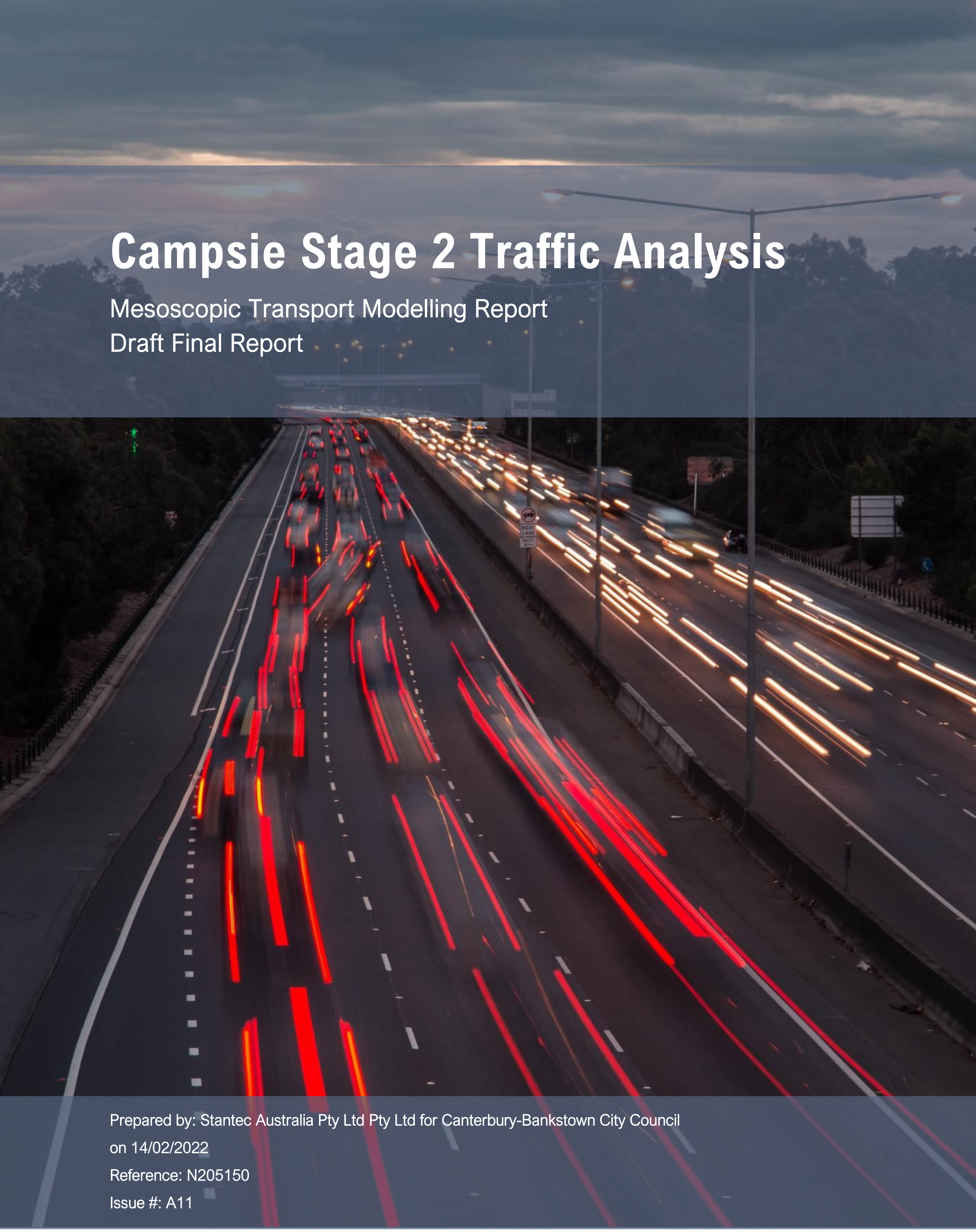

Campsie Stage 2 Traffic Analysis

Mesoscopic Transport Modelling Report
Draft Final Report

Prepared by: Stantec Australia Pty Ltd Pty Ltd for Canterbury-Bankstown City Council

on 14/02/2022

Reference: N205150

Issue #: A11

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Campsie Stage 2 Traffic Analysis

Mesoscopic Transport Modelling Report
Draft Final Report

Client: Canterbury-Bankstown City Council

on 14/02/2022

Reference: N205150

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1. INTRODUCTION

01

1.1. Background

Canterbury-Bankstown City Council (Council) has developed a Local Strategic Planning Statement, Connective City 2036, that recognises Campsie as a Strategic Centre, evolving into an important health and lifestyle precinct for the city. The delivery of Sydney Metro South-West Services, investment in a new cultural and civic hub and renewal in the centre will provide a catalyst for the realisation of the vision for Campsie. Campsie's connectivity will change with the opening of Sydney South West Metro services, connecting it to the City within 20 minutes, and to new centres it has not been connected to directly in the past, such as North Sydney, Chatswood, Macquarie Park and North-West Sydney. Campsie is located on the banks of the Cooks River and is located approximately 12 kilometres south-west of Sydney.

Beamish Street functions as a spine road that runs north-south through the Campsie Town Centre providing a key connection between the town centre, Campsie train station and key arterial roads such as Georges River Road in the north and Canterbury Road in the south. The majority of the commercial development such as small retailers, food outlets and other various small businesses are concentrated on either side of Beamish Street.

Council has developed a draft masterplan that focuses on capitalising this opportunity and recognises the presence of the hospital and embrace its unique position next to the river to create a health and lifestyle hub. This masterplan needs to be supported by strong evidence through transport modelling to achieve a more consistent basis for impact assessment and identification of infrastructure and service improvements required. This modelling and the draft Master Plan will inform transport and traffic network changes to be developed in the coming 10-20 years.

A robust traffic model provides the opportunity to assess the collective impacts of such infrastructure upgrades, highlight future problems, and identify mitigations which align with the aspirations of Council. Therefore, a mesoscopic (meso) model has been developed as a robust capacity forecasting tool that can provide visual and performance outputs to show the contributing factors driving infrastructure needs for planners and policy makers to modify planning scenarios.

1.2. Project Objective

The objective of this study is to develop a traffic model for Campsie that will provide direction for the Campsie Complete Streets Integrated Transport and Place Plan, which will result in a series of recommendations for transport, road, and public domain infrastructure to support the planned growth of the centre. Ultimately, this work will:

- assess the ability of the local transport network to accommodate the planned growth under the draft Campsie Town Centre Master Plan
- enable rapid assessment and accelerated delivery of infrastructure and land development
- provide forecasts of travel behaviour and network performance under a range of planning scenarios
- enable prioritisation of mitigation works.

1.3. Scope of Works

This report outlines the:

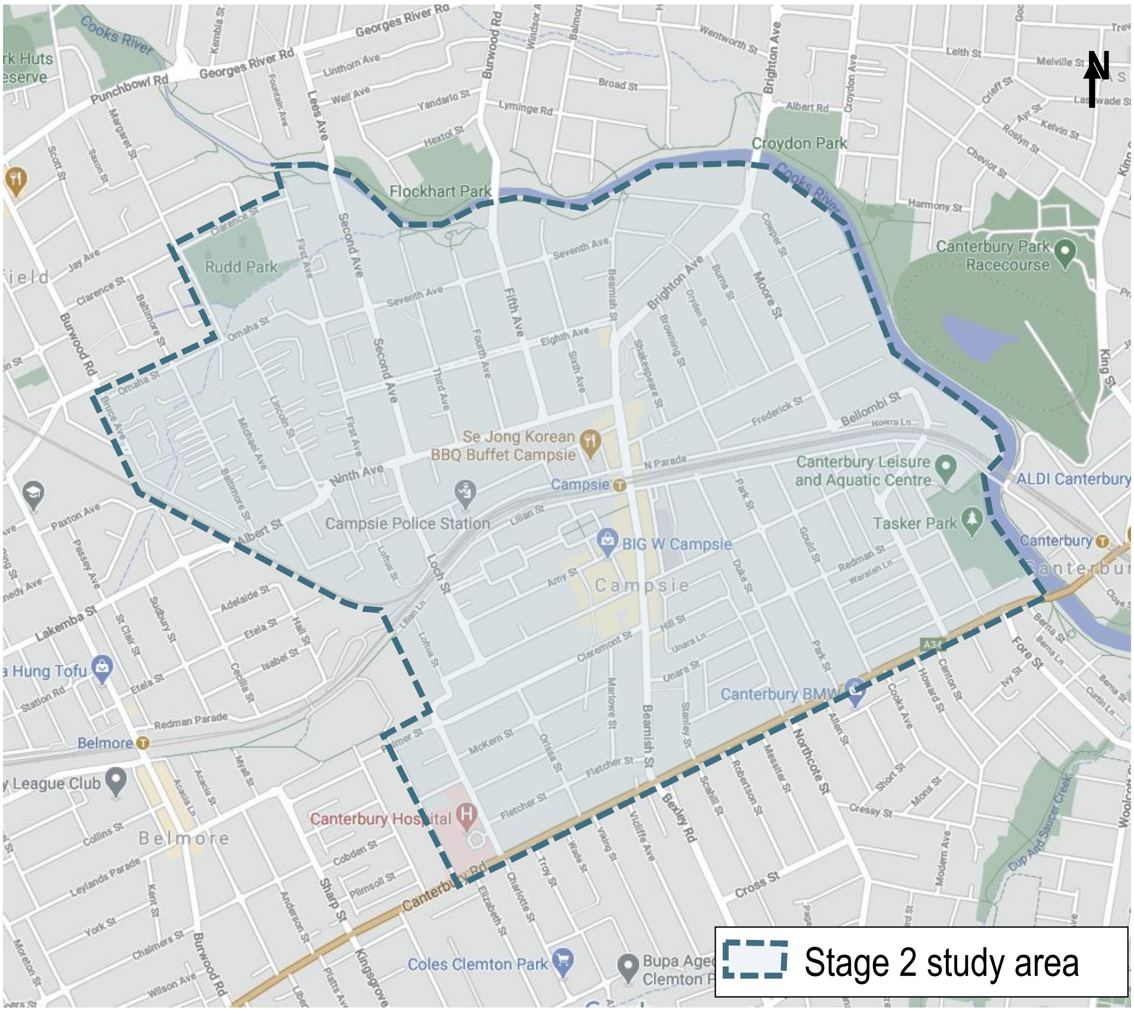
- calibration and validation process and key assumptions made to develop the existing conditions meso model

- existing conditions model results
- development of future year and options scenario meso models
- future year and options scenario model results.

1.4. Study Area

The proposed study area is presented in Figure 1.1 and covers the Campsie town centre. The study area extends from Canterbury Road in the south and is bounded by Cooks River in the north and east, and Burwood Road, the freight rail line and canterbury hospital in the west.

Figure 1.1: Study area extents



Base map source: Google Maps

The study area generally aligns with the study area of the Draft Campsie Master Plan with the exception of a small area south of Canterbury Road, which is shown in Figure 1.2. The Draft Master Plan shows a potential residential / commercial growth within this section and change of use from R3 to R4 zone.

Figure 1.2: Campsie Draft Master Plan study area extents

Source: Campsie Town Centre, March 2021 Master Plan, Final Draft for Exhibition.

1.5. Report Outline

This report sets out an overview of the meso model development process and an assessment of the existing traffic conditions. The report is divided in following sections:

- Chapter 1 Introduction
- Chapter 2 Existing Conditions
- Chapter 3 Model Assumptions
- Chapter 4 Future Year Models
- Chapter 5 Option Scenario Models
- Chapter 6 Conclusion.

2. EXISTING CONDITIONS

02

2.1. Traffic Surveys

Comprehensive traffic data was collected to develop, calibrate, and validate the existing conditions models. A summary of the data collected is provided in Table 2.1.

Table 2.1: Traffic data summary

Data Type	Source	Survey Dates	Survey Time
Annual Average Daily Traffic Data	Transport for NSW	2018, 2019	24 hours
SCATS Detector Volume Data	Transport for NSW	Thursday 21/02/2019	24 hours
SCATS Signal Data	Transport for NSW	Thursday 21/02/2019 Thursday 25/03/2021	24 hours
Intersection Traffic Counts	Matrix	Thursday 25/03/2021	6:00am to 10:00am 3:00pm to 7:00pm
Automatic Tube Counts	Matrix	Wednesday 24/03/2021 to Tuesday 30/03/2021	24 hours
Travel Time Surveys	Matrix	Thursday 25/03/2021	6:00am to 10:00am 3:00pm to 7:00pm

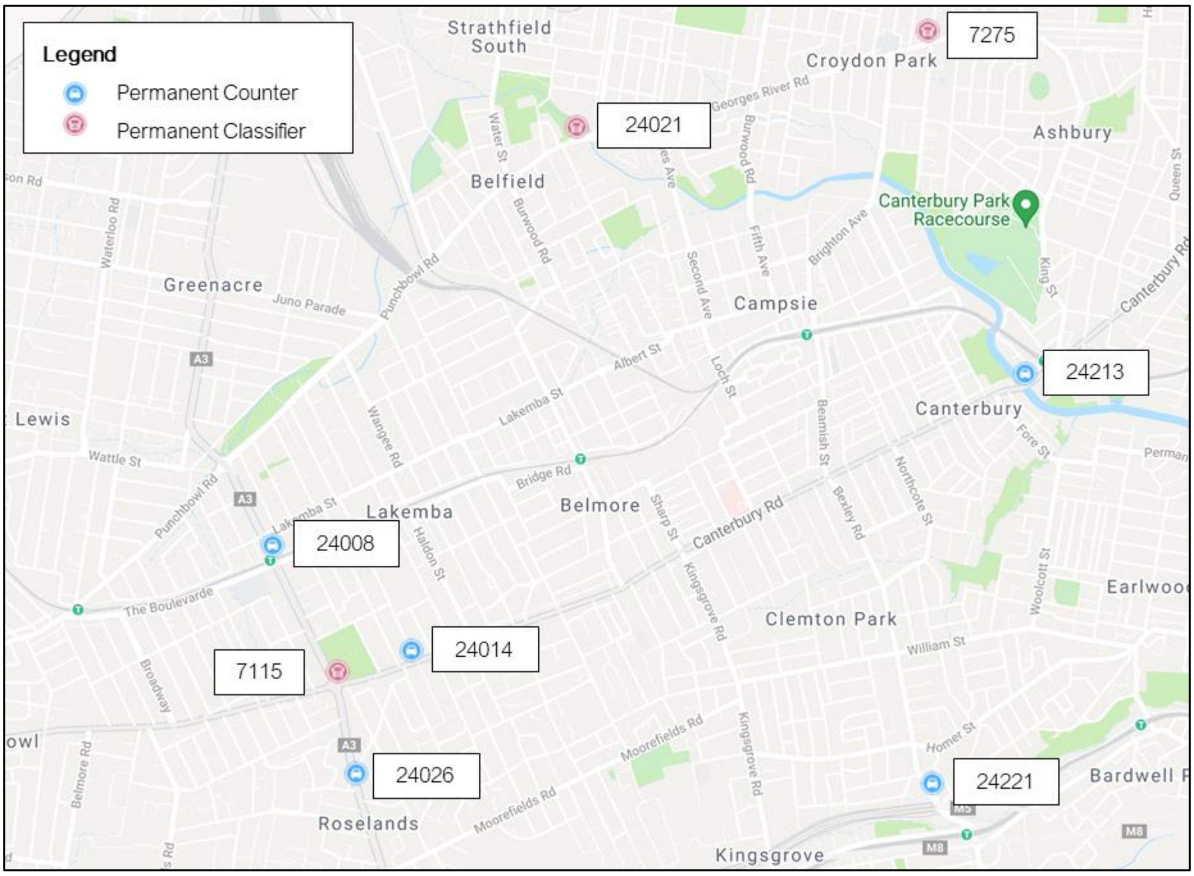
2.1.1. Annual Average Daily Traffic (AADT)

Annual Average Daily Traffic (AADT) data was assessed for eight permanent traffic collection stations identified within the study area, as presented in Table 2.2 and graphically presented in Figure 2.1.

Table 2.2: Permanent traffic collection stations and locations

Number	Station ID	Name	Location
1	7115	Canterbury Road	10m east of King Georges Road, Wiley Park, 2195
2	7275	Georges River Road	10m west of Croydon Avenue, Croydon Park, 2133
3	24008	King Georges Road	40m north of The Boulevarde, Wiley Park, 2195
4	24014	Canterbury Road	30m west of Sproule Street, Roselands, 2196
5	24021	Punchbowl Road	90m east of Margaret Street, Belfield, 2191
6	24026	King Georges Road	30 north of Roseland Avenue, Roselands, 2196
7	24213	Canterbury Road	90m west of Charles Street, Canterbury, 2193
8	24221	Bexley Road	60m north of South-Western Motorway, Kingsgrove, 2208

Figure 2.1: Permanent traffic collection stations map



Base map source: Google Maps

AADT data has been utilised to assess the impacts of COVID (if any) and the impacts of seasonality. Detailed analysis has been provided in Section 2.2.

2.1.2. Intersection Traffic Counts

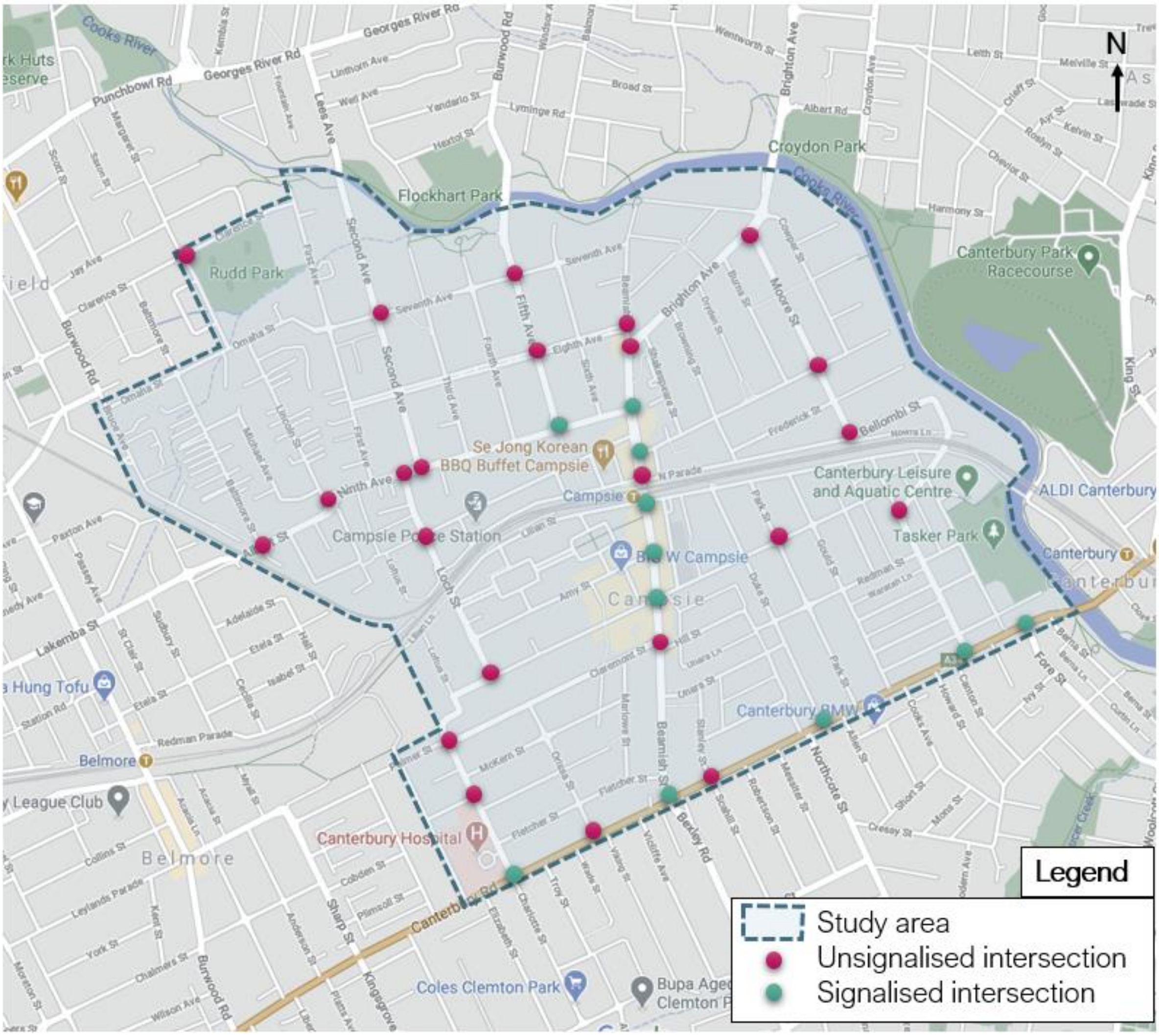
Traffic surveys were undertaken on Thursday 25 March 2021 during both the AM and PM peaks, totalling to an eight (8) hour combined period for the following hours:

- 6:00am to 10:00am in the morning peak
- 3:00pm to 7:00pm in the afternoon peak.

A total of 34 key intersections within the study area were identified for surveying in consultation with Council and are presented in Figure 2.2.

Intersection counts were used for model calibration.

Figure 2.2: Key study intersections

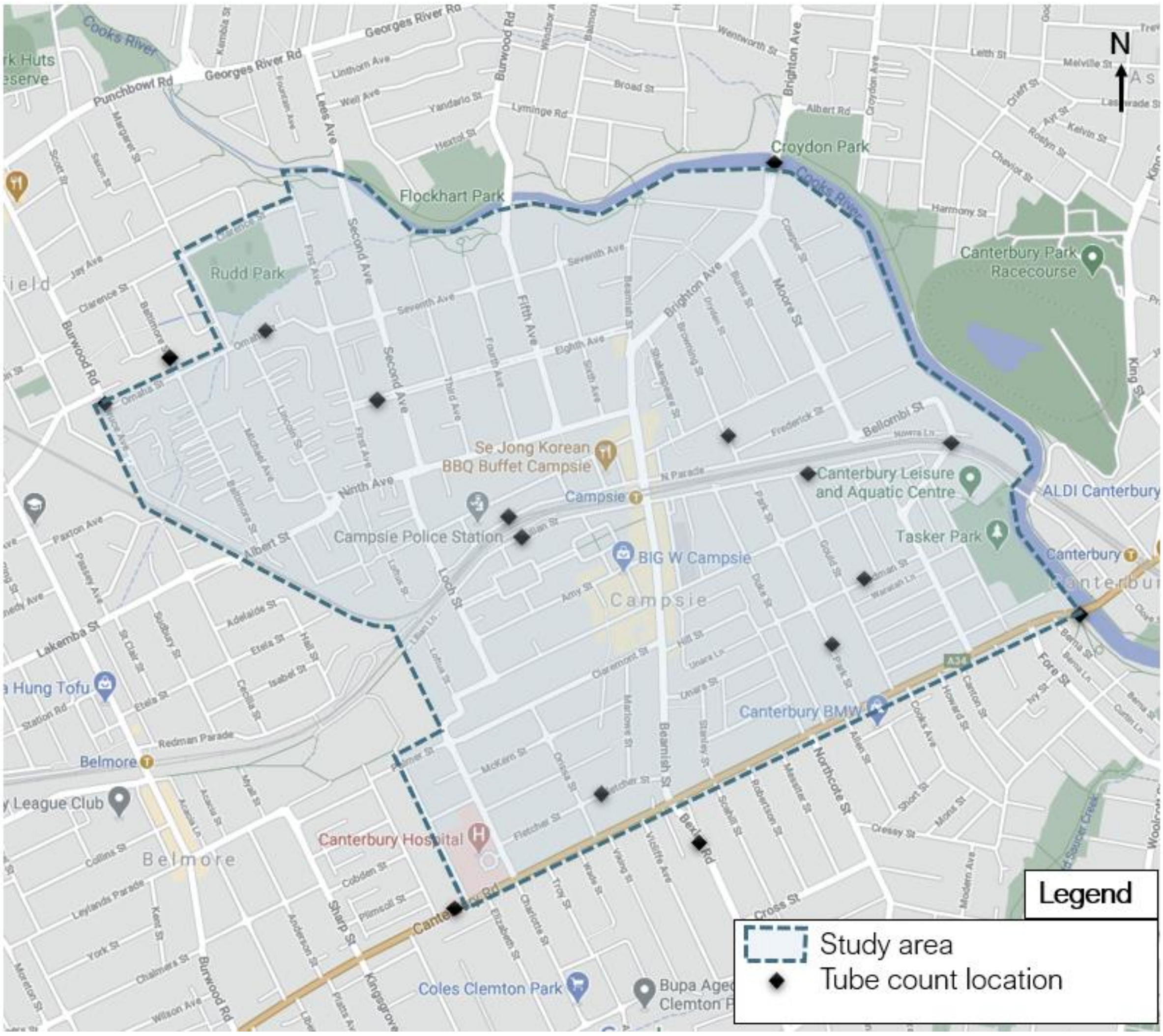


Base map source: Google Maps

2.1.3. Automatic Tube Counts

Automatic tube counts (ATC) were collected at 16 sites within the study area to understand the daily and hourly traffic profiles. The locations of these ATC are presented in Figure 2.3. These were used for model calibration.

Figure 2.3: Automatic tube count locations map

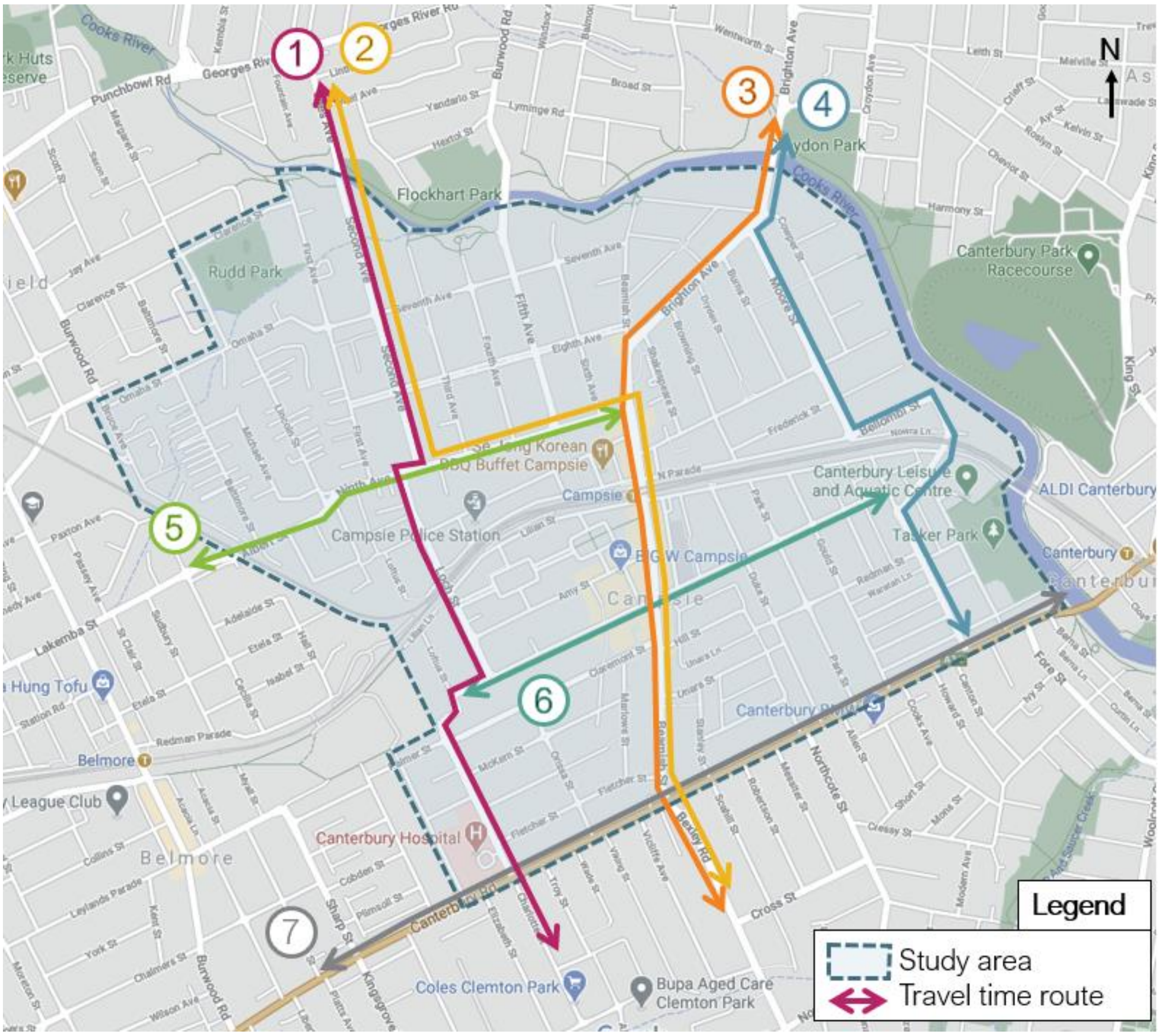


Base map source: Google Maps

2.1.4. Travel Time Surveys

Travel time surveys (based on a floating car survey) were collected for seven (7) key routes within the study area, presented in Figure 2.4 and outlined in Table 2.3. These were used for base model validation. Travel time route descriptions, locations and the number of runs undertaken across each of the peak periods are outlined below.

Figure 2.4: Travel time survey routes locations



Base map source: Google Maps

Table 2.3: Travel time run details

#	Route	Direction	Number of Travel Time Runs	
			AM Peak (6:00am – 10:00am)	PM Peak (3:00pm – 7:00pm)
1	Lees Avenue (south of Linthorn Avenue), Second Avenue, Ninth Avenue, Loch Street, Evaline Street, Loftus Street, Thorncraft Parade (north of Sunbeam Street)	Northbound	30	29
		Southbound	30	30
2	Lees Avenue (south of Linthorn Avenue), Second Avenue, Ninth Avenue, Beamish Street, Bexley Road (north of Cross Street)	Northbound	38	31
		Southbound	37	31
3	Brighton Avenue (south of Albert Street), Beamish Street, Bexley Road (north of Cross Street)	Northbound	28	28
		Southbound	27	28
4	Brighton Avenue (south of Albert Street), Moore Street, Bellombi Street, Nowra Street, Wairao Street, Wonga Street (north of Canterbury Road)	Northbound	39	39
		Southbound	39	38
5	Albert Street (east of Cecilia Street), Ninth Avenue (west of Beamish Street)	Eastbound	29	23
		Westbound	29	23
6	Evaline Street (east of Loftus Street, west of Wonga Street)	Eastbound	28	23
		Westbound	28	23
7	Canterbury Road (east of Platts Avenue, west of Cooks River crossing)	Eastbound	25	22
		Westbound	26	24

2.2. Existing Conditions Analysis

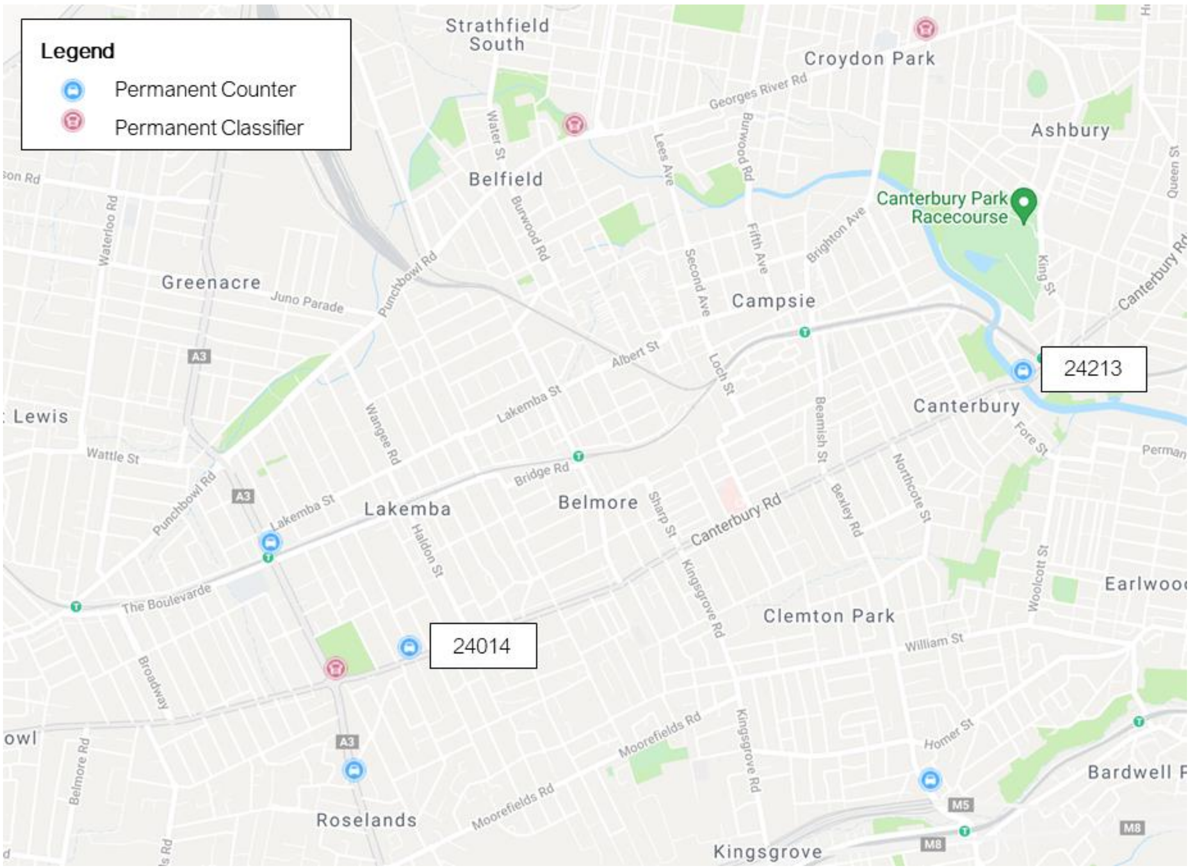
2.2.1. Annual Average Daily Traffic (AADT)

Permanent traffic counters are located in vicinity of the site area. Two stations were selected to assess the seasonality of traffic volumes, these being:

- Station ID: 24213 – Canterbury Road, 90 metres west of Charles Street
- Station ID: 24014 – Canterbury Road, 30 metres west of Sproule Street.

