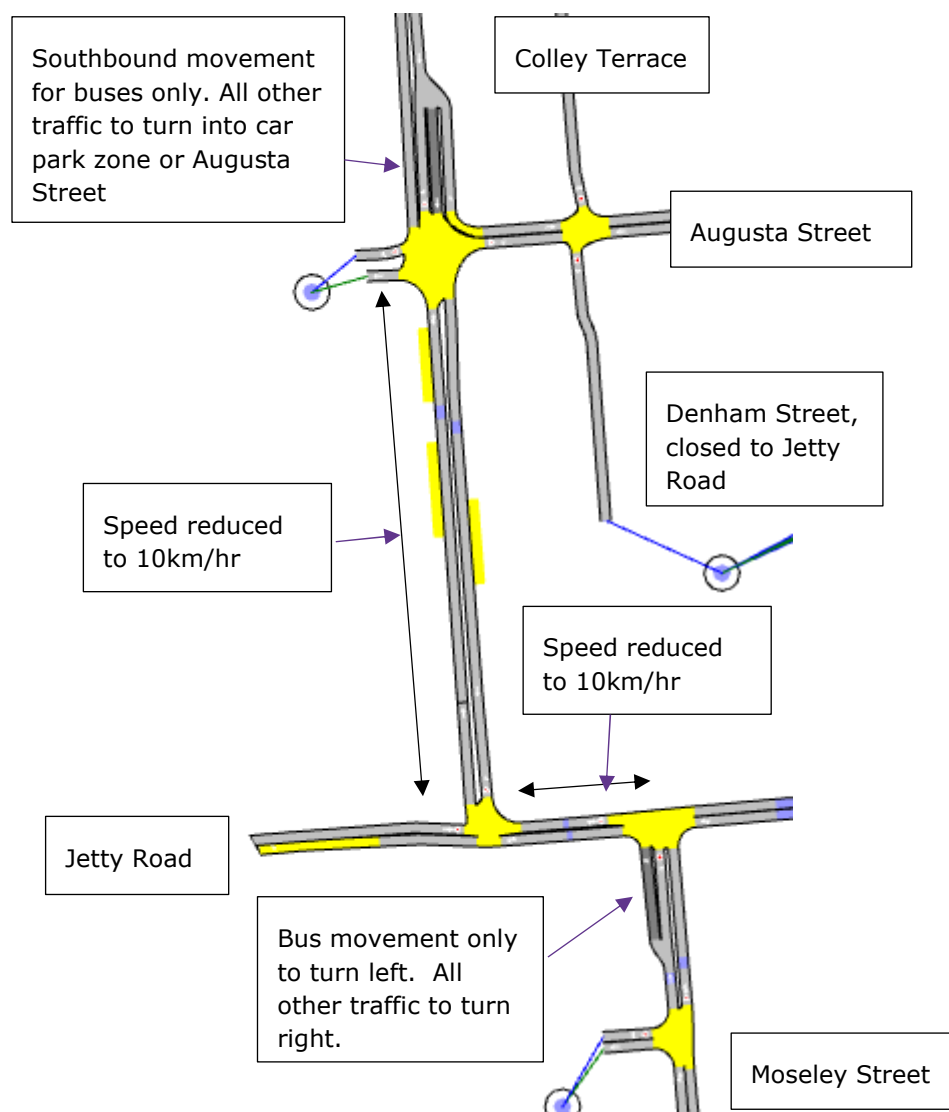


Figure 6.2 – Option 2 – identified changes to Base Model

6.2.3 Option 3 – Full Closure

The full closure of Jetty Road option requires closure to all traffic including buses between Colley Terrace and Moseley Street. The key changes are listed below:

- Jetty Road is closed to all vehicle traffic with only trams allowed. This has been reinforced by the removal of the Colley Terrace link between Jetty Road and Augusta Street.
- The Augusta Street / Colley Terrace junction has been modified to cater for the closure of Colley Terrace.
- Denham Street is closed at its connection with Jetty Road.
- Significant rerouting of the bus network has been undertaken to cater for the closure with the majority of buses to travel from Moseley Street to Gordon Street and then to Anzac Highway.
- A new bus interchange is provided in the Elizabeth Street car park. This provides the terminus and allows for layover time that are used by existing routes.
- Moseley Street approach to Jetty Road is modified so that all traffic turns right into Jetty Road.

The changes made to the base model are shown in Figure 6.3.

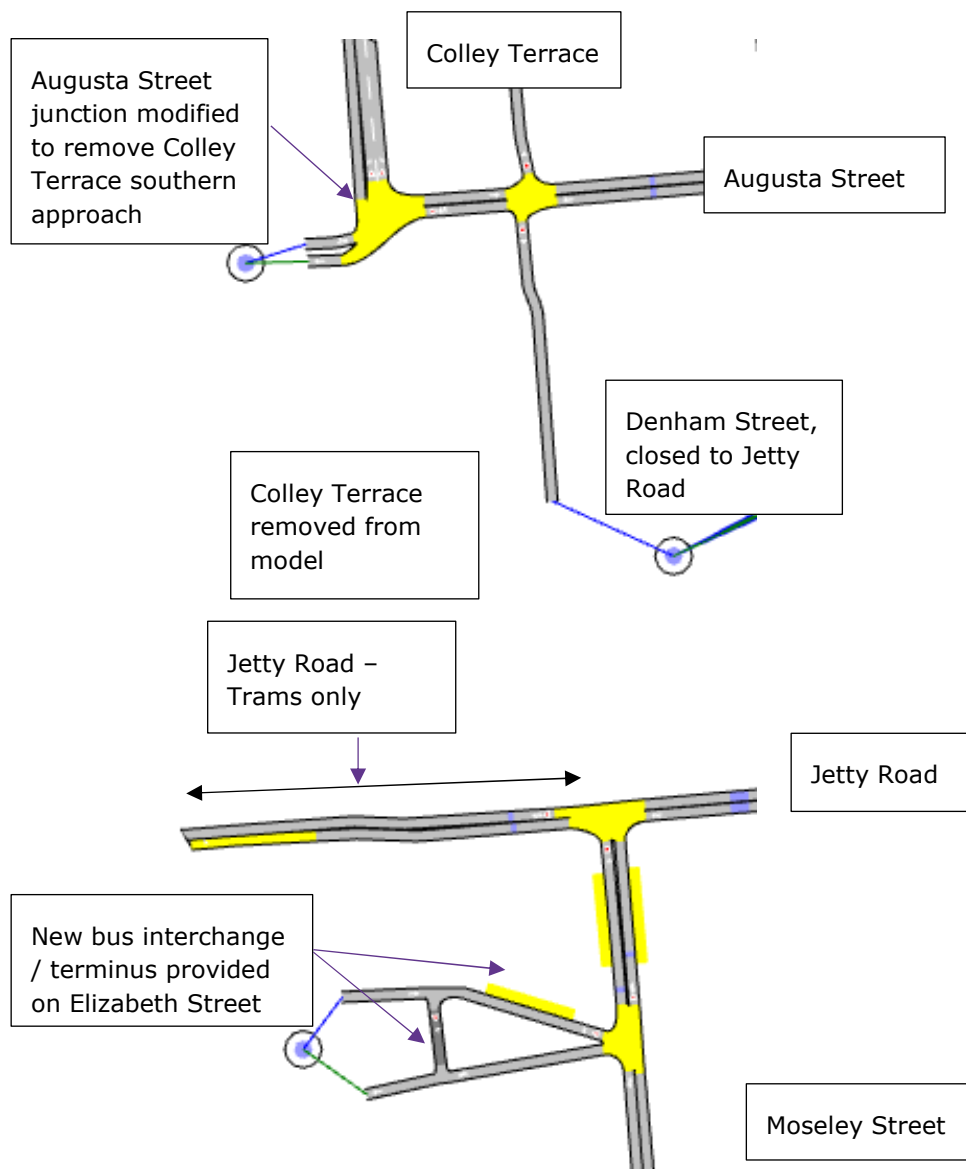


Figure 6.3 – Option 3 – identified changes to Base Model

6.2.4 Option 3A – Partial Closure

This option is removes vehicular traffic except buses from the section of Jetty Road between Colley Terrace and Moseley Street. No changes are proposed to bus routes for this option. The key changes are listed below:

- Jetty Road is closed to all vehicle traffic with only trams and buses allowed. This has been reinforced by modifying the Colley Terrace link between Jetty Road and Augusta Street as a public transport link.
- The Augusta Street / Colley Terrace junction has been modified to cater for the change in access for Colley Terrace.
- Denham Street is closed at its connection with Jetty Road.



- Moseley Street approach to Jetty Road is modified so that only buses can turn left into Jetty Road. All remaining traffic turns right into Jetty Road.
- The input speed for Moseley Street from the car park to Jetty Road is reduced to 30km/hr (from 40km/hr).

The changes made to the base model are shown in Figure 6.4.

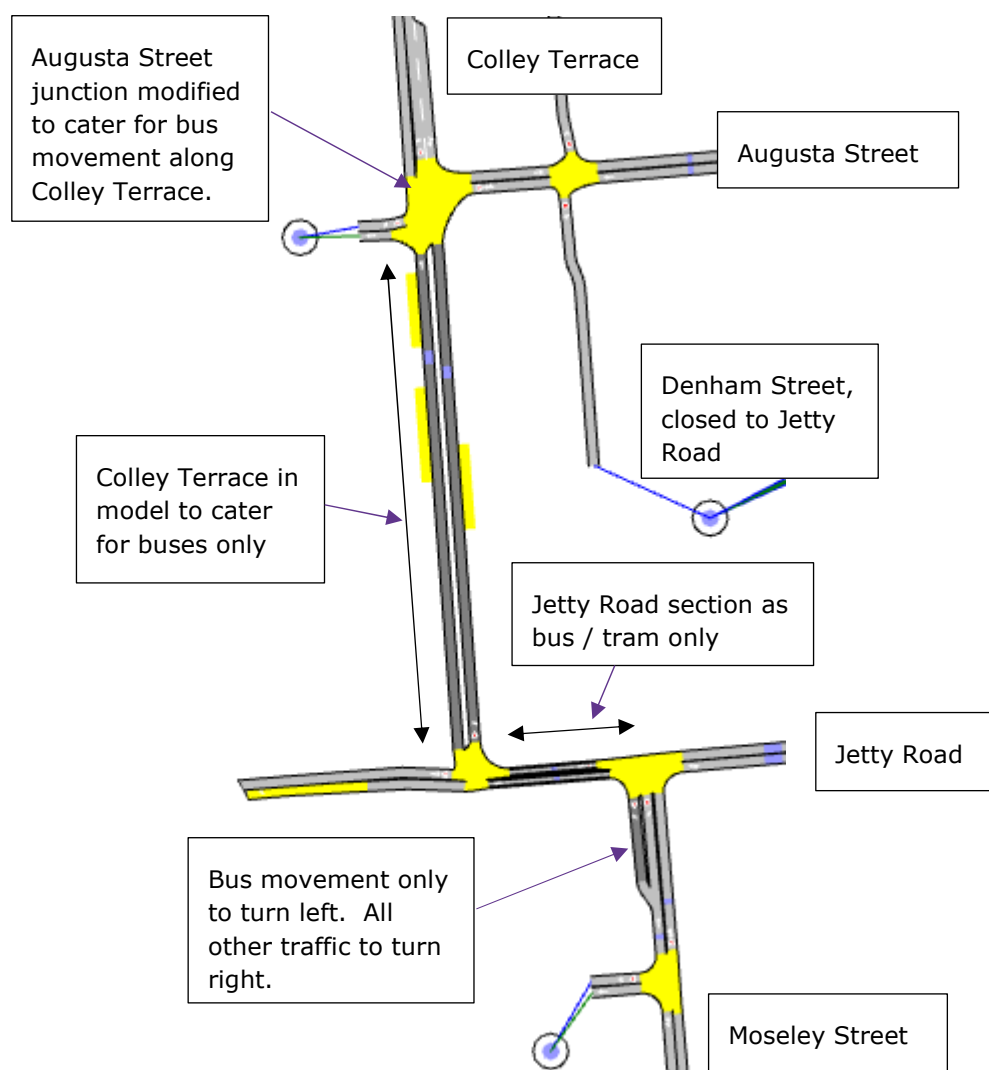


Figure 6.4 – Option 3A – identified changes to Base Model

6.3 Option Assessment

The four option models were run for both peak periods; Thursday PM and Sunday lunch. Observations regarding the impacts of the changes are provided below.