The selected traffic counters are presented in Figure 2.5 below.

Figure 2.5: Selected permanent traffic counter locations



Base map source: Google Maps

Data for year 2018 (for counter 24213) and 2019 (for counter 24014) was analysed to assess the seasonal patterns in this area. Average monthly data is presented in Figure 2.6 and Figure 2.7.

Figure 2.6: Station ID: 24213 – Canterbury Road seasonality analysis

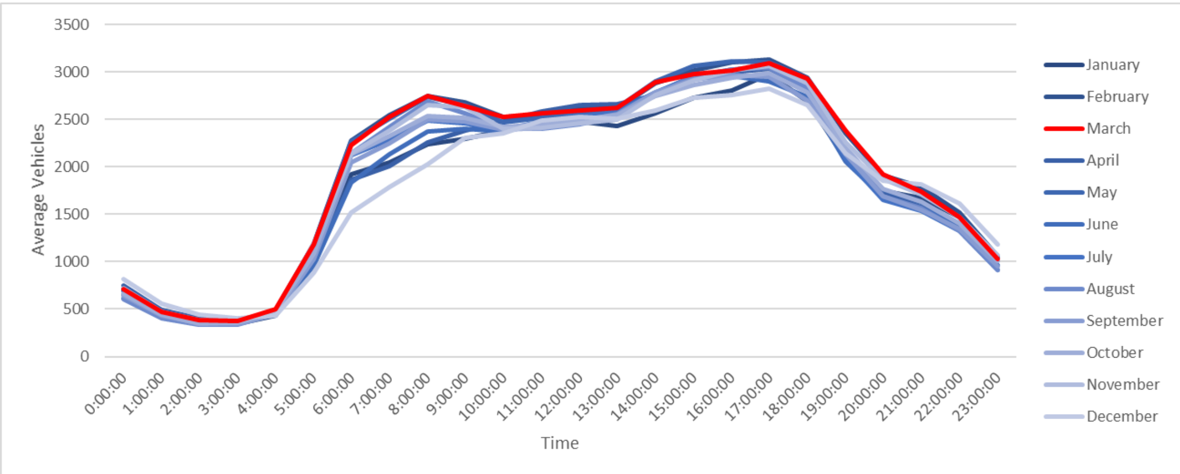
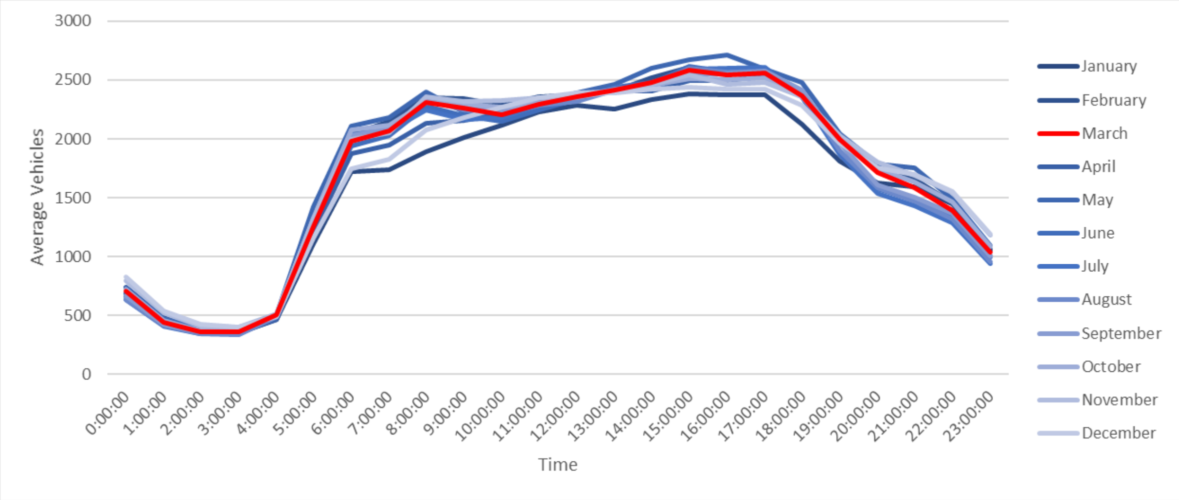


Figure 2.7: Station ID: 24014 – Canterbury Road seasonality analysis



As presented in the graphs, March data generally represents averge traffic at both stations on Canterbury Road. Therefore, based on this data, it was considered that March 2021 data would generally represent average traffic conditions and no adjustmens were required to the survey data to account for the seasonality.

2.2.2. SCATS Detector Volume Data

SCATS detector count data has been provided for Thursday 21 February 2019, to obtain pre-COVID traffic volumes and to assess the impacts of the COVID-19 pandemic on traffic conditions, if any.

The Beamish Street/ Evaline intersection was selected to conduct comparison of data for AM and PM peak periods.

The comparison of data is shown in Figure 2.8 and Figure 2.9 below.

Figure 2.8: Comparison of AM Peaks – SCATS detector volumes/ intersection counts (8:00am-9:00am)

Figure 2.9: Comparison of PM Peaks – SCATS detector volumes/ intersection counts (5:00pm-6:00pm)

The comparison shows that 2021 data is generally comparable to the 2019 data. Traffic along Evaline Street is higher in 2021 compared to 2019, whereas southbound volumes along Beamish Street are slightly lower. This may be attributed to vehicles using other local roads such as Loch Street, Moore Street, Second Avenue and Wonga Street to access Canterbury Road. Peak directions of travel and general traffic patterns are similar between the two years for the AM and PM peak period.

Therefore, the current survey (2021) data was considered suitable in reflecting existing conditions and was utilised for model development, calibration, and validation.

2.2.3. Existing Traffic Volumes

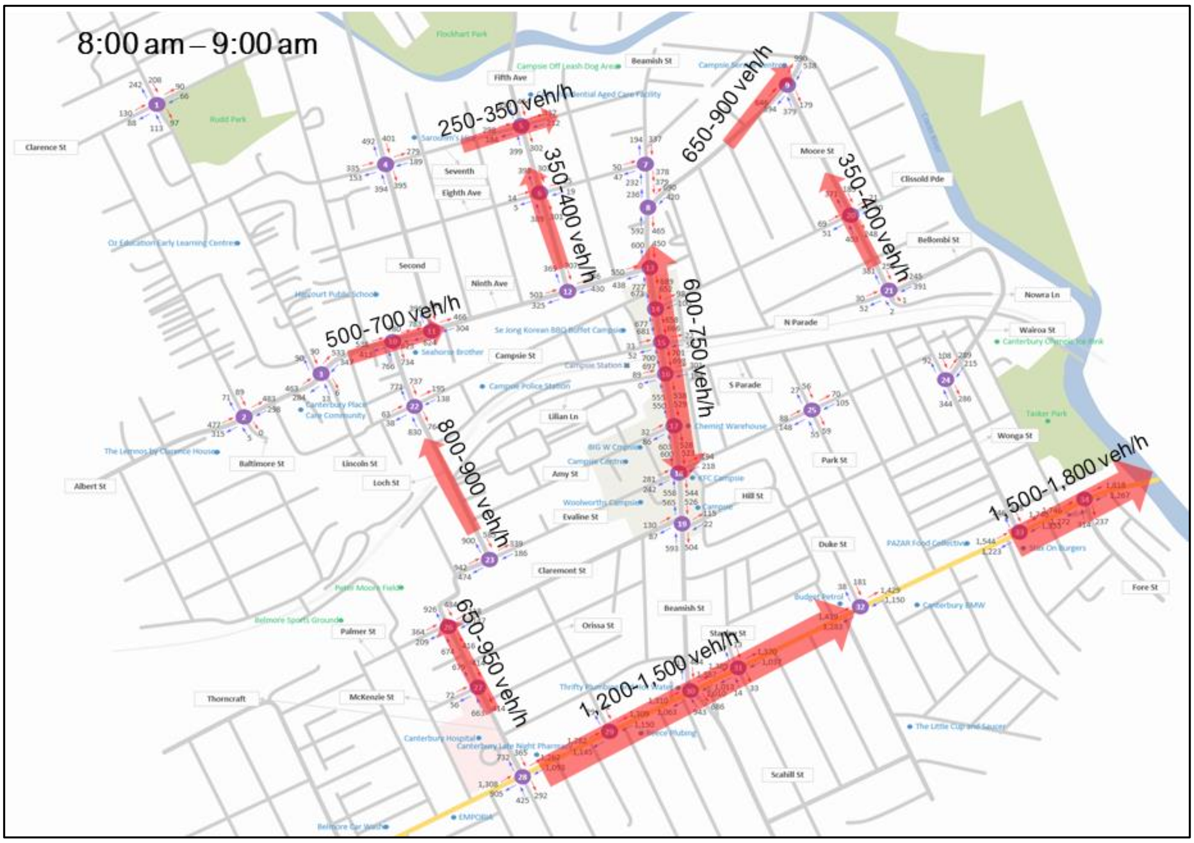
Hourly traffic volumes for the AM and PM peak hours for each of the surveyed intersections is presented in Appendix D.

As expected, a relatively high amount of traffic is observed on the key roads within Campsie such as:

- Canterbury Road - between 3,500 to 4,000 vehicles per hour approaching the intersection of Canterbury Road and Beamish Street.
- Beamish Street - between 1,000 to 1,500 vehicles per hour travelling along the main corridor of Beamish Street between Ninth Avenue and Canterbury Road.
- Ninth Avenue – between 1,000 to 1,500 vehicles per hour travelling along Ninth Avenue, with 1,500 to 2,000 vehicles approaching the intersection with Beamish Street.

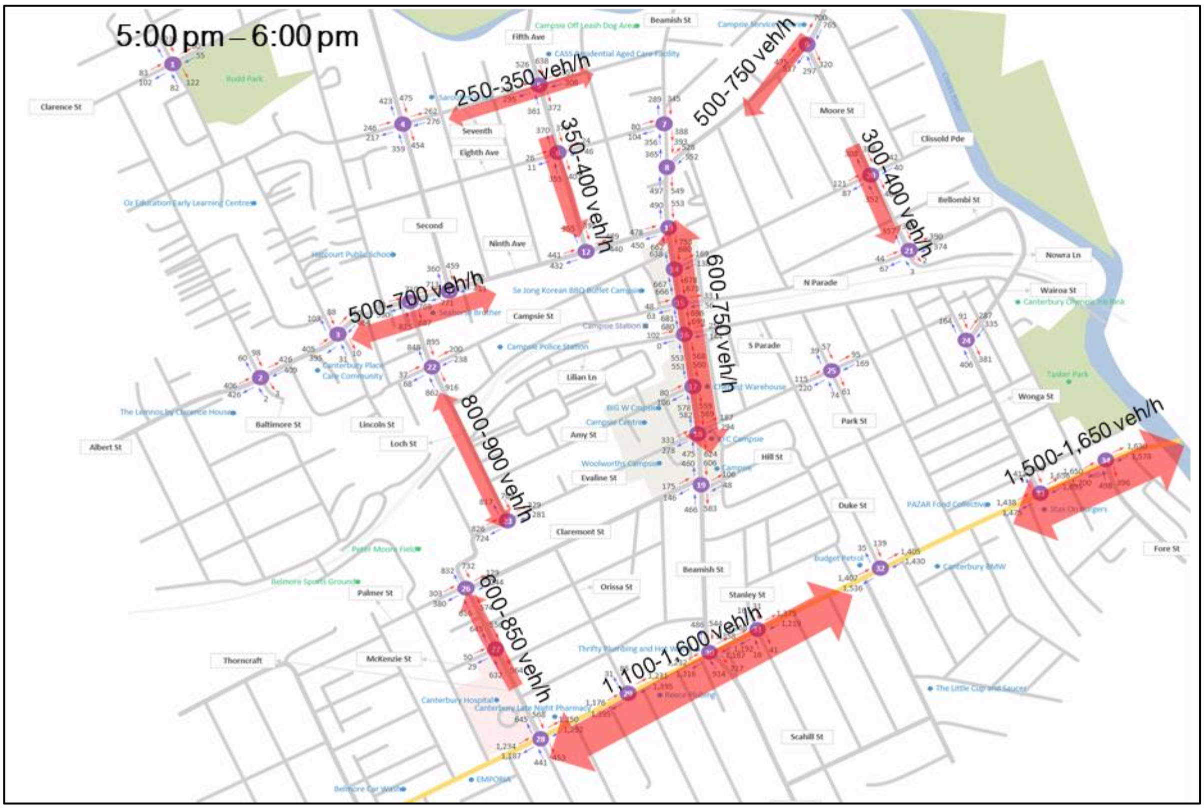
Mid-block traffic volumes for a number of road links in the AM and PM peak hours are presented in Figure 2.10 and Figure 2.11 respectively.

Figure 2.10: Midblock Traffic Volumes - AM Peak (8:00am-9:00am)



Base map source: Matrix

Figure 2.11: Midblock Traffic Volumes - PM Peak (5:00pm–6:00pm)



Base map source: Matrix

Analysis of the existing mid-block traffic counts indicates the following:

- The peak direction of travel during the AM peak period is north-east towards Sydney CBD, with commuters also utilising local roads as well as Beamish Street, Canterbury Road and Brighton Avenue.
- During the PM peak period mid-block flows are generally more distributed, with similar amount of traffic along Canterbury Road and Beamish Street in both directions.
- During the PM peak hour, the peak direction of travel along Brighton Road appears to be southbound towards the Campsie town centre.

2.2.4. Existing Speed Profile

Overall average travel times for each of the routes surveyed are presented in Table 2.4.

Table 2.4: Surveyed Travel Time Results – Four Hour Average

Route ID	Route	Period	Direction	Average Speed (km/h)	Total Travel Time (mins)
Route 1	Lees Avenue, Second Avenue, Ninth Avenue, Loch Street, Evaline Street, Loftus Street, Thorncraft Parade	6:00am - 10:00am	NB	24	7 minutes 14 seconds
			SB	24	7 minutes 8 seconds
		3:00pm - 7:00pm	NB	24	7 minutes 2 seconds
			SB	22	7 minutes 50 seconds
Route 2		6:00am - 10:00am	NB	24	8 minutes 35 seconds

Route ID	Route	Period	Direction	Average Speed (km/h)	Total Travel Time (mins)
	Lees Avenue, Second Avenue, Ninth Avenue, Beamish Street, Bexley Road		SB	22	9 minutes 16 seconds
		3:00pm-7:00pm	NB	19	10 minutes 30 seconds
			SB	18	11 minutes 2 seconds
Route 3	Brighton Avenue, Beamish Street, Bexley Road	6:00am-10:00am	NB	23	6 minutes 58 seconds
			SB	22	7 minutes 2 seconds
		3:00pm-7:00pm	NB	20	7 minutes 58 seconds
			SB	20	8 minutes 0 seconds
Route 4	Brighton Avenue, Moore Street, Bellombi Street, Nowra Street, Wairao Street, Wonga Street	6:00am-10:00am	NB	34	3 minutes 42 seconds
			SB	26	4 minutes 52 seconds
		3:00pm-7:00pm	NB	34	3 minutes 45 seconds
			SB	26	4 minutes 58 seconds
Route 5	Albert Street, Ninth Avenue	6:00am-10:00 am	EB	24	3 minutes 38 seconds
			WB	31	2 minutes 44 seconds
		3:00pm-7:00pm	EB	21	4 minutes 8 seconds
			WB	24	3 minutes 39 seconds
Route 6	Evaline Street	6:00am-10:00am	EB	24	3 minutes 42 seconds
			WB	23	3 minutes 44 seconds
		3:00pm-7:00pm	EB	17	5 minutes 3 seconds
			WB	20	4 minutes 19 seconds
Route 7	Canterbury Road	6:00am-10:00am	EB	28	5 minutes 46 seconds
			WB	30	4 minutes 56 seconds
		3:00pm-7:00pm	EB	27	5 minutes 29 seconds
			WB	27	5 minutes 31 seconds

In general, the average speed for the key routes varies between 20km/h and 30km/h for both AM and PM peak hours, except for vehicles along Route 2 (Beamish Street) during the PM period. In addition, Route 6 (Evaline Street) has noticeably slower average speeds for eastbound traffic during the PM peak.

Lower average speeds over the entire route are a good indication that the route in its entirety experiences delays (and in turn congestion) and thus these roads are expected to operate close to capacity. To understand which sections are performing at poor levels, level of service was estimated for each section of each of the surveyed routes. This is detailed in the section below.

2.2.5. Section Level of Service

The Levels of Service (LOS) of a section of a road can be measured by the average travel speeds along the section. The LOS thresholds as compared to the base Free Flow Speed (FFS) is defined in the Austroads *Guide to Traffic Management, Part 3 – Transport Study and Analysis Methods* and is provided in Table 2.5.

For this analysis, the posted speed limit is assumed to be the base FFS and LOS D (or above) representing the acceptable performance level.

Table 2.5: Section Level of Service Criteria

Travel speed as a percentage of base Free Flow Speed (FFS)	LOS
>85	A
>67-85	B
>50-67	C
>40-50	D
> 30-40	E
≤30	F

The sections operating close to or at poor levels of service (E or F) for the peak hours are presented in Table 2.6 below.

Table 2.6: Section Performance for Peak Hour– Level of Service

Route	Direction	Street	End Section	Posted Speed Limit (km/h)	AM (8:00-9:00)		PM (5:00-6:00)	
					Avg. Speed (km/h)	LOS	Avg. Speed (km/h)	LOS
1	NB	Charlotte Street	Canterbury Road	50	15	F	17	E
		Thorncraft Parade	Palmer Street	50	27	C	19	E
		Loch Street	Ninth Avenue	50	28	C	22	D
		Second Avenue	Seventh Avenue	50	30	C	28	C
		Lees Avenue	Linthorn Avenue	50	31	C	28	C
	SB	Second Avenue	Seventh Avenue	50	30	C	28	C
		Loch Street	Evaline Street	50	27	C	21	D
		Thorncraft Parade	Palmer Street	50	27	C	24	D
		Charlotte Street	Canterbury Road	50	16	E	21	D
		Charlotte Street	Sunbeam Street	50	30	C	30	C
2	NB	Bexley Road	Canterbury Road	60	26	D	24	D
		Beamish Street	Evaline Street	50	13	F	13	F
		Beamish Street	Ninth Avenue	40	25	C	23	C
		Ninth Avenue	Fifth Avenue	40	23	C	25	C
		Ninth Avenue	Second Avenue	50	20	D	12	F
		Second Avenue	Seventh Avenue	50	30	C	31	C
		Lees Avenue	Linthorn Avenue	50	30	C	30	C
	SB	Second Avenue	Seventh Avenue	50	31	C	30	C

Route	Direction	Street	End Section	Posted Speed Limit (km/h)	AM (8:00-9:00) Avg. Speed (km/h)	AM (8:00-9:00) LOS	PM (5:00-6:00) Avg. Speed (km/h)	PM (5:00-6:00) LOS
		Ninth Avenue	Fifth Avenue	50	25	D	24	D
		Beamish Street	Evaline Street	40	18	D	12	F
		Bexley Road	Canterbury Road	50	21	D	14	F
		Bexley Road	Cross Street	60	48	B	46	B
3	NB	Bexley Road	Canterbury Road	60	21	E	13	F
		Beamish Street	Evaline Street	50	16	E	12	F
		Beamish Street	Brighton Avenue	40	27	C	25	C
		Brighton Avenue	Albert Street	50	25	C	30	C
	SB	Brighton Avenue	Moore Street	50	28	C	26	C
		Beamish Street	Brighton Avenue	50	36	B	33	C
		Beamish Street	Evaline Street	40	22	C	16	E
		Bexley Road	Canterbury Road	50	17	E	17	E
		Bexley Road	Cross Street	60	44	B	44	B
4	NB	Wonga Street	Wairoa Street	50	41	B	40	B
		Bellombi Street	Moore Street	50	34	B	32	C
		Moore Street	Clissold Parade	50	38	B	37	B
		Brighton Avenue	Albert Road	50	28	C	32	C
	SB	Brighton Avenue	Moore Street	50	30	C	29	C
		Moore Street	Clissold Parade	50	37	B	36	B
		Bellombi Street	Moore Street	50	37	B	37	B
		Wonga Street	Canterbury Road	50	24	D	24	D
5	EB	Ninth Avenue	Fifth Avenue	50	24	D	24	D
		Ninth Avenue	Beamish Street	40	14	E	13	E
	WB	Ninth Avenue	Fifth Avenue	40	30	B	28	B
		Ninth Avenue	Loch Street	50	22	D	13	F
		Albert Street	Cecilia Street	50	37	B	36	B
6	EB	Evaline Street	Loch Street	50	17	E	23	D
		Evaline Street	Beamish Street	40	11	F	9	F
		Evaline Street	Wonga Street	50	27	C	32	C
	WB	Evaline Street	Beamish Street	50	23	D	28	C
		Evaline Street	Loch Street	40	29	B	22	C
		Evaline Street	Loftus Street	50	17	E	17	E

Route	Direction	Street	End Section	Posted Speed Limit (km/h)	AM (8:00-9:00)		PM (5:00-6:00)	
					Avg. Speed (km/h)	LOS	Avg. Speed (km/h)	LOS
7	EB	Canterbury Road	Cooks River Crossing	60	24	E	35	C
	WB	Canterbury Road	Platts Avenue	60	34	C	32	C

The results presented in Table 2.6, indicate that:

- Congestion occurs at the key intersections with heavy conflicting flows along both Canterbury Road and Beamish Street.
- Generally, sections along the southern boundary of the study area (connecting to Canterbury Road) and within Beamish Street are expected to operate at capacity (LOS E or F) due to the heavy traffic (1,000-1,500 vehicles per hour) estimated along these key roads. This is in line with the observed travel patterns and traffic volumes as presented in Section 2.2.3.
- Based on the average speeds estimated along the sections, the following intersections are expected to be operating at capacity (LOS D or worse) with long delays and queues at some or all approaches:
  - Beamish Street/ Ninth Avenue
  - Canterbury Road/ Charlotte Street
  - Canterbury Road/ Beamish Street/ Bexley Road
  - Canterbury Road/ Wonga Street
  - Beamish Street/ Evaline Street
  - Loch Street/ Ninth Avenue.
- A number of sections along Beamish Street are generally operating at or close to capacity (LOS E or worse) especially in the PM peak hours.
- Congestion is also observed along Loch Street during the PM peak, with sections operating at LOS E.

3. MODEL ASSUMPTIONS

03

3.1. Modelling Platform

The model was developed using Aimsun Next version 20.0.2.

3.2. Network

The base network was developed with an import of OSM with reference to the major connections in the Sydney Travel Forecasting Model (STFM) base model network. Additional connections were introduced where appropriate to produce a more refined network and zoning structure. The network geometry was coded with reference to Google Maps and NearMap aerial photography to ensure the network was represented accurately.

3.3. Time Period

A two-hour period was modelled as part of this study for both the AM and PM peak periods with 30-minute warm-up and 30-minute cool-down periods, created by profiling the peak period demands. Table 3.1 lists the modelled peak times.

Table 3.1: Modelled Time Periods

Peak	Warm-up times	Model Period	Cool Down
AM Peak	6:45am–7:15am	7:15am–9:15am	9:15am–9:45am
PM Peak	2:45pm–3:15pm	3:15pm–5:15pm	5:15pm–5:45pm

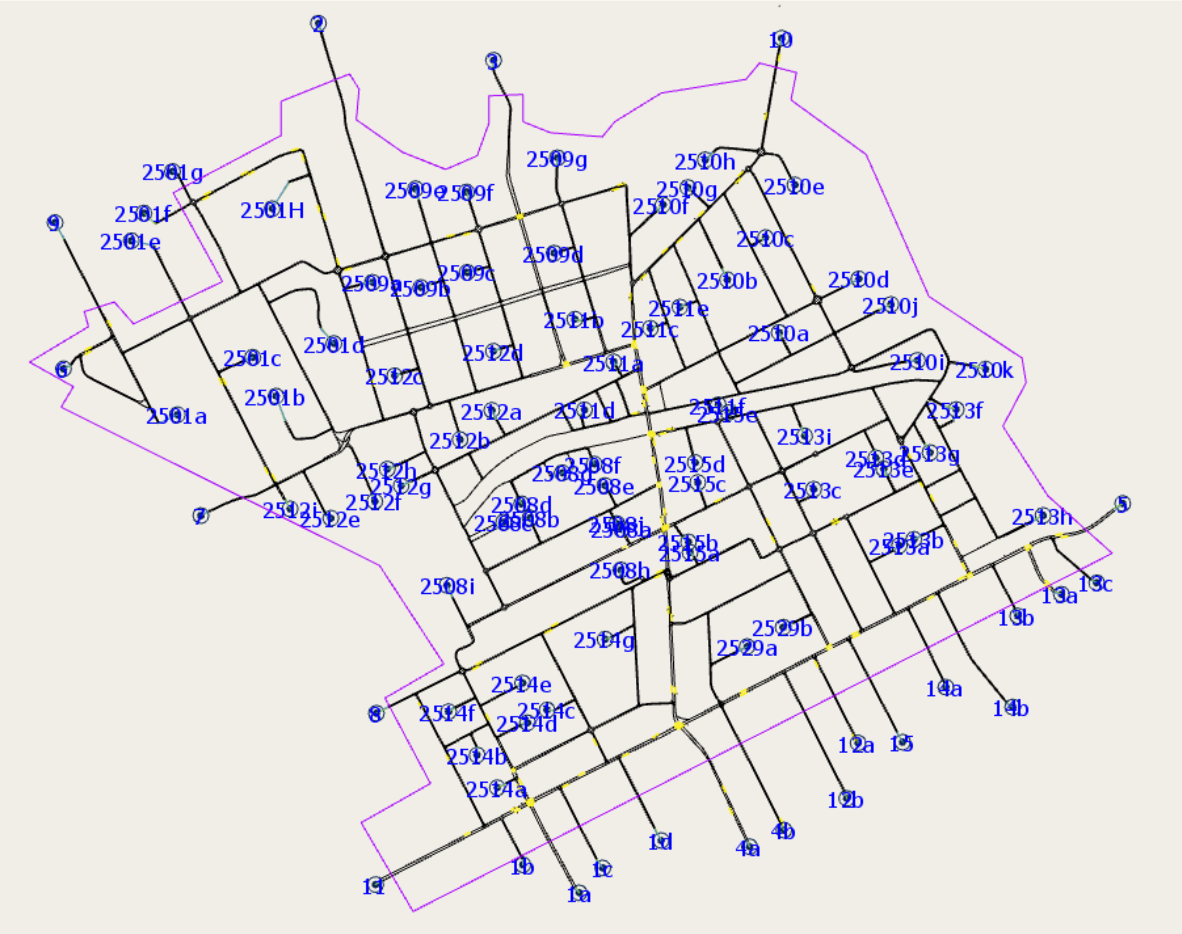
3.4. Vehicle Types

Two vehicle types were adopted: light vehicles (LV) and heavy vehicles (HV). Matrices for both vehicle types were developed and calibrated separately.

3.5. Traffic Zones

The model zoning system comprises 97 travel zones, shown graphically in Figure 3.1. All external zones are numbered 1 to 15, and all internal zones are named with the corresponding STFM zone followed by a letter system.

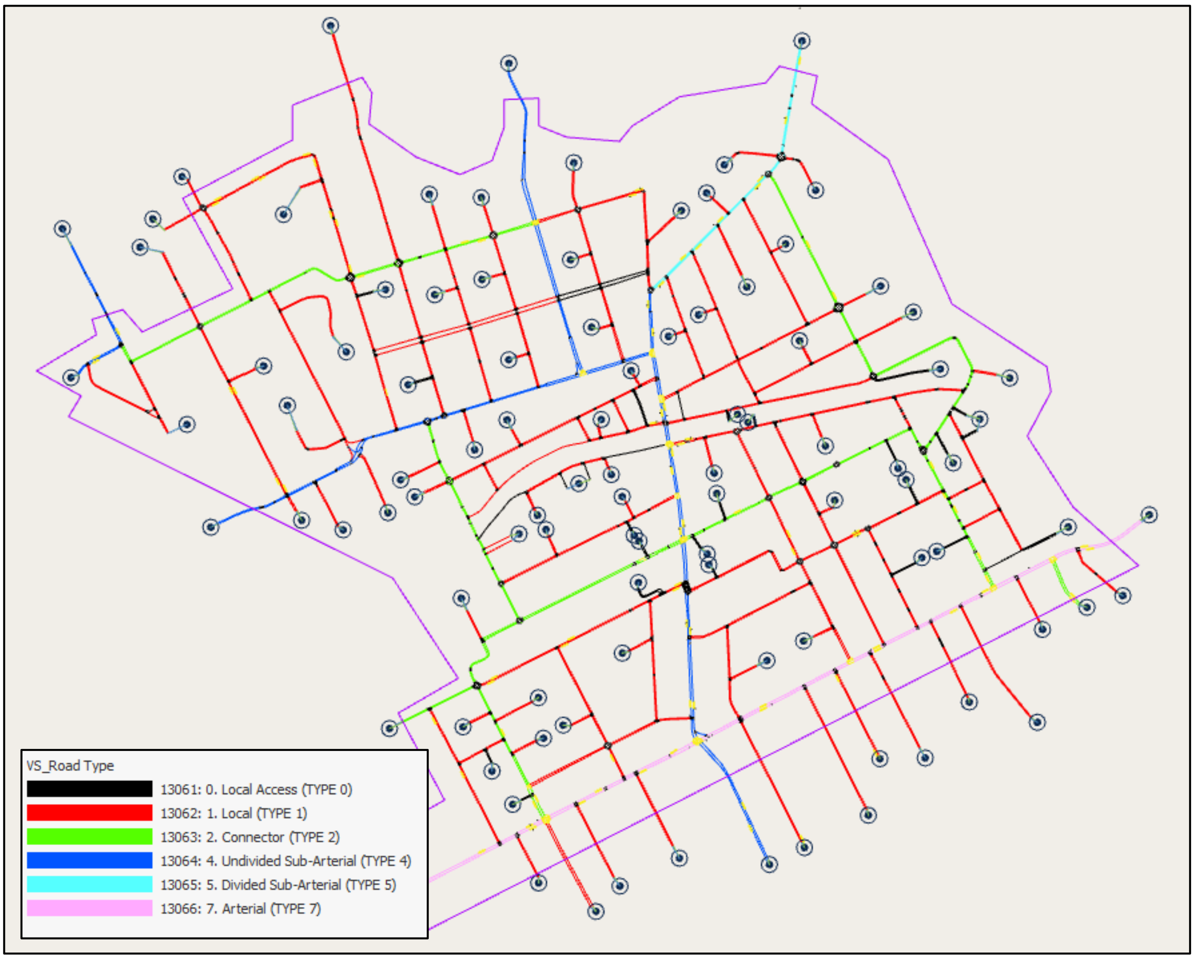
Figure 3.1: Aimsun Model Zones



3.6. Road Types

Roads were coded to match the existing road network and intersection geometry including the correct configuration, lane designation and permitted turning movements. U- turns were permitted and coded at roundabouts. The modelled road hierarchy is presented in Figure 3.2.

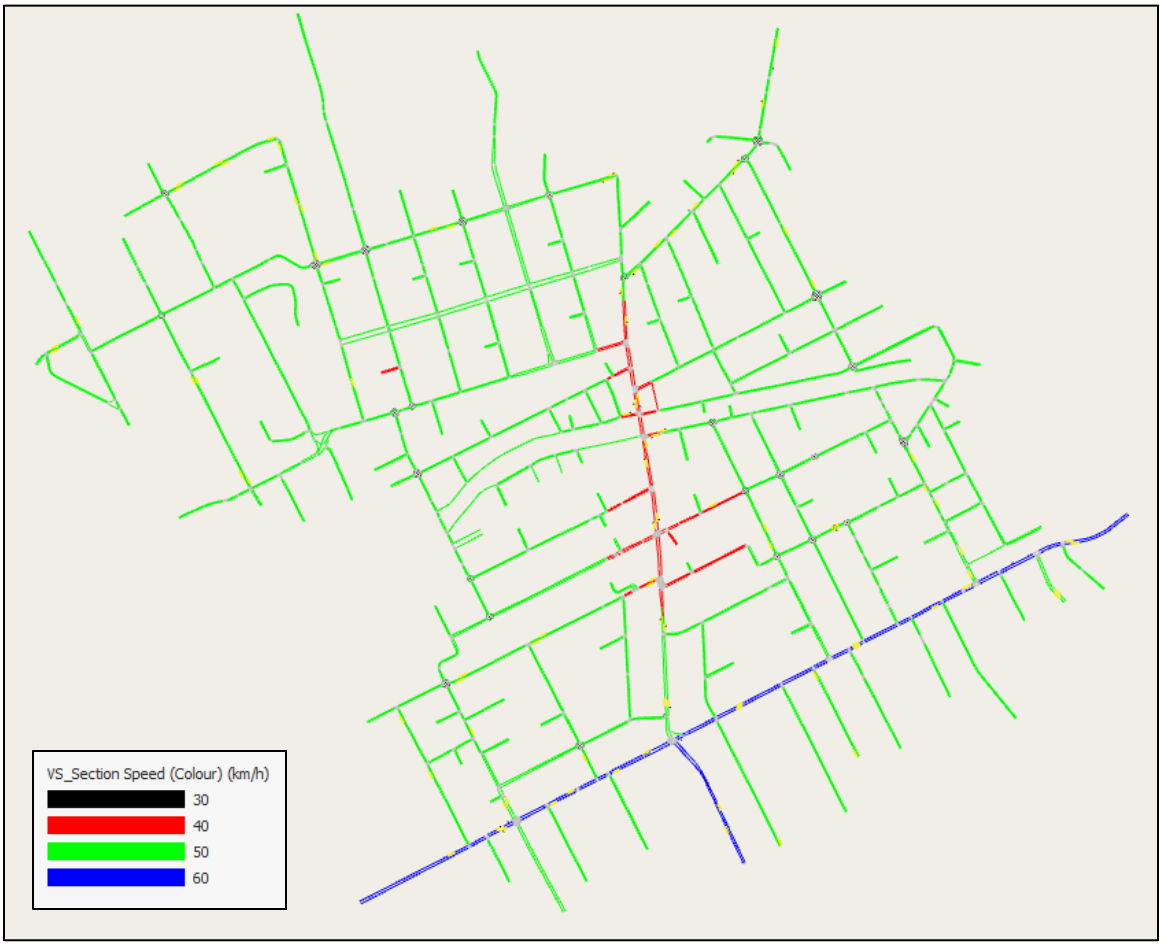
Figure 3.2: Modelled Road Types



3.7. Speed Profiles

Sign posted speed limits were used throughout the model and this is presented in Figure 3.3. A majority of the network is 50km/h, with the only exceptions being Canterbury Road (60km/h) and Beamish Street through Campsie town centre (40km/h).

Figure 3.3: Modelled Speeds



3.8. School Zones

There are three school zones within the study area that are restricted to 40km/h speed limits during school time periods. The schools are:

1. Harcourt Public School
2. Wangee Park School
3. Campsie Public School.

The 40km/h speed zones are presented in Figure 3.4 and were only implemented during the school hours of 8:00am to 9:30am and 2:30pm to 4:00pm.

Figure 3.4: School Zones within the Study Area

3.9. Traffic Signals

3.9.1. SCATS

Traffic signal characteristics for the base year model were derived from an extensive analysis of SCATS data. All intersections and interchanges within the model cordon were developed with actuated control. The signal groups and the associated detector functionalities and phasing specifications were all estimated from analysis and interrogation of provided traffic signal control plans and historic signal timings (SCATS data).

Minimum and maximum green times for each signal phase were calculated in one-hour intervals for each intersection in the corresponding modelled period. Phase sequences, signal offsets and special conditions were incorporated as relevant to existing SCATS operations.

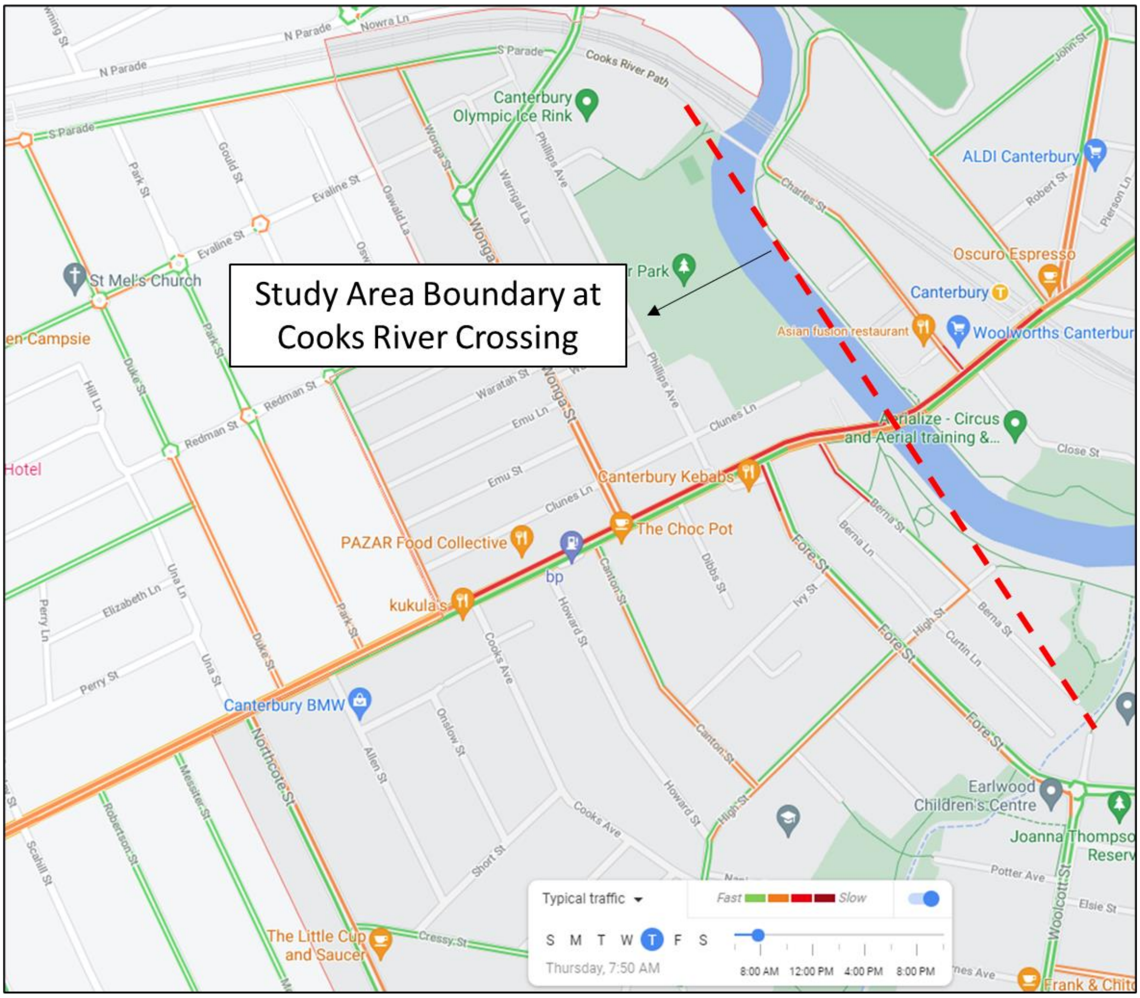
The linking of intersections can vary throughout the day within SCATS; however, it is typical that Link Plan 4 operates during the AM peak while Link Plan 2 operates during the PM peak. Analysis of the SCATS LX data outlined that the signalised intersections are coordinated along Canterbury Road and along Beamish Street. Offsets have been applied to the model accordingly.

It is noted that some adjustments were made to the signal timing to account for pedestrian movements. As pedestrians were excluded from the model, the green times for pedestrian affected movements were adjusted based on expected delays and approximate call frequency rate of the signalised crossing.

3.9.2. Canterbury Road End Constraints

Travel times and congestion along Canterbury Road indicated significant congestion originates outside of the study area. The congestion on Canterbury Road in the eastbound direction can be seen to originate to the east of Cooks River Crossing, at the Broughton Street intersection. This is shown graphically by the Google Maps estimated traffic tool in Figure 3.5.

Figure 3.5: Google Maps Congestion at Cooks River Crossing (AM Peak)

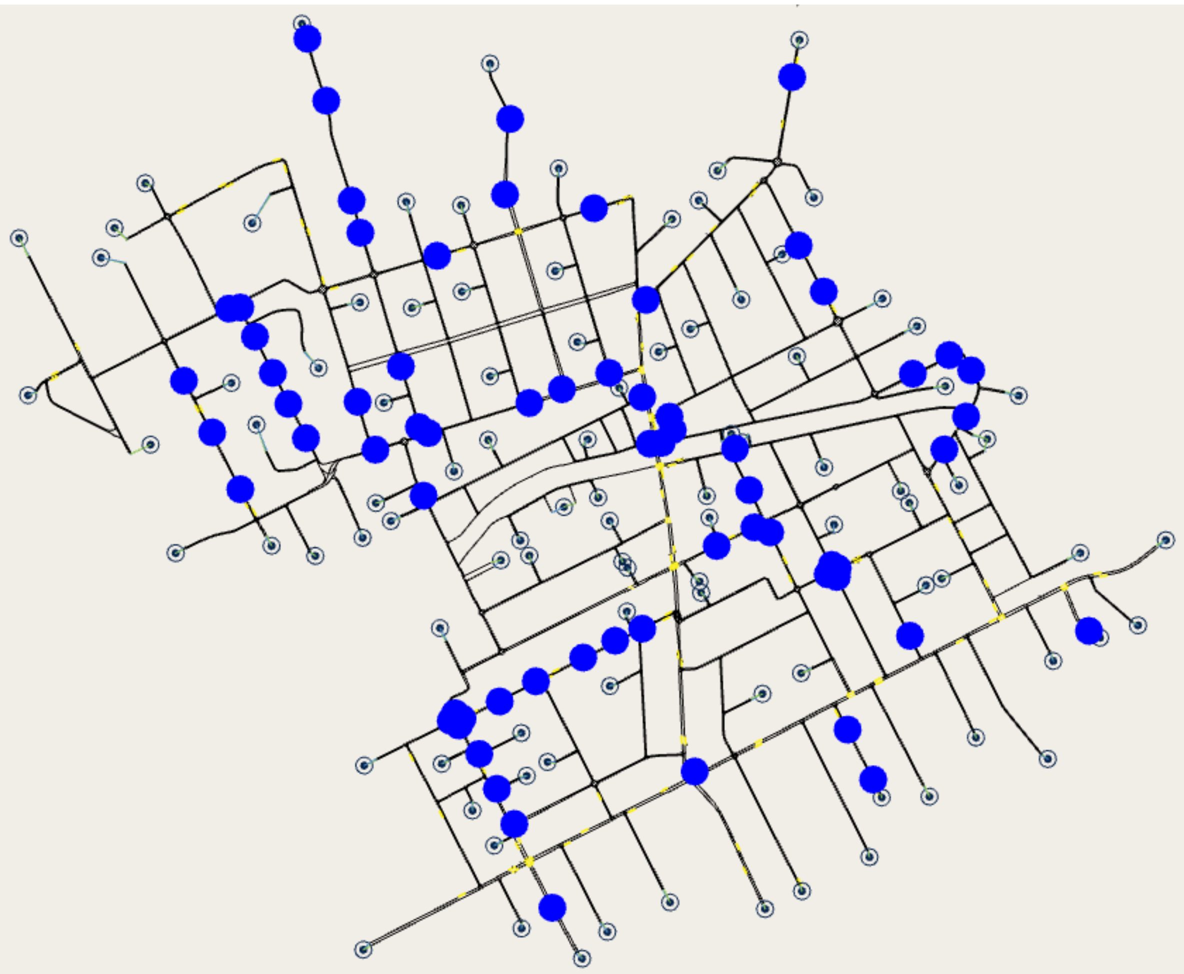


In order to replicate this in the base model, the signal data for the signalised intersections either side of Canterbury Road study area boundaries were analysed. Metering was included in the model at both ends of Canterbury Road to replicate the average green times applied to the movements exiting the model. It is noted that due to the actuated control of these intersections, the average green times required slight adjustment in the validation process.

3.10. Traffic Management

The Campsie model study area includes a large number of routes with traffic calming devices (speed bumps). Locations of speed bumps in the study area are outlined in Figure 3.6.

Figure 3.6: Speed Bump Locations within the study area



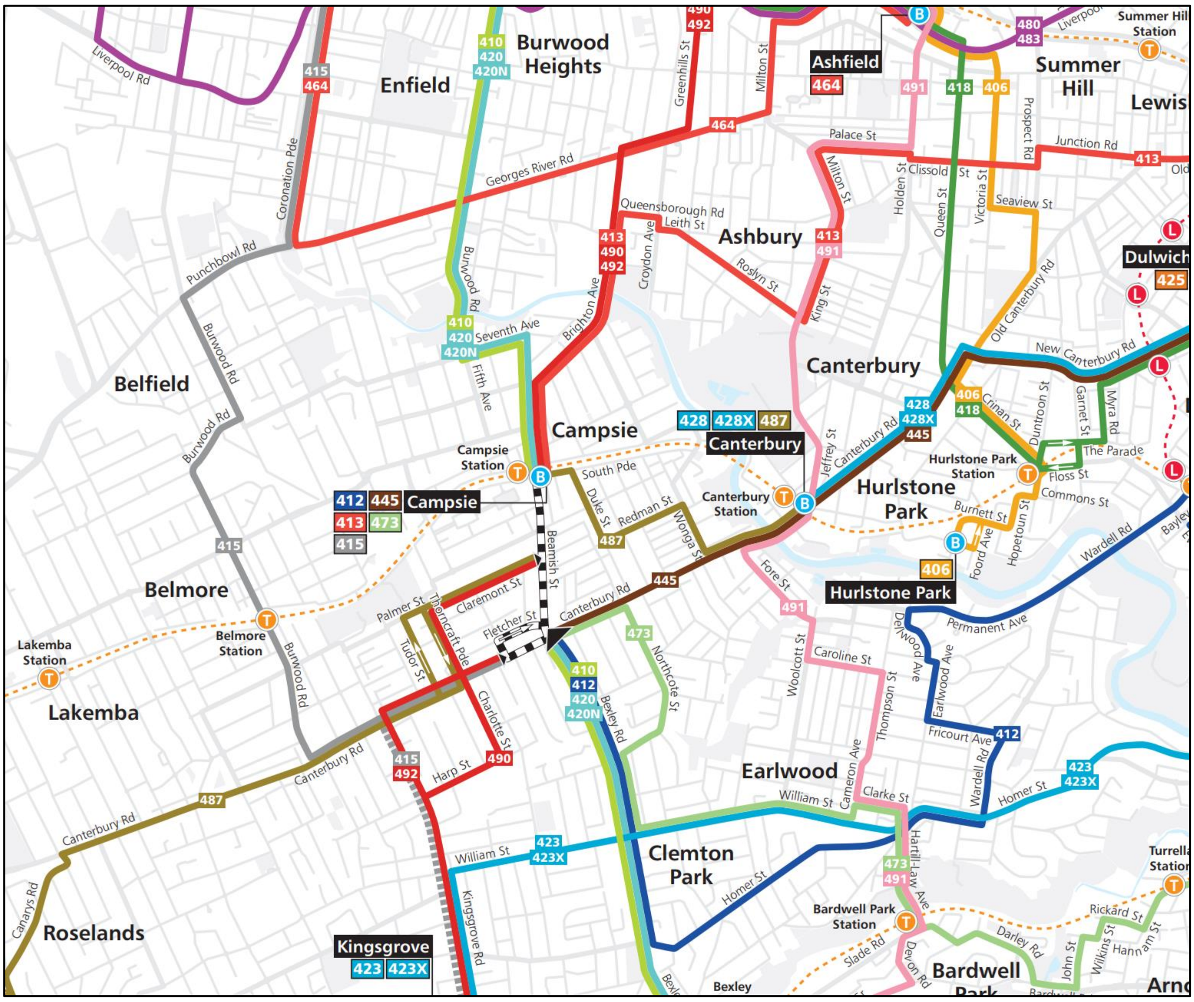
In addition to the above locations, there are a number of locations, particularly along Beamish Street with high pedestrian activity and friction caused by on-street parking (parallel parking). For all these locations, appropriate speed reductions have been developed to reflect the reduced speeds occurring due to the combination of all of these factors. These speed reductions have been coded as traffic management plans within Aimsun and have been applied directly to the Stochastic Route Choice assignments, as it is deemed due to the extensive reach of these speed reductions across the study area that they will not influence route choice.

3.11. Public Transport

All public transport lines and schedules are coded as fixed routes as per the latest timetables available from the open source General Transit Feed Specification (GTFS) data.

A map of the public transport routes and services included in the model is shown in Figure 3.7.

Figure 3.7: Public Transport Map

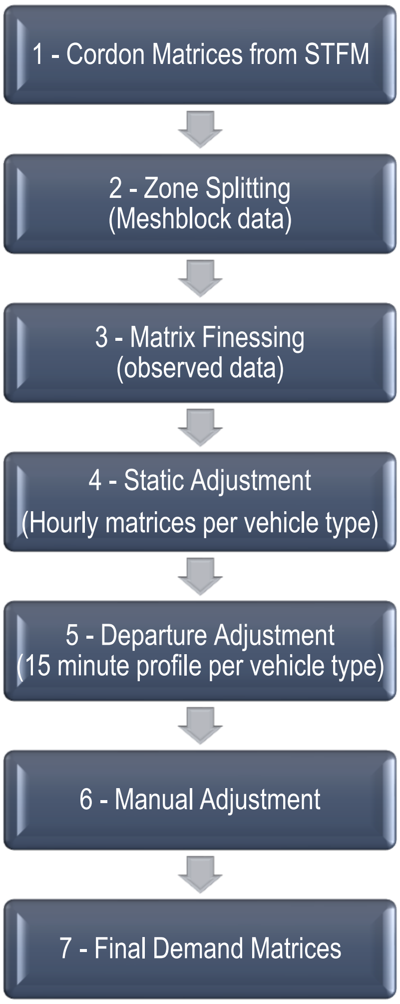


Base image source: Transit Systems Inner West Network Map

3.12. Demand Development

Six key steps were undertaken during the development of the demand matrices as outlined in Figure 3.8.

Figure 3.8: Base Model Demand Development Procedure



1. *Cordon Matrices from STFM* – cordon matrices were extracted from the STFM provided for the study area as outlined in the Campsie Stage 1 Analysis report, 17/03/2021. These matrices provide the initial OD structure at the Travel Zone level.
2. *Zone Splitting* – travel zones were further disaggregated into a more detailed structure for the additional detail required for the mesoscopic model. Mesh block data are a refined subset of SA1 data sets and are the 'building blocks' of the census data. 2016 mesh block data has been used to determine the proportion of trips being attracted and generated by each of the zones within each travel zone to proportion the demand obtained from step 1 to the new zone structure. It is noted that each mesh block has been assigned to a centroid only within the corresponding STFM zones. QGIS was used to initially analyse this data and provide a platform to appropriately match geographic locations and zones. A screenshot of this analysis can be seen in Figure 3.9 below.

Figure 3.9: QGIS mesh block analysis for STFM to Aimsun zone disaggregation

3. *Matrix Finessing* – the survey data was utilised to determine the known origin and destination totals and the OD pair totals. The matrices developed in step 2 were refined (finessed) to match the totals while maintaining the structure of the matrix.
4. *Static Adjustment* – the matrices from step 3 were then imported into Aimsun where the static adjustment tool was used to further refine the matrix to represent survey data.
5. *Departure Adjustment* – a departure adjustment scenario was undertaken in Aimsun to determine the 15-minute demand profile.
6. *Manual Adjustments* – some minor additional manual adjustments were undertaken to better reflect observed counts and congestion in the network. Only two manual adjustments were made, with both in the PM peak demands, where initial assumptions on the zone split around Beamish Street in Campsie town centre needed refinement.

The resultant demand profiles for the normal weekday AM and PM peak periods are presented in Figure 3.10 and Figure 3.11 while a comparison of the trip length distribution between the prior and the adjusted matrix is shown in Figure 3.12, Figure 3.13, Figure 3.14 and Figure 3.15 for the AM and PM peaks respectively.

Figure 3.10:Traffic Demand Profile AM Peak

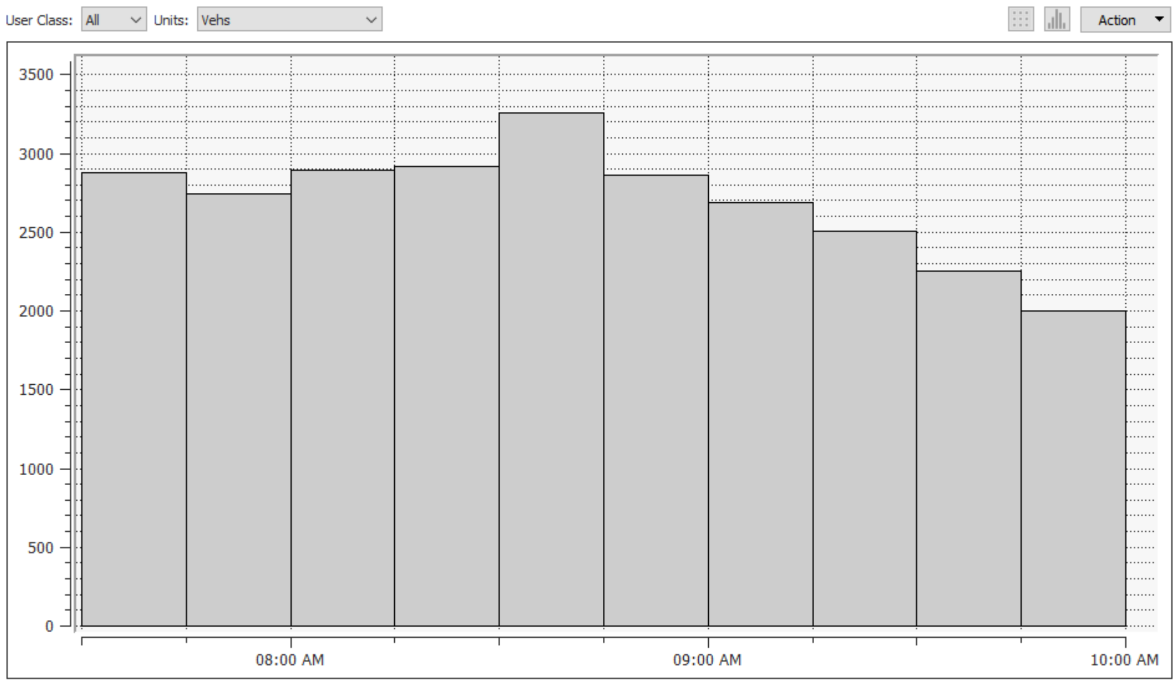


Figure 3.11:Traffic Demand Profile PM Peak

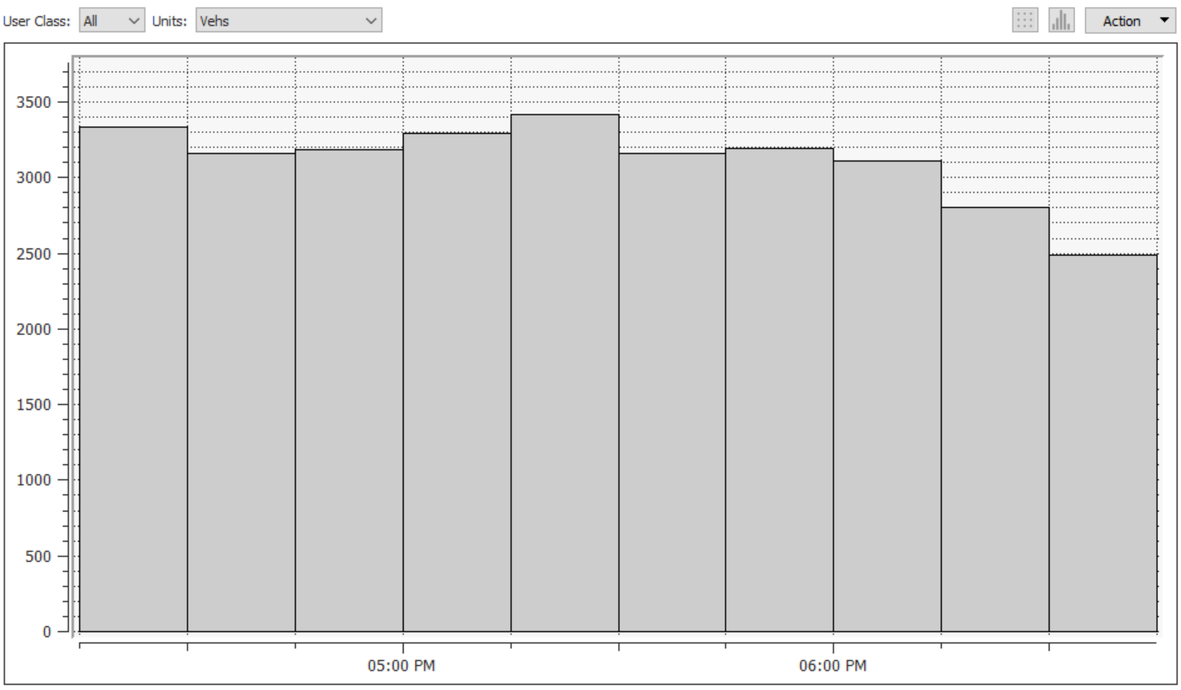


Figure 3.12: Trip Length Distribution – AM Peak (7:30am – 8:30am)

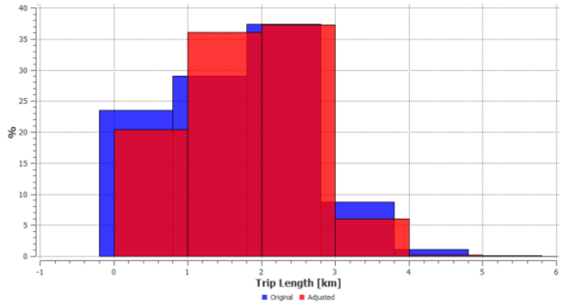


Figure 3.13: Trip Length Distribution – AM Peak (8:30am – 9:30am)

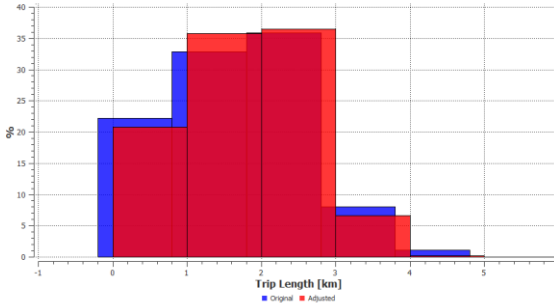


Figure 3.14: Trip Length Distribution – PM Peak (4:15pm – 5:15pm)

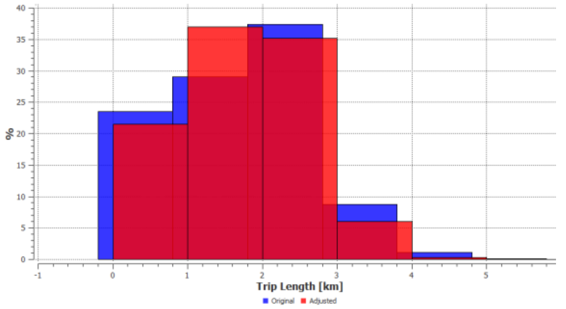
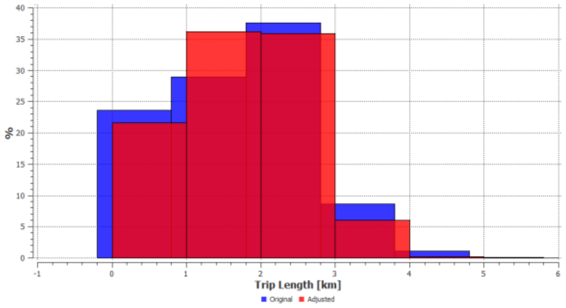


Figure 3.15: Trip Length Distribution – PM Peak (5:15pm – 6:15pm)



The trip distribution figures show that minimal changes have been made in the overall distribution from the STFM estimated prior matrices and the adjusted demands estimated with the static adjustment experiments for both hours of the AM and PM peaks.

3.13. Assignment

Two assignment types within the Aimsun software package were adopted to inform and develop the base year model demands. The static (macro) and dynamic (mesoscopic) assignment types are discussed below to indicate their purpose in the assessment.

3.13.1.Static Assignment

Prior to running the dynamic scenario, a static assignment experiment was run to generate an initial path assignment file (APA file) for use as a starting point for the dynamic scenario. This provides a suitable base with available paths from which the vehicles in the dynamic scenario will follow. An industry accepted check of the paths generated in the static assignment was undertaken by utilising the select link analysis and path assignment tools, pinpointing reasons for the unrealistic paths or bad matches between the survey and the modelled results. To ensure unrealistic paths were eliminated, Volume Delay Functions (VDF) were refined and applied with one set VDF for each road type. The VDF refinements incorporated adjusted factors based on both section speed and section capacity to ensure similar route choices were made between STFM (as per select link analysis outputs) and the Aimsun Mesoscopic Base Model.

3.13.2.Dynamic User Equilibrium Route Choice Assignment

Dynamic User Equilibrium (DUE) traffic assignment within the Aimsun models was used to run the dynamic scenarios. This is considered the most appropriate method given the scope of the road network model and potential future alternate routes that may alter travel patterns.

The DUE assignment is an iterative process where vehicles are released into the model network, select a preferred route, and respond to the cost of their route choice (as a function of travel time and delay) as a result of traffic conditions within the model, changing its route if deemed appropriate. This provides a realistic representation of the actual driver behaviour where drivers have their own perception on when to make the decision and change their route and avoid delays.

The DUE assignment runs over a number of iterations (predetermined maximum) until it reaches the maximum, or a state of equilibrium or convergence measured as the relative gap in the path costs for each path assignment cycle (15 minutes). Achieving convergence before the maximum iterations is exhausted indicates that the travel behaviour in the network between the previous and current iteration is able to be closely replicated for the entire simulation period, therefore suggesting the model is in a stable condition and suitable for assessment.

During the model development process, the following process was undertaken to ensure that the demands were suitable for each of peak period simulations:

- Each DUE assignment was assessed in terms of relative gap, regression slope, number of vehicles waiting to enter, number of vehicles in the network and the number of vehicles that went through.
- Validity of the DUE paths were assessed to ensure unrealistic paths were not being assigned between any origin-destination pairs.

3.14. Dynamic Cost Function

The dynamic cost function for the meso model was adjusted from the default cost function provided within the Aimsun software. This was undertaken to not only consider travel time as a cost but also distance travelled. A comparison of the two functions is shown below:

Default Cost Function

Dynamic Cost = TT + TT x AW x A + UDCW * UDC

Adjusted Cost Function

Dynamic Cost = TT + TT x AW x A + UDCW x UDC + D x DW

Where:

TT = Estimated Travel Time

A = Attractiveness

AW = Attractiveness Weight

UDC = User Defined Cost

UDCW = User Defined Cost Weight

D = Distance

DW = Distance Weight

Further, the methodology used to calculate the attractiveness weight of each link was adjusted to reflect attractiveness as a function of road type and not overall capacity. This was adjusted as the default methodology applies greater differences to the attractiveness weighting for higher order roads and less of an impact for lower order roads. This does not reflect overall route choice in which vehicles will typically choose higher order roads based on travel time of total journey with local roads used typically used to access the desired destination.

3.15. Behaviour Parameters

Table 3.2 provides a summary of all global model parameters used to simulate the existing conditions and outlines any departures from the default values.

Table 3.2: Global Parameters

Parameters	Default Value	Model Value
Reaction Time	1.2	1.2
Reaction Time at Traffic Light	1.6	1.6
DUE Model	Gradient Based	Gradient Based
Maximum Iterations	20	20
Relative Gap	0.5%	0.5%
Arrivals	Exponential	Uniform
Attractiveness Weight	0	4
User Defined Cost Weight	0	0

Any changes to these global parameters were made to better reflect the current behaviour of the transport system as part of the standard model calibration process.

3.15.1.Vehicle Parameters

Default vehicle parameters were adopted for the model except for the changes outlined in Table 3.3.

Table 3.3: Vehicle Parameters

Parameters		Car		Truck	
		Default Value	Model Value	Default Value	Model Value
Speed Limit Acceptance	Mean	1.10	0.85	1.05	0.85
	Deviation	0.10	0.10	0.10	0.10
	Minimum	0.90	0.75	1.00	0.75
	Maximum	1.30	0.95	1.10	0.95

The travel time data analysis generally indicated that vehicles within the study area adhere to posed speed limits. This is further enforced by presence of multiple speed cameras and red-light cameras along key routes and intersections within the LGA. Therefore, the Speed Limit Acceptance was reduced from the default values to ensure all simulated vehicles will travel below the posted speed limits.

3.16. Calibration and Validation criteria

The base model was calibrated and validated in accordance with TfNSW 'Traffic Modelling Guidelines – 2013'. Table 3.4 presents the relevant targets:

Table 3.4: Adopted Calibration and Validation Criteria

Item	Criteria
Turn Volumes	Tolerance limits for turn volumes: • GEH ≤ 5 for at least 85% of link flows • GEH ≤ 5 for at least 85% of turn flows • All Link and turn flows should have GEH ≤ 10 • R^2 value for Observed vs. Modelled plots to be >0.9.
Travel Time Average	• Average modelled journey time to be within 15% or one minute (whichever is greater) of average observed journey time for full length of route. • Average modelled journey time to be within 15% of average observed journey time for individual sections.
Model Stability	• Model convergence should be achieved. Parameters for convergence have been adopted from the Transport for London traffic modelling guidelines and consist of the following. • 95% of all path volumes change by less than 5% for at least four (4) consecutive iterations. • 95% of travel times on all paths change by less than 20% for at least four (4) consecutive iterations.

Full details of the model calibration and validation process are included in Appendix A, B and C.

4. FUTURE YEAR MODELS

04

4.1. Future Year Scenarios

As discussed in the Stage 1 modelling report, an alternative route, west of Campsie Town Centre (Option 1), is being considered to provide an alternative north-south connection between Canterbury Road and Georges River Road. Option 1 is also expected to alleviate some congestion from Beamish Street, providing opportunities for land use uplift within the Campsie Town Centre.