6.3.1 General Comments

Southbound traffic

The modelling of the changes indicated that southbound traffic from Adelphi Terrace or Anzac Highway would primarily be diverted to Sussex Street with increases on Waterloo Street, Byron Street and Gordon Street.

Northbound traffic

The modelling of the changes indicated that northbound traffic from Moseley Street would primarily be diverted to Jetty Road and then along Sussex Street to Augusta Street and then Nile Street with smaller increases on Waterloo Street, Byron Street and Gordon Street.

There were some differences between the Thursday and Sunday periods greater distribution for the Sunday, as the traffic patterns are different with greater north to south movement

6.3.2 Thursday Operation

For all options, the model operation was similar to the Base Case with congestion primarily associated with the arterial road junctions at Anzac Highway / Brighton Road and Brighton Road / Diagonal Road. However the congestion did not extend beyond the Jetty Road / Gordon Street intersection.

For Option 1 within the CBD area the proposed changes divert traffic to Sussex and Nile Streets and this has a minor impact on operation particularly at the Nile Street / Anzac Highway junction as traffic accesses either Adelphi Terrace right turn or the U-turn. This occurred to varying degrees for all the options.

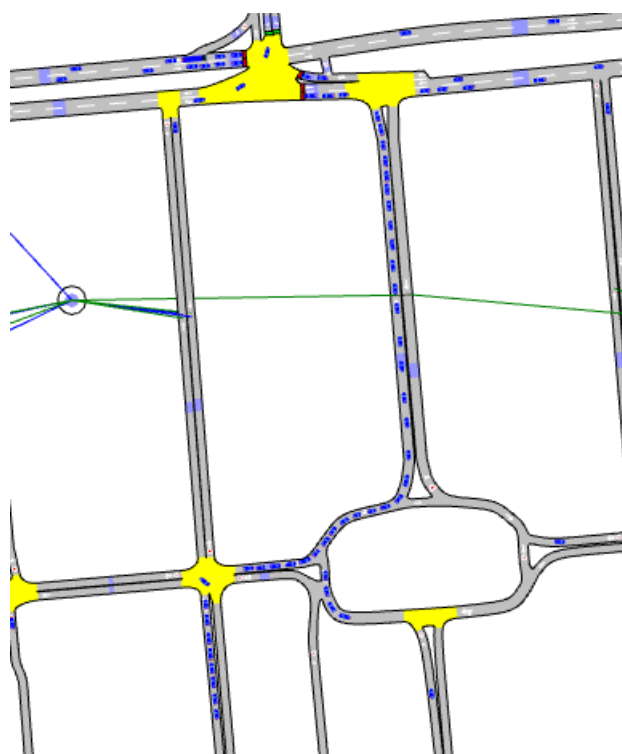


Figure 6.5 – congestion along Nile Street for Option 1 (both periods)



Congestion for Option 2 was also observed for the Nile Street / Anzac Highway junction. Long queues were observed in the vicinity of the Gordon Street / Jetty Road intersection that extended to Byron Street and High Street due to amount of relocated traffic. For this option the queues dissipated relatively quickly.

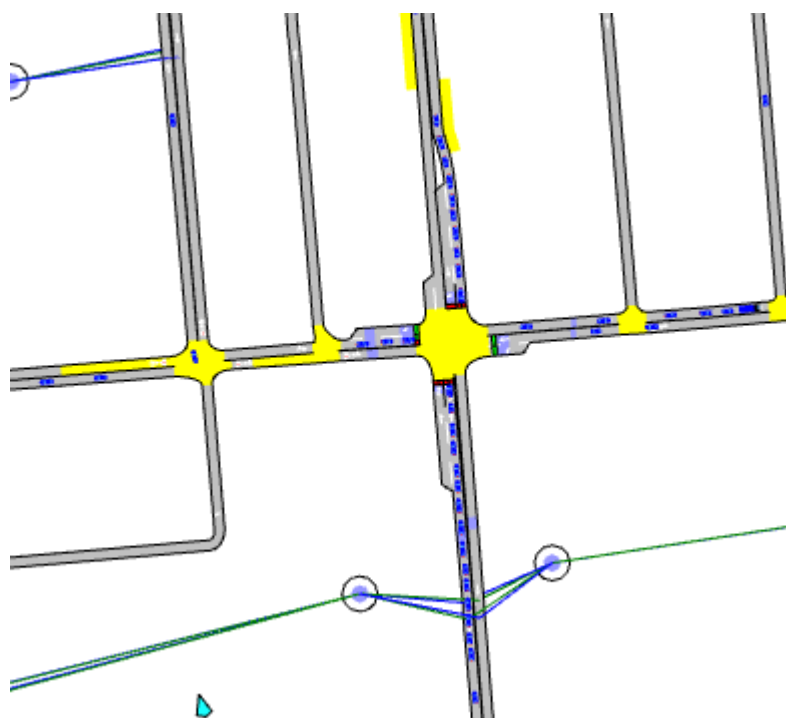


Figure 6.6 –Queues at Jetty / Partridge Street for Option 2 (Thursday)

For Option 3, the diverted traffic on Jetty Road increased congestion significantly with queue back along Jetty Road to Nile Street. These queues extended further than for Option 1 and 2 and took longer to dissipate. This has resulted in some traffic diversion to High Street and Augusta Street as well as the north south connecting streets such as Waterloo and Byron. Occasional queuing was observed along Partridge / Gordon Street either side of Jetty Road that would extend to Augusta Street / High Street but dissipated within 10 minutes. This also occurred for Option 3A but to a lesser extent.

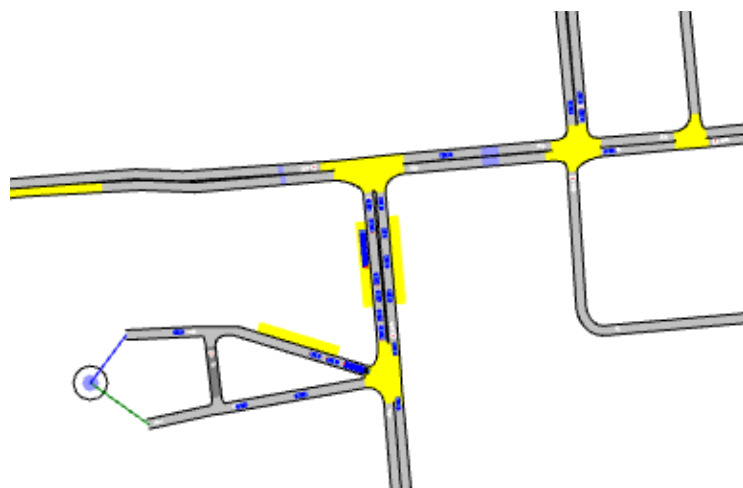


Figure 6.7 –Queues at Jetty / Moseley Street for Option 3 (both periods)

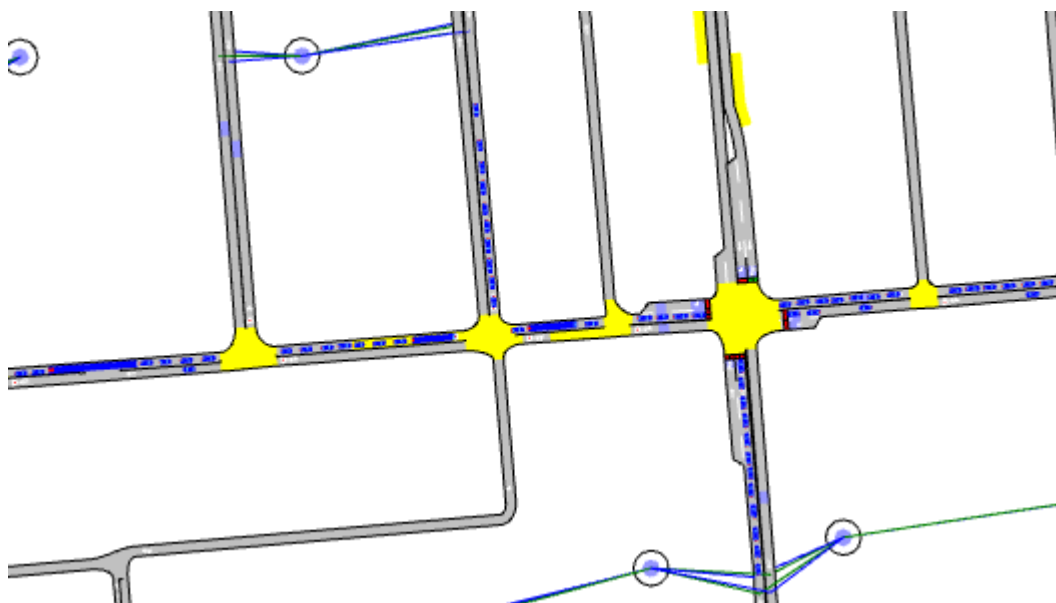


Figure 6.8 –Queues at Jetty / Partridge Street for Option 3 (both periods)

6.3.3 Sunday Operation

Satisfactory operation comparable to the Base Case was observed along the arterial network. Congestion was significantly greater than the Thursday period along the Sussex Street / Augusta Street / Nile Street route with interaction between north and south bound movements particularly to access either Adelphi Terrace right turn or the U-turn. This was evident for all the options.

It was noted that there appeared to be some transfer of traffic from Jetty Road to High Street to access Gordon Street / Partridge Street link for primarily Option 1. This occurred in both modelled periods, but the impact was greater for the Sunday. However, there were no issues with congestion at the junctions.

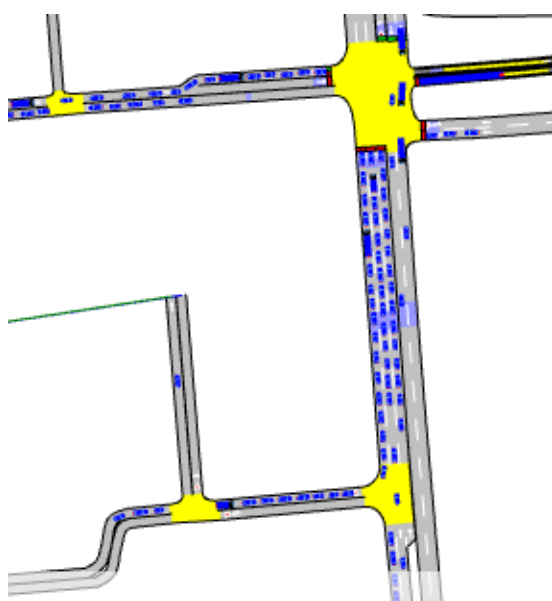


Figure 6.9 –Queues at High Street Option 3A (Sunday)



For Option 2 it was observed that traffic did divert to Brighton Road (Figure 6.9) with some queueing at the junction with High Street, but this dissipated relatively quickly. This also occurred for Option 3A.

For Option 3 increase in traffic on Jetty Road increased congestion significantly with queue back along Jetty Road to Nile Street. However, the queues did take longer to dissipate. This has resulted in some traffic diversion to High Street and Augusta Street as well as the north south connecting streets such as Waterloo Street and Byron Street.

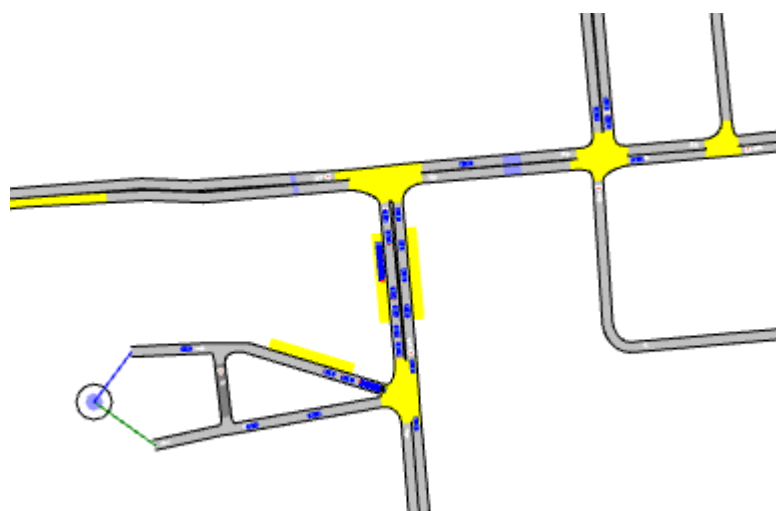


Figure 6.10 –Minor queuing at Jetty / Moseley Street for Option 3 (Sunday)

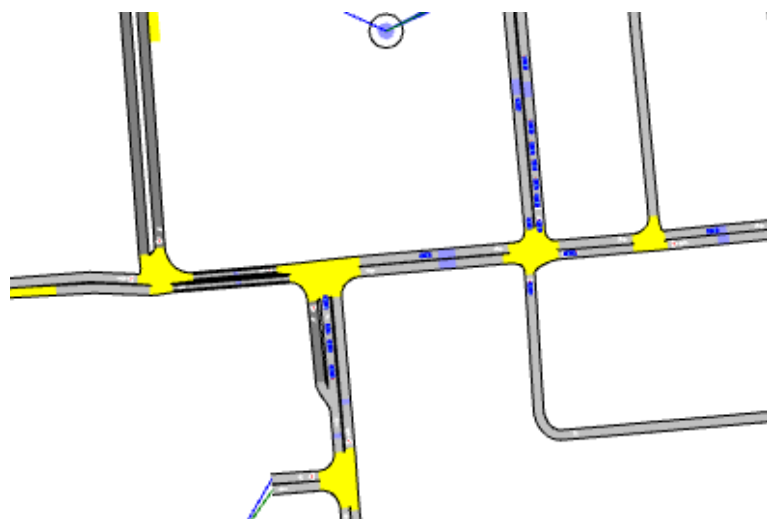


Figure 6.11 – Minor queuing at Sussex Street Option 3A (Sunday)



6.4 Option comparison

A comparison of the options has been undertaken based on general statistics for each of the model and the changes in traffic volumes for key roads within the study area.

6.4.1 Summary Comparison

The general statistics over the modelled period include the following parameters:

- Delay time – Is the average time per vehicle where the vehicle was at stop or not able to travel at the input speed.
- Stopped time – Is the average time per vehicle where the vehicle is stopped either at traffic signals or in a queue within the model network.
- Total travel time – The total time (hours) that vehicles are travelling within the modelled area
- Total distance travelled – This the total distance travelled in the network during the modelled period
- Average Virtual queue – This provides an indication of where vehicles cannot enter (from a centroid) the modelled area due to congestions / queues.
- Mean Queue – Average length of vehicles queued within the model
- Missed turns – This indicates the number of vehicles that take an alternative route within the modelled area due to congestion.
- Speed – Average travel speed of all vehicles in the modelled area

Tables 6.1 and 6.2 provide a comparison of the summary statistics for each modelled period between the four options and the Base Case.

The key points from this comparison are detailed below.

- For the Thursday weekday peak period, the difference between the options and the Base Case in terms of delays, speed, mean queue and distance is less than +/-10%. The mean virtual queue and missed turns vary more indicating that there is an increase in the congestion within the model, particularly for Options 2, 3 and 3A.
- For the Thursday peak the best performing options compared to the Base Case are Options 1 and 2 with the worst Option 3A.
- For the Sunday peak period, the difference between the options and the Base Case varies significantly more than the Thursday peak. For this period, all options provide a reduction in traffic operation compared to the Base Case. In terms of speed, total distance travelled and total travel time the difference is less than -5%. The mean virtual queue and missed turn turns vary more indicating that there is an increase in the congestion within the model, particularly for Options 2, 3 and 3A.
- For the Sunday period, the best performing options compared to the Base Case are Options 2 and 3A with the worst Option 3.
- In terms of impact on public transport, Option 3 has the biggest adverse impact with delay times and stopped time increasing by 40 to 60% over the Base Case. Options 1 and 2 have only a minor impact with increases in delay in the order of 10%. Option 3A sits midway between the two, which is primarily due to the impacts of the relocated traffic affecting the key movements along Jetty Road and Gordon Street.

On this basis, it is considered that the development of the options is not expected to significantly affect the traffic operation of the road network within the study area. It is noted that congestion will occur at times but is likely to dissipate within 10 to 20 minutes.



Table 6.1 – Thursday Period – Summary statistics

Time Series	Base Model			Option 1 - shared space			Option 2 - modified Colley Terrace			Option 3 - Jetty / Colley closed to all traffic			Option 3a - Jetty / Colley closed but open to buses		
	Value	Standard Deviatio	Units	Value	Standard Deviatio	% Difference to base case	Value	Standard Deviatio	% Difference	Value	Standard Deviatio	% Difference to base case	Value	Standard Deviatio	% Difference to base case
Delay Time - All	98.48	7.45	sec/km	96	7.64	3%	102.13	10.93	-4%	100.7	4.05	-2%	97.19	5.32	1%
Mean Queue - All	170.36	18.32	veh	165.93	19.43	3%	178.72	28.15	-5%	191.31	35.52	-12%	185.8	47.38	-9%
Mean Virtual Queue - All	3.33	3.51	veh	2.17	1.65	35%	3.94	3.29	-18%	5.82	6.58	-75%	8.65	14.43	-160%
Missed Turns - All	188	34.95		224.6	34.44	-19%	202.8	36.18	-8%	220.2	44.01	-17%	225.2	47.17	-20%
Speed - All	25.39	0.53	km/h	25.26	0.55	1%	24.9	0.64	2%	25	0.27	2%	25.03	0.43	1%
Stop Time - All	82.28	6.84	sec/km	80.09	6.86	3%	86	10.21	-5%	84.81	3.95	-3%	80.94	4.81	2%
Total Distance Travelled - All	27935.27	99.33	km	27755.24	72.13	1%	27790.11	106.67	1%	27501.61	629.39	2%	27399.19	809.22	2%
Total Travel Time - All	1304.05	67.8	h	1286.73	73.19	1%	1330.94	93.65	-2%	1307.72	45.35	0%	1277.28	49.32	2%

Table 6.2 – Sunday Period – Summary statistics

Time Series	Base Model			Option 1 - shared space			Option 2 - modified Colley Terrace			Option 3 - Jetty / Colley closed to all traffic			Option 3a - Jetty / Colley closed but open to buses		
	Value	Standard Deviatio	Units	Value	Standard Deviatio	% Difference to base case	Value	Standard Deviatio	% Difference to base case	Value	Standard Deviatio	% Difference to base case	Value	Standard Deviatio	% Difference to base case
Delay Time - All	75.99	1.3	sec/km	84.73	2.39	-12%	81.35	1.33	-7%	93.07	10.9	-22%	81.49	0.67	-7%
Mean Queue - All	132.02	4.2	veh	149.48	3.29	-13%	143.06	5.16	-8%	169.43	28.51	-28%	142.76	2.46	-8%
Mean Virtual Queue - All	1.3	0.36	veh	3.33	2.02	-156%	1.95	0.91	-50%	2.6	1.39	-100%	1.72	1.11	-32%
Missed Turns - All	104	13.87		178.2	8.35	-71%	161.8	11.84	-56%	169.2	25.53	-63%	157.2	8.58	-51%
Speed - All	27.24	0.05	km/h	26.38	0.14	3%	26.33	0.22	3%	25.75	0.6	5%	26.35	0.14	3%
Stop Time - All	62.75	1.2	sec/km	71.74	2.48	-14%	68.06	1.27	-8%	79.53	10.62	-27%	68.2	0.73	-9%
Total Distance Travelled - All	20430.77	284.98	km	20550.83	290.03	-1%	20567.21	276.63	-1%	20359.02	282.18	0%	20433.37	271.2	0%
Total Travel Time - All	833.6	16.77	h	889.09	8.28	-7%	873.9	17.88	-5%	935.16	74.37	-12%	868.39	10.87	-4%



6.4.2 Traffic Volume Comparison

The second comparison is based on the changes in traffic volumes on particular links within the study area. This has been undertaken for peak hour of both modelled periods.

Appendix A provides the locations of the comparison of the traffic counts including a map of the locations. Where the difference is shown as a negative value it means there is an increase in traffic over the Base Case for that option.

The major changes in traffic patterns for the peak hour are indicated below for each of the modelled period. The same conclusions occur of the full length of the modelled period. It is noted that there are some road sections that show a reduction in the peak hour but not the modelled period. This is due to the nature of vehicles being queued in the peak hour and being held over to the following period.

Thursday PM

Table 6.3 below indicates for the various options which road sections have significant changes in traffic volume compared to the base case. The road sections in the table have been highlighted where the percentage difference is greater than 12.5% and /or the increase from the base case volume is greater than 50vph. Increases in volume are highlighted in fill with the scale of the increase is indicated by the cell shading; yellow, orange and red.

The reduction in traffic on Colley Terrace is significant for all options (greater than 80%). Approximately 100 to 120 vph and 290 to 335vph are relocated in the north and southbound directions respectively. This is a bit surprising for Option 1 as all movements are still catered for. It is likely due to the way AIMSUN redirects traffic based on travel times and the extra time due to reduced speeds is seen as a significant penalty.