To test the potential impacts and benefits of the proposal, it is also necessary to develop a suitable baseline in which to compare the results. To this end, the existing road network conditions have been modelled under the following future year scenarios for both the AM and PM peak periods to enable appropriate comparisons:

- 2026 Future Base (Do Minimum)
- 2036 Future Base (Do Minimum).

The Future Base (Do Minimum) model results are discussed within this section of the report, whilst the Option Testing is discussed in Section 5.

4.2. Future Year Demand

4.2.1. Methodology

The future year demands have been obtained from the strategic modelling undertaken and discussed within the Stage 1 modelling report. The future STFM scenarios considered various future infrastructure changes that have impacted the study area future demands; however, the zone structure for the study area itself have remained consistent between base and Future Do Minimum scenarios. The following process summarises the steps undertaken in order to develop Future Do Minimum Aimsun model demands:

1. Using a cordon to represent the Masterplan Area in the Stage 1 STFM model, calculate 2-hour OD demand differences between Base and Future Do Minimum STFM scenarios (i.e., STFM 2026 AM Peak – STFM 2019 AM Peak).
2. Absolute demand differences were then applied to each Aimsun 15-minute matrix, by vehicle type, based on the proportion of those demands for the corresponding overall STFM zone.
3. Warm-up and cool-down matrices were given the same proportions to the first and last 15-minute matrix as was done for the base models.

4.2.2. Demand Summary

The following table outlines the 2-hour total demands applied in the Aimsun mesoscopic models. These include traffic travelling through the study area as well as traffic travelling within the study area.

Table 4.1: 2-hour Aimsun Total Demands – Future Base

Peak	2021 (Base)	2026		2036	
	Demand	Demand	Growth (p.a.)	Demand	Growth (p.a.)
AM Peak	22,741	25,361	2.3%	27,508	0.8%
PM Peak	25,862	28,756	2.2%	31,104	0.8%

4.3. Future Do Minimum Model Assumptions

4.3.1. Road Network

For the future do minimum models, the road network, including all intersection configuration, method of control, speed limits, traffic management measures (i.e., speed bumps) have remained exactly as per the base year base model. The only exception to this is for the future PM models which experienced issues in the mesoscopic scenarios at the Ninth Avenue, Loch Street and Second Avenue roundabouts. In a number of the SRC experiments, this area caused unrealistic network-wide gridlock. The base model traffic management plan at this location had originally been carried through to the Future Do Minimum PM scenarios, with the school zone speed limit (40km/h) further reduced to 30km/h due to speed bumps. It was determined that this particular traffic management plan was the cause of the gridlock issues. For the purposes of this assessment, this traffic management plan was altered back to the school zone posted speed limit of 40km/h. This was applied for both the Future Do Minimum 2026/2036 PM scenario and the Future Option 2026/2036 PM scenarios.

4.3.2. Traffic Signal Timing

For the future do minimum modelling, some minor changes have been permitted to the control plans developed for the signalised intersections to accommodate changes in demands. The changes made to the control plans have altered the minimum and maximum phase time permitted to operate for various approaches. These changes have been limited to the Canterbury Road, Beamish Street and Bexley Road intersection, which is a major cause of congestion for the study area both north-south and east-west and required some optimisation for various movements.

It is also noted that the base model end constraints applied at either end of Canterbury Road, to replicate exterior congestion issues, have been maintained in the Future Do Minimum model scenarios.

4.4. Future Do Minimum Model Results

4.4.1. Overview

The following sections outline the expected level of performance under the 2026 and 2036 Future Do Minimum model scenarios in comparison to the 2021 Base year model results. Analysis includes the following:

1. Network Performance
   - overall performance
   - density plots.
2. Travel Times

All scenarios have been run with 5 seeds as per the calibrated and validated base models, with the outputs reported for the median seed of each.

4.4.2. Overall Network Performance

The following network performance statistics have been reported on for comparative purposes:

- Vehicle Kilometres Travelled – VKT (km) represents the total travelled distance of all vehicles during the simulation period.
- Vehicle Hours Travelled – VHT (h) represents the total travel time of all vehicles during the simulation period.
- Average Speed (km/h) represents the average speed of all vehicles during the simulation period (VKT/ VHT).
- Delay (sec/km) represents the average delay of all vehicles during simulation period per unit distance (sec/km).
- Latent Demand (vehicles) represents the unreleased demand into the network at the end of the simulation period.

A summary of the network performance of the existing road network under the future 2026 demands in comparison to the base 2021 as well as 2036 demands in comparison to 2026 is presented in Table 4.2.

Table 4.2: Future Base – Do Minimum Network Performance Statistics

Peak Period	Time	Network Statistic	Base	Future Do Minimum	
			2021	2026	2036
AM Peak	7:30am–8:30am	VKT (km)	19,211	20,911	21,623
				8.8%	3.4%
		VHT (h)	809	1,097	1,191
				35.6%	8.6%
		Average Speed (km/h)	27.1	25.0	24.9
				-7.7%	-0.6%
		Delay (sec/km)	63	95	103
				50.5%	9.0%
	8:30am–9:30am	VKT (km)	19,424	21,175	22,043
				9.0%	4.1%
		VHT (h)	773	1,181	1,330
				52.8%	12.6%
		Average Speed (km/h)	28.1	24.1	23.6
				-14.3%	-2.1%
		Delay (sec/km)	54	104	122
				93.6%	16.5%
		Latent Demand (veh)	1	502	1,153
				50100%	130%
PM Peak	4:15pm–5:15pm	VKT (km)	21,630	23,551	25,064
				8.9%	6.4%

Peak Period	Time	Network Statistic	Base	Future Do Minimum	
			2021	2026	2036
		VHT (h)	855	945	1,111
				10.5%	17.6%
		Average Speed (km/h)	28.1	27.8	26.2
				-1.2%	-5.7%
		Delay (sec/km)	54	56	70
				5.1%	23.4%
	5:15pm–6:15pm	VKT (km)	21,815	23,656	25,169
				8.4%	6.4%
		VHT (h)	862	1,089	1,409
				26.4%	29.3%
		Average Speed (km/h)	27.9	25.6	23.5
				-8.2%	-8.4%
		Delay (sec/km)	54	76	108
				40.1%	42.5%
		Latent Demand (veh)	1	1	23
				0%	2200%

The following key outcomes are noted with regards to the overall network statistics:

- AM Peak:
  - Across the overall road network, VKT and VHT have increased in 2026 and 2036 Do Minimum scenarios. This is predominantly due to the increased demand.
  - Average speeds for all vehicles across the entire network can also be expected to reduce by 7-15% in 2026 and reduce by a further 2% in 2036.
  - Latent demand significantly increases in both 2026 and 2036, with the expected total latent demand in 2036 representing approximately 4% of the overall demand. This is mostly due to the excessive queueing on Canterbury Road.
  - The overall network is seen to perform worse in the second hour of the AM Peak period than the first hour.
- PM Peak:
  - Similar overall performance patterns are observed in the PM peak as in the AM peak.
  - VKT and VHT increase significantly in both 2026 and 2036, corresponding to a reduction in overall network speeds of up to 9%.
  - With no significant queueing on Canterbury Road, the PM peak experiences minimal latent demand.
  - As was noted in the AM peak, the second hour of the PM peak is worse than the first.

4.4.3. Route Performance (Travel Times)

Average total travel times for each of the routes modelled are presented in Figure 4.1 to Figure 4.4 below, with base model travel times included for comparison.

Figure 4.1: Average Travel Times (sec) – AM Peak (7:30am-8:30am)

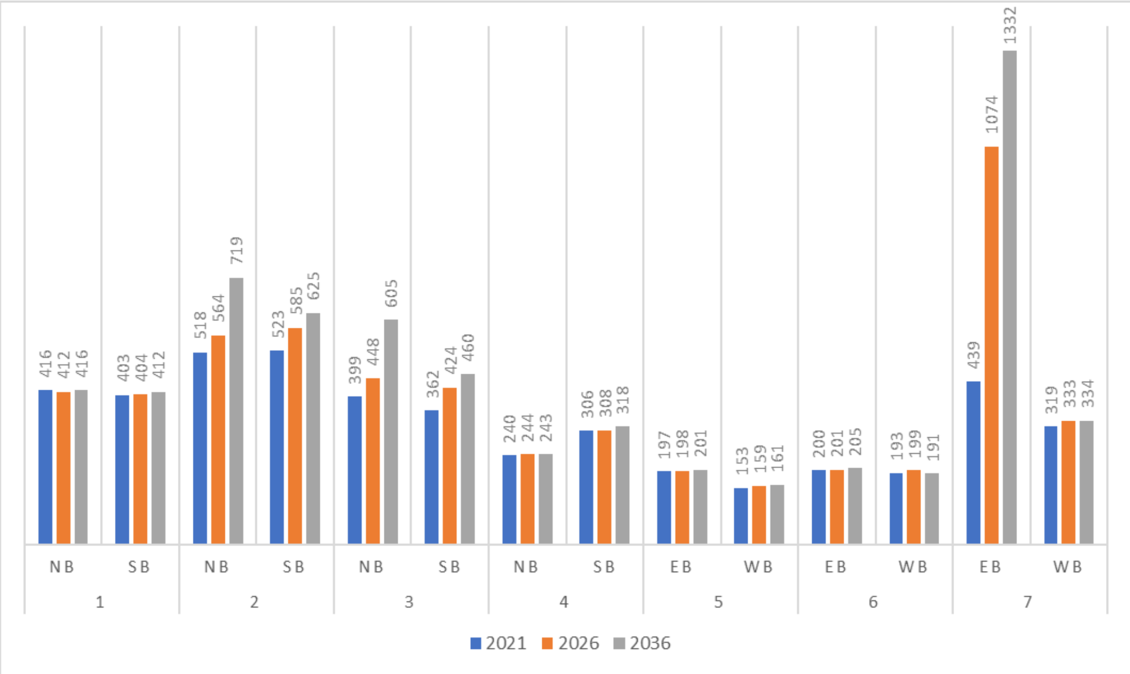


Figure 4.2: Average Travel Times (sec) – AM Peak (8:30am-9:30am)

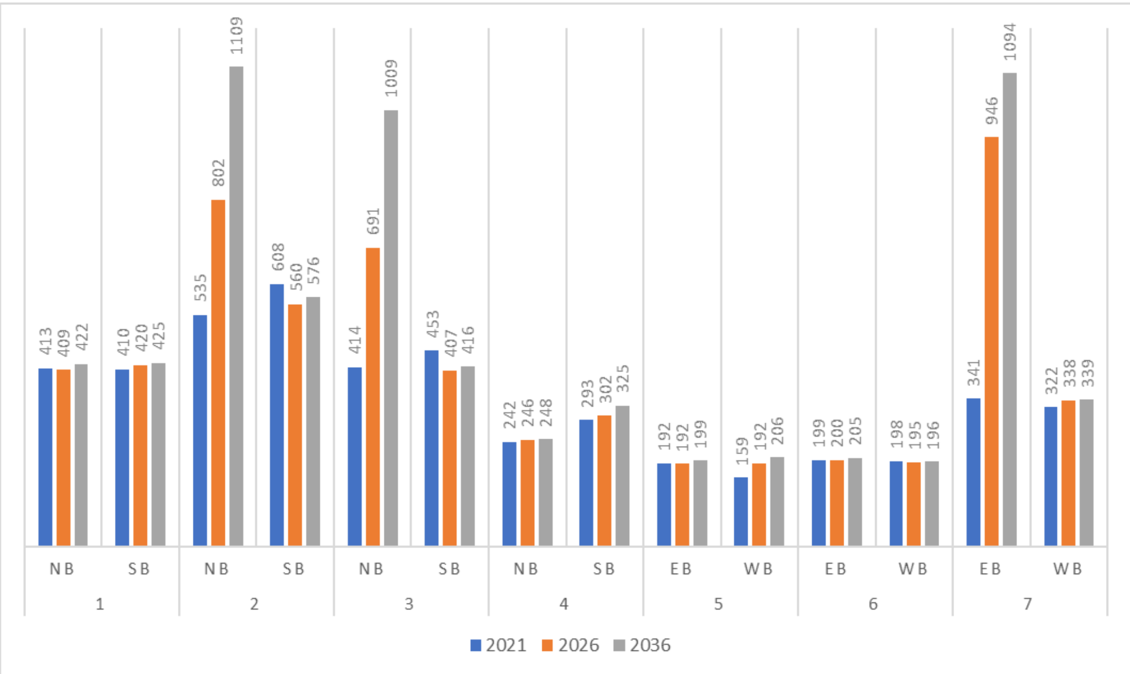


Figure 4.3: Average Travel Times (sec) – PM Peak (4:15pm-5:15pm)

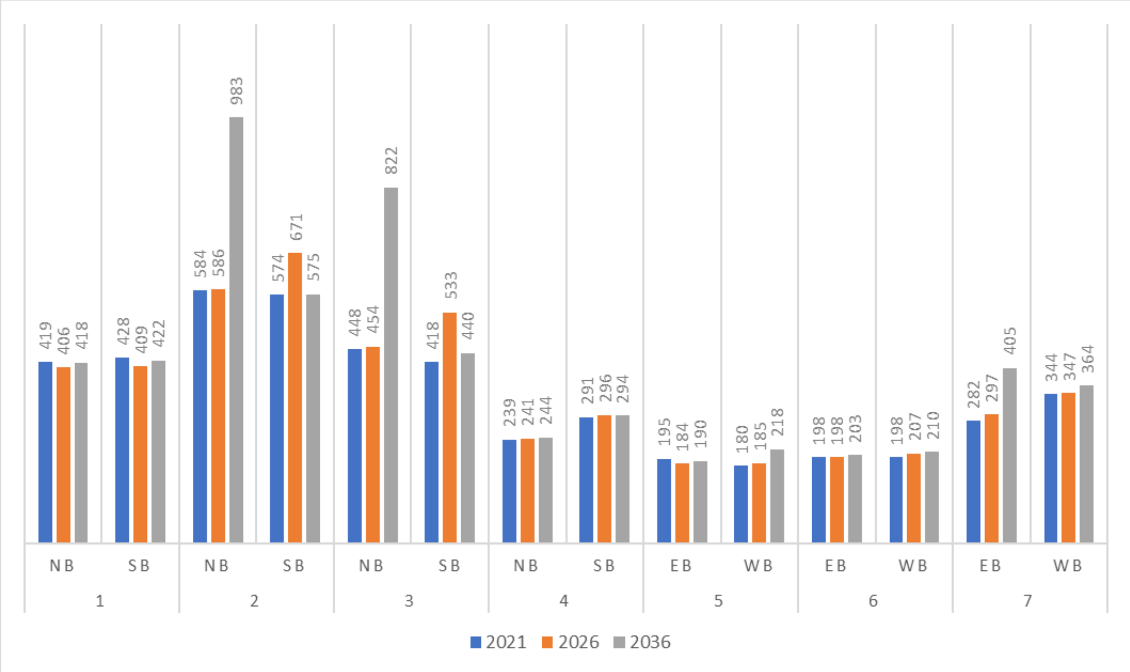
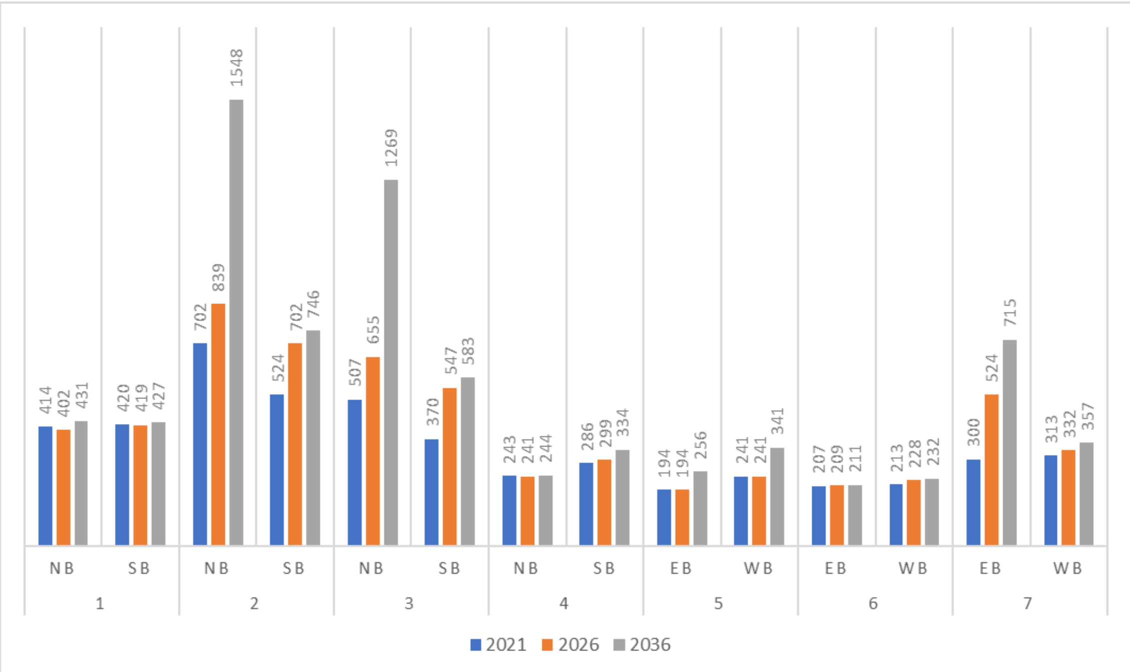


Figure 4.4: Average Travel Times (sec) – PM Peak (5:15pm-6:15pm)



The network travel times indicate an increase in delays across the network for both 2026 and 2036 Do Minimum scenarios. The following key observations are made for the AM and PM peaks respectively:

- AM Peak:
  - The most significant increase in travel times is observed on Canterbury Road (Route 7), particularly from the base year to 2026 Do Minimum scenario.
  - Increases in travel times are also noted for Route 2 and Route 3, which are attributed to the increased demand and corresponding delays both northbound and southbound on Beamish Street.
    - This is significantly worse for the northbound direction of both Routes 2 and 3.
  - As noted with the overall network statistics, travel times are worse in the second AM peak hour than the first hour.
- PM Peak:
  - The PM peak future base models operate similarly to the AM peak, with no major increases in network route travel times with the exception again of Routes 2, 3 and 7.
  - Route 7 is seen to increase in both PM peak hours across all years, though not as drastically as the AM peak as there are less significant capacity end constraints in the PM peak on Canterbury Road.
  - Route 2 and Route 3 experience large increases in overall route travel time, particularly for the northbound direction, with overall travel times increasing by over 100% in the second PM Peak hour from the Base model to the 2036 Do Minimum model scenario.

4.4.4. Network Congestion

The following section highlights the overall network simulated density, which pinpoints critical locations causing congestion. Figure 4.5 and Figure 4.6 include model simulated density plots for the AM and PM peaks respectively.

Figure 4.5: Aimsun Base and Future Base Model Simulated Density – AM Peak (9:00am)

Base (2021)	Do Minimum (2026)	Do Minimum (2036)
		

The results of the simulated density plots analysis in the AM peak generally indicate the following:

- Major congestion build up is observed on the following corridors:
  - Canterbury Road both eastbound and westbound (worse in eastbound peak direction)

- Ninth Avenue at the Loch Street roundabouts
- the southern end of Beamish Street both northbound and southbound due to delays caused by the signals at both Canterbury Road and Evaline Street.

* Route diversion is observed for Canterbury Road eastbound, with vehicles travelling northbound at Tudor Street and Thorncraft Parade off Canterbury Road due to the significant delays from the external signals. There is also expected diversions for vehicles that would travel northbound at Beamish Street from Canterbury Road that divert due to the Beamish Street northbound congestion issues.
* Both Canterbury Road and Beamish Street corridors are significantly more congested in 2026 and 2036 Do Minimum scenarios.

Figure 4.6: Aimsun Base and Future Base Model Simulated Density – PM Peak (6:15pm)

Base (2021)	Do Minimum (2026)	Do Minimum (2036)
		

The results of the simulated density plots analysis in the PM peak generally indicate the following:

* Congestion locations in the PM peak scenarios remained relatively consistent across design years, with larger congestion and a significant breakdown in flow seen by the 2036 Do Minimum scenario within a number of key corridors.
* Major congestion is observed at the following locations:
    - Canterbury Road due to the interactions and operation of the Beamish Street and Bexley Road intersection
    - Beamish Street northbound and southbound between Evaline Street and Canterbury Road, as well as the south approach to Canterbury Road
    - Ninth Avenue east approach to the Loch Street roundabouts as well as the linked Fifth Avenue corridor both northbound and southbound.

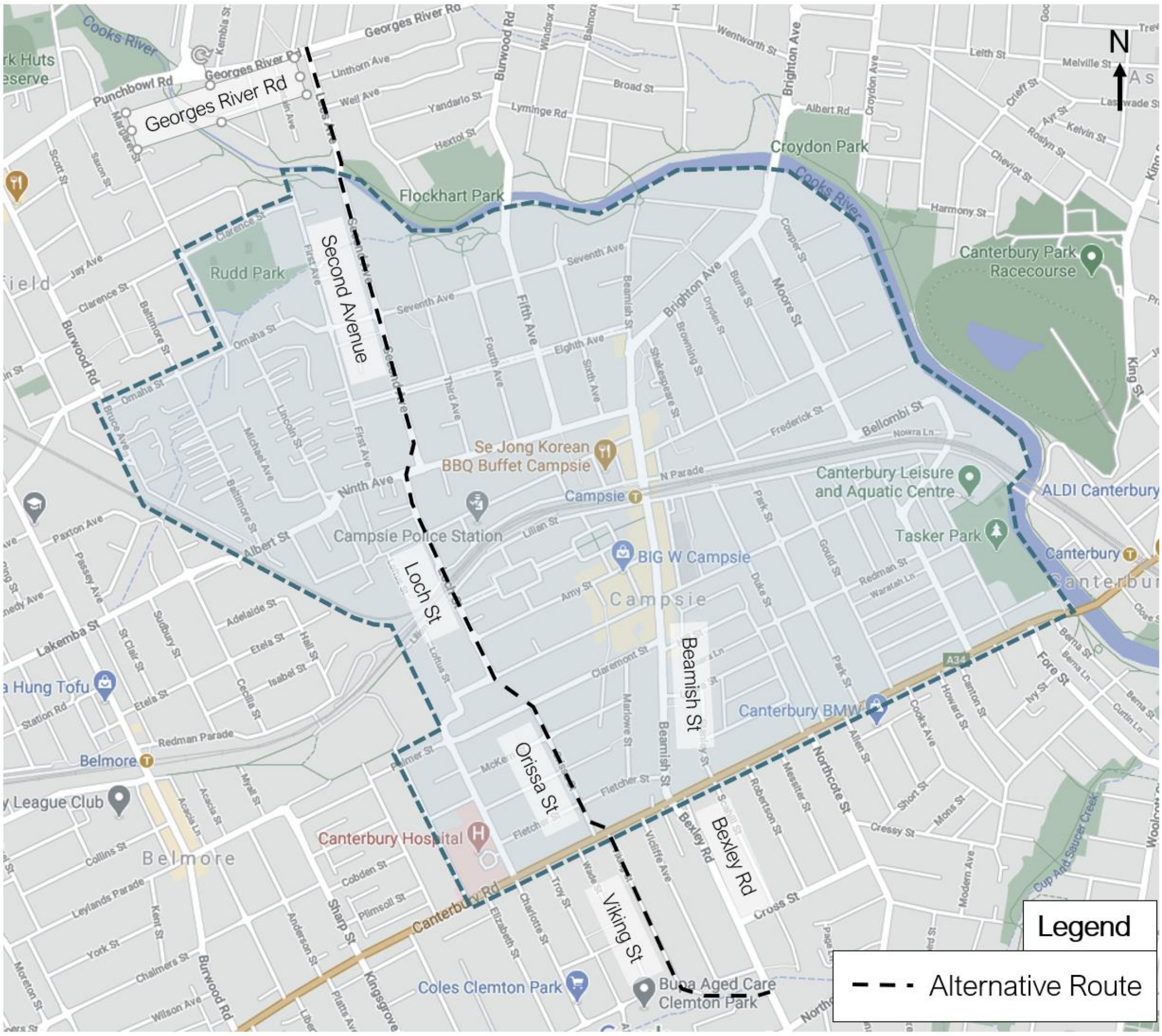
5. OPTIONS SCENARIO MODELS

05

5.1. Overview

As discussed in the Stage 1 modelling report, an alternative route, west of Campsie Town Centre (Option 1), is being considered to provide an alternative north-south connection between Canterbury Road and Georges River Road. Option 1 is also expected to alleviate some congestion from Beamish Street, providing opportunities for land use uplift within the Campsie Town Centre. The proposed layout for Option 1 is presented in Figure 5.1.

Figure 5.1: Proposed West Campsie Alternative Route



5.2. Future Year Option Model Assumptions

5.2.1. Future Option Demands

Demand for the options model scenarios was developed with the same methodology as was applied for future base models; with the exception that the absolute differences were calculated between future base and options STFM matrices as opposed to base year and future base scenarios. It is noted in a number of instances, the future options scenarios have less demand to/from zones than the future base scenarios due to the introduction of the bypass.

Table 5.1: 2-hour Aimsun Total Demands – Future Option Scenarios

Peak	Year	Base	Bypass	Abs. Difference
AM Peak	2021	22,741	-	-
	2026	25,361	26,003	642
	2036	27,508	27,879	371
PM Peak	2021	25,862	-	-
	2026	28,756	29,454	698
	2036	31,104	31,905	801

The overall 2-hour mesoscopic Aimsun demands remain relatively consistent between the Base and corresponding Bypass scenarios, with the Bypass options scenarios yielding slightly greater total demands in the order of 350-800 vehicles. This is likely a result of the increased attractiveness in the strategic model due to the introduction of the bypass.

5.2.2. Road Network

For the future year options models, the majority of the road network, including all existing intersection configuration, method of control, speed limits, traffic management measures (speed bumps) have remained consistent with the Base and Future Do Minimum models.

The notable exception is along the proposed alternative route, where the model has been updated to include:

- Removing speed bumps and chicanes along the bypass route.
- Upgrading the full bypass route to road type "Undivided Sub-Arterial" to match that of Beamish Street.
- Providing direct connection between Second Avenue, Loch Street, Orissa Street and Viking Street.

The assumed intersection configuration and control at the new connections are shown in Figure 5.2 to Figure 5.5.

The main changes are noted as follows:

- Canterbury Road / Viking Street / Orissa Street – realign the Viking Street and Orissa Street to provide a signalised cross intersection rather than the existing staggered t-intersections.
- Evaline Street – create a new south approach which joins Orissa Street to Loch Street. Convert the existing roundabout to a signalised cross intersection.
- Ninth Avenue – realign the north approach to align with the south approach and provide a signalised cross intersection rather than the existing staggered roundabout t-intersections.
- Second Avenue / Seventh Avenue – convert the existing roundabout to a signalised cross intersection.

Figure 5.2: Canterbury Road Configuration

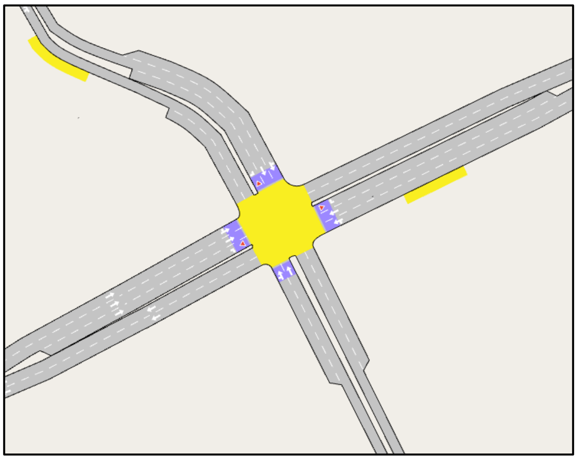


Figure 5.3: Evaline Street Configuration

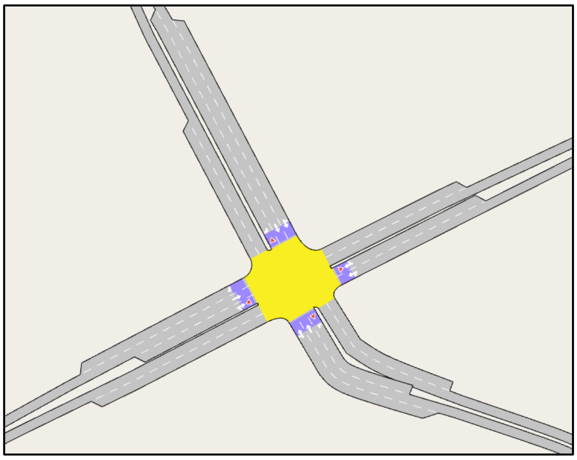


Figure 5.4: Ninth Avenue Configuration

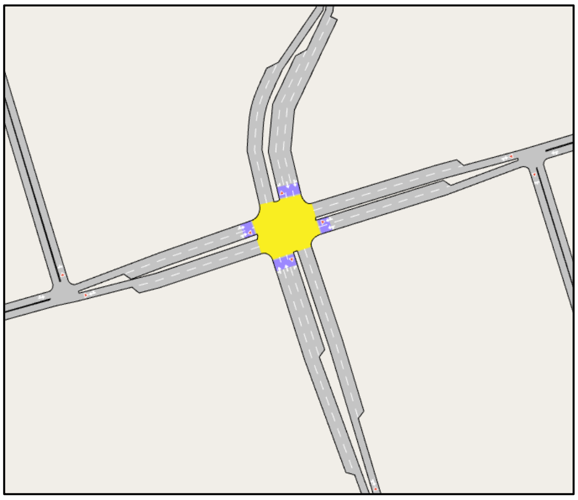
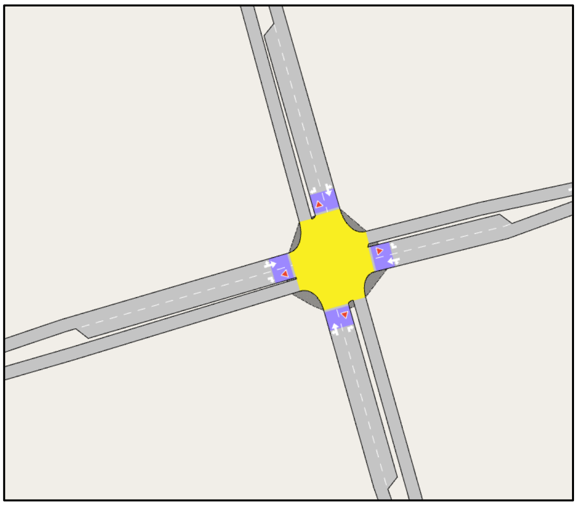


Figure 5.5: Seventh Avenue Configuration



Other minor adjustments were made to intersections along the bypass corridor to ensure appropriate priority was provided to the bypass movements. This included removal of the roundabout at Campsie Street and Loch Street and reducing the attractiveness for east-west movements along Claremont and Fletcher Street to reduce the amount of rat-running between the Bypass and surrounding higher order roads.

5.2.3. Traffic Signal Timing

To inform the optimal operation of the proposed signalised intersections along the bypass, intersection models were developed using SIDRA Intersection. These models used the anticipated demands, a minimal geometry and typical intersection phasing in order to determine how the minimal intersection layout configurations would operate. An iterative process was then undertaken following interrogation of the anticipated turning demands to identify if additional lanes or alternative phasing arrangements resulted in better performance.

The resultant intersection configurations are shown in Figure 5.6 to Figure 5.9 and their high-level SIDRA results are shown Table 5.2.

Figure 5.6: Canterbury Road Configuration

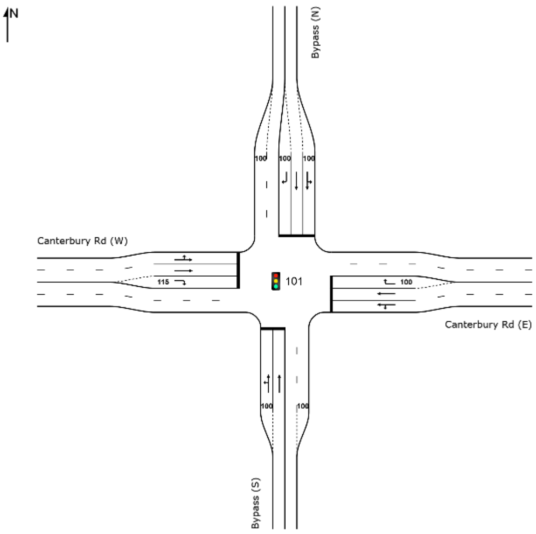


Figure 5.7: Evaline Street Configuration

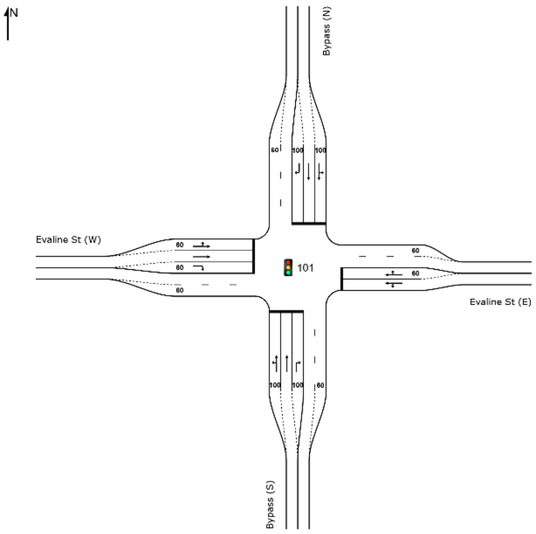


Figure 5.8: Ninth Avenue Configuration

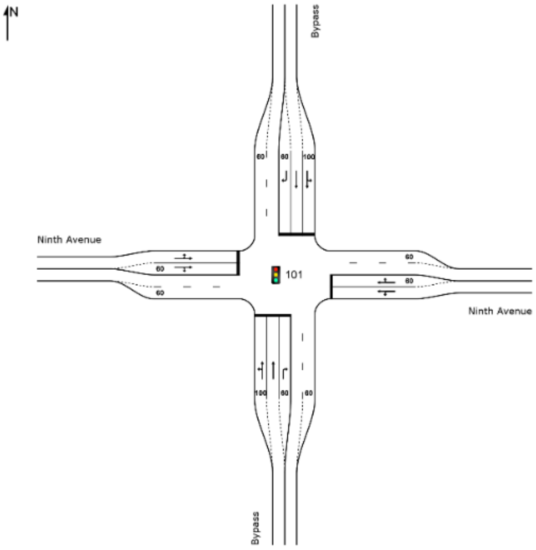


Figure 5.9: Seventh Avenue Configuration

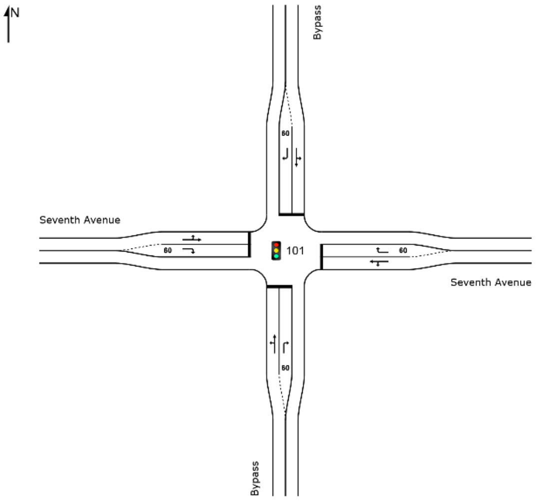


Table 5.2: Preliminary SIDRA Results for Signalised intersections – Future Option Scenarios

Location	AM Peak		PM Peak	
	DOS	LOS	DOS	LOS
Bypass and Canterbury Road (2036)	0.97	E	1.00	E
Bypass and Evaline Street (2036)	0.85	C	0.86	C
Bypass and Ninth Avenue (2036)	0.90	C	0.92	D
Bypass and Seventh Avenue (2036)	0.82	C	0.92	D

The results suggest that the proposed intersection configurations have the potential to operate satisfactorily in the future, with the exception of the Canterbury Road / Bypass intersection which would be at capacity. However, it is noted that Canterbury Road is already approaching capacity and therefore this would be a function of the anticipated demands, not because of the proposed intersection changes.

Once satisfactory performance of the intersection was achieved for the 2036 scenarios in SIDRA, the intersection geometry and phasing in the AIMSUN model was updated. The traffic signal phase splits identified in the SIDRA models were used as the basis of the actuated signal plans noting that:

- Minimum phase times were set to be 12 seconds, with 6 seconds green, 4 seconds yellow and 2 seconds all red.
- Maximum phase times were set to have at least 6 seconds more green time than calculated by SIDRA.

5.3. Future Option Model Results

5.3.1. Overview

The following section compares all Future Do Minimum scenarios with the corresponding Future Bypass scenarios, with the results taken from the median seed run for each. As was outlined in the Future Do Minimum analysis, this section highlighted performance based on network statistics, travel times, overall network congestion and a review of demand changes due to the implementation of the bypass.

5.3.2. Overall Network Performance

A summary of the network performance of the Bypass options in comparison to the Future Do Minimum scenarios with both 2026 and 2036 demands is presented in Figure 5.2.

Table 5.3: Future Year – Option Network Performance Statistics

Peak Period	Time	Network Statistic	2026		2036	
			Base	Bypass	Base	Bypass
AM Peak	7:30am–8:30am	VKT (km)	20,911	21,505	21,623	22,337
				2.8%		3.3%
		VHT (h)	1,097	1,146	1,191	1,243
				4.5%		4.4%

Peak Period	Time	Network Statistic	2026 Base	2026 Bypass	2036 Base	2036 Bypass
		Average Speed (km/h)	25.0	24.7	24.9	24.4
				-1.6%		-2.0%
		Delay (sec/km)	95	100	103	107
				5.5%		3.3%
	8:30am–9:30am	VKT (km)	21,175	22,004	22,043	22,826
				3.9%		3.6%
		VHT (h)	1,181	1,230	1,330	1,389
				4.1%		4.5%
		Average Speed (km/h)	24.1	23.7	23.6	23.0
				-1.4%		-2.5%
		Delay (sec/km)	104	107	122	122
				2.1%		0.4%
		Latent Demand (veh)	502	439	1,153	961
				-12.5%		-16.7%
PM Peak	4:15pm–5:15pm	VKT (km)	23,551	24,430	25,064	26,370
				3.7%		5.2%
		VHT (h)	945	1,038	1,111	1,170
				9.8%		5.3%
		Average Speed (km/h)	27.8	26.7	26.2	25.7
				-4.1%		-1.7%
		Delay (sec/km)	56	64	70	70
				13.9%		1.1%
	5:15pm–6:15pm	VKT (km)	23,656	24,564	25,169	26,431
				3.8%		5.0%
		VHT (h)	1,089	1,235	1,409	1,475
				13.3%		4.7%
		Average Speed (km/h)	25.6	24.3	23.5	22.7
				-5.3%		-3.3%
		Delay (sec/km)	76	88	108	106
				15.8%		-2.3%
		Latent Demand (veh)	1	-	23	1
				-100.0%		-95.7%

The following key outcomes are noted with regards to the overall network statistics:

- AM Peak:
  - Across the overall road network, VKT and VHT have increased in 2026 and 2036 Bypass scenarios in comparison to the Future Do Minimum scenarios. This is due to both the increase in overall demand and the introduction of several signalised intersections as part of the bypass supporting infrastructure.
  - Average speeds for all vehicles across the entire network can also be expected to reduce by up to 1.6% with the bypass in 2026 and reduce by a further 2.5% in 2036.
  - Latent demand decreases in both 2026 and 2036 Bypass scenarios by an estimated 12.5% and 16.7% respectively.
  - The overall network is seen to perform similarly in both the first and second AM peak hours.
- PM Peak:
  - Similar overall performance patterns are observed in the PM peak as in the AM peak.
  - VKT and VHT increase in both the 2026 and 2036 Bypass scenarios, corresponding to a reduction in overall network speeds of up to 5%.
  - The PM peak scenarios all experience minimal latent demand.
  - A more significant drop in overall performance is noted in the 2026 PM scenarios compared to the 2036 scenarios.
  - The second hour of the PM peak is observed to operate slightly worse than the first hour, with more significant drops in average speeds and increases in overall network delays.

Figure 5.10 to Figure 5.13 include comparisons of overall network speeds and the corresponding throughput for each hour of the peak periods for the Future Do Minimum and Bypass scenarios.

Figure 5.10:Total Throughput and Network Speeds – AM Peak (7:30am-8:30am)

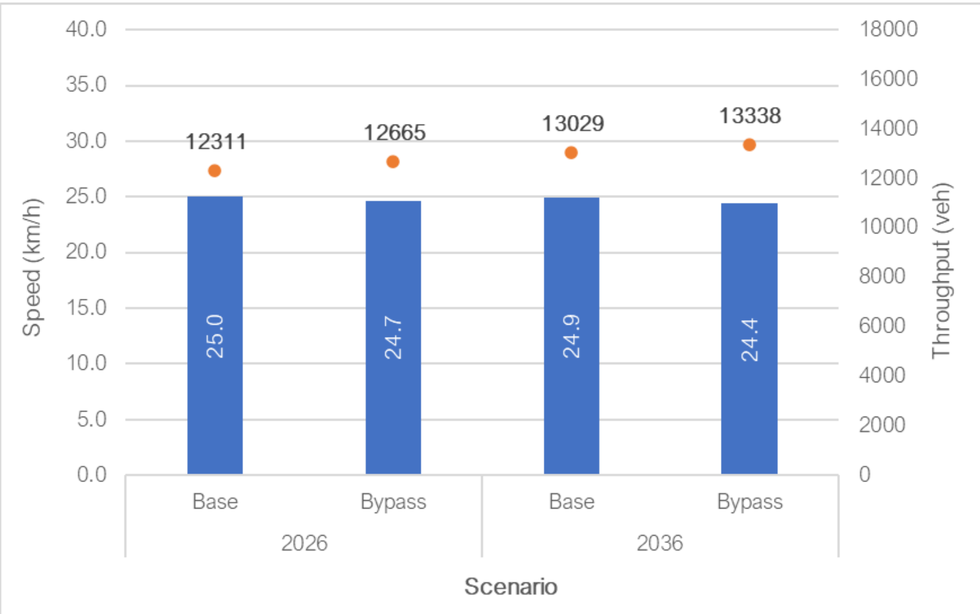


Figure 5.11:Total Throughput and Network Speeds – AM Peak (8:30am-9:30am)

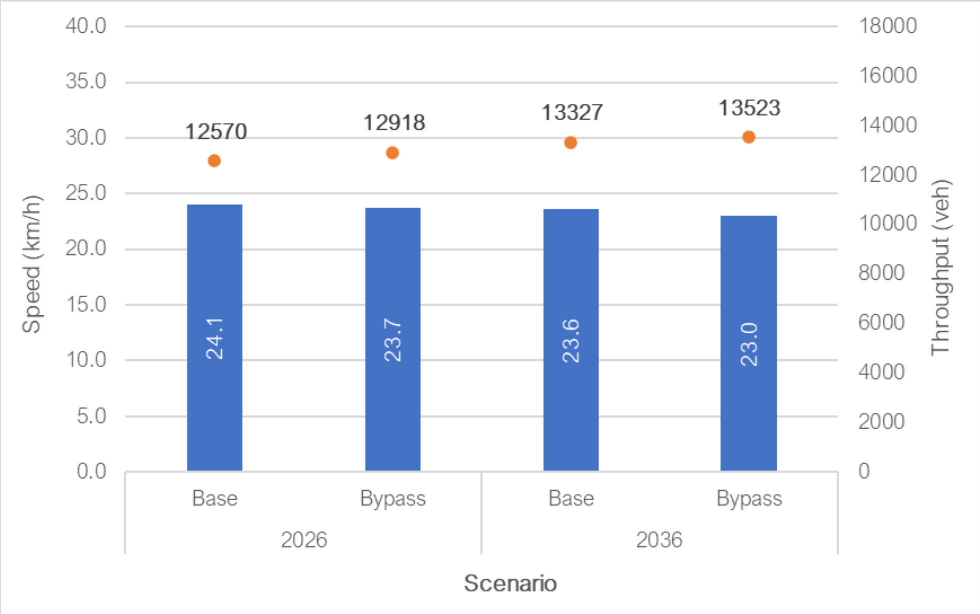


Figure 5.12:Total Throughput and Network Speeds – PM Peak (4:15pm-5:15pm)

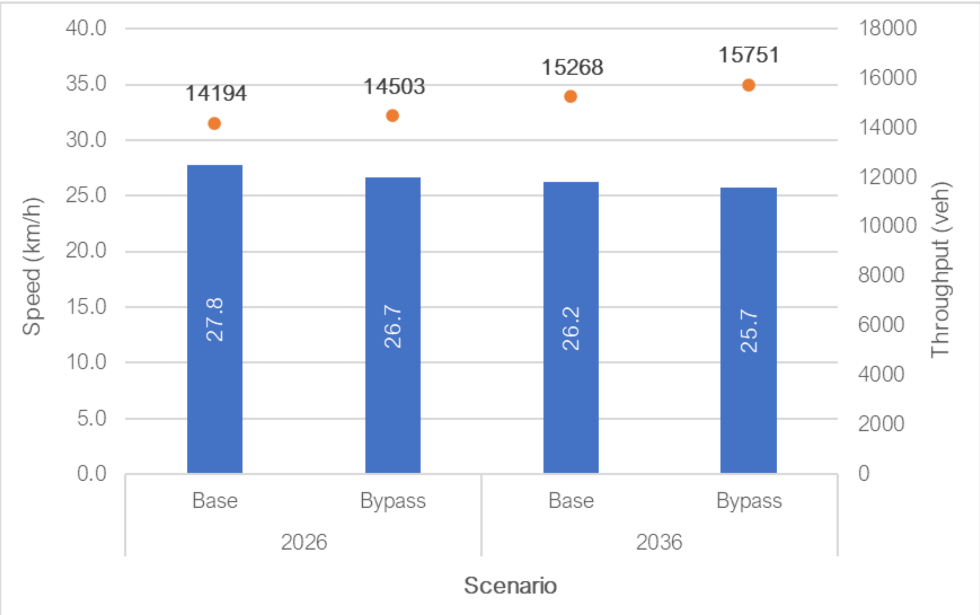
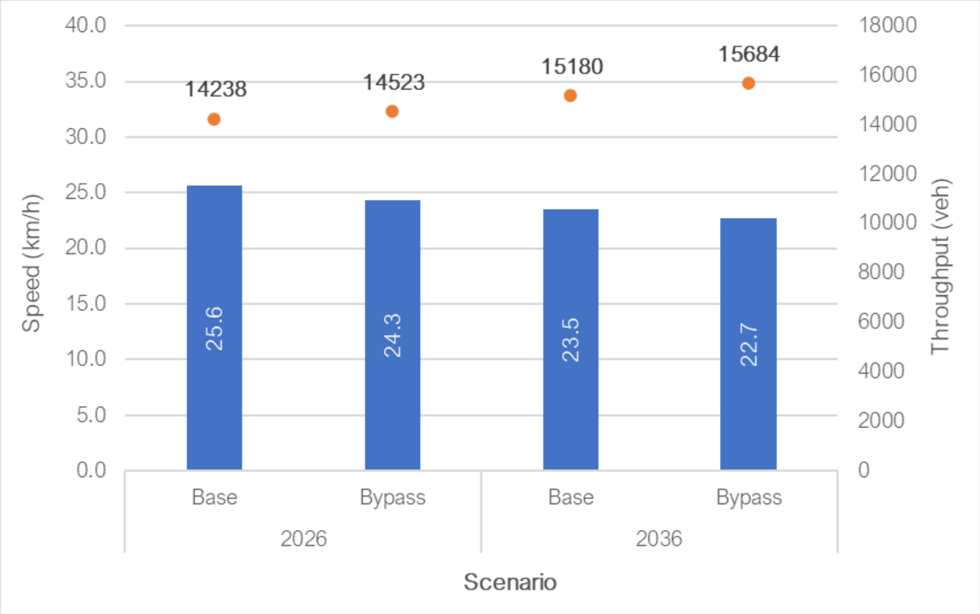


Figure 5.13:Total Throughput and Network Speeds – PM Peak (5:15pm-6:15pm)



The results show that the introduction of the bypass increases the network throughput (capacity) in all peak periods and scenarios when compared to the base. The drop in average speed corresponds with the introduction of signalised intersections which are needed to support the bypass.

5.3.3. Route Performance (Travel Times)

A comparison of overall modelled travel time routes between Future Do Minimum and Bypass option scenarios is included below in Figure 5.14 to Figure 5.17.

Figure 5.14:Average Travel Times (sec) – AM Peak (7:30am-8:30am)

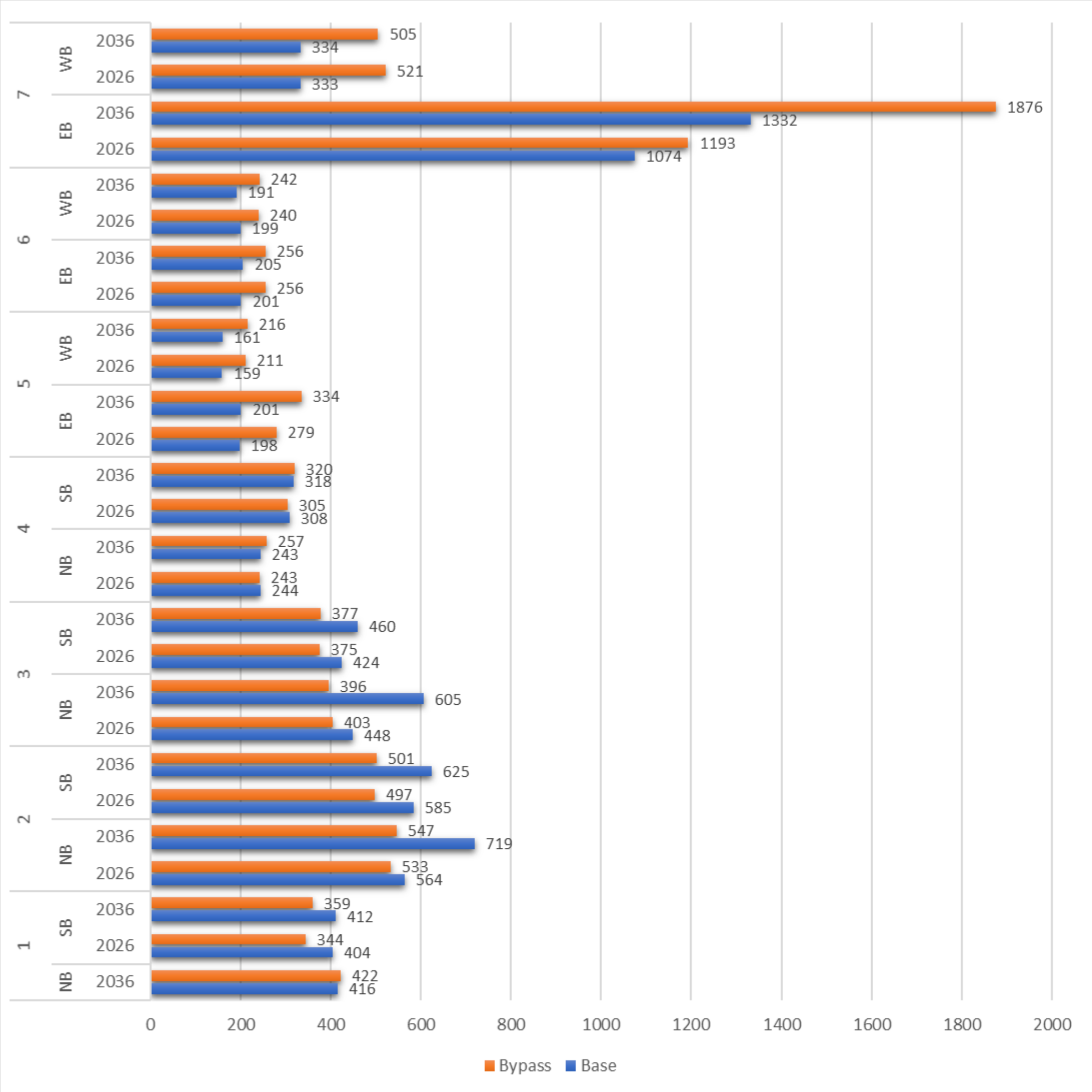
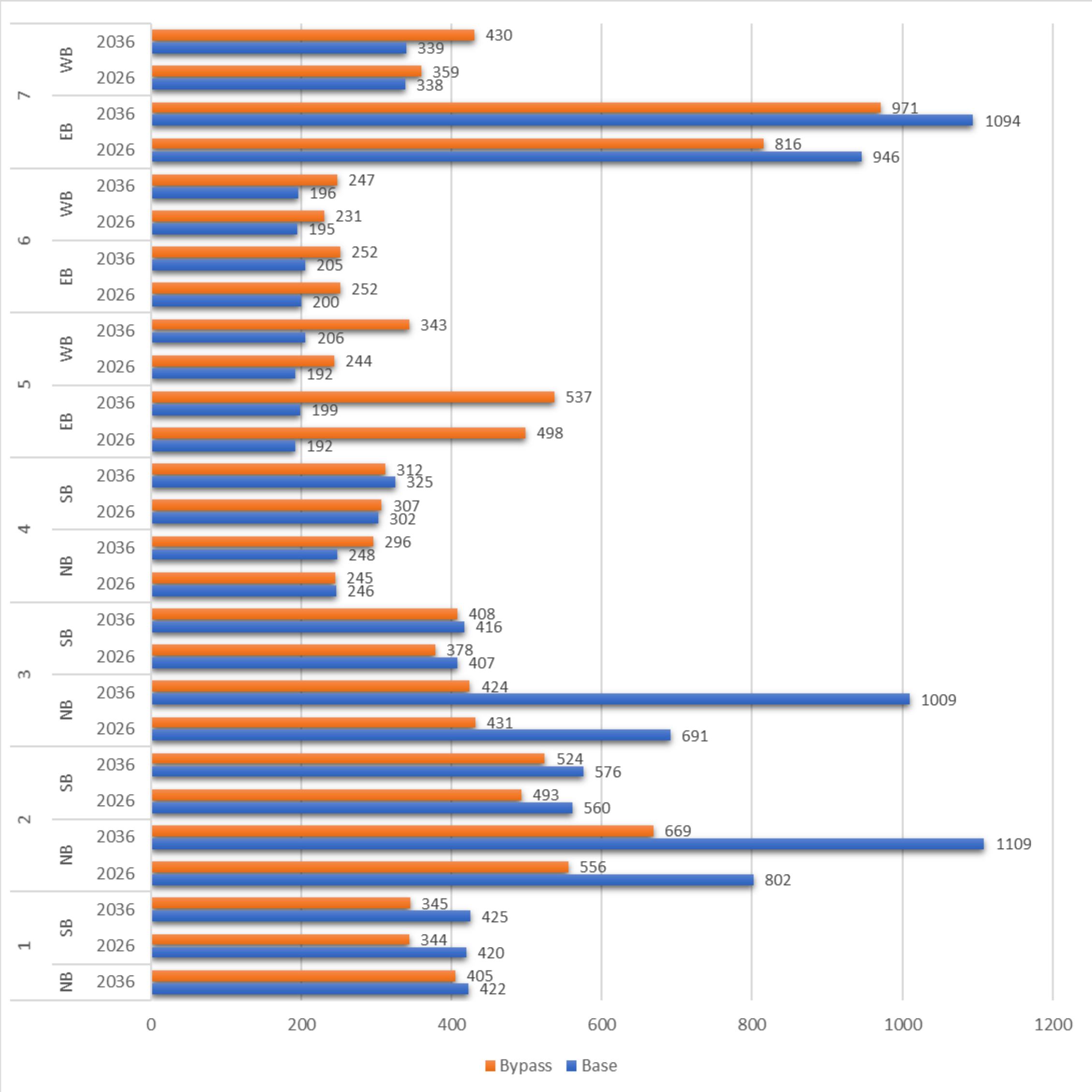


Figure 5.15:Average Travel Times (sec) – AM Peak (8:30am-9:30am)



The AM peak period travel time results indicate the following:

- Some disbenefits are observed for Canterbury Road (Route 7), with travel times increasing slightly in both hours of the 2026 models. The eastbound travel times in the 2036 Bypass option seen to balance across the 2-hour peak, with some increases in travel times in the first hour and decreases in the second hour (likely due to an increased throughput able to make it through in the first hour), with less friction at the Beamish Street and Bexley Road intersection.
- The east-west connections on Evaline Street and Ninth Avenue (Route 5 and 6) also experience increased overall travel times due to the increase in the competing bypass demands and the corresponding priority and coordination provided for the north-south movement.
- Significant benefits in travel time savings, particularly in the second hour of the models, are noted for Route 2 and 3 which correlates to the reduction in demand both northbound and southbound on Beamish Street through Campsie town centre. The peak travel time savings for this route are observed

in the second hour of the 2036 scenarios, with reductions of approximately 60% for Route 3 northbound.

Figure 5.16:Average Travel Times (sec) – PM Peak (4:15pm-5:15pm)

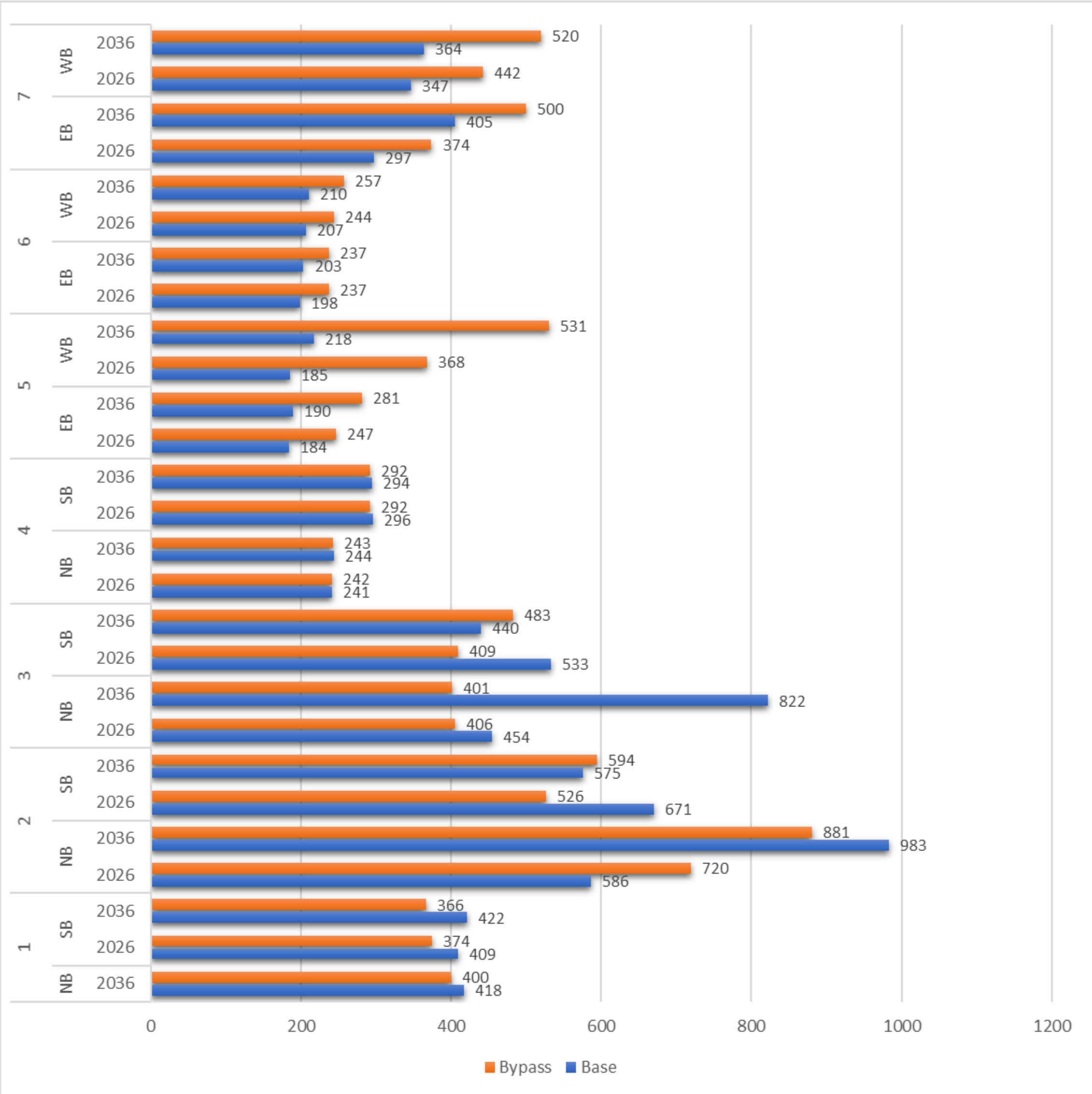
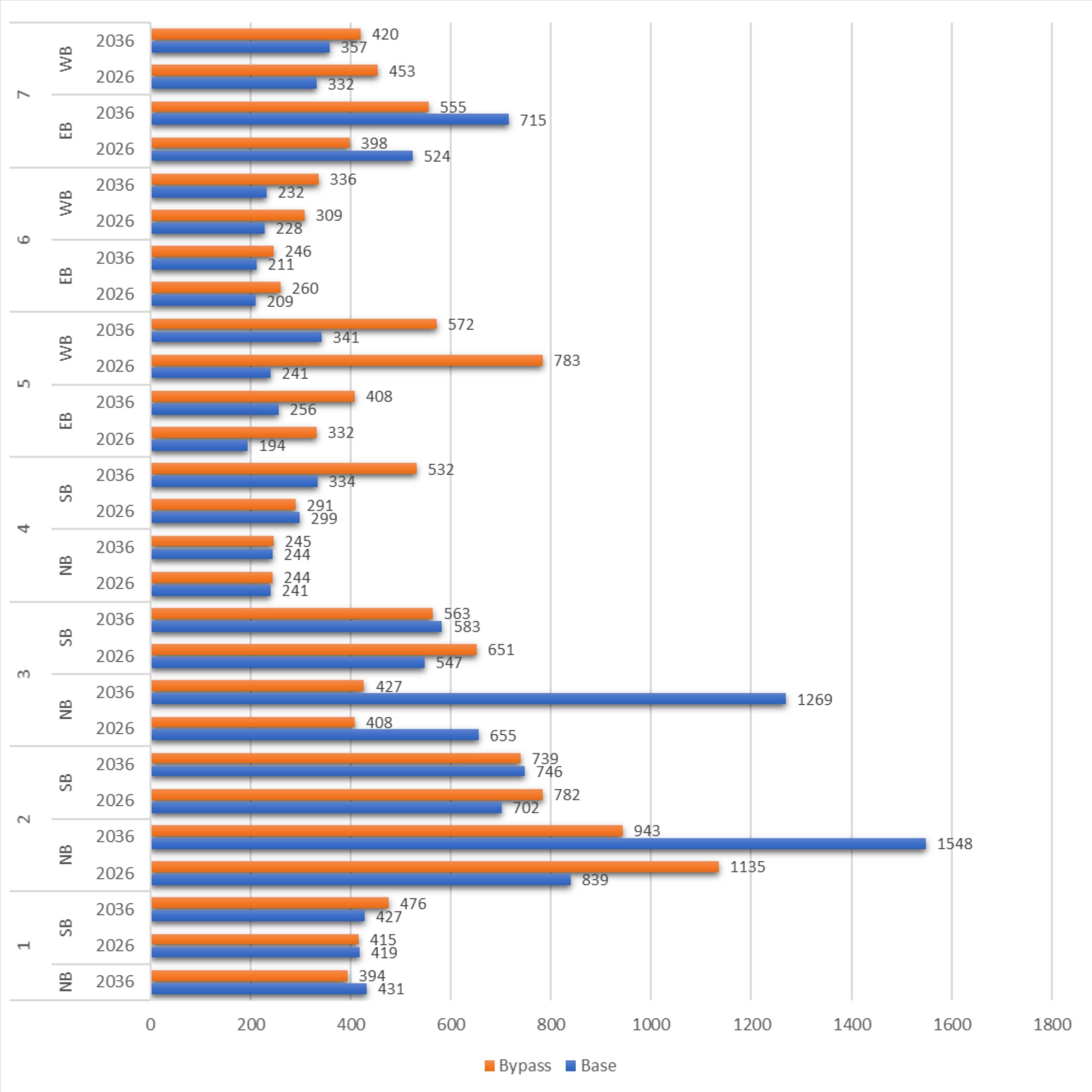


Figure 5.17:Average Travel Times (sec) – PM Peak (5:15pm-6:15pm)



The PM peak period travel time results indicate the following:

- Overall, no notable change in performance of Canterbury Road (Route 7), with some travel time reductions for the eastbound direction and increases for the westbound direction. This is likely a result of the demand shifts experienced with the introduction of the bypass running with the current actuated traffic signal control configurations.
- As noted in the AM peak period, Evaline Street and Ninth Avenue (Route 5 and 6) experience increased overall travel times in both hours of the PM peak models.
- Significant benefits are observed, again particularly in the second hour of the peak period, for Beamish Street (Route 2 and 3). Travel time reductions are most significant in the second hour of the 2036 models, with overall travel time reductions of over 65% for Route 3 northbound through Beamish Street.

5.3.4. Network Congestion

The following section provides an overview of the overall network simulated density, highlighting critical locations causing network congestion.

Figure 5.18:Aimsun Future Base and Bypass Model Simulated Density – 2026 AM Peak (9:00am)

Future Do Minimum	Bypass Option
	

Figure 5.19:Aimsun Future Base and Bypass Model Simulated Density – 2036 AM Peak (9:00am)

Future Do Minimum	Bypass Option
	

Figure 5.20:Aimsun Future Base and Bypass Model Simulated Density – 2026 PM Peak (6:15pm)

Future Do Minimum	Bypass Option
	

Figure 5.21:Aimsun Future Base and Bypass Model Simulated Density – 2036 PM Peak (6:15pm)

Future Do Minimum	Bypass Option
	

The network congestion results show that the introduction of the bypass will have a two-fold impact:

- Reduction of observed congestion along Beamish Street through Campsie Town Centre.
- Increases in congestion for some of the east-west routes at the intersections with the bypass.

5.3.5. Changes in Traffic Volumes

Due to the introduction of the bypass, notable changes in traffic volumes for north-south routes are observed. To understand the key route diversions across the study area, volumes along the natural screenline created by the railway have been reviewed. These include the following locations (shown in Figure 5.22):

1. Loch Street (Bypass)
2. Beamish Street
3. Belombi Street.

Figure 5.22: North-South Screenline Locations for Volume Comparisons

Volume differences (2-hour) have been reviewed between the Bypass and Future Do Minimum scenarios across each design year and peak period. A summary of these volume differences is included in Table 5.4.