Table 6.3 – Thursday PM Peak Hour volume changes

Option 1	Option 2	Option 3	Option 3A
Anzac Hwy – Colley to Adelphi (E & W)	Anzac Hwy – Colley to Adelphi (E & W)	Anzac Hwy – Colley to Adelphi (E & W)	Anzac Hwy – Colley to Adelphi (W)
Colley Tce – south of Anzac (E & W)	Colley Tce – south of Anzac (E & W)	Colley Tce – south of Anzac (E & W)	Colley Tce – south of Anzac (E & W)
Colley Tce – south of Augusta (E & W)	Colley Tce – south of Augusta (E & W)	Colley Tce – south of Augusta (E & W)	Colley Tce – south of Augusta (E & W)
Moseley St – south of Jetty (N & S)			
Jetty Road – west of Waterloo (W)			
Gordon St – south of Augusta (N)	Gordon St – south of Augusta (N)	Gordon St – south of Augusta (N)	Gordon St – south of Augusta (N)
Waterloo St – north of Jetty (S)			
Nile St – south of Anzac (N)	Nile St – south of Anzac (N)	Nile St – south of Anzac (N)	Nile St – south of Anzac (N)
Augusta St – west of Torrens Sq (E)	Augusta St – west of Torrens Sq (E)	Augusta St – west of Torrens Sq (E)	Augusta St – west of Torrens Sq (E)



Option 1	Option 2	Option 3	Option 3A
Sussex north of Jetty (N & S)	Sussex north of Jetty (N & S)	Sussex north of Jetty (N & S)	Sussex north of Jetty (N & S)
Jetty Road – east of Moseley (E & W)	Jetty Road – east of Moseley (E & W)	Jetty Road – east of Moseley (E & W)	Jetty Road – east of Moseley (E & W)
Partridge – south of Jetty (S)			
High St – East of Moseley (E & W)			
Gordon – south of Augusta (S)			

The majority of northbound traffic (transfer of 80-120vph) for all options turns right onto Jetty Road and then left onto Sussex Street, through to Augusta Street and then onto Nile Street. Traffic then turns right into Adelphi Terrace. For traffic heading further east, there is an increase in traffic along Jetty Road through to Gordon Street.

For southbound traffic the deviation of traffic is primarily to Sussex Street (generally 300vph) from Anzac Highway with minor deviations to Gordon Street / Partridge Street (60 to 120vph). However, for Option 1 there is a transfer of traffic (approximately 160vph) away from Jetty Road to High Street, which is double the base volume on High Street.

For Options 3 and 3A there is a greater diversion of traffic (30 to 50vph) to Jetty Road to the east of Sussex Street than for Options 1 and 2.

Sunday PM

A similar process was undertaken for the Sunday peak period with the outcomes indicated in Table 6.4. In summary the same roads are impacted upon as for the Thursday period. The main difference relates to volumes deviated in the northbound direction due to the different travel patterns that have been assumed between the modelled periods. The only real difference between the two modelled periods is that Option 2 provided a greater reduction along the eastbound direction of Jetty Road to Gordon / Partridge Street

The reduction in traffic on Colley Terrace is significant for all options (greater than 80%). Approximately 320 to 390 vph and 30 to 345vph are relocated in the north and southbound directions respectively.

For the majority of northbound traffic, the transfer patterns are slightly different for Options 1 and 2 compared to Option 3 and 3A. For Options 1 and 2 the transfer to Sussex Street is less at 190 / 250vph compared almost 400 for Options 3 and 3A. The predominant route for all options turns right onto Jetty Road and then left onto Sussex Street, through to Augusta Street and then onto Nile Street. Traffic then turns right into Adelphi Terrace. For traffic heading further east, there is an increase in traffic along Jetty Road through to Gordon Street and along Augusta Street to Brighton Road.

For southbound traffic the deviation of traffic is primarily to Sussex Street (generally 250 to 330vph) from Anzac Highway with minor deviations to Gordon Street / Partridge Street (30 to 60vph). However, for Option 1 there is a transfer of traffic (approximately 160vph) away from Jetty Road to High Street, which is double the base volume on High Street.



Table 6.4 – Sunday Peak Hour volume changes

Option 1	Option 2	Option 3	Option 3A
Anzac Hwy – Colley to Adelphi (E)	Anzac Hwy – Colley to Adelphi (E)	Anzac Hwy – Colley to Adelphi (E & W)	Anzac Hwy – Colley to Adelphi (W)
Colley Tce – south of Anzac (E & W)	Colley Tce – south of Anzac (E & W)	Colley Tce – south of Anzac (E & W)	Colley Tce – south of Anzac (E & W)
Colley Tce – south of Augusta (E & W)	Colley Tce – south of Augusta (E & W)	Colley Tce – south of Augusta (E & W)	Colley Tce – south of Augusta (E & W)
Moseley St – south of Jetty (N & S)			
Jetty Road – west of Waterloo (W)	Jetty Road – west of Waterloo (W)		
Jetty Road – west of Byron (W)	Jetty Road – west of Byron (W)		
Jetty Road – east of Eitzen (W)	Jetty Road – east of Eitzen (W)		
Waterloo St – north of Jetty (S)			
Nile St – south of Anzac (N)	Nile St – south of Anzac (N)	Nile St – south of Anzac (N)	Nile St – south of Anzac (N)
Augusta St – west of Torrens Sq (E)	Augusta St – west of Torrens Sq (E)	Augusta St – west of Torrens Sq (E)	Augusta St – west of Torrens Sq (E)
Sussex north of Jetty (N & S)	Sussex north of Jetty (N & S)	Sussex north of Jetty (N & S)	Sussex north of Jetty (N & S)
Jetty Road – east of Moseley (E & W)	Jetty Road – east of Moseley (E & W)	Jetty Road – east of Moseley (E & W)	Jetty Road – east of Moseley (E & W)
Partridge – south of Jetty (S)			
Gordon – north of Augusta (S)			
Gordon – south of Augusta (S)			
Anzac Hwy - Adelphi to Old Tapleys (W)	Anzac Hwy - Adelphi to Old Tapleys (W)		
		Jetty Road – east of Byron (E)	



6.5 Summary and Conclusion

6.5.1 Modelling Summary

The traffic modelling has indicated that there are minor changes in overall traffic performance in the study area. There was little difference in operation between the options for the Thursday modelled period (3.00 to 6.30PM). Modelling indicated for the Thursday peak the best performing options compared to the Base Case are Options 1 and 2 with the worst Option 3A

For the Sunday peak period (11.00 to 1:30), the difference between the options and the Base Case varies significantly more than the Thursday peak. For this period, all options provide a reduction in traffic operation compared to the Base Case. The best performing options compared to the Base Case are Options 2 and 3A with the worst Option 3.

In terms of impact on public transport, Option 3 has the biggest adverse impact with delays stops increasing by 40 to 60% over the Base Case. Options 1 and 2 have only a minor impact with increases in delay in the order of 10%. Option 3A sits midway between the two, which is primarily due to the impacts of the relocated traffic affecting the key movements along Jetty Road and Gordon Street.

Review of the models indicates that for all options, congestion increased along Sussex Street / Nile Street experiencing the most significant increase in traffic. For Options 3 and 3A additional congestion was observed along Jetty Road as the changes in traffic patterns resulted in more turn movements being undertaken to access Jetty Road from Gordon Street, Nile Street and Waterloo Street. In both these locations the queues dissipated after the peak period by the end of the overall model period (i.e. within 30 minutes).

The traffic modelling for all options indicates there is a significant transfer of north / southbound traffic from Colley Terrace to Sussex Street that occurred for both modelled periods. It is noted that the transfer of traffic is slightly different between the modelled periods as there is more of a balance between north and southbound flows for the Sunday compared to the Thursday.

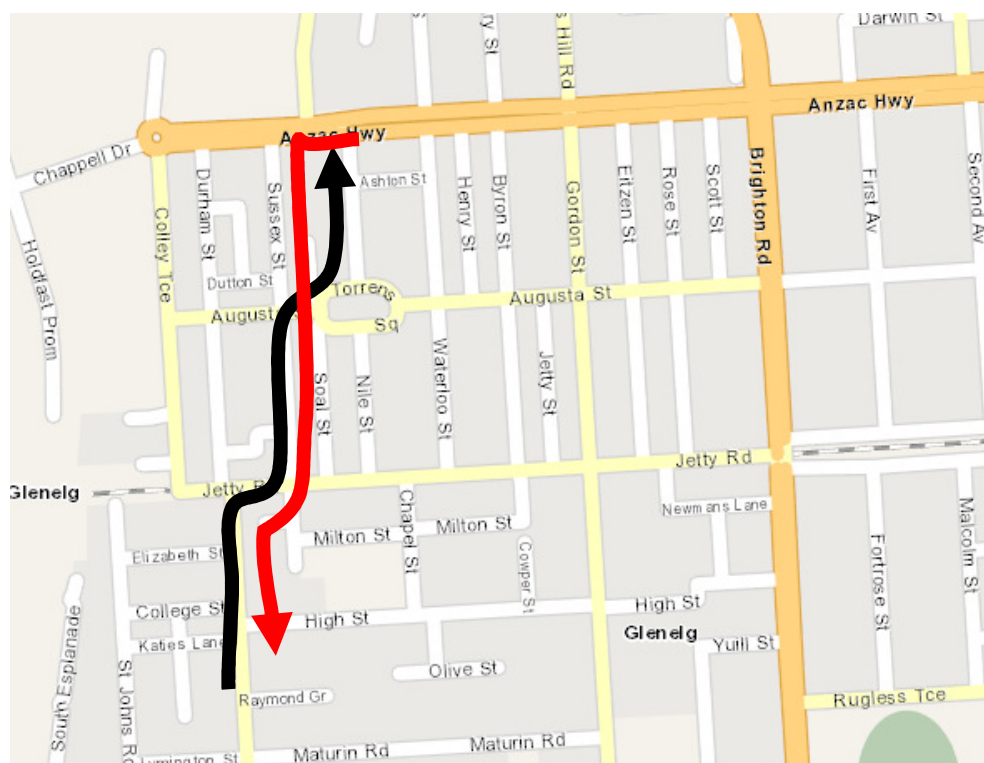


Figure 6.12 – Major change in traffic patterns



The model indicated that for Option 1 there would be an 80% diversion of traffic from Colley Terrace. This is considered high given the likely travel patterns of users. The main cause for this is that the AIMSUN model considers overall travel time on how to assign traffic to the road network. If it considers that the improvement in travel time is sufficient then it will deviate traffic accordingly.

For Option 1 and Option 2 there is some diversion of south and north bound traffic from Jetty Road to High / Partridge Street with greater volumes for the southbound movement.

6.5.2 Modelling Conclusions

The traffic modelling undertaken for the four options indicates overall the options are not expected to significantly affect the traffic operation of the road network within the study area. It is noted that congestion is expected to occur at times but is likely to dissipate within 15 to 30 minutes.

North and southbound traffic is shown to be diverted from Colley Terrace through to Sussex Street (southbound direction) and Sussex, Augusta and Nile Streets (northbound).

The modelling does not indicate a definitive preferred option in term of traffic operation. Option 3 has a greater adverse impact on public transport operation within the study area. This is primarily due to the rerouting of the bus network conflicting with diverted traffic along Jetty Road / Gordon Street.

There are concerns with the modelling in that there is no / minimal origin and destination data to determine the initial travel patterns which would then give better information how traffic would divert as a result of the options.



7 Conclusion

The City of Holdfast Bay (Council) is undertaking a redevelopment of Jetty Road at Glenelg. As part of the redevelopment, Council is considering various options for the treatment of Jetty Road at the western end in vicinity of Moseley Square.

The objective of this traffic study is to compare the traffic operation of particular options for the proposed redevelopment of Jetty Road that Council is undertaking as a separate study.

The AIMSUN traffic modelling computer software package has been used to assess the traffic operation as it is the standard modelling software package used by The Department of Infrastructure and Transport (DIT) and that it allows for traffic to bypass areas of congestion which can be viewed readily.

The traffic modelling was undertaken in two stages to provide the basis for a comparative review of the traffic impacts of the options as indicated below

Stage 1 – Prepare, Run and Calibrate Existing Model

Development of an existing model for two timeframes; a Thursday PM peak, and a Sunday afternoon between 12.00 and 1.00PM.

Stage 2 - Prepare and Run Option Models

Once the existing model had been agreed with Council, future models with the proposed options were developed and run with key outputs being used to compare the options.

Existing model review

The base model network, as shown in Figure 2.1 extends from Anzac Highway in the north, Pier Street in the south, Colley Terrace / Moseley Street to the west and Brighton Road to the east including all approaches to the main intersections. Existing traffic data was used to develop the model with key input data provided by DIT and Council including traffic volumes and signal operation.