Table 5.4: Future Year – Changes in Traffic Volumes (2 hours)

Scenario	Location 1		Location 2		Location 3		Total	
	NB	SB	NB	SB	NB	SB	NB	SB
2026 AM	+889	+830	-573	-221	-76	-83	240	526
2026 PM	+840	+833	-554	-10	-6	-13	280	810
2036 AM	+917	+771	-503	-182	-77	-92	337	497
2036 PM	+980	+781	-450	+56	-26	-129	504	708

The results show the following:

- The introduction of the bypass attracts additional north-south traffic volumes to Loch Street. The increase is in the order of 800-1,000 vehicles in two hours in the AM and PM peaks respectively.
- The bypass offers alternative north-south routes, mainly for through traffic which results in reduced traffic volumes along Beamish Street. The most pronounce reduction is recorded in the northbound direction in both peak periods.
- Overall, traffic volumes across the screenline increase in each future year which indicates that the proposed bypass will induce some addition trips from other corridors to travel through the study area.

6. CONCLUSION

06

6.1. Conclusion

Based on the above discussions and findings regarding the Campsie Master Plan traffic modelling assessment, an overview of the key modelling outcomes are as follows:

- Future Do Minimum modelling:
  - Traffic volumes within the study area will continue to grow at a rate of 2%p.a. until 2026. The rate of growth is expected to slow after 2026 to approximately 1%p.a.
  - The forecast growth in traffic demands results will result in increased travel times and delays for the local road network around Campsie.
  - With no changes to travel demands or road network infrastructure, travel times along Beamish Street northbound are likely to double in 2036.
- Future Options Assessment:
  This assessment has identified that implementing the Campsie Bypass would provide significant traffic improvements to Campsie by reducing traffic on Beamish Street by up to 500 vehicles over 2 hours and providing an alternative route for traffic moving north and south through the centre. Without the bypass, Beamish Street would be expected to be at capacity by 2036.
  - The introduction of the bypass would require changes to a number of intersections with local road network to ensure that appropriate means of traffic control and priority are provided. The recommended changes to key intersections, as demonstrated within this report, will require further design investigations to determine if they are feasible within the available road environment or opportunities for land acquisition. If the intersection upgrades are not available, alternative measures to reduce the anticipated traffic volumes will be required by Council. Alternative measures could include improvements to walking, cycling and public transport accessibility and frequency. It is understood Council will commence a Complete Streets project, which will provide a more detailed analysis and recommendations for delivery of the Bypass and improvements to the local road network.
  - As a result of additional traffic signals to support the bypass, some of the network statistics (average delays and travel times) would increase, however overall, the bypass will provide improvements to Beamish Street, in line with Council's aspirations to reduce regional through-traffic along this road.
  - The overall volumes within the study area would increase with the introduction of the bypass. These induced trips represent up to 2% of additional demands.
  - The reduction in traffic volumes along Beamish Street is reflected in reduced congestion and significant travel time savings for northbound trips in 2026 and 2036 scenarios.

It is acknowledged that the draft Campsie Town Centre Master Plan comprises a number of measures to also support the reduction in congestion and traffic impacts to the local road network as a result of the forecast growth in Campsie. These include:

- The introduction of a maximum parking rate in the Campsie Town Centre core (sites within 400 metres of Campsie Station)
- A more flexible approach to parking outside of the core, with minimum and maximum parking rates
- The introduction of mandatory cycle parking

- Improved pedestrian and cycle network to make walking and cycling easier for the community to move around the town centre
- Advocacy to Transport for NSW for improved bus connectivity, particularly north-south between Campsie and Burwood

Collectively, these measures will encourage the community and users of the Campsie Town Centre to be less reliant on cars and maximise opportunities for active and passive transport use to achieve Council's long term modal-shift aspirations.

- Next steps
  - This assessment has identified the proposed growth in Campsie under the revised draft masterplan and how this could be accommodated subject to improvements to the road network at the identified intersections.
  - Further work will be undertaken as part of Council's Complete Streets project for Campsie to identify if the specific road network improvements needed to accommodate the predicted traffic growth along the proposed bypass and at other intersections are feasible and cost effective.
  - Further work will also be undertaken as part of Council's Complete Streets project for Campsie to implement other measures to increase public transport usage such as reduced parking rates within close proximity to the metro station and to encourage walking and cycling.

A. CALIBRATION AND VALIDATION REPORT

A

A.1. Convergence

The relative Gap (RGap) is a ratio of the actual travel time to the travel time when all vehicles use the shortest paths. The smaller the Rgap the better the convergence. For the purposes of this assessment, the RGap being < 0.5% was adopted. The model showed a satisfactory level of convergence as shown in Figure A.1 and Figure A.2, with the AM and PM models reaching the required RGap criteria after 6 iterations.

Figure A.1: AM Model Convergence

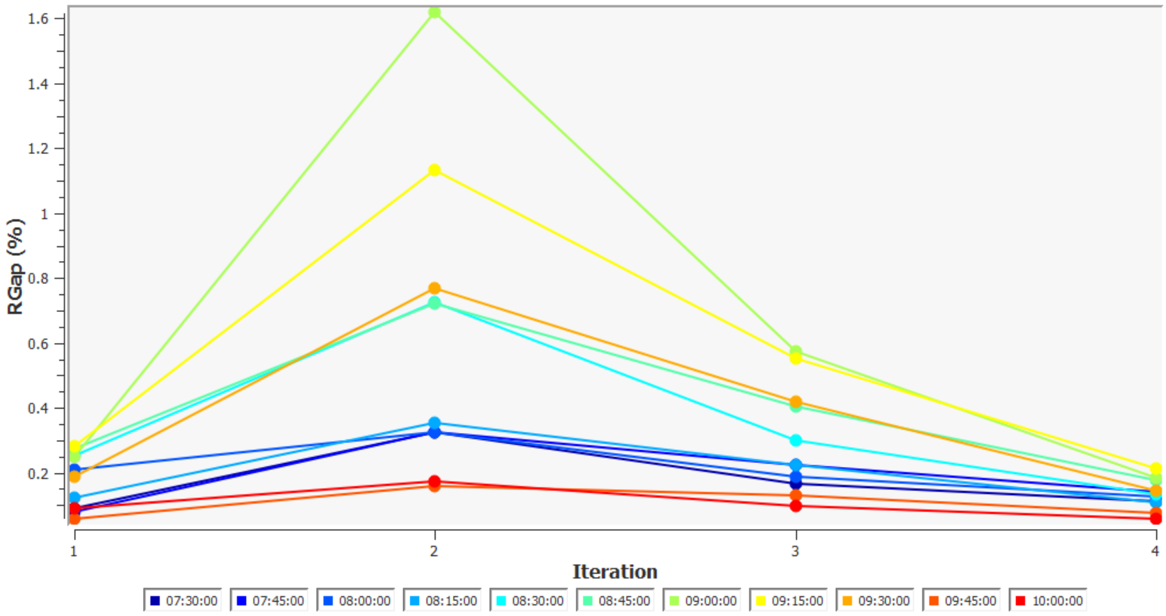
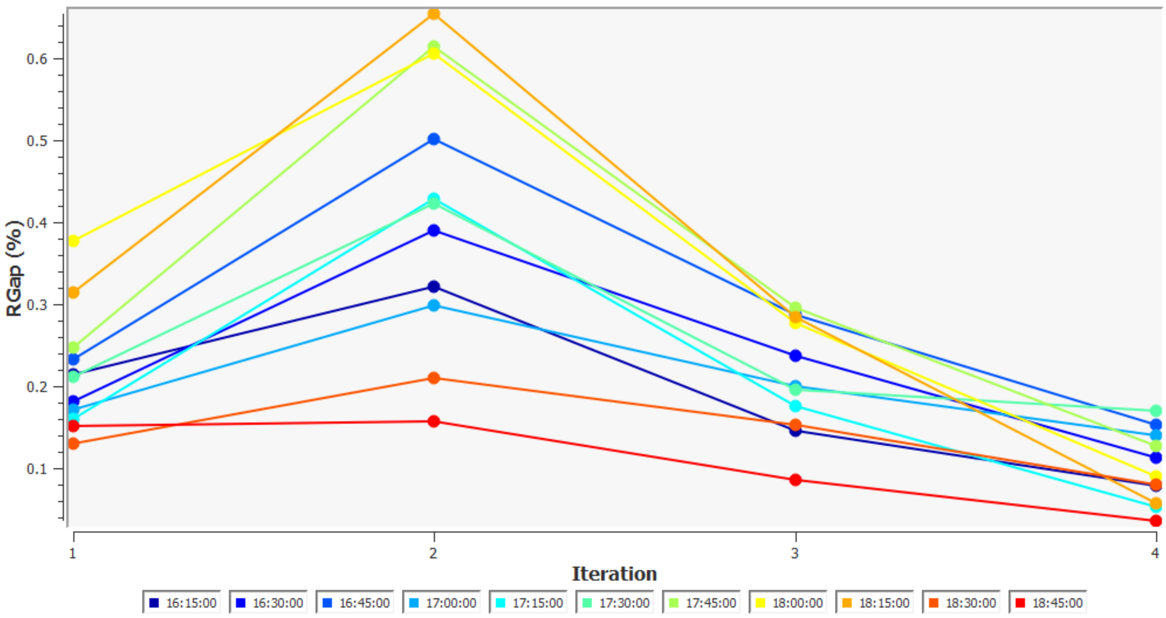


Figure A.2: PM Model Convergence



A.2. Model Stability

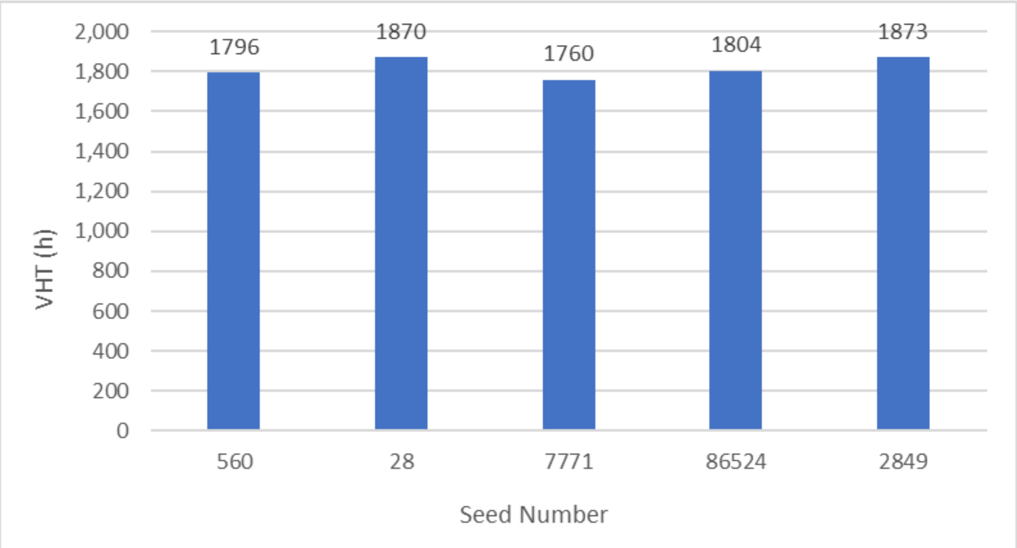
In order to demonstrate the stability of the model, 5 seeds were run and used to determine a suitable median seed based on the VHT network statistics. The five seed values processed for both the AM and PM base model are listed in Table A.1.

Table A.1: Model Seed Values (as per TfNSW Guidelines)

Seed Number	Seed Value
1	560
2	28
3	7771
4	86524
5	2849

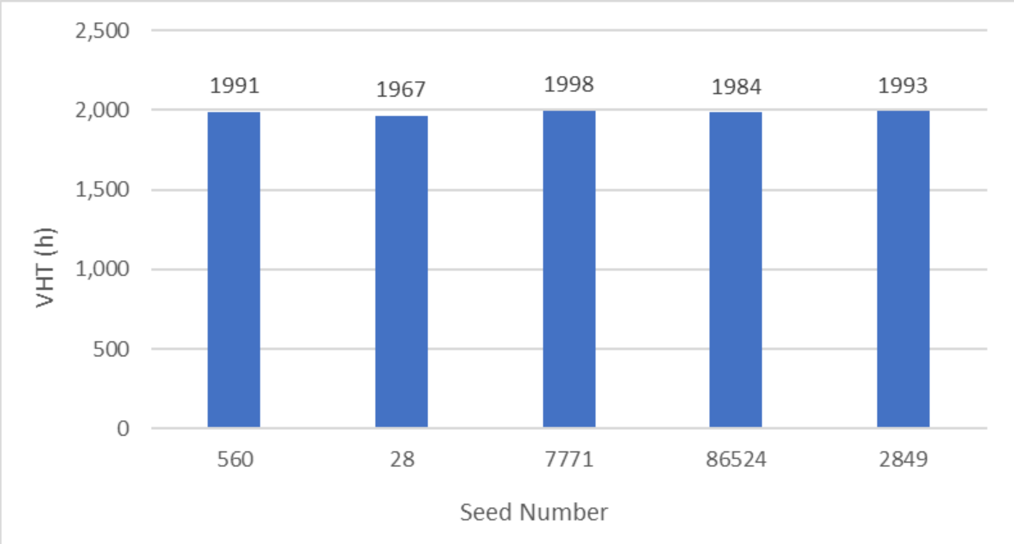
The AM and PM peak model stability results are outlined in Table A.3 and Table A.4.

Figure A.3: Median Seed Analysis – AM Peak



The results of the model stability analysis for the AM peak show acceptable variation in the VHT results, with the median seed recorded as **seed value 86524**.

Figure A.4: Median Seed Analysis – PM Peak



The results of the model stability analysis for the PM peak show acceptable variation in the VHT results, with the median seed recorded as **seed value 560**.

A.3. Calibration Results

A total of 31 link counts and 331 turn counts were utilised for both peak hours in the calibration process. Table A.2 shows the comparison of the observed and modelled link and turn traffic volumes for the AM and PM peak hours. The complete set of network wide traffic volume comparisons between observed and modelled data is provided as Appendix B.

Table A.2: Model Calibration Results

AM	Target	7:30am-8:30am			8:30am-9:30am		
		Cars	Trucks	Total	Cars	Trucks	Total
Individual Turn Counts GEH ≤ 5	85%	90%	99%	89%	93%	98%	91%
Individual Turn Counts GEH ≤ 10	100%	100%	100%	100%	100%	100%	100%
Individual Link Counts GEH ≤ 5	85%	87%	97%	84%	90%	94%	87%
Individual Link Counts GEH ≤ 10	100%	100%	100%	100%	100%	100%	100%
PM	**Target**	**4:15pm-5:15 pm**			**5:15pm-6:15pm**		
Individual Turn Counts GEH ≤ 5	85%	93%	98%	92%	87%	99%	87%
Individual Turn Counts GEH ≤ 10	100%	100%	100%	100%	100%	100%	100%
Individual Link Counts GEH ≤ 5	85%	94%	97%	94%	94%	90%	90%
Individual Link Counts GEH ≤ 10	100%	100%	100%	100%	100%	100%	100%

The calibration results indicate that both the turn flow and link flow calibration appropriately meet criteria for both peak periods. There are a few turns that fall outside the GEH > 10 range, which are outlined below:

- AM Peak (8:30am-9:30am):
  - There is 1 turn in the AM peak model with GEH > 10. This is for the southbound right turn from Duke Street on to Canterbury Road. This value has a GEH of 10.7; however, with the north approach signals running at least minimum green time, is deemed to not have a significant impact on the operation of the model.
- PM Peak (4:15pm-5:15pm):
  - There is 1 turn in the PM peak model first hour with GEH > 10, which is observed for the Clissold Parade Eastbound right turn on to Beamish Street. The left turn at this approach calibrates appropriately and with the overall hourly count difference approximately 70 vehicles, this is not seen as a critical difference.
- PM Peak (5:15pm-6:15pm):
  - 1 turn count in the second hour of the PM peak model has a GEH of 11. This is seen at the Campsie Street westbound left turn at the roundabout with Loch Street. Again, the difference in count at this location has little bearing on the overall model performance.

It is also noted that in other seed runs, the GEH values at this location are less than 10, so are not considered critical to the model performance or overall model suitability.

In addition to the above, a modelled versus observed traffic volume (links) comparison has been undertaken in the form of a R^2 and scatter plot analysis for each of the peak hours. It is typically recommended that an R^2 value greater than 0.95 be achieved before a model is considered to be calibrated appropriately, whilst the guidelines recommend a value greater than 0.9.

Figure 6.5: Link Flow comparison All Vehicles - AM Peak (7:30am-8:30 am)

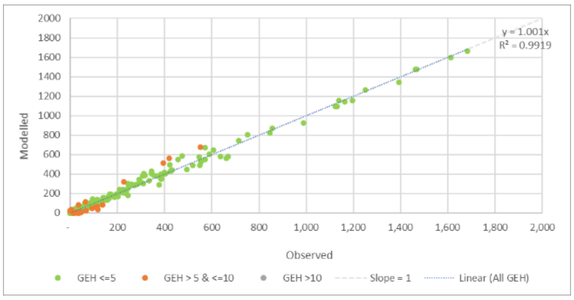


Figure 6.6: Link Flow comparison All Vehicles - AM Peak (8:30am-9:30am)

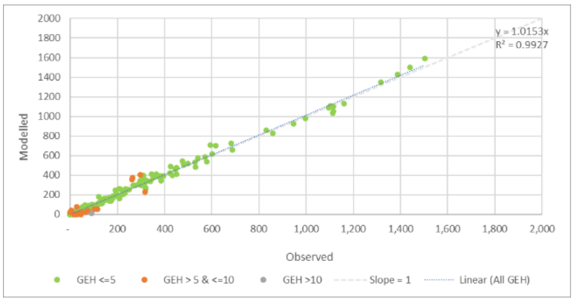


Figure 6.7: Link Flow comparison All Vehicles - PM Peak (4:15pm–5:15pm)

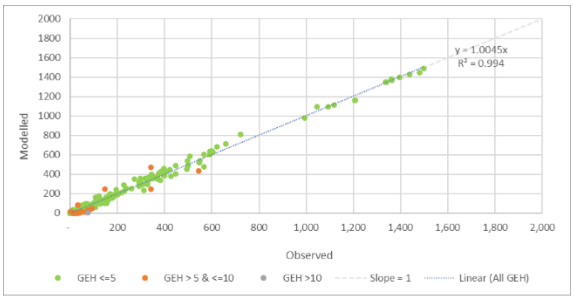
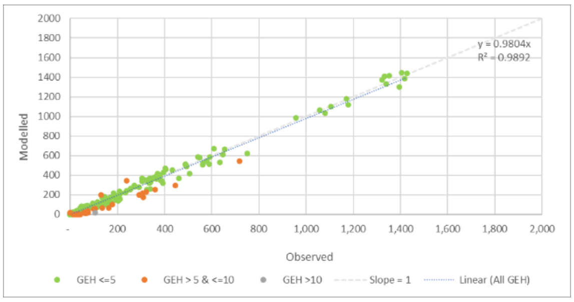


Figure 6.8: Link Flow comparison All Vehicles - PM Peak (5:15pm-6:15pm)



Given the above, the results of the turn flow and link flow calibration meet the calibration criteria and are considered satisfactory for all peak periods.

A.4. Travel Time Validation Results

Table A.3 and Table A.4 provide the travel time validation results for AM and PM peak hours, respectively. It is noted that the travel time criteria requires that Average modelled journey time to be within 15% or one minute (whichever is greater) of average observed journey time for full length of route.

Table A.3: Travel Time Validation Results – AM Peak

Peak Period	Route	Direction	Average Observed Travel Time (s)	Average Modelled Travel Time (s)	Difference		Meets Criteria?
					Relative (s)	%	
7:30am–8:30am	Route 1	Northbound	456	416	-40	-9%	Yes
		Southbound	419	403	-16	-4%	Yes
	Route 2	Northbound	544	518	-26	-5%	Yes
		Southbound	527	523	-5	-1%	Yes
	Route 3	Northbound	465	399	-66	-14%	Yes
		Southbound	398	362	-37	-9%	Yes
	Route 4	Northbound	231	240	9	4%	Yes
		Southbound	341	306	-34	-10%	Yes
	Route 5	Eastbound	233	197	-36	-15%	Yes
		Westbound	152	153	1	1%	Yes
	Route 6	Eastbound	232	200	-32	-14%	Yes
		Westbound	231	193	-38	-17%	Yes
	Route 7	Eastbound	481	439	-42	-9%	Yes
		Westbound	311	319	8	3%	Yes
8:30am–9:30am	Route 1	Northbound	452	413	-40	-9%	Yes
		Southbound	441	410	-31	-7%	Yes
	Route 2	Northbound	574	535	-39	-7%	Yes
		Southbound	596	608	11	2%	Yes
	Route 3	Northbound	468	414	-54	-11%	Yes
		Southbound	424	453	29	7%	Yes
	Route 4	Northbound	214	242	27	13%	Yes
		Southbound	275	293	18	7%	Yes
	Route 5	Eastbound	256	192	-64	-25%	No
		Westbound	209	159	-50	-24%	Yes
	Route 6	Eastbound	321	199	-122	-38%	No
		Westbound	262	198	-64	-25%	No
	Route 7	Eastbound	389	341	-48	-12%	Yes
		Westbound	311	322	11	4%	Yes

Table A.4: Travel Time Validation Results – PM Peak

Peak Period	Route	Direction	Average Observed Travel Time (s)	Average Modelled Travel Time (s)	Difference		Meets Criteria?
					Relative (s)	%	
4:15pm–5:15pm	Route 1	Northbound	454	419	-35	-8%	Yes
		Southbound	489	428	-61	-13%	Yes
	Route 2	Northbound	606	584	-22	-4%	Yes
		Southbound	675	574	-100	-15%	Yes
	Route 3	Northbound	462	448	-14	-3%	Yes
		Southbound	511	418	-93	-18%	No
	Route 4	Northbound	220	239	19	9%	Yes
		Southbound	312	291	-20	-6%	Yes
	Route 5	Eastbound	266	195	-71	-27%	No
		Westbound	233	180	-54	-23%	Yes
	Route 6	Eastbound	300	198	-101	-34%	No
		Westbound	274	198	-76	-28%	No
	Route 7	Eastbound	307	282	-25	-8%	Yes
		Westbound	341	344	3	1%	Yes
5:15pm–6:15pm	Route 1	Northbound	446	414	-32	-7%	Yes
		Southbound	453	420	-32	-7%	Yes
	Route 2	Northbound	650	702	52	8%	Yes
		Southbound	693	524	-169	-24%	No
	Route 3	Northbound	511	507	-4	-1%	Yes
		Southbound	491	370	-121	-25%	No
	Route 4	Northbound	226	243	17	8%	Yes
		Southbound	291	286	-5	-2%	Yes
	Route 5	Eastbound	243	194	-49	-20%	Yes
		Westbound	235	241	6	3%	Yes
	Route 6	Eastbound	408	207	-200	-49%	No
		Westbound	261	213	-47	-18%	Yes
	Route 7	Eastbound	289	300	10	4%	Yes
		Westbound	337	313	-24	-7%	Yes

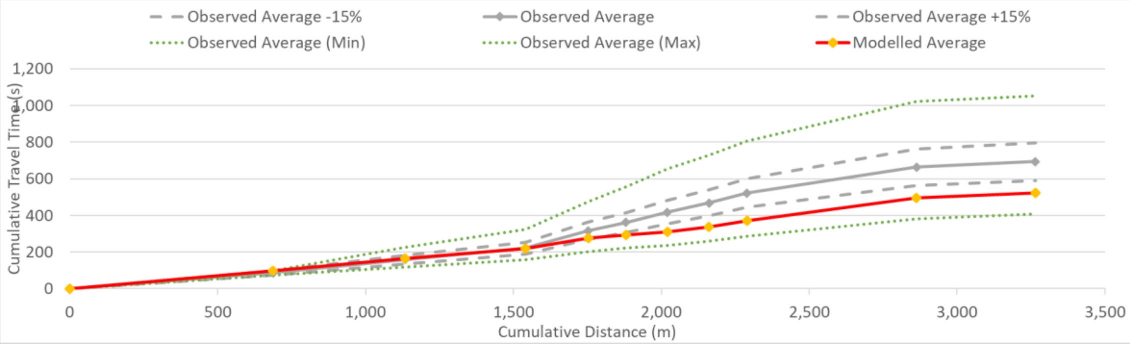
The travel time results are also graphically presented in Appendix C.

In general, the modelled travel time are within acceptable range except for the routes detailed below.

Route 2 – Lees Avenue, Second Avenue, Ninth Avenue, Beamish Street and Bexley Road

Route 2 (Southbound) modelled timings are faster than observed average travel times in the second PM peak hour (5:15pm to 6:15pm) between Linthorn Avenue and Cross Street as presented in Figure A.9.

Figure A.9: Route 2, Southbound (5:15pm-6:15pm)



Route 3 – Brighton Avenue, Beamish Street and Bexley Road

Route 3 (Southbound) modelled timings are faster than observed average travel times in both PM peak hours between Albert Street and Cross Street as presented in Figure A.10 and Figure A.11.

Figure A.10: Route 3, Southbound (4:15pm-5:15pm)

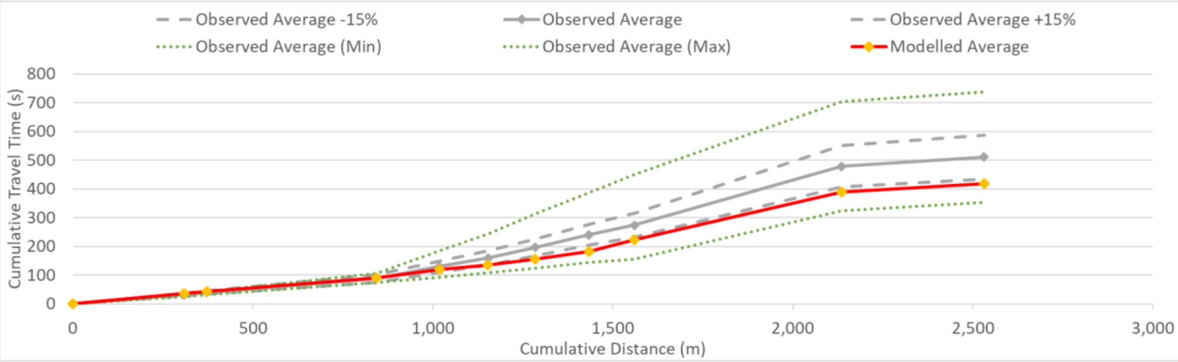
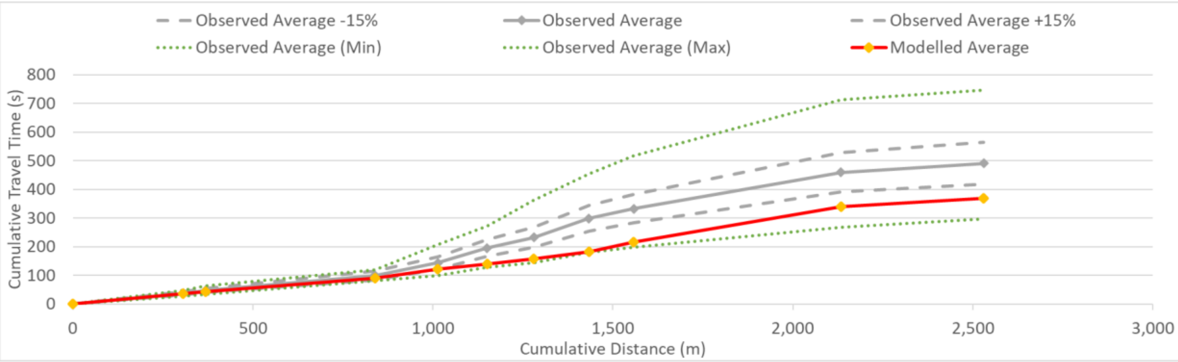


Figure A.11: Route 3, Southbound (5:15pm-6:15pm)



It is seen in the Figures above that the PM peak model travel times for routes 2 and 3 show less delay through the cente of Campsie; hwoever are within the minimum range of the obesrved travel times and only marginally outside the 15% margins.

Route 5 – Albert Street and Ninth Avenue

Route 5 (Eastbound) modelled timings are faster than observed average travel times in the second AM peak hour (8:30am to 9:30am) and first PM peak (4:15pm to 5:15pm) between Cecelia Street and Beamish Street. These are presented in Figure A.12 and Figure A.13.

Figure A.12: Route 5, Eastbound (8:30am-9:30am)

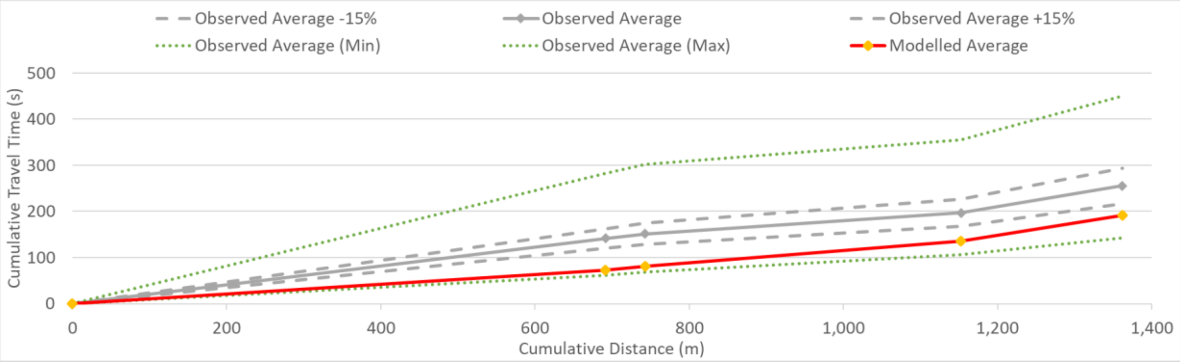
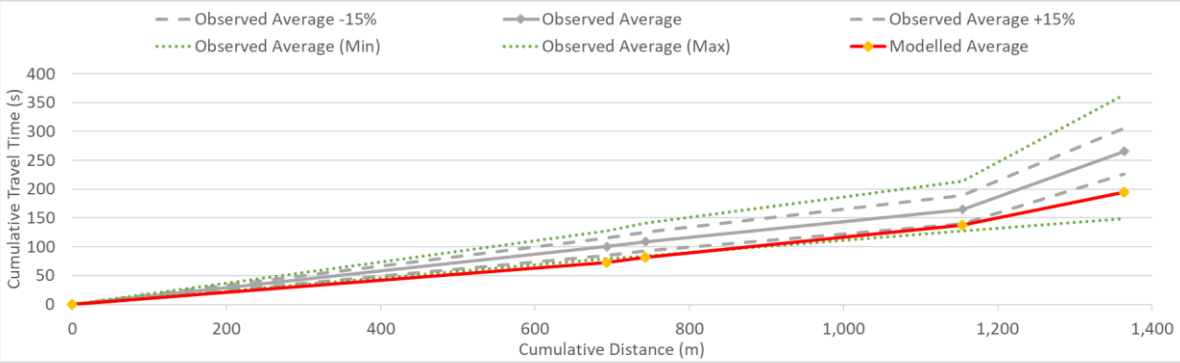


Figure A.13: Route 5, Eastbound (4:15pm-5:15pm)



As noted with routes 2 and 3, the modelled travel times for route 5 eastbound fall just outside the required criteria; however, are still within the minimum observed travel times.

Route 6 – Evaline Street

Route 6 modelled timings between Loftus Street and Wonga Street are consistently faster than observed average travel times for both directions during the second AM peak hour (8:30am to 9:30am) as presented in Figure A.14 and Figure A.15.

Figure A.14: Route 6, Eastbound (8:30am-9:30am)

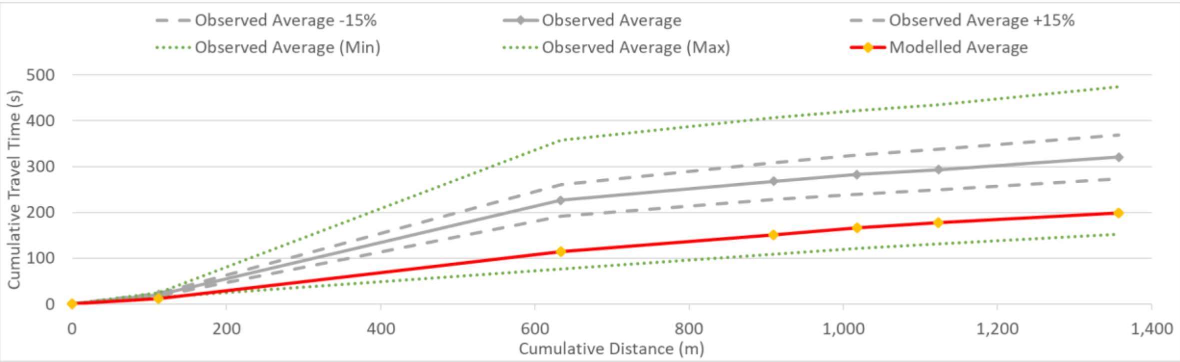
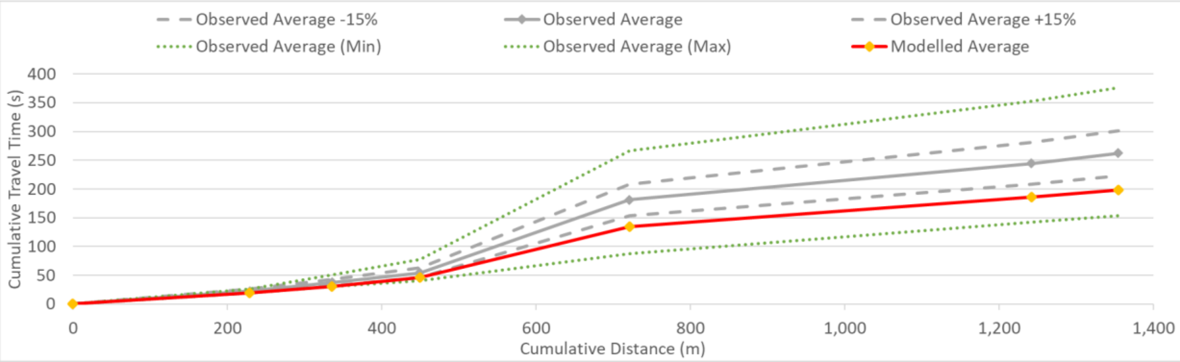


Figure A.15: Route 6, Westbound (8:30am-9:30am)



Furthermore, modelled timings for both eastbound and westbound directions during the first PM peak (4:15pm-5:15pm) and eastbound during the second PM peak (5:15pm-6:15pm) are faster than average observed travel times, presented in Figure A.16, Figure A.17, and Figure A.18.

Figure A.16: Route 6, Eastbound (4:15pm-5:15pm)

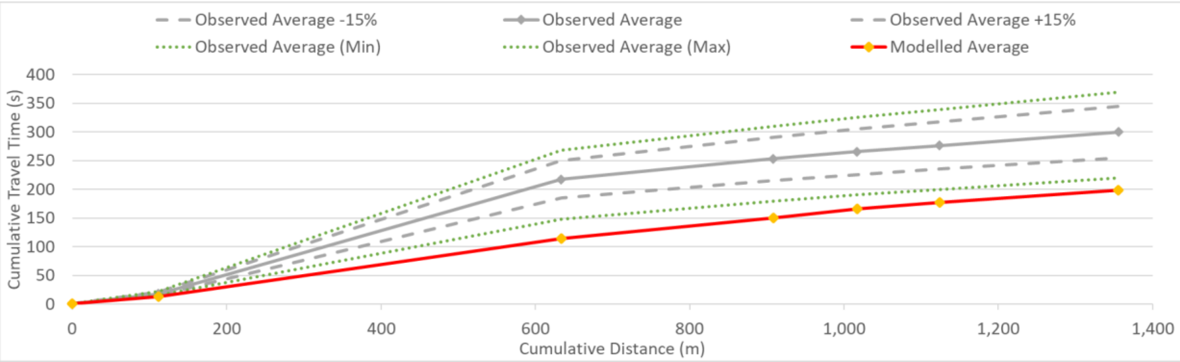


Figure A.17: Route 6, Westbound (4:15pm-5:15pm)

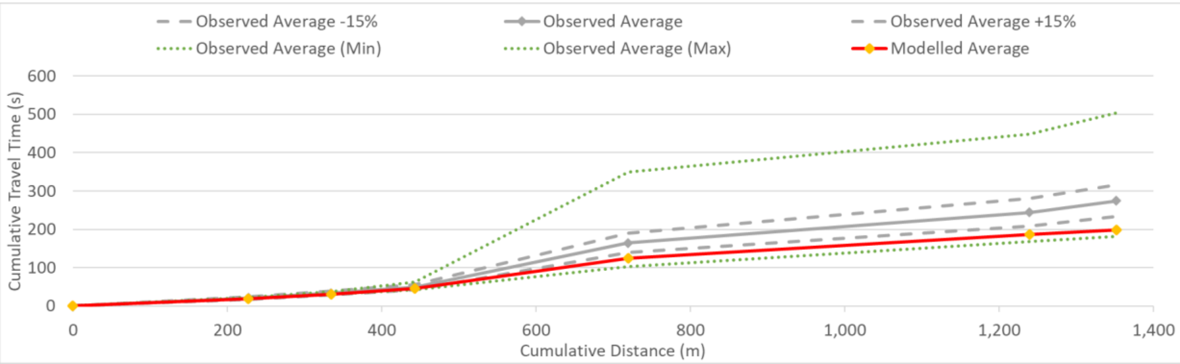
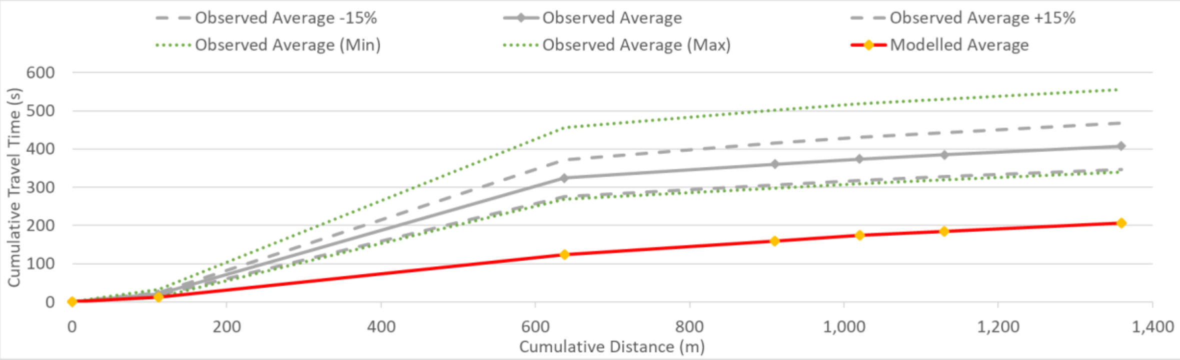


Figure A.18: Route 6, Eastbound (5:15pm-6:15pm)



It is noted there is a consistent mismatch for the Evaline Street (route 6) travel times, particularly with the interactions at Beamish Street and the signalised pedestrian crossing at the shopping centre. It is noted, that in some instances there is a lack of observed vehicle runs contributing to these averages, with higher observed times then significantly affecting the average. This is seen for the second hour of the PM peak in the eastbound direction, where only 3 runs were observed, one with greater than a 7 minute travel time for the second segment along Evaline Street, suggesting this vehicle missed more than 3 cycle times at these traffic lights.

A.5. Congestion Hot Spots

A comparison between Google Traffic maps and simulated model density plots is presented in Figure A.19 and Figure A.20 for the AM and PM peak hour, respectively.

Figure A.19: AM Peak Congestion Comparison – 8:30am

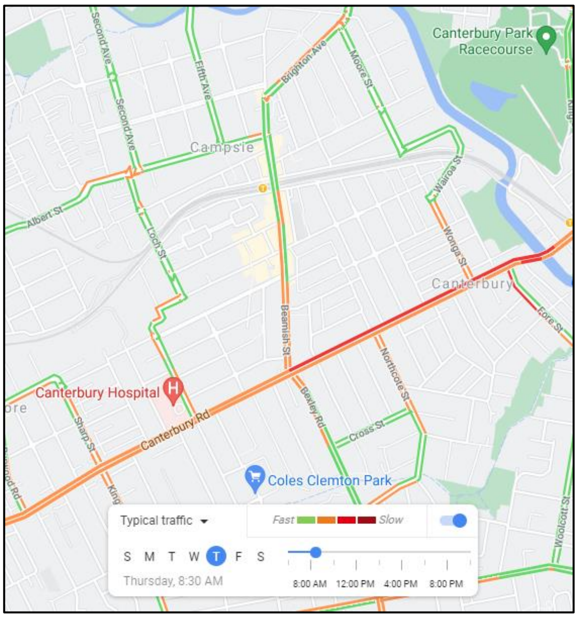
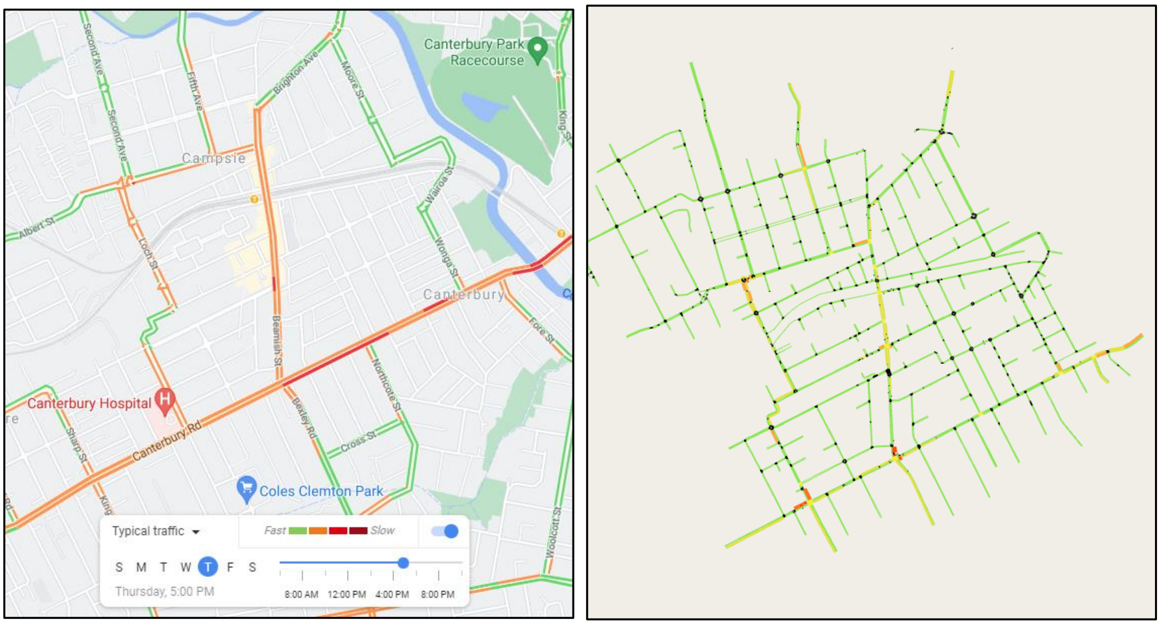


Figure A.20: PM Peak Congestion Comparison – 5:00pm



As presented above, in general the model congestion locations are similar in nature to that estimated by Google Traffic. The congestion hot spots are similar, with most of the locations observed along Canterbury Road and the arterial roads through Campsie.

A.6. Model Limitations

In general, the model provides a good representation of existing conditions, however it is recognised that meso models may not adequately represent:

- delays relating to interactions between pedestrians and cars
- delays relating to drivers slowing down to look for parking spaces or giving way to vehicles parallel parking
- weaving and merging delays.

Meso models may generally be faster around sections with the interactions outlined above. Therefore, the model travel times can be expected to be faster or predict less delays at some locations which is recognised and outlined in the context of this report.

For a study area of this size and the strategic nature of the study, a mesoscopic model was considered to be an appropriate tool and represents and adequate level of delays and congestion for the study purpose.

A.7. Conclusion

This section of the report has presented the calibration and validation results of the Aimsun mesoscopic model for Campsie. The results presented show that the model demonstrates reasonable 'goodness of fit' with the observed traffic conditions, which indicates that the model performs well at the network wide level.

The traffic volume comparisons for each of the peaks indicate a high level of correlation between the modelled and observed traffic flows with almost all of the targets being met.

The travel time analysis illustrates a reasonably good level of correlation between the modelled and observed travel times, with any discrepancies considered to have minimal impact on the overall project.

It is our view that the model is successfully calibrated and validated and is fit for its intended purpose.

B. CALIBRATION RESULTS

B

CAR	Observed		Modelled		Difference		GEH	
ID	8:30	9:30	8:30	9:30	8:30	9:30	8:30	9:30
106372	238	138	213	138	-25	0	1.7	0.0
106373	166	156	181	169	15	13	1.1	1.0
106374	54	51	45	41	-9	-10	1.3	1.5
106375	35	37	41	37	6	0	1.0	0.0
106376	210	255	213	268	3	13	0.2	0.8
106377	130	136	127	132	-3	-4	0.3	0.3
106378	27	34	2	5	-25	-29	6.6	6.6
106379	12	31	4	4	-8	-27	2.8	6.5
106380	18	27	14	21	-4	-6	1.0	1.2
106381	101	81	101	89	0	8	0.0	0.9
106382	6	8	7	9	1	1	0.4	0.3
106383	45	53	5	6	-40	-47	8.0	8.7
106384	60	41	76	77	16	36	1.9	4.7
106386	15	18	22	38	7	20	1.6	3.8
106385	43	33	51	39	8	6	1.2	1.0
106387	87	102	146	153	59	51	5.5	4.5
106388	49	53	18	33	-31	-20	5.4	3.0
106389	69	121	66	127	-3	6	0.4	0.5
106390	29	63	26	72	-3	9	0.6	1.1
106391	41	55	42	58	1	3	0.2	0.4
106392	45	47	57	45	12	-2	1.7	0.3
106393	322	309	415	396	93	87	4.8	4.6
106394	222	193	164	184	-58	-9	4.2	0.7
106395	955	791	963	830	8	39	0.3	1.4
106396	402	404	414	403	12	-1	0.6	0.0
106397	1,306	1,126	1,309	1,166	3	40	0.1	1.2
106398	817	743	844	760	27	17	0.9	0.6
106399	1,755	1,670	1,731	1,783	-24	113	0.6	2.7
106400	1,156	1,153	1,155	1,148	-1	-5	0.0	0.1
106401	968	901	991	922	23	21	0.7	0.7
106402	670	639	695	647	25	8	1.0	0.3

Truck	Observed		Modelled		Difference		GEH	
ID	8:30	9:30	8:30	9:30	8:30	9:30	8:30	9:30
106372	1	3	7	5	6	2	3.0	1.0
106373	14	13	11	14	-3	1	0.8	0.3
106374	3	3	3	5	0	2	0.0	1.0
106375	3	2	-	-	-3	-2	2.4	2.0
106376	10	6	7	4	-3	-2	1.0	0.9
106377	3	3	2	5	-1	2	0.6	1.0
106378	1	1	-	-	-1	-1	1.4	1.4
106379	1	3	-	-	-1	-3	1.4	2.4
106380	-	-	-	-	0	0	0.0	0.0
106381	4	4	5	2	1	-2	0.5	1.2
106382	-	-	-	-	0	0	0.0	0.0
106383	4	7	-	-	-4	-7	2.8	3.7
106384	1	-	6	4	5	4	2.7	2.8
106386	-	-	-	-	0	0	0.0	0.0
106385	1	-	-	-	-1	0	1.4	0.0
106387	3	6	3	3	0	-3	0.0	1.4
106388	5	15	-	-	-5	-15	3.2	5.5
106389	6	4	-	-	-6	-4	3.5	2.8
106390	3	8	-	-	-3	-8	2.4	4.0
106391	3	3	2	4	-1	1	0.6	0.5
106392	5	5	-	-	-5	-5	3.2	3.2
106393	9	47	2	17	-7	-30	3.0	5.3
106394	18	23	2	6	-16	-17	5.1	4.5
106395	27	39	26	39	-1	0	0.2	0.0
106396	18	24	18	22	0	-2	0.0	0.4
106397	128	77	98	75	-30	-2	2.8	0.2
106398	83	86	73	68	-10	-18	1.1	2.1
106399	88	82	90	87	2	5	0.2	0.5
106400	67	71	65	72	-2	1	0.2	0.1
106401	44	43	49	46	5	3	0.7	0.4
106402	49	47	56	45	7	-2	1.0	0.3

CAR	Observed		Modelled		Difference		GEH	
ID	8:30	9:30	8:30	9:30	8:30	9:30	8:30	9:30
8657	1	-	-	-	-1	0	1.4	0.0
8658	1	2	-	-	-1	-2	1.4	2.0
8656	-	2	-	-	0	-2	0.0	2.0
8652	-	-	-	-	0	0	0.0	0.0
8650	206	306	214	310	8	4	0.6	0.2
8651	22	29	45	44	23	15	4.0	2.5
8653	37	42	-	29	-37	-13	8.6	2.2
8655	-	1	-	-	0	-1	0.0	1.4
8654	37	44	13	33	-24	-11	4.8	1.8
8648	24	34	30	29	6	-5	1.2	0.9
8646	400	368	395	382	-5	14	0.3	0.7
8649	-	1	-	-	0	-1	0.0	1.4
8750	13	12	24	21	11	9	2.6	2.2
8752	1	10	8	9	7	-1	3.3	0.3
8753	207	298	237	330	30	32	2.0	1.8
8802	61	70	54	63	-7	-7	0.9	0.9
6970	74	97	62	79	-12	-18	1.5	1.9
8780	16	22	1	1	-15	-21	5.1	6.2
8782	389	359	393	406	4	47	0.2	2.4
7119	13	10	4	10	-9	0	3.1	0.0
7118	411	287	420	320	9	33	0.4	1.9
7117	9	14	3	8	-6	-6	2.4	1.8
7112	-	8	1	2	1	-6	1.4	2.7
7113	78	107	56	98	-22	-9	2.7	0.9
7110	83	96	79	82	-4	-14	0.4	1.5
7114	80	110	78	113	-2	3	0.2	0.3
7115	261	258	271	281	10	23	0.6	1.4
7116	50	56	51	44	1	-12	0.1	1.7
7121	67	66	75	81	8	15	0.9	1.7
7120	183	171	160	162	-23	-9	1.8	0.7
7122	6	12	27	20	21	8	5.2	2.0
7162	3	8	4	23	1	15	0.5	3.8
7164	415	295	422	320	7	25	0.3	1.4
7165	14	17	7	11	-7	-6	2.2	1.6
7149	22	22	26	22	4	0	0.8	0.0
7148	250	265	279	281	29	16	1.8	1.0
7145	15	20	14	13	-1	-7	0.3	1.7
105919	21	44	20	38	-1	-6	0.2	0.9
105920	137	192	133	193	-4	1	0.3	0.1
105923	289	271	313	305	24	34	1.4	2.0
105924	1	6	-	-	-1	-6	1.4	3.5
105922	-	6	-	-	0	-6	0.0	3.5
105921	47	37	37	37	-10	0	1.5	0.0
6235	166	203	193	260	27	57	2.0	3.7
6234	273	185	275	234	2	49	0.1	3.4
6233	165	155	177	157	12	2	0.9	0.2
6231	102	133	101	141	-1	8	0.1	0.7
13115	139	117	152	108	13	-9	1.1	0.8
6237	342	297	428	384	86	87	4.4	4.7
11531	373	281	332	297	-41	16	2.2	0.9
11529	345	292	265	209	-80	-83	4.6	5.2
11532	269	325	325	356	56	31	3.2	1.7
11533	64	118	112	178	48	60	5.1	4.9
11535	210	138	226	148	16	10	1.1	0.8
11534	296	300	370	387	74	87	4.1	4.7
9844	615	489	523	445	-92	-44	3.9	2.0

CAR	Observed		Modelled		Difference		GEH	
ID	8:30	9:30	8:30	9:30	8:30	9:30	8:30	9:30
13205	53	78	57	71	4	-7	0.5	0.8
13203	31	45	5	16	-26	-29	6.1	5.3
13204	41	58	21	28	-20	-30	3.6	4.6
13202	29	42	11	4	-18	-38	4.0	7.9
9846	523	559	647	673	124	114	5.1	4.6
105935	50	46	48	44	-2	-2	0.3	0.3
105937	632	542	538	502	-94	-40	3.9	1.8
105931	41	48	62	51	21	3	2.9	0.4
105933	24	26	14	23	-10	-3	2.3	0.6
105934	539	578	638	667	99	89	4.1	3.6
105927	39	18	44	15	5	-3	0.8	0.7
13265	538	467	510	481	-28	14	1.2	0.6
13266	1	-	-	-	-1	0	1.4	0.0
13268	31	50	11	25	-20	-25	4.4	4.1
13267	110	111	37	52	-73	-59	8.5	6.5
13262	173	183	176	207	3	24	0.2	1.7
13261	391	450	525	512	134	62	6.3	2.8
13263	41	14	38	15	-3	1	0.5	0.3
13264	42	45	2	-	-40	-45	8.5	9.5
10017	13	5	10	4	-3	-1	0.9	0.5
7261	52	96	23	48	-29	-48	4.7	5.7
7262	512	403	491	426	-21	23	0.9	1.1
7260	432	500	550	538	118	38	5.3	1.7
7256	17	50	19	52	2	2	0.5	0.3
5943	62	57	100	75	38	18	4.2	2.2
5944	476	380	447	387	-29	7	1.3	0.4
13473	-	-	-	-	0	0	0.0	0.0
5950	18	27	22	15	4	-12	0.9	2.6
5949	87	128	61	143	-26	15	3.0	1.3
5951	49	69	25	34	-24	-35	3.9	4.9
5948	32	51	42	28	10	-23	1.6	3.7
5947	355	388	477	458	122	70	6.0	3.4
5946	39	62	29	47	-10	-15	1.7	2.0
5941	32	53	34	51	2	-2	0.3	0.3
5942	112	131	104	111	-8	-20	0.8	1.8
5939	82	107	58	78	-24	-29	2.9	3.0
105946	24	37	18	28	-6	-9	1.3	1.6
105947	514	392	487	367	-27	-25	1.2	1.3
105945	17	44	16	43	-1	-1	0.2	0.2
105941	18	29	16	34	-2	5	0.5	0.9
105939	-	-	2	2	2	2	2.0	2.0
105940	-	-	22	21	22	21	6.6	6.5
105948	14	31	14	4	0	-27	0.0	6.5
105950	415	442	515	474	100	32	4.6	1.5
105949	25	49	30	73	5	24	1.0	3.1
105943	37	50	43	73	6	23	0.9	2.9
105942	43	43	6	40	-37	-3	7.5	0.5
105944	22	34	15	6	-7	-28	1.6	6.3
7358	44	30	42	27	-2	-3	0.3	0.6
7359	596	556	627	568	31	12	1.3	0.5
7361	376	375	345	342	-31	-33	1.6	1.7
7360	23	9	16	16	-7	7	1.6	2.0
7355	56	28	53	24	-3	-4	0.4	0.8
7357	16	18	15	9	-1	-9	0.3	2.4
8485	21	18	18	11	-3	-7	0.7	1.8
8483	349	308	385	352	36	44	1.9	2.4

CAR	Observed		Modelled		Difference		GEH	
ID	8:30	9:30	8:30	9:30	8:30	9:30	8:30	9:30
8484	63	40	20	15	-43	-25	6.7	4.8
8487	33	49	46	43	13	-6	2.1	0.9
8488	772	784	803	804	31	20	1.1	0.7
8486	228	162	205	135	-23	-27	1.6	2.2
8481	80	70	70	39	-10	-31	1.2	4.2
8479	239	234	252	246	13	12	0.8	0.8
8482	48	61	26	41	-22	-20	3.6	2.8
8489	137	144	136	129	-1	-15	0.1	1.3
8491	1,179	1,050	1,182	1,035	3	-15	0.1	0.5
8375	1,068	1,057	1,030	985	-38	-72	1.2	2.3
8374	4	5	-	-	-4	-5	2.8	3.2
8369	41	55	27	60	-14	5	2.4	0.7
8371	4	4	11	34	7	30	2.6	6.9
8372	21	17	7	22	-14	5	3.7	1.1
8373	1,317	1,103	1,258	1,068	-59	-35	1.6	1.1
8466	85	88	100	90	15	2	1.6	0.2
8465	571	512	579	510	8	-2	0.3	0.1
8463	312	301	312	321	0	20	0.0	1.1
8467	140	125	108	136	-32	11	2.9	1.0
8469	804	816	780	791	-24	-25	0.9	0.9
5954	29	51	78	82	49	31	6.7	3.8
8470	323	300	379	315	56	15	3.0	0.9
8472	82	92	133	89	51	-3	4.9	0.3
8475	48	72	24	46	-24	-26	4.0	3.4
8474	1,069	899	1,034	877	-35	-22	1.1	0.7
8473	207	214	213	198	6	-16	0.4	1.1
8355	16	5	-	-	-16	-5	5.7	3.2
8353	-	-	3	1	3	1	2.4	1.4
8354	1	2	6	5	5	3	2.7	1.6
8357	37	26	34	76	-3	50	0.5	7.0
8358	929	939	861	927	-68	-12	2.3	0.4
8351	14	13	24	15	10	2	2.3	0.5
8349	-	-	9	-	9	0	4.2	0.0
8352	-	-	21	9	21	9	6.5	4.2
8359	16	24	19	19	3	-5	0.7	1.1
8361	1,384	1,237	1,396	1,270	12	33	0.3	0.9
8394	1,136	1,066	1,090	1,000	-46	-66	1.4	2.1
8390	-	-	5	5	5	5	3.2	3.2
8392	106	87	58	12	-48	-75	5.3	10.7
8395	17	30	19	48	2	18	0.5	2.9
8396	1,390	1,312	1,400	1,348	10	36	0.3	1.0
11250	1,107	1,035	1,083	1,027	-24	-8	0.7	0.2
11249	194	213	178	223	-16	10	1.2	0.7
11246	230	220	201	248	-29	28	2.0	1.8
11248	88	90	45	68	-43	-22	5.3	2.5
11251	18	35	18	31	0	-4	0.0	0.7
11252	1,537	1,366	1,519	1,422	-18	56	0.5	1.5
7813	91	189	112	201	21	12	2.1	0.9
7811	152	244	155	250	3	6	0.2	0.4
7814	76	114	69	115	-7	1	0.8	0.1
7815	1,080	1,039	1,100	1,040	20	1	0.6	0.0
7817	1,603	1,426	1,584	1,509	-19	83	0.5	2.2
7816	136	172	151	176	15	4	1.3	0.3
105321	9	15	9	21	0	6	0.0	1.4
105322	78	67	74	64	-4	-3	0.5	0.4
105323	-	-	-	-	0	0	0.0	0.0

CAR	Observed		Modelled		Difference		GEH	
ID	8:30	9:30	8:30	9:30	8:30	9:30	8:30	9:30
105320	-	-	-	-	0	0	0.0	0.0
105317	17	13	14	13	-3	0	0.8	0.0
105318	47	29	49	29	2	0	0.3	0.0
105315	31	62	33	63	2	1	0.4	0.1
105316	61	76	72	84	11	8	1.3	0.9
105313	33	51	32	45	-1	-6	0.2	0.9
105310	67	68	67	68	0	0	0.0	0.0
105311	26	21	25	20	-1	-1	0.2	0.2
105312	6	5	23	17	17	12	4.5	3.6
105309	-	-	-	-	0	0	0.0	0.0
105324	-	-	-	-	0	0	0.0	0.0
105319	1	-	-	-	-1	0	1.4	0.0
105314	1	4	-	-	-1	-4	1.4	2.8
105441	13	23	13	12	0	-11	0.0	2.6
105438	378	295	384	311	6	16	0.3	0.9
105439	19	26	8	-	-11	-26	3.0	7.2
105436	29	34	13	16	-16	-18	3.5	3.6
105437	85	117	74	110	-11	-7	1.2	0.7
105434	45	29	41	47	-4	18	0.6	2.9
105431	38	36	51	57	13	21	1.9	3.1
105432	271	297	281	292	10	-5	0.6	0.3
105433	22	22	27	20	5	-2	1.0	0.4
105442	73	92	70	99	-3	7	0.4	0.7
105443	189	173	187	182	-2	9	0.1	0.7
105444	21	24	1	2	-20	-22	6.0	6.1
105445	-	-	-	-	0	0	0.0	0.0
105440	-	-	-	-	0	0	0.0	0.0
105435	1	1	-	-	-1	-1	1.4	1.4
105430	-	-	-	-	0	0	0.0	0.0
105877	77	117	70	108	-7	-9	0.8	0.8
105876	475	308	420	248	-55	-60	2.6	3.6
105878	215	299	300	372	85	73	5.3	4.0
105880	85	127	83	123	-2	-4	0.2	0.4
105882	212	183	210	180	-2	-3	0.1	0.2
105881	125	129	138	164	13	35	1.1	2.9
105875	2	6	-	-	-2	-6	2.0	3.5
105879	-	-	-	1	0	1	0.0	1.4
105883	-	-	-	-	0	0	0.0	0.0
105520	22	24	36	27	14	3	2.6	0.6
105522	316	253	386	338	70	85	3.7	4.9
105524	136	164	134	165	-2	1	0.2	0.1
105523	250	371	271	372	21	1	1.3	0.1
105519	616	437	558	386	-58	-51	2.4	2.5
105518	25	16	15	17	-10	1	2.2	0.2
105517	4	2	-	-	-4	-2	2.8	2.0
105521	-	-	-	-	0	0	0.0	0.0
105525	4	6	-	-	-4	-6	2.8	3.5
105579	212	211	213	199	1	-12	0.1	0.8
105577	537	432	564	453	27	21	1.2	1.0
105575	393	445	416	473	23	28	1.1	1.3
105576	130	192	120	200	-10	8	0.9	0.6
105580	241	202	294	256	53	54	3.2	3.6
105581	240	312	177	256	-63	-56	4.4	3.3
105582	1	-	-	-	-1	0	1.4	0.0
105578	2	4	-	-	-2	-4	2.0	2.8
105574	1	1	-	-	-1	-1	1.4	1.4

CAR	Observed		Modelled		Difference		GEH	
ID	8:30	9:30	8:30	9:30	8:30	9:30	8:30	9:30
105602	220	292	240	342	20	50	1.3	2.8
106312	38	33	65	58	27	25	3.8	3.7
105598	41	45	50	51	9	6	1.3	0.9
105599	307	336	296	333	-11	-3	0.6	0.2
106313	361	305	365	306	4	1	0.2	0.1
105604	414	338	493	405	79	67	3.7	3.5
105605	-	3	-	-	0	-3	0.0	2.4
105601	3	2	-	-	-3	-2	2.4	2.0
106311	1	-	-	-	-1	0	1.4	0.0
105550	24	38	17	37	-7	-1	1.5	0.2
105551	310	259	403	356	93	97	4.9	5.5
105548	13	12	5	5	-8	-7	2.7	2.4
105545	25	19	4	12	-21	-7	5.5	1.8
105546	7	8	1	6	-6	-2	3.0	0.8
105547	1	-	21	10	20	10	6.0	4.5
105556	1	1	4	-	3	-1	1.9	1.4
105557	162	189	146	180	-16	-9	1.3	0.7
105558	5	4	-	-	-5	-4	3.2	2.8
105555	18	12	-	-	-18	-12	6.0	4.9
105552	10	8	7	3	-3	-5	1.0	2.1
105553	37	36	4	28	-33	-8	7.3	1.4
105554	1	-	-	-	-1	0	1.4	0.0
105549	-	-	-	-	0	0	0.0	0.0
105544	-	-	-	-	0	0	0.0	0.0
105559	1	-	-	-	-1	0	1.4	0.0
105685	1	1	-	-	-1	-1	1.4	1.4
105682	-	-	4	2	4	2	2.8	2.0
105683	-	-	-	-	0	0	0.0	0.0
106296	-	-	1	-	1	0	1.4	0.0
105681	18	21	-	-	-18	-21	6.0	6.5
105678	310	291	397	387	87	96	4.6	5.2
105675	200	228	165	208	-35	-20	2.6	1.4
106295	-	-	3	3	3	3	2.4	2.4
105677	34	18	-	-	-34	-18	8.2	6.0
105686	12	11	-	-	-12	-11	4.9	4.7
105687	22	7	6	3	-16	-4	4.3	1.8
106298	-	1	-	1	0	0	0.0	0.0
105689	-	1	-	-	0	-1	0.0	1.4
106297	-	-	-	-	0	0	0.0	0.0
105679	1	1	-	-	-1	-1	1.4	1.4
105674	1	-	-	-	-1	0	1.4	0.0
105630	20	16	5	-	-15	-16	4.2	5.7
105631	694	585	729	601	35	16	1.3	0.7
105628	97	90	91	98	-6	8	0.6	0.8
105625	51	71	47	35	-4	-36	0.6	4.9
105626	13	15	-	-	-13	-15	5.1	5.5
105627	57	52	60	35	3	-17	0.4	2.6
105636	96	73	93	67	-3	-6	0.3	0.7
105637	539	679	486	654	-53	-25	2.3	1.0
105638	-	5	3	1	3	-4	2.4	2.3
105635	4	11	5	10	1	-1	0.5	0.3
105632	14	10	1	-	-13	-10	4.7	4.5
105633	32	42	-	24	-32	-18	8.0	3.1
105634	-	-	-	-	0	0	0.0	0.0
105629	2	1	-	-	-2	-1	2.0	1.4
105624	1	1	-	-	-1	-1	1.4	1.4