A review was undertaken of the Origin-Destination study for Tapleys Hill / Brighton Road provided by Council and data was used for traffic flow along Brighton Road. There is essentially no Origin-Destination data that can be used for locations within the study area as there are no compatible traffic signals that provide the data at the time of the development of the model. This affects the overall confidence in the model to accurately reflect travel patterns, particularly at the western end of Jetty Road. However, traffic volumes on the local roads at key locations within the model are 10 to 15% of the count data, consequently there is confidence the model would be useful as a comparison between the options.

In reviewing the operation of both the Thursday and Sunday models the level of congestion at key locations is considered satisfactory with queue lengths approaching distances that were observed on-site. It is noted that for the Thursday and Sunday models the queues and congestion from the peak period had dissipated during the following 30 minute period. On this basis the AIMSUN model developed for the Glenelg precinct is considered to satisfactory to provide a basis for the comparison of options for the redevelopment of Jetty Road.

Option Models

The City of Holdfast Bay identified four options for the redevelopment of Jetty Road as indicated below:

Option 1 – Shared Zone - This option provides for a shared zone along Jetty Road between Moseley Street and Colley Terrace. In this option access is maintained for all vehicles however the travel speed along Jetty Road is reduced to 10km/hr between Colley Terrace and Moseley Street. There are no changes proposed to existing bus routes.

Option 2 – Modified Colley Terrace - This option retains full access at Colley Terrace for public transport vehicles (buses and trams) but restricts access to private and commercial vehicles to only those travelling



west along Jetty Road. Southbound vehicles on Colley Terrace are diverted onto Augusta Street and all northbound private vehicles on Moseley Street are diverted to Jetty Road.

Option 3 – Full Closure of Jetty Road / Colley Terrace junction - This option provides for the full closure to all vehicles (except trams) of Jetty Road between Colley Terrace and Moseley Street.

Option 3A – Partial Closure of Jetty Road / Colley Terrace junction - This option provides for a partial closure to private vehicles with trams and buses can utilise the section of Jetty Road between Colley Terrace and Moseley Street

Option Model review

The traffic modelling has indicated that there are minor changes in overall traffic performance in the study area. There was little difference in operation between the options Thursday modelled period (3.00 to 6.30PM). Modelling indicated for the Thursday peak the best performing options compared to the Base Case are Options 1 and 2 with the worst Option 3A

For the Sunday peak period (11.00 to 1:30), the difference between the options and the Base Case varies significantly more than the Thursday peak. For this period, all options provide a reduction in traffic operation compared to the Base Case. The best performing options compared to the Base Case are Options 2 and 3A with the worst Option 3.

Review of the models indicates that for all options, congestion increased along Sussex Street / Nile Street with the significant increase in traffic. For Options 3 and 3A additional congestion was observed along Jetty Road as the changes in traffic patterns resulted in more turn movements being undertaken to access Jetty Road for Gordon Street, Nile Street and Waterloo Street. In both these locations the queues dissipated after the peak period by the end of the overall model period.

The traffic modelling for all options indicates there is a significant transfer of north / southbound traffic from Colley Terrace to Sussex Street that occurred for both modelled periods. It is noted that the transfer of traffic is slightly different between the modelled periods as there is more of a balance between north and southbound flows for the Sunday compared to the Thursday.

Conclusion and Recommendation

AIMSUM traffic modelling undertaken for the four options indicates overall the options are not expected to significantly affect the traffic operation of the road network within the study area. It is noted that congestion is expected to occur at times but is likely to dissipate within 15 to 30 minutes.

North and southbound traffic is shown to be diverted from Colley Terrace through to Sussex Street (southbound direction) and Sussex, Augusta and Nile Streets (northbound).

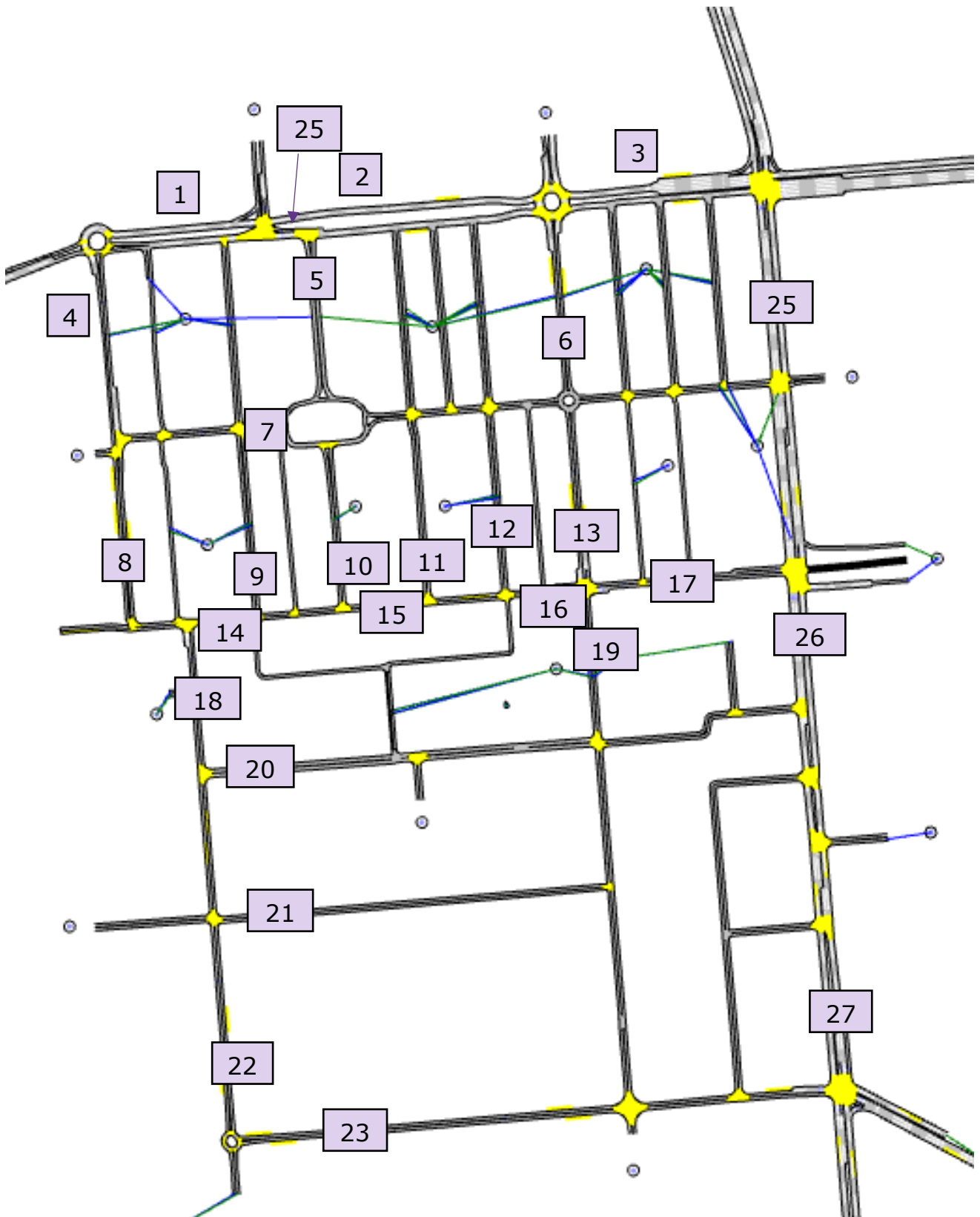
The modelling does not indicate a definitive preferred option in term of traffic operation. Option 3 has a greater adverse impact on public transport operation within the study area. This is primarily due to the rerouting of the bus network conflicting with diverted traffic along Jetty Road / Gordon Street.

There are concerns with the modelling in that there is no / minimal origin and destination data to determine the initial travel patterns which would then give better information how traffic would divert as a result of the options. It is recommended that traffic surveys be undertaken to better define the origin and destination of traffic within the study area. These surveys could be undertaken cost effectively using specific bluetooth technology that is currently undertaken by the DIT at its traffic Signal locations.

It is suggested that consideration be given to pedestrian safety and access across Moseley Street for the options as this may require additional traffic control (signals). This is likely to have a flow on effect with additional delays to traffic (including buses) that may redirect traffic onto other streets.



Appendix A – Traffic Volume Comparison



Direction		BASE volume	Option 1			Option 2			Option 3			Option 3A		
			volume	difference	% difference	volume	difference	% difference	Volume	difference	% difference	Volume	difference	% difference
Anzac Hwy - Colley to	1 - East	1355.8	1177.4	178.4	13.2%	1155.8	200.00	14.8%	1052.6	303.20	22.4%	1197.4	158.40	11.7%
Adelphi	1 - West	1702.8	1722	-19.20	-1.1%	1718.6	-15.80	-0.9%	1277	425.80	25.0%	1278	424.80	24.9%
Anzac Hwy - Adelphi -	2 - East	1638	1674.2	-36.20	-2.2%	1666.2	-28.20	-1.7%	1533.4	104.60	6.4%	1684.6	-46.60	-2.8%
old Tapleys Hill	2 - West	1659.4	1947.2	-287.80	-17.3%	1920	-260.60	-15.7%	1649.8	9.60	0.6%	1658.2	1.20	0.1%
Anzac Hwy - East of	3 - East	1810.4	1758	52.40	2.9%	1811.2	-0.80	0.0%	1706.8	103.60	5.7%	1815	-4.60	-0.3%
old Tapleys Hill	3 - West	2501.6	2755.8	-254.20	-10.2%	2759.4	-257.80	-10.3%	2509	-7.40	-0.3%	2506	-4.40	-0.2%
Colley Tce - south of	4 -North	921	525.6	395.40	42.9%	466.8	454.20	49.3%	458.6	462.40	50.2%	656.6	264.40	28.7%
Anzac	4 - South	1131	931.8	199.20	17.6%	890.2	240.80	21.3%	517	614.00	54.3%	570.2	560.80	49.6%
Nile St - south of Anzac	5 - North	256	540.6	-284.60	-111.2%	540.4	-284.40	-111.1%	511	-255.00	-99.6%	510.4	-254.40	-99.4%
Hwy	5 - South	21.4	21.6	-0.20	-0.9%	21.4	0.00	0.0%	21.6	-0.20	-0.9%	21.4	0.00	0.0%
Gordon St - north of	6 - North	772.8	763.6	9.20	1.2%	811.6	-38.80	-5.0%	811.2	-38.40	-5.0%	782.6	-9.80	-1.3%
Augusta	6 - South	555	702.4	-147.40	-26.6%	592.8	-37.80	-6.8%	598	-43.00	-7.7%	604	-49.00	-8.8%
Augusta St - west of	7 - East	208.8	516	-307.20	-147.1%	527.6	-318.80	-152.7%	497.2	-288.40	-138.1%	497.4	-288.60	-138.2%
torrens square	7 - West	87.6	87.6	0.00	0.0%	119.4	-31.80	-36.3%	119.4	-31.80	-36.3%	119.2	-31.60	-36.1%
Colley Tce - south of	8 - North	830.6	150.4	680.20	81.9%	66.4	764.20	92.0%	0	830.60	100.0%	32	798.60	96.1%
Augusta	8 - South	747.8	84.8	663.00	88.7%	63.8	684.00	91.5%	0	747.80	100.0%	5	742.80	99.3%
Sussex St - north of	9 - North	206.8	593.8	-387.00	-187.1%	747	-540.20	-261.2%	1042.6	-835.80	-404.2%	1043.2	-836.40	-404.4%
Jetty Rd	9 - South	58.2	653.2	-595.00	-1022.3%	607.4	-549.20	-943.6%	766.8	-708.60	-1217.5%	648.6	-590.40	-1014.4%
Nile St - south of Jetty	10 - North	270.6	270.6	0.00	0.0%	288.6	-18.00	-6.7%	288.6	-18.00	-6.7%	288.2	-17.60	-6.5%
Rd	10 - South	142.6	165.2	-22.60	-15.8%	177	-34.40	-24.1%	174	-31.40	-22.0%	177	-34.40	-24.1%
Waterloo St - north of	11 - North	76.2	76.4	-0.20	-0.3%	76.4	-0.20	-0.3%	76.2	0.00	0.0%	76.2	0.00	0.0%
Jetty Rd	11 - South	419.6	319.8	99.80	23.8%	447.4	-27.80	-6.6%	430.4	-10.80	-2.6%	430.4	-10.80	-2.6%
Byron St - north of Jetty	12 - North	188.2	187.6	0.60	0.3%	189.2	-1.00	-0.5%	189.2	-1.00	-0.5%	188	0.20	0.1%
Rd	12 - South	207.6	208.6	-1.00	-0.5%	208.6	-1.00	-0.5%	203.8	3.80	1.8%	208	-0.40	-0.2%
Gordon St - south of	13 - North	616.2	606.8	9.40	1.5%	655.4	-39.20	-6.4%	653.4	-37.20	-6.0%	625.6	-9.40	-1.5%
Augusta	13 - South	558.8	705.4	-146.60	-26.2%	596	-37.20	-6.7%	601.6	-42.80	-7.7%	607.6	-48.80	-8.7%
Jetty Rd - east of	14 - East	351	643.8	-292.80	-83.4%	829	-478.00	-136.2%	869	-518.00	-147.6%	836.8	-485.80	-138.4%
Moseley	14 -West	691.4	923	-231.60	-33.5%	948	-256.60	-37.1%	967.4	-276.00	-39.9%	963	-271.60	-39.3%
Jetty Rd - west of	15 - East	377.8	315.6	62.20	16.5%	396	-18.20	-4.8%	542	-164.20	-43.5%	396.2	-18.40	-4.9%
Waterloo	15 - West	957.6	604	353.60	36.9%	735.2	222.40	23.2%	1011.8	-54.20	-5.7%	1005.2	-47.60	-5.0%
	16 - East	431	370	61.00	14.2%	450.4	-19.40	-4.5%	592	-161.00	-37.4%	449.6	-18.60	-4.3%
Jetty Rd - east of Byron	16 - West	789.8	536.4	253.40	32.1%	541	248.80	31.5%	835.6	-45.80	-5.8%	827.8	-38.00	-4.8%
	17 - East	565.4	551.8	13.60	2.4%	645.4	-80.00	-14.1%	678.2	-112.80	-20.0%	581.8	-16.40	-2.9%
Jetty Rd - east of Eitzen	17 - West	900.4	651.8	248.60	27.6%	537.2	363.20	40.3%	903.6	-3.20	-0.4%	905	-4.60	-0.5%
Moseley St - south of	18 - North	872	754.4	117.60	13.5%	823.2	48.80	5.6%	853.6	18.40	2.1%	832	40.00	4.6%
Jetty	18 - South	997.6	836.2	161.40	16.2%	945.4	52.20	5.2%	952.2	45.40	4.6%	937	60.60	6.1%
Partridge - South of	19 - North	670.4	707.6	-37.20	-5.5%	711	-40.60	-6.1%	709.8	-39.40	-5.9%	711.2	-40.80	-6.1%
Jetty Rd	19 - South	334.2	482.8	-148.60	-44.5%	372.2	-38.00	-11.4%	381.8	-47.60	-14.2%	382.6	-48.40	-14.5%
High St - east of	20 - East	313.8	394	-80.20	-25.6%	321.2	-7.40	-2.4%	313.6	0.20	0.1%	313.8	0.00	0.0%
Moseley St	20 - West	180.4	243	-62.60	-34.7%	143.2	37.20	20.6%	139.6	40.80	22.6%	139	41.40	22.9%
Maturin Rd - East of	21 - East	0	0	0.00	NA	0	0.00	NA	0	0.00	NA	0	0.00	NA
Moseley St	21 - West	108.8	109.4	-0.60	-0.6%	109.4	-0.60	-0.6%	109.4	-0.60	-0.6%	109.2	-0.40	-0.4%
Moseley St - north of	22 - North	642.8	642.8	0.00	0.0%	642.8	0.00	0.0%	643.8	-1.00	-0.2%	643.8	-1.00	-0.2%
Pier St	22 - South	659.2	598	61.20	9.3%	610.2	49.00	7.4%	596.6	62.60	9.5%	598	61.20	9.3%
Pier St - east of	23 - East	474	413	61.00	12.9%	425	49.00	10.3%	413	61.00	12.9%	413	61.00	12.9%
Moseley St	23 - West	176	177	-1.00	-0.6%	176	0.00	0.0%	178.8	-2.80	-1.6%	178.6	-2.60	-1.5%
Anzac Highway U-turn	24 - U-Turn	194	184	10.00	5.2%	188	6.00	3.1%	158.4	35.60	18.4%	157.6	36.40	18.8%
Brighton Road - south	25 - North	3449.4	3751.8	-302.40	-8.8%	3708.6	-259.20	-7.5%	3449	0.40	0.0%	3452.8	-3.40	-0.1%
of Anzac	25 - South	3322.4	3317.8	4.60	0.1%	3326.6	-4.20	-0.1%	3217.2	105.20	3.2%	3329.4	-7.00	-0.2%
Brighton Road - south	26 - North	4206.6	4292.6	-86.00	-2.0%	4209.4	-2.80	-0.1%	4211	-4.40	-0.1%	4207.4	-0.80	0.0%
of Jetty	26 - South	3582.6	3587.4	-4.80	-0.1%	3593.2	-10.60	-0.3%	3577	5.60	0.2%	3599.4	-16.80	-0.5%
Brighton Road - north	27 - North	4025.6	4029.8	-4.20	-0.1%	4031.2	-5.60	-0.1%	4023.4	2.20	0.1%	4022.2	3.40	0.1%
of Pier	27 - South	3578.6	3588.2	-9.60	-0.3%	3599.6	-21.00	-0.6%	3578.8	-0.20	0.0%	3590.8	-12.20	-0.3%

Direction		BASE volume	Option 1			Option 2			Option 3			Option 3A		
			volume	difference	% difference	volume	difference	% difference	Volume	difference	% difference	Volume	difference	% difference
Anzac Hwy - Colley to	1 - East	1277	1059.8	217.2	17.0%	1079	198	15.5%	985.4	291.6	22.8%	1096.2	180.8	14.2%
Adelphi	1 - West	1656	902.2	753.80	45.5%	782.2	873.80	52.8%	705.4	950.60	57.4%	702.2	953.80	57.6%
Anzac Hwy - Adelphi -	2 - East	2112	2069	43.00	2.0%	2108.8	3.20	0.2%	1956.2	155.80	7.4%	2073.4	38.60	1.8%
old Tapleys Hill	2 - West	1265	1365.8	-100.80	-8.0%	1333	-68.00	-5.4%	1231.8	33.20	2.6%	1238.2	26.80	2.1%
Anzac Hwy - East of old	3 - East	2428	2333.6	94.40	3.9%	2421.4	6.60	0.3%	2320	108.00	4.4%	2377.2	50.80	2.1%
Tapleys Hill	3 - West	2463	2535.2	-72.20	-2.9%	2533	-70.00	-2.8%	2410.6	52.40	2.1%	2392.6	70.40	2.9%
Colley Tce - south of	4 -North	515	260	255.00	49.5%	298	217.00	42.1%	197	318.00	61.7%	331.2	183.80	35.7%
Anzac	4 - South	1270	473.8	796.20	62.7%	373.2	896.80	70.6%	262.6	1007.40	79.3%	272	998.00	78.6%
Nile St - south of Anzac	5 - North	294	495.2	-201.20	-68.4%	495.4	-201.40	-68.5%	450.6	-156.60	-53.3%	454.2	-160.20	-54.5%
Hwy	5 - South	37	36	1.00	2.7%	36.2	0.80	2.2%	36	1.00	2.7%	36	1.00	2.7%
Gordon St - north of	6 - North	858	817	41.00	4.8%	870	-12.00	-1.4%	917	-59.00	-6.9%	853.4	4.60	0.5%
Augusta	6 - South	1199	1361.8	-162.80	-13.6%	1205	-6.00	-0.5%	1196.8	2.20	0.2%	1167	32.00	2.7%
Augusta St - west of	7 - East	297	529.4	-232.40	-78.2%	543.8	-246.80	-83.1%	494	-197.00	-66.3%	500.2	-203.20	-68.4%
torrens square	7 - West	43	43	0.00	0.0%	55.2	-12.20	-28.4%	54.4	-11.40	-26.5%	53.6	-10.60	-24.7%
Colley Tce - south of	8 - North	406	61	345.00	85.0%	99.6	306.40	75.5%	0	406.00	100.0%	59.4	346.60	85.4%
Augusta	8 - South	1031	114.8	916.20	88.9%	14.8	1016.20	98.6%	0	1031.00	100.0%	5.8	1025.20	99.4%
Sussex St - north of Jetty	9 - North	172	373.6	-201.60	-117.2%	429.8	-257.80	-149.9%	504.8	-332.80	-193.5%	506	-334.00	-194.2%
Rd	9 - South	65	949.8	-884.80	-1361.2%	948.2	-883.20	-1358.8%	986.8	-921.80	-1418.2%	915.6	-850.60	-1308.6%
Nile St - south of Jetty	10 - North	212	212.2	-0.20	-0.1%	218.6	-6.60	-3.1%	213	-1.00	-0.5%	207.4	4.60	2.2%
Rd	10 - South	192	222.8	-30.80	-16.0%	238.2	-46.20	-24.1%	227.2	-35.20	-18.3%	230.6	-38.60	-20.1%
Waterloo St - north of	11 - North	42	41.6	0.40	1.0%	41.6	0.40	1.0%	40.2	1.80	4.3%	39.2	2.80	6.7%
Jetty Rd	11 - South	526	350.6	175.40	33.3%	544	-18.00	-3.4%	515.2	10.80	2.1%	516.2	9.80	1.9%
Byron St - north of Jetty	12 - North	165	164.6	0.40	0.2%	164.8	0.20	0.1%	159	6.00	3.6%	157	8.00	4.8%
Rd	12 - South	298	299	-1.00	-0.3%	280.2	17.80	6.0%	284.4	13.60	4.6%	277	21.00	7.0%
Gordon St - south of	13 - North	859	639.2	219.80	25.6%	692.4	166.60	19.4%	744	115.00	13.4%	687.4	171.60	20.0%
Augusta	13 - South	1199	1358.6	-159.60	-13.3%	1201.6	-2.60	-0.2%	1190.4	8.60	0.7%	1165.4	33.60	2.8%
Jetty Rd - east of	14 - East	215	291	-76.00	-35.3%	399.2	-184.20	-85.7%	445.8	-230.80	-107.3%	392.2	-177.20	-82.4%
Moseley	14 -West	570	1162.8	-592.80	-104.0%	1337.2	-767.20	-134.6%	1278.4	-708.40	-124.3%	1262.8	-692.80	-121.5%
Jetty Rd - west of	15 - East	429	350	79.00	18.4%	446.2	-17.20	-4.0%	556.8	-127.80	-29.8%	432.4	-3.40	-0.8%
Waterloo	15 - West	830	552	278.00	33.5%	767.6	62.40	7.5%	827.8	2.20	0.3%	801.2	28.80	3.5%
	16 - East	596	518.4	77.60	13.0%	599.6	-3.60	-0.6%	714.2	-118.20	-19.8%	585.8	10.20	1.7%
Jetty Rd - east of Byron	16 - West	587	485	102.00	17.4%	506.8	80.20	13.7%	591.2	-4.20	-0.7%	558.4	28.60	4.9%
	17 - East	896	871.2	24.80	2.8%	896.8	-0.80	-0.1%	952.2	-56.20	-6.3%	880.2	15.80	1.8%
Jetty Rd - east of Eitzen	17 - West	743	650.8	92.20	12.4%	658.2	84.80	11.4%	721	22.00	3.0%	715.6	27.40	3.7%
Moseley St - south of	18 - North	430	293.4	136.60	31.8%	405.4	24.60	5.7%	430.2	-0.20	0.0%	408.6	21.40	5.0%
Jetty	18 - South	1284	1094.2	189.80	14.8%	1255.2	28.80	2.2%	1235.2	48.80	3.8%	1221.8	62.20	4.8%
Partridge - South of Jetty	19 - North	942	953.8	-11.80	-1.3%	954.8	-12.80	-1.4%	952.4	-10.40	-1.1%	949.8	-7.80	-0.8%
Rd	19 - South	912	1086.6	-174.60	-19.1%	919	-7.00	-0.8%	895.6	16.40	1.8%	899.2	12.80	1.4%
High St - east of Moseley	20 - East	400	500.8	-100.80	-25.2%	403.8	-3.80	-1.0%	390.6	9.40	2.3%	395	5.00	1.3%
St	20 - West	151	315	-164.00	-108.6%	142.6	8.40	5.6%	130.4	20.60	13.6%	129.8	21.20	14.0%
Maturin Rd - East of	21 - East	0	0	0.00	NA	0	0.00	NA	0	0.00	NA	0	0.00	NA
Moseley St	21 - West	120	119.8	0.20	0.2%	119.6	0.40	0.3%	119.4	0.60	0.5%	118.8	1.20	1.0%
Moseley St - north of	22 - North	349	324	25.00	7.2%	349	0.00	0.0%	344.6	4.40	1.3%	352.2	-3.20	-0.9%
Pier St	22 - South	869	853.2	15.80	1.8%	853.8	15.20	1.7%	826.2	42.80	4.9%	825.6	43.40	5.0%
Pier St - east of Moseley	23 - East	502	486.8	15.20	3.0%	486.8	15.20	3.0%	481.2	20.80	4.1%	481.6	20.40	4.1%
St	23 - West	247	228.4	18.60	7.5%	247.4	-0.40	-0.2%	246.6	0.40	0.2%	245.2	1.80	0.7%
Anzac Highway U-turn	24 - U-Turn	252	248.6	3.40	1.3%	252.4	-0.40	-0.2%	216.2	35.80	14.2%	219	33.00	13.1%
Brighton Road - south of	25 - North	4289	4438.2	-149.20	-3.5%	4383.2	-94.20	-2.2%	4277.8	11.20	0.3%	4266	23.00	0.5%
Anzac	25 - South	6364	6329.4	34.60	0.5%	6357.2	6.80	0.1%	6267	97.00	1.5%	6323.4	40.60	0.6%
Brighton Road - south of	26 - North	5080	5185.2	-105.20	-2.1%	5093.8	-13.80	-0.3%	5056	24.00	0.5%	5029.8	50.20	1.0%
Jetty	26 - South	6742	6730.8	11.20	0.2%	6745.2	-3.20	0.0%	6719.4	22.60	0.3%	6709.6	32.40	0.5%
Brighton Road - north of	27 - North	4794	4794.6	-0.60	0.0%	4792.6	1.40	0.0%	4770.8	23.20	0.5%	4763	31.00	0.6%
Pier	27 - South	6670	6654.6	15.40	0.2%	6673.6	-3.60	-0.1%	6658.2	11.80	0.2%	6637.6	32.40	0.5%

	Direction	BASE volume	Option 1			Option 2			Option 3			Option 3A		
			volume	difference	% difference	volume	difference	% difference	Volume	difference	% difference	Volume	difference	% difference
Anzac Hwy - Colley to Adelphi	1 - East	645.6	562.4	83.2	12.9%	555.8	89.80	13.9%	507.8	137.80	21.3%	574.6	71.00	11.0%
Anzac Hwy - Adelphi - old Tapleys Hill	1 - West	806	819.8	-13.80	-1.7%	822.8	-16.80	-2.1%	612.2	193.80	24.0%	612.2	193.80	24.0%
Anzac Hwy - East of old Tapleys Hill	2 - East	744.8	752.4	-7.60	-1.0%	748.2	-3.40	-0.5%	691.6	53.20	7.1%	760.6	-15.80	-2.1%
	2 - West	771.4	904.6	-133.20	-17.3%	891.2	-119.80	-15.5%	768	3.40	0.4%	771.8	-0.40	-0.1%
	3 - East	823.6	796	27.60	3.4%	817	6.60	0.8%	774.4	49.20	6.0%	824.4	-0.80	-0.1%
	3 - West	1156.6	1275.8	-119.20	-10.3%	1272	-115.40	-10.0%	1156.4	0.20	0.0%	1157.8	-1.20	-0.1%
	4 -North	434.8	244	190.80	43.9%	216.2	218.60	50.3%	218.6	216.20	49.7%	309.4	125.40	28.8%
Colley Tce - south of Anzac	4 - South	522.6	431.6	91.00	17.4%	411.8	110.80	21.2%	239	283.60	54.3%	262.4	260.20	49.8%
Nile St - south of Anzac Hwy	5 - North	103	224	-121.00	-117.5%	235.2	-132.20	-128.3%	222.8	-119.80	-116.3%	221.6	-118.60	-115.1%
	5 - South	9.6	10	-0.40	-4.2%	9.8	-0.20	-2.1%	9.8	-0.20	-2.1%	9.8	-0.20	-2.1%
Gordon St - north of Augusta	6 - North	347	345.4	1.60	0.5%	363.4	-16.40	-4.7%	357	-10.00	-2.9%	351.2	-4.20	-1.2%
Augusta St - west of torrens square	6 - South	257	324	-67.00	-26.1%	272.8	-15.80	-6.1%	275.4	-18.40	-7.2%	279	-22.00	-8.6%
Colley Tce - south of Augusta	7 - East	99.8	245.8	-146.00	-146.3%	254.8	-155.00	-155.3%	239.6	-139.80	-140.1%	240.8	-141.00	-141.3%
	7 - West	40.6	38.2	2.40	5.9%	54.6	-14.00	-34.5%	54.8	-14.20	-35.0%	54.4	-13.80	-34.0%
Sussex St - north of Jetty Rd	8 - North	387.4	67.4	320.00	82.6%	29.2	358.20	92.5%	0	387.40	100.0%	13.8	373.60	96.4%
	8 - South	346.4	39	307.40	88.7%	30	316.40	91.3%	0	346.40	100.0%	2	344.40	99.4%
	9 - North	98.2	284	-185.80	-189.2%	355.2	-257.00	-261.7%	487.6	-389.40	-396.5%	490.4	-392.20	-399.4%
	9 - South	26.6	301.8	-275.20	-1034.6%	281.8	-255.20	-959.4%	355.2	-328.60	-1235.3%	301	-274.40	-1031.6%
	10 - North	129	128.8	0.20	0.2%	137.2	-8.20	-6.4%	136	-7.00	-5.4%	137.2	-8.20	-6.4%
Nile St - south of Jetty Rd	10 - South	62.8	75	-12.20	-19.4%	82	-19.20	-30.6%	80.8	-18.00	-28.7%	82	-19.20	-30.6%
Waterloo St - north of Jetty Rd	11 - North	36.8	37.2	-0.40	-1.1%	37.4	-0.60	-1.6%	36.2	0.60	1.6%	37.4	-0.60	-1.6%
Byron St - north of Jetty Rd	11 - South	193.6	149.4	44.20	22.8%	205.8	-12.20	-6.3%	196.2	-2.60	-1.3%	195.6	-2.00	-1.0%
	12 - North	88.6	87.6	1.00	1.1%	87.6	1.00	1.1%	87	1.60	1.8%	88.2	0.40	0.5%
	12 - South	89.6	90.4	-0.80	-0.9%	89.8	-0.20	-0.2%	84.6	5.00	5.6%	89.4	0.20	0.2%
Gordon St - south of Augusta	13 - North	277.4	277	0.40	0.1%	295.2	-17.80	-6.4%	287.6	-10.20	-3.7%	282	-4.60	-1.7%
	13 - South	258.4	324.2	-65.80	-25.5%	273.2	-14.80	-5.7%	273.2	-14.80	-5.7%	279.8	-21.40	-8.3%
	14 - East	160.8	304.2	-143.40	-89.2%	387	-226.20	-140.7%	403.6	-242.80	-151.0%	391	-230.20	-143.2%
Jetty Rd - east of Moseley	14 -West	313.4	425.8	-112.40	-35.9%	436.8	-123.40	-39.4%	446	-132.60	-42.3%	442.8	-129.40	-41.3%
Jetty Rd - west of Waterloo	15 - East	166	139.8	26.20	15.8%	174	-8.00	-4.8%	234.2	-68.20	-41.1%	174.2	-8.20	-4.9%
	15 - West	440.4	278.8	161.60	36.7%	337.4	103.00	23.4%	457.8	-17.40	-4.0%	459.2	-18.80	-4.3%
	16 - East	189.8	164.6	25.20	13.3%	197.6	-7.80	-4.1%	251	-61.20	-32.2%	197.4	-7.60	-4.0%
Jetty Rd - east of Byron	16 - West	367.8	249	118.80	32.3%	252.4	115.40	31.4%	379.8	-12.00	-3.3%	384.6	-16.80	-4.6%
	17 - East	254	249.2	4.80	1.9%	290	-36.00	-14.2%	294.4	-40.40	-15.9%	257.8	-3.80	-1.5%
Jetty Rd - east of Eitzen	17 - West	418.4	300.4	118.00	28.2%	250.6	167.80	40.1%	415	3.40	0.8%	418	0.40	0.1%
	18 - North	406.8	355	51.80	12.7%	382.4	24.40	6.0%	397	9.80	2.4%	387.8	19.00	4.7%
Moseley St - south of Jetty	18 - South	458.4	385	73.40	16.0%	436.4	22.00	4.8%	438.6	19.80	4.3%	431	27.40	6.0%
Partridge - South of Jetty Rd	19 - North	305.8	323.6	-17.80	-5.8%	324.4	-18.60	-6.1%	319.8	-14.00	-4.6%	325.6	-19.80	-6.5%
	19 - South	152.4	217.8	-65.40	-42.9%	166.6	-14.20	-9.3%	170.6	-18.20	-11.9%	173.8	-21.40	-14.0%
High St - east of Moseley St	20 - East	144.2	177.2	-33.00	-22.9%	148	-3.80	-2.6%	143.8	0.40	0.3%	143.4	0.80	0.6%
	20 - West	85	110.6	-25.60	-30.1%	66	19.00	22.4%	64.6	20.40	24.0%	64.6	20.40	24.0%
Maturin Rd - East of Moseley St	21 - East	0	0	0.00	NA	0	0.00	NA	0	0.00	NA	0	0.00	NA
Moseley St - north of Pier St	21 - West	56.2	56.2	0.00	0.0%	55.8	0.40	0.7%	56.2	0.00	0.0%	56	0.20	0.4%
	22 - North	295	295	0.00	0.0%	295	0.00	0.0%	296	-1.00	-0.3%	296	-1.00	-0.3%
	22 - South	302.4	274	28.40	9.4%	281	21.40	7.1%	274.4	28.00	9.3%	275.2	27.20	9.0%
	23 - East	222.2	195.4	26.80	12.1%	201.8	20.40	9.2%	195.2	27.00	12.2%	195.6	26.60	12.0%
Pier St - east of Moseley St	23 - West	83.4	83.8	-0.40	-0.5%	83.8	-0.40	-0.5%	85.2	-1.80	-2.2%	85	-1.60	-1.9%
Anzac Highway U-turn	24 - U-Turn	81.6	70	11.60	14.2%	71.6	10.00	12.3%	60.4	21.20	26.0%	60.6	21.00	25.7%
Brighton Road - south of Anzac	25 - North	1600.4	1732.6	-132.20	-8.3%	1716.2	-115.80	-7.2%	1578.6	21.80	1.4%	1589	11.40	0.7%
	25 - South	1545.8	1539.6	6.20	0.4%	1549.8	-4.00	-0.3%	1505.8	40.00	2.6%	1550.8	-5.00	-0.3%
Brighton Road - south of Jetty	26 - North	1969.8	1986.4	-16.60	-0.8%	1957.6	12.20	0.6%	1948	21.80	1.1%	1967.6	2.20	0.1%
	26 - South	1667.6	1667	0.60	0.0%	1668	-0.40	0.0%	1662.8	4.80	0.3%	1670.2	-2.60	-0.2%
Brighton Road - north of Pier	27 - North	1878.6	1866.2	12.40	0.7%	1875	3.60	0.2%	1874.8	3.80	0.2%	1874.2	4.40	0.2%
	27 - South	1668.4	1658	10.40	0.6%	1677	-8.60	-0.5%	1667.8	0.60	0.0%	1679.2	-10.80	-0.6%

Direction			BASE volume	Option 1		Option 2			Option 3			Option 3A			
				volume	difference	% difference	volume	difference	% difference	Volume	difference	% difference	Volume	difference	% difference
Anzac Hwy - Colley to	1 - East		460.9	380.4	80.5	17.5%	376.2	58.40	13.4%	352.8	81.80	18.8%	388.4	46.20	10.6%
	Adelphi	1 - West	583.2	316.6	266.64	45.7%	263.4	319.84	54.8%	252.8	330.44	56.7%	249.6	333.64	57.2%
Anzac Hwy - Adelphi - old	2 - East		763.8	736	27.80	3.6%	750.4	13.40	1.8%	708.6	55.20	7.2%	750.8	13.00	1.7%
	Tapleys Hill	2 - West	432.1	462.2	-30.11	-7.0%	446	-13.91	-3.2%	425.6	6.49	1.5%	430.4	1.69	0.4%
Anzac Hwy - East of old	3 - East		841.7	813	28.69	3.4%	840.8	0.89	0.1%	820.2	21.49	2.6%	849	-7.31	-0.9%
	Tapleys Hill	3 - West	837.3	865.2	-27.88	-3.3%	855.4	-18.08	-2.2%	843.6	-6.28	-0.7%	842.4	-5.08	-0.6%
Colley Tce - south of	4 -North		182.9	91	91.86	50.2%	103	79.86	43.7%	70.2	112.66	61.6%	113	69.86	38.2%
	Anzac	4 - South	448.0	160	287.96	64.3%	125.8	322.16	71.9%	94.2	353.76	79.0%	96.8	351.16	78.4%
Nile St - south of Anzac	5 - North		103.0	171.4	-68.41	-66.4%	171.2	-68.21	-66.2%	162.4	-59.41	-57.7%	162.6	-59.61	-57.9%
	Hwy	5 - South	12.5	12.2	0.34	2.7%	12.2	0.34	2.7%	12.2	0.34	2.7%	12.2	0.34	2.7%
Gordon St - north of	6 - North		304.5	285.8	18.69	6.1%	299.8	4.69	1.5%	314.2	-9.71	-3.2%	304.6	-0.11	0.0%
	Augusta	6 - South	423.9	483.4	-59.53	-14.0%	425	-1.13	-0.3%	433.2	-9.33	-2.2%	426.8	-2.93	-0.7%
Augusta St - west of	7 - East		102.6	182.4	-79.83	-77.8%	187.8	-85.23	-83.1%	178.2	-75.63	-73.7%	179.8	-77.23	-75.3%
	torrens square	7 - West	16.2	16.8	-0.59	-3.7%	21.6	-5.39	-33.3%	22	-5.79	-35.8%	21.8	-5.59	-34.5%
Colley Tce - south of	8 - North		132.8	18.6	114.16	86.0%	29.8	102.96	77.6%	0	132.76	100.0%	18.8	113.96	85.8%
	Augusta	8 - South	358.2	38	320.19	89.4%	5	353.19	98.6%	0	358.19	100.0%	2	356.19	99.4%
Sussex St - north of Jetty	9 - North		59.6	131.2	-71.63	-120.2%	147.4	-87.83	-147.4%	176.4	-116.83	-196.1%	177	-117.43	-197.1%
	Rd	9 - South	25.3	330.2	-304.89	-1204.4%	328.6	-303.29	-1198.1%	345.2	-319.89	-1263.7%	327	-301.69	-1191.8%
	10 - North		67.8	68.8	-1.00	-1.5%	71.6	-3.80	-5.6%	72	-4.20	-6.2%	72.6	-4.80	-7.1%
	Nile St - north of Jetty Rd	10 - South	69.3	84.2	-14.88	-21.5%	87.8	-18.48	-26.7%	82	-12.68	-18.3%	89	-19.68	-28.4%
Waterloo St - north of	11 - North		11.5	12	-0.48	-4.2%	11.6	-0.08	-0.7%	11.8	-0.28	-2.5%	11.8	-0.28	-2.5%
	Jetty Rd	11 - South	172.3	119.8	52.51	30.5%	181	-8.69	-5.0%	178	-5.69	-3.3%	180.4	-8.09	-4.7%
Byron St - north of Jetty	12 - North		51.9	54.4	-2.50	-4.8%	54.2	-2.30	-4.4%	55.2	-3.30	-6.4%	53.6	-1.70	-3.3%
	Rd	12 - South	100.6	100.6	-0.03	0.0%	94.2	6.37	6.3%	90.8	9.77	9.7%	96.2	4.37	4.3%
Gordon St - south of	13 - North		309.0	227.8	81.18	26.3%	239	69.98	22.6%	253.8	55.18	17.9%	248.8	60.18	19.5%
	Augusta	13 - South	422.9	482.6	-59.65	-14.1%	420	2.95	0.7%	433.4	-10.45	-2.5%	426.6	-3.65	-0.9%
	14 - East		77.8	101	-23.21	-29.8%	141.8	-64.01	-82.3%	158.6	-80.81	-103.9%	141.8	-64.01	-82.3%
	Jetty Rd - east of Moseley	14 -West	179.7	395.6	-215.94	-120.2%	450.4	-270.74	-150.7%	434.4	-254.74	-141.8%	440.8	-261.14	-145.4%
Jetty Rd - west of	15 - East		152.9	127.8	25.07	16.4%	160.8	-7.93	-5.2%	189.6	-36.73	-24.0%	161.4	-8.53	-5.6%
	Waterloo	15 - West	264.9	182	82.92	31.3%	248.8	16.12	6.1%	275.4	-10.48	-4.0%	271.8	-6.88	-2.6%
Jetty Rd - east of Byron	16 - East		206.5	185.4	21.13	10.2%	211.6	-5.07	-2.5%	239.2	-32.67	-15.8%	214.8	-8.27	-4.0%
	16 - West		182.9	156.6	26.32	14.4%	162.6	20.32	11.1%	198.2	-15.28	-8.4%	187.2	-4.28	-2.3%
Jetty Rd - east of Eitzen	17 - East		298.7	297.8	0.94	0.3%	294.8	3.94	1.3%	313.8	-15.06	-5.0%	309.4	-10.66	-3.6%
	17 - West		239.6	221.4	18.15	7.6%	222.4	17.15	7.2%	253.8	-14.25	-5.9%	252	-12.45	-5.2%
	18 - North		152.5	101.2	51.27	33.6%	143.2	9.27	6.1%	153.2	-0.73	-0.5%	146.6	5.87	3.9%
	Moseley St - south of Jetty	18 - South	436.9	376	60.94	13.9%	428	8.94	2.0%	421.8	15.14	3.5%	430.2	6.74	1.5%
Partridge - South of Jetty	19 - North		332.7	335.2	-2.53	-0.8%	326	6.67	2.0%	328.8	3.87	1.2%	336.8	-4.13	-1.2%
	Rd	19 - South	323.6	389	-65.41	-20.2%	322.6	0.99	0.3%	328.4	-4.81	-1.5%	336.8	-13.21	-4.1%
High St - east of Moseley	20 - East		146.0	185	-38.97	-26.7%	147.2	-1.17	-0.8%	145.4	0.63	0.4%	146.8	-0.77	-0.5%
	St	20 - West	55.0	106.6	-51.63	-93.9%	49.2	5.77	10.5%	46.2	8.77	15.9%	46.4	8.57	15.6%
Maturin Rd - East of	21 - East		0.0	0	0.00	NA	0	0.00	NA	0	0.00	NA	0	0.00	NA
	Moseley St	21 - West	41.7	41.8	-0.08	-0.2%	41.4	0.32	0.8%	41.6	0.12	0.3%	42	-0.28	-0.7%
Moseley St - north of Pier	22 - North		127.1	114.4	12.66	10.0%	122	5.06	4.0%	122	5.06	4.0%	125.4	1.66	1.3%
	St	22 - South	297.9	290.8	7.06	2.4%	290.2	7.66	2.6%	283.8	14.06	4.7%	287.8	10.06	3.4%
Pier St - east of Moseley	23 - East		183.2	175	8.25	4.5%	175	8.25	4.5%	175.2	8.05	4.4%	174.8	8.45	4.6%
	St	23 - West	82.0	75.8	6.20	7.6%	81.6	0.40	0.5%	82.6	-0.60	-0.7%	81.2	0.80	1.0%
Anzac Highway U-turn	24 - U-Turn		92.1	86.6	5.48	6.0%	92.4	-0.32	-0.3%	81.6	10.48	11.4%	81.4	10.68	11.6%
Brighton Road - south of	25 - North		1390.2	1458.6	-68.36	-4.9%	1439.2	-48.96	-3.5%	1433	-42.76	-3.1%	1421.6	-31.36	-2.3%
	Anzac	25 - South	2218.6	2185.6	32.95	1.5%	2186.6	31.95	1.4%	2172.8	45.75	2.1%	2168.8	49.75	2.2%
Brighton Road - south of	26 - North		1687.1	1751.4	-64.33	-3.8%	1727.4	-40.33	-2.4%	1726.8	-39.73	-2.4%	1728.8	-41.73	-2.5%
	Jetty	26 - South	2324.1	2284.6	39.51	1.7%	2284.6	39.51	1.7%	2307.2	16.91	0.7%	2257	67.11	2.9%
Brighton Road - north of	27 - North		1606.4	1629.8	-23.44	-1.5%	1628.2	-21.84	-1.4%	1627	-20.64	-1.3%	1625	-18.64	-1.2%
	Pier	27 - South	2282.7	2248.2	34.50	1.5%	2218	64.70	2.8%	2235.4	47.30	2.1%	2216.4	66.30	2.9%