CAR	Observed		Modelled		Difference		GEH	
ID	8:30	9:30	8:30	9:30	8:30	9:30	8:30	9:30
105639	-	-	-	-	0	0	0.0	0.0
105857	39	59	51	76	12	17	1.8	2.1
105856	112	104	62	68	-50	-36	5.4	3.9
105858	133	200	82	161	-51	-39	4.9	2.9
105860	422	391	425	389	3	-2	0.1	0.1
105862	740	668	788	708	48	40	1.7	1.5
105861	113	172	138	137	25	-35	2.2	2.8
105863	1	-	-	-	-1	0	1.4	0.0
105855	2	3	-	-	-2	-3	2.0	2.4
105859	1	2	-	-	-1	-2	1.4	2.0
105974	51	81	63	113	12	32	1.6	3.2
105972	223	218	228	242	5	24	0.3	1.6
105970	173	196	105	174	-68	-22	5.8	1.6
105971	11	17	15	19	4	2	1.1	0.5
105975	15	18	27	27	12	9	2.6	1.9
105976	80	80	83	119	3	39	0.3	3.9
105973	1	1	4	3	3	2	1.9	1.4
105969	1	-	-	-	-1	0	1.4	0.0
105977	7	5	-	-	-7	-5	3.7	3.2
106020	22	37	8	24	-14	-13	3.6	2.4
106021	23	13	9	5	-14	-8	3.5	2.7
106018	3	5	7	13	4	8	1.8	2.7
106015	3	3	5	1	2	-2	1.0	1.4
106016	91	104	61	107	-30	3	3.4	0.3
106017	4	1	1	-	-3	-1	1.9	1.4
106026	5	5	2	3	-3	-2	1.6	1.0
106027	27	36	14	7	-13	-29	2.9	6.3
106028	5	5	8	7	3	2	1.2	0.8
106025	2	5	8	15	6	10	2.7	3.2
106022	53	72	49	80	-4	8	0.6	0.9
106023	12	15	16	16	4	1	1.1	0.3
106024	5	2	-	-	-5	-2	3.2	2.0
106019	2	1	-	-	-2	-1	2.0	1.4
106014	-	-	-	-	0	0	0.0	0.0
106029	-	-	-	-	0	0	0.0	0.0
105908	41	62	40	48	-1	-14	0.2	1.9
105909	580	508	611	554	31	46	1.3	2.0
105906	15	14	-	-	-15	-14	5.5	5.3
105903	9	20	-	-	-9	-20	4.2	6.3
105904	34	57	34	59	0	2	0.0	0.3
105905	62	80	57	85	-5	5	0.6	0.6
105914	14	22	17	29	3	7	0.8	1.4
105915	322	323	326	315	4	-8	0.2	0.4
105916	97	102	121	126	24	24	2.3	2.2
105913	221	204	249	167	28	-37	1.8	2.7
105910	81	69	81	110	0	41	0.0	4.3
105911	44	35	28	31	-16	-4	2.7	0.7
105912	-	-	-	-	0	0	0.0	0.0
105907	3	3	-	-	-3	-3	2.4	2.4
105902	-	-	-	-	0	0	0.0	0.0
105917	3	-	-	-	-3	0	2.4	0.0

Truck	Observed		Modelled		Difference		GEH	
ID	8:30	9:30	8:30	9:30	8:30	9:30	8:30	9:30
8657	-	-	-	-	0	0	0.0	0.0
8658	-	-	-	-	0	0	0.0	0.0
8656	-	-	-	-	0	0	0.0	0.0
8652	-	-	-	-	0	0	0.0	0.0
8650	5	5	3	4	-2	-1	1.0	0.5
8651	-	1	-	1	0	0	0.0	0.0
8653	-	1	-	-	0	-1	0.0	1.4
8655	-	-	-	-	0	0	0.0	0.0
8654	3	2	-	-	-3	-2	2.4	2.0
8648	3	2	-	-	-3	-2	2.4	2.0
8646	3	3	6	2	3	-1	1.4	0.6
8649	-	-	-	-	0	0	0.0	0.0
8750	-	-	-	-	0	0	0.0	0.0
8752	-	-	-	-	0	0	0.0	0.0
8753	3	6	3	5	0	-1	0.0	0.4
8802	1	1	-	-	-1	-1	1.4	1.4
6970	2	1	-	-	-2	-1	2.0	1.4
8780	-	-	-	-	0	0	0.0	0.0
8782	3	6	6	2	3	-4	1.4	2.0
7119	1	-	1	1	0	1	0.0	1.4
7118	17	10	18	11	1	1	0.2	0.3
7117	-	-	-	-	0	0	0.0	0.0
7112	1	1	-	-	-1	-1	1.4	1.4
7113	3	5	2	3	-1	-2	0.6	1.0
7110	10	10	-	-	-10	-10	4.5	4.5
7114	11	13	4	6	-7	-7	2.6	2.3
7115	11	8	9	11	-2	3	0.6	1.0
7116	-	-	1	2	1	2	1.4	2.0
7121	-	-	-	2	0	2	0.0	2.0
7120	5	6	-	-	-5	-6	3.2	3.5
7122	-	-	5	3	5	3	3.2	2.4
7162	1	-	1	4	0	4	0.0	2.8
7164	16	9	19	12	3	3	0.7	0.9
7165	1	1	-	-	-1	-1	1.4	1.4
7149	2	-	1	-	-1	0	0.8	0.0
7148	10	8	14	14	4	6	1.2	1.8
7145	1	-	-	-	-1	0	1.4	0.0
105919	-	1	-	-	0	-1	0.0	1.4
105920	13	15	-	-	-13	-15	5.1	5.5
105923	13	19	-	-	-13	-19	5.1	6.2
105924	-	1	-	-	0	-1	0.0	1.4
105922	1	-	-	-	-1	0	1.4	0.0
105921	1	2	1	-	0	-2	0.0	2.0
6235	2	7	-	-	-2	-7	2.0	3.7
6234	12	6	17	15	5	9	1.3	2.8
6233	8	7	12	13	4	6	1.3	1.9
6231	3	1	2	1	-1	0	0.6	0.0
13115	6	2	3	1	-3	-1	1.4	0.8
6237	3	5	1	7	-2	2	1.4	0.8
11531	13	11	16	15	3	4	0.8	1.1
11529	31	25	24	17	-7	-8	1.3	1.7
11532	22	27	20	20	-2	-7	0.4	1.4
11533	1	3	1	-	0	-3	0.0	2.4
11535	-	2	1	6	1	4	1.4	2.0
11534	10	10	12	13	2	3	0.6	0.9
9844	47	41	39	35	-8	-6	1.2	1.0

Truck	Observed		Modelled		Difference		GEH	
ID	8:30	9:30	8:30	9:30	8:30	9:30	8:30	9:30
13205	1	-	1	-	0	0	0.0	0.0
13203	2	1	1	-	-1	-1	0.8	1.4
13204	-	1	-	-	0	-1	0.0	1.4
13202	1	1	-	-	-1	-1	1.4	1.4
9846	29	35	32	33	3	-2	0.5	0.3
105935	-	-	-	-	0	0	0.0	0.0
105937	38	36	40	36	2	0	0.3	0.0
105931	-	-	3	1	3	1	2.4	1.4
105933	-	-	-	-	0	0	0.0	0.0
105934	33	38	33	33	0	-5	0.0	0.8
105927	7	6	-	-	-7	-6	3.7	3.5
13265	33	32	40	36	7	4	1.2	0.7
13266	11	9	-	-	-11	-9	4.7	4.2
13268	16	15	-	-	-16	-15	5.7	5.5
13267	7	3	-	-	-7	-3	3.7	2.4
13262	6	9	-	-	-6	-9	3.5	4.2
13261	27	26	36	34	9	8	1.6	1.5
13263	-	-	-	-	0	0	0.0	0.0
13264	-	-	-	-	0	0	0.0	0.0
10017	2	-	-	-	-2	0	2.0	0.0
7261	1	6	3	3	2	-3	1.4	1.4
7262	42	42	40	35	-2	-7	0.3	1.1
7260	43	41	38	33	-5	-8	0.8	1.3
7256	-	1	-	-	0	-1	0.0	1.4
5943	1	2	-	-	-1	-2	1.4	2.0
5944	42	43	44	36	2	-7	0.3	1.1
13473	1	-	-	-	-1	0	1.4	0.0
5950	1	1	1	3	0	2	0.0	1.4
5949	1	3	-	-	-1	-3	1.4	2.4
5951	3	4	-	-	-3	-4	2.4	2.8
5948	1	2	1	-	0	-2	0.0	2.0
5947	39	38	37	32	-2	-6	0.3	1.0
5946	2	1	-	1	-2	0	2.0	0.0
5941	1	3	-	1	-1	-2	1.4	1.4
5942	5	4	-	-	-5	-4	3.2	2.8
5939	4	4	-	-	-4	-4	2.8	2.8
105946	-	-	-	-	0	0	0.0	0.0
105947	39	41	39	32	0	-9	0.0	1.5
105945	-	-	-	-	0	0	0.0	0.0
105941	1	-	-	-	-1	0	1.4	0.0
105939	-	-	1	1	1	1	1.4	1.4
105940	-	-	-	-	0	0	0.0	0.0
105948	-	-	-	-	0	0	0.0	0.0
105950	42	39	37	32	-5	-7	0.8	1.2
105949	4	5	1	3	-3	-2	1.9	1.0
105943	4	3	5	6	1	3	0.5	1.4
105942	1	-	-	-	-1	0	1.4	0.0
105944	2	4	-	3	-2	-1	2.0	0.5
7358	-	-	-	-	0	0	0.0	0.0
7359	10	14	19	19	9	5	2.4	1.2
7361	8	10	3	4	-5	-6	2.1	2.3
7360	-	-	-	-	0	0	0.0	0.0
7355	1	1	-	-	-1	-1	1.4	1.4
7357	1	1	-	-	-1	-1	1.4	1.4
8485	1	2	5	17	4	15	2.3	4.9
8483	6	6	1	6	-5	0	2.7	0.0

Truck	Observed		Modelled		Difference		GEH	
ID	8:30	9:30	8:30	9:30	8:30	9:30	8:30	9:30
8484	3	2	-	-	-3	-2	2.4	2.0
8487	2	2	-	1	-2	-1	2.0	0.8
8488	85	47	70	52	-15	5	1.7	0.7
8486	2	3	-	1	-2	-2	2.0	1.4
8481	1	1	-	-	-1	-1	1.4	1.4
8479	5	6	3	4	-2	-2	1.0	0.9
8482	2	3	-	-	-2	-3	2.0	2.4
8489	3	5	18	12	15	7	4.6	2.4
8491	72	65	82	63	10	-2	1.1	0.3
8375	62	55	63	50	1	-5	0.1	0.7
8374	5	7	-	-	-5	-7	3.2	3.7
8369	-	1	-	-	0	-1	0.0	1.4
8371	-	-	6	4	6	4	3.5	2.8
8372	1	-	-	-	-1	0	1.4	0.0
8373	76	57	82	62	6	5	0.7	0.6
8466	3	4	9	6	6	2	2.4	0.9
8465	19	17	23	19	4	2	0.9	0.5
8463	22	22	17	21	-5	-1	1.1	0.2
8467	18	15	21	17	3	2	0.7	0.5
8469	41	41	43	37	2	-4	0.3	0.6
5954	5	11	4	11	-1	0	0.5	0.0
8470	21	22	25	24	4	2	0.8	0.4
8472	13	9	11	7	-2	-2	0.6	0.7
8475	9	10	13	9	4	-1	1.2	0.3
8474	55	48	60	49	5	1	0.7	0.1
8473	10	10	10	4	0	-6	0.0	2.3
8355	-	3	1	-	1	-3	1.4	2.4
8353	-	-	3	5	3	5	2.4	3.2
8354	-	-	-	1	0	1	0.0	1.4
8357	-	1	1	-	1	-1	1.4	1.4
8358	60	57	64	54	4	-3	0.5	0.4
8351	1	-	-	-	-1	0	1.4	0.0
8349	-	-	1	-	1	0	1.4	0.0
8352	-	-	-	-	0	0	0.0	0.0
8359	2	-	1	2	-1	2	0.8	2.0
8361	78	80	79	80	1	0	0.1	0.0
8394	60	50	62	51	2	1	0.3	0.1
8390	-	-	-	-	0	0	0.0	0.0
8392	2	3	-	-	-2	-3	2.0	2.4
8395	4	1	2	1	-2	0	1.2	0.0
8396	78	75	76	80	-2	5	0.2	0.6
11250	57	60	59	60	2	0	0.3	0.0
11249	5	10	1	10	-4	0	2.3	0.0
11246	7	14	8	11	1	-3	0.4	0.8
11248	4	2	4	-	0	-2	0.0	2.0
11251	2	2	-	4	-2	2	2.0	1.2
11252	76	73	77	80	1	7	0.1	0.8
7813	3	7	3	3	0	-4	0.0	1.8
7811	8	4	8	5	0	1	0.0	0.5
7814	10	8	9	7	-1	-1	0.3	0.4
7815	57	63	57	67	0	4	0.0	0.5
7817	80	78	80	82	0	4	0.0	0.4
7816	4	10	5	9	1	-1	0.5	0.3
105321	1	-	3	8	2	8	1.4	4.0
105322	3	1	3	4	0	3	0.0	1.9
105323	-	-	-	-	0	0	0.0	0.0

Truck	Observed		Modelled		Difference		GEH	
ID	8:30	9:30	8:30	9:30	8:30	9:30	8:30	9:30
105320	-	1	-	-	0	-1	0.0	1.4
105317	4	2	2	1	-2	-1	1.2	0.8
105318	1	-	-	-	-1	0	1.4	0.0
105315	1	-	2	-	1	0	0.8	0.0
105316	4	3	4	3	0	0	0.0	0.0
105313	-	-	-	1	0	1	0.0	1.4
105310	-	1	1	1	1	0	1.4	0.0
105311	4	5	1	3	-3	-2	1.9	1.0
105312	-	-	3	3	3	3	2.4	2.4
105309	-	-	-	-	0	0	0.0	0.0
105324	-	-	-	-	0	0	0.0	0.0
105319	-	-	-	-	0	0	0.0	0.0
105314	1	-	-	-	-1	0	1.4	0.0
105441	1	1	-	-	-1	-1	1.4	1.4
105438	7	10	14	10	7	0	2.2	0.0
105439	1	-	-	-	-1	0	1.4	0.0
105436	1	-	-	-	-1	0	1.4	0.0
105437	5	3	1	4	-4	1	2.3	0.5
105434	-	2	4	6	4	4	2.8	2.0
105431	-	1	1	2	1	1	1.4	0.8
105432	4	4	5	4	1	0	0.5	0.0
105433	-	-	-	-	0	0	0.0	0.0
105442	1	1	4	2	3	1	1.9	0.8
105443	5	7	4	2	-1	-5	0.5	2.4
105444	-	-	-	-	0	0	0.0	0.0
105445	-	-	-	-	0	0	0.0	0.0
105440	-	-	-	-	0	0	0.0	0.0
105435	-	-	-	-	0	0	0.0	0.0
105430	-	-	-	-	0	0	0.0	0.0
105877	12	14	-	-	-12	-14	4.9	5.3
105876	19	12	25	23	6	11	1.3	2.6
105878	12	11	21	20	9	9	2.2	2.3
105880	1	2	-	-	-1	-2	1.4	2.0
105882	4	2	1	-	-3	-2	1.9	2.0
105881	11	20	-	-	-11	-20	4.7	6.3
105875	-	-	-	-	0	0	0.0	0.0
105879	-	-	-	-	0	0	0.0	0.0
105883	-	-	-	-	0	0	0.0	0.0
105520	-	-	-	-	0	0	0.0	0.0
105522	2	7	2	15	0	8	0.0	2.4
105524	1	4	3	5	2	1	1.4	0.5
105523	12	11	15	17	3	6	0.8	1.6
105519	21	14	24	25	3	11	0.6	2.5
105518	1	-	-	-	-1	0	1.4	0.0
105517	1	-	-	-	-1	0	1.4	0.0
105521	-	-	-	-	0	0	0.0	0.0
105525	-	-	-	-	0	0	0.0	0.0
105579	3	4	1	2	-2	-2	1.4	1.2
105577	10	13	12	11	2	-2	0.6	0.6
105575	6	4	3	4	-3	0	1.4	0.0
105576	1	5	3	4	2	-1	1.4	0.5
105580	3	3	6	2	3	-1	1.4	0.6
105581	4	8	-	-	-4	-8	2.8	4.0
105582	-	-	-	-	0	0	0.0	0.0
105578	-	-	-	-	0	0	0.0	0.0
105574	-	-	-	-	0	0	0.0	0.0

Truck	Observed		Modelled		Difference		GEH	
ID	8:30	9:30	8:30	9:30	8:30	9:30	8:30	9:30
105602	5	5	2	2	-3	-3	1.6	1.6
106312	1	2	-	-	-1	-2	1.4	2.0
105598	2	-	1	4	-1	4	0.8	2.8
105599	2	4	4	6	2	2	1.2	0.9
106313	6	10	14	10	8	0	2.5	0.0
105604	8	7	4	3	-4	-4	1.6	1.8
105605	-	-	-	-	0	0	0.0	0.0
105601	-	-	-	-	0	0	0.0	0.0
106311	-	-	-	-	0	0	0.0	0.0
105550	-	-	-	2	0	2	0.0	2.0
105551	2	6	2	15	0	9	0.0	2.8
105548	1	-	-	-	-1	0	1.4	0.0
105545	-	1	-	-	0	-1	0.0	1.4
105546	-	-	-	-	0	0	0.0	0.0
105547	-	1	-	-	0	-1	0.0	1.4
105556	-	-	-	-	0	0	0.0	0.0
105557	2	4	2	6	0	2	0.0	0.9
105558	1	-	-	-	-1	0	1.4	0.0
105555	-	-	-	-	0	0	0.0	0.0
105552	-	1	-	-	0	-1	0.0	1.4
105553	2	-	-	-	-2	0	2.0	0.0
105554	-	-	-	-	0	0	0.0	0.0
105549	-	-	-	-	0	0	0.0	0.0
105544	-	-	-	-	0	0	0.0	0.0
105559	-	-	-	-	0	0	0.0	0.0
105685	-	-	-	-	0	0	0.0	0.0
105682	-	-	-	-	0	0	0.0	0.0
105683	-	-	-	-	0	0	0.0	0.0
106296	-	-	-	-	0	0	0.0	0.0
105681	-	2	-	-	0	-2	0.0	2.0
105678	2	5	2	17	0	12	0.0	3.6
105675	3	4	2	6	-1	2	0.6	0.9
106295	-	-	-	-	0	0	0.0	0.0
105677	-	-	-	-	0	0	0.0	0.0
105686	1	-	-	-	-1	0	1.4	0.0
105687	-	-	-	-	0	0	0.0	0.0
106298	-	-	-	-	0	0	0.0	0.0
105689	-	-	-	-	0	0	0.0	0.0
106297	-	-	-	-	0	0	0.0	0.0
105679	-	-	-	-	0	0	0.0	0.0
105674	-	-	-	-	0	0	0.0	0.0
105630	-	3	-	-	0	-3	0.0	2.4
105631	20	17	13	13	-7	-4	1.7	1.0
105628	3	2	-	-	-3	-2	2.4	2.0
105625	1	5	-	-	-1	-5	1.4	3.2
105626	-	2	-	-	0	-2	0.0	2.0
105627	2	-	-	-	-2	0	2.0	0.0
105636	-	3	-	-	0	-3	0.0	2.4
105637	10	8	3	4	-7	-4	2.7	1.6
105638	-	-	-	-	0	0	0.0	0.0
105635	-	-	-	-	0	0	0.0	0.0
105632	-	1	-	-	0	-1	0.0	1.4
105633	-	1	-	-	0	-1	0.0	1.4
105634	-	-	-	-	0	0	0.0	0.0
105629	-	-	-	-	0	0	0.0	0.0
105624	-	-	-	-	0	0	0.0	0.0

Truck	Observed		Modelled		Difference		GEH	
ID	8:30	9:30	8:30	9:30	8:30	9:30	8:30	9:30
105639	-	-	-	-	0	0	0.0	0.0
105857	1	1	-	1	-1	0	1.4	0.0
105856	3	4	-	-	-3	-4	2.4	2.8
105858	5	8	-	-	-5	-8	3.2	4.0
105860	2	3	3	3	1	0	0.6	0.0
105862	11	14	18	19	7	5	1.8	1.2
105861	2	-	1	1	-1	1	0.8	1.4
105863	-	-	-	-	0	0	0.0	0.0
105855	-	-	-	-	0	0	0.0	0.0
105859	-	-	-	-	0	0	0.0	0.0
105974	4	8	1	3	-3	-5	1.9	2.1
105972	3	3	-	9	-3	6	2.4	2.4
105970	5	5	2	5	-3	0	1.6	0.0
105971	-	-	-	-	0	0	0.0	0.0
105975	-	2	1	-	1	-2	1.4	2.0
105976	3	3	4	3	1	0	0.5	0.0
105973	-	-	-	1	0	1	0.0	1.4
105969	-	-	-	-	0	0	0.0	0.0
105977	-	-	-	-	0	0	0.0	0.0
106020	-	4	-	-	0	-4	0.0	2.8
106021	1	1	-	-	-1	-1	1.4	1.4
106018	-	-	1	-	1	0	1.4	0.0
106015	-	-	-	-	0	0	0.0	0.0
106016	1	3	1	3	0	0	0.0	0.0
106017	1	1	-	-	-1	-1	1.4	1.4
106026	-	2	-	-	0	-2	0.0	2.0
106027	1	3	-	-	-1	-3	1.4	2.4
106028	-	1	-	-	0	-1	0.0	1.4
106025	2	4	-	-	-2	-4	2.0	2.8
106022	5	5	1	-	-4	-5	2.3	3.2
106023	1	1	-	-	-1	-1	1.4	1.4
106024	-	-	-	-	0	0	0.0	0.0
106019	-	-	-	-	0	0	0.0	0.0
106014	-	-	-	-	0	0	0.0	0.0
106029	-	-	-	-	0	0	0.0	0.0
105908	-	2	-	-	0	-2	0.0	2.0
105909	10	10	19	19	9	9	2.4	2.4
105906	1	3	-	-	-1	-3	1.4	2.4
105903	3	5	-	-	-3	-5	2.4	3.2
105904	-	-	-	-	0	0	0.0	0.0
105905	-	-	-	-	0	0	0.0	0.0
105914	-	1	-	-	0	-1	0.0	1.4
105915	2	4	3	4	1	0	0.6	0.0
105916	1	-	-	-	-1	0	1.4	0.0
105913	2	4	-	2	-2	-2	2.0	1.2
105910	3	3	-	-	-3	-3	2.4	2.4
105911	1	-	-	-	-1	0	1.4	0.0
105912	-	-	-	-	0	0	0.0	0.0
105907	-	-	-	-	0	0	0.0	0.0
105902	-	-	-	-	0	0	0.0	0.0
105917	-	-	-	-	0	0	0.0	0.0

CAR	Observed		Modelled		Difference		GEH	
ID	17:15	18:15	17:15	18:15	17:15	18:15	17:15	18:15
106372	197	163	196	167	-1	4	0.1	0.3
106373	272	260	275	258	3	-2	0.2	0.1
106374	42	36	41	41	-1	5	0.2	0.8
106375	35	31	34	28	-1	-3	0.2	0.6
106376	220	218	208	220	-12	2	0.8	0.1
106377	171	168	166	182	-5	14	0.4	1.1
106378	27	23	-	1	-27	-22	7.3	6.4
106379	21	14	4	6	-17	-8	4.8	2.5
106380	38	38	42	46	4	8	0.6	1.2
106381	66	82	62	65	-4	-17	0.5	2.0
106382	14	14	12	12	-2	-2	0.6	0.6
106383	60	45	8	4	-52	-41	8.9	8.3
106384	83	74	111	89	28	15	2.8	1.7
106386	27	38	59	39	32	1	4.9	0.2
106385	37	40	44	62	7	22	1.1	3.1
106387	121	87	130	113	9	26	0.8	2.6
106388	88	79	61	51	-27	-28	3.1	3.5
106389	156	144	134	136	-22	-8	1.8	0.7
106390	123	104	124	108	1	4	0.1	0.4
106391	91	85	88	114	-3	29	0.3	2.9
106392	57	60	62	76	5	16	0.6	1.9
106393	314	352	370	430	56	78	3.0	3.9
106394	401	365	402	342	1	-23	0.0	1.2
106395	531	614	543	649	12	35	0.5	1.4
106396	725	738	736	729	11	-9	0.4	0.3
106397	1,095	1,092	1,173	1,169	78	77	2.3	2.3
106398	1,084	1,039	1,142	1,098	58	59	1.7	1.8
106399	1,496	1,622	1,501	1,658	5	36	0.1	0.9
106400	1,607	1,553	1,598	1,561	-9	8	0.2	0.2
106401	843	820	867	869	24	49	0.8	1.7
106402	695	691	705	712	10	21	0.4	0.8

Truck	Observed		Modelled		Difference		GEH	
ID	17:15	18:15	17:15	18:15	17:15	18:15	17:15	18:15
106372	6	2	8	4	2	2	0.8	1.2
106373	20	16	14	16	-6	0	1.5	0.0
106374	2	1	6	5	4	4	2.0	2.3
106375	5	4	2	-	-3	-4	1.6	2.8
106376	1	2	3	2	2	0	1.4	0.0
106377	5	5	9	1	4	-4	1.5	2.3
106378	1	1	-	-	-1	-1	1.4	1.4
106379	1	-	-	-	-1	0	1.4	0.0
106380	1	-	-	-	-1	0	1.4	0.0
106381	4	3	-	-	-4	-3	2.8	2.4
106382	-	-	-	-	0	0	0.0	0.0
106383	10	5	-	-	-10	-5	4.5	3.2
106384	-	-	-	-	0	0	0.0	0.0
106386	1	-	-	-	-1	0	1.4	0.0
106385	-	1	-	-	0	-1	0.0	1.4
106387	3	2	-	-	-3	-2	2.4	2.0
106388	3	20	-	-	-3	-20	2.4	6.3
106389	2	4	-	-	-2	-4	2.0	2.8
106390	5	8	-	-	-5	-8	3.2	4.0
106391	3	1	-	-	-3	-1	2.4	1.4
106392	2	1	-	-	-2	-1	2.0	1.4
106393	14	31	4	-	-10	-31	3.3	7.9
106394	16	14	1	-	-15	-14	5.1	5.3
106395	24	31	21	17	-3	-14	0.6	2.9
106396	41	38	29	30	-12	-8	2.0	1.4
106397	51	36	34	23	-17	-13	2.6	2.4
106398	106	69	73	59	-33	-10	3.5	1.3
106399	33	21	34	22	1	1	0.2	0.2
106400	40	44	39	45	-1	1	0.2	0.1
106401	31	23	29	27	-2	4	0.4	0.8
106402	19	22	23	19	4	-3	0.9	0.7

CAR	Observed		Modelled		Difference		GEH	
ID	17:15	18:15	17:15	18:15	17:15	18:15	17:15	18:15
8657	-	-	-	-	0	0	0.0	0.0
8658	-	-	-	-	0	0	0.0	0.0
8656	1	1	-	-	-1	-1	1.4	1.4
8652	1	1	-	-	-1	-1	1.4	1.4
8650	352	382	364	349	12	-33	0.6	1.7
8651	33	34	53	43	20	9	3.0	1.5
8653	43	42	7	-	-36	-42	7.2	9.2
8655	-	2	-	-	0	-2	0.0	2.0
8654	46	36	44	35	-2	-1	0.3	0.2
8648	30	29	24	13	-6	-16	1.2	3.5
8646	371	349	401	369	30	20	1.5	1.1
8649	1	1	2	1	1	0	0.8	0.0
8750	23	26	22	27	-1	1	0.2	0.2
8752	7	8	5	3	-2	-5	0.8	2.1
8753	340	363	396	364	56	1	2.9	0.1
8802	91	76	70	64	-21	-12	2.3	1.4
6970	100	76	98	80	-2	4	0.2	0.5
8780	18	13	-	3	-18	-10	6.0	3.5
8782	379	358	410	365	31	7	1.6	0.4
7119	15	12	20	7	5	-5	1.2	1.6
7118	288	327	313	327	25	0	1.4	0.0
7117	16	15	5	5	-11	-10	3.4	3.2
7112	8	15	7	5	-1	-10	0.4	3.2
7113	144	173	100	121	-44	-52	4.0	4.3
7110	111	105	95	96	-16	-9	1.6	0.9
7114	151	173	150	182	-1	9	0.1	0.7
7115	338	335	354	361	16	26	0.9	1.4
7116	114	121	100	110	-14	-11	1.4	1.0
7121	48	61	42	82	-6	21	0.9	2.5
7120	174	159	155	144	-19	-15	1.5	1.2
7122	12	16	33	23	21	7	4.4	1.6
7162	9	9	9	14	0	5	0.0	1.5
7164	287	337	313	319	26	-18	1.5	1.0
7165	45	39	19	43	-26	4	4.6	0.6
7149	26	27	39	29	13	2	2.3	0.4
7148	330	346	361	359	31	13	1.7	0.7
7145	29	29	29	14	0	-15	0.0	3.2
105919	86	73	72	77	-14	4	1.6	0.5
105920	244	280	253	277	9	-3	0.6	0.2
105923	313	327	330	348	17	21	0.9	1.1
105924	12	14	-	-	-12	-14	4.9	5.3
105922	10	12	-	-	-10	-12	4.5	4.9
105921	55	50	47	29	-8	-21	1.1	3.3
6235	266	236	346	342	80	106	4.6	6.2
6234	177	210	176	213	-1	3	0.1	0.2
6233	193	201	192	189	-1	-12	0.1	0.9
6231	174	181	186	212	12	31	0.9	2.2
13115	125	136	144	123	19	-13	1.6	1.1
6237	314	303	355	370	41	67	2.2	3.7
11531	306	323	228	334	-78	11	4.8	0.6
11529	318	322	228	239	-90	-83	5.4	5.0
11532	354	381	387	448	33	67	1.7	3.3
11533	143	129	242	193	99	64	7.1	5.0
11535	165	145	185	179	20	34	1.5	2.7
11534	325	360	327	375	2	15	0.1	0.8
9844	515	555	408	523	-107	-32	5.0	1.4

CAR	Observed		Modelled		Difference		GEH	
ID	17:15	18:15	17:15	18:15	17:15	18:15	17:15	18:15
13205	73	108	80	103	7	-5	0.8	0.5
13203	47	66	11	9	-36	-57	6.7	9.3
13204	73	74	5	33	-68	-41	10.9	5.6
13202	64	75	11	18	-53	-57	8.7	8.4
9846	569	590	601	640	32	50	1.3	2.0
105935	49	71	39	73	-10	2	1.5	0.2
105937	543	625	454	589	-89	-36	4.0	1.5
105931	55	56	61	59	6	3	0.8	0.4
105933	31	22	17	12	-14	-10	2.9	2.4
105934	580	633	597	635	17	2	0.7	0.1
105927	37	47	34	40	-3	-7	0.5	1.1
13265	473	528	430	556	-43	28	2.0	1.2
13266	2	1	-	-	-2	-1	2.0	1.4
13268	28	45	15	28	-13	-17	2.8	2.8
13267	76	105	26	56	-50	-49	7.0	5.5
13262	166	209	200	234	34	25	2.5	1.7
13261	478	472	460	459	-18	-13	0.8	0.6
13263	44	51	37	50	-7	-1	1.1	0.1
13264	35	36	2	2	-33	-34	7.7	7.8
10017	13	9	3	8	-10	-1	3.5	0.3
7261	92	103	44	53	-48	-50	5.8	5.7
7262	410	456	379	491	-31	35	1.6	1.6
7260	510	527	489	494	-21	-33	0.9	1.5
7256	66	74	53	62	-13	-12	1.7	1.5
5943	62	67	59	51	-3	-16	0.4	2.1
5944	348	374	314	434	-34	60	1.9	3.0
13473	1	-	-	-	-1	0	1.4	0.0
5950	32	45	28	40	-4	-5	0.7	0.8
5949	121	136	172	165	51	29	4.2	2.4
5951	90	113	58	70	-32	-43	3.7	4.5
5948	49	62	24	33	-25	-29	4.1	4.2
5947	384	398	416	422	32	24	1.6	1.2
5946	79	72	53	41	-26	-31	3.2	4.1
5941	68	69	47	40	-21	-29	2.8	3.9
5942	126	128	129	109	3	-19	0.3	1.7
5939	154	134	150	103	-4	-31	0.3	2.8
105946	72	64	73	57	1	-7	0.1	0.9
105947	340	329	322	360	-18	31	1.0	1.7
105945	32	32	31	28	-1	-4	0.2	0.7
105941	39	47	34	39	-5	-8	0.8	1.2
105939	1	-	1	9	0	9	0.0	4.2
105940	-	-	-	12	0	12	0.0	4.9
105948	39	47	19	20	-20	-27	3.7	4.7
105950	466	456	507	474	41	18	1.9	0.8
105949	64	72	68	67	4	-5	0.5	0.6
105943	74	91	55	115	-19	24	2.4	2.4
105942	33	37	17	23	-16	-14	3.2	2.6
105944	36	47	33	43	-3	-4	0.5	0.6
7358	19	22	22	22	3	0	0.7	0.0
7359	583	585	598	580	15	-5	0.6	0.2
7361	538	530	533	572	-5	42	0.2	1.8
7360	4	8	9	9	5	1	2.0	0.3
7355	35	38	32	35	-3	-3	0.5	0.5
7357	19	17	15	17	-4	0	1.0	0.0
8485	39	33	37	29	-2	-4	0.3	0.7
8483	315	308	353	351	38	43	2.1	2.4

CAR	Observed		Modelled		Difference		GEH	
ID	17:15	18:15	17:15	18:15	17:15	18:15	17:15	18:15
8484	47	58	10	22	-37	-36	6.9	5.7
8487	62	63	96	61	34	-2	3.8	0.3
8488	1,016	1,023	1,053	1,023	37	0	1.2	0.0
8486	175	182	156	171	-19	-11	1.5	0.8
8481	66	71	53	66	-13	-5	1.7	0.6
8479	390	369	410	398	20	29	1.0	1.5
8482	92	112	90	120	-2	8	0.2	0.7
8489	134	128	107	87	-27	-41	2.5	4.0
8491	1,101	1,086	1,080	1,081	-21	-5	0.6	0.2
8375	1,323	1,357	1,319	1,255	-4	-102	0.1	2.8
8374	3	6	-	-	-3	-6	2.4	3.5
8369	80	63	65	56	-15	-7	1.8	0.9
8371	11	7	19	13	8	6	2.1	1.9
8372	21	18	5	4	-16	-14	4.4	4.2
8373	1,183	1,151	1,131	1,159	-52	8	1.5	0.2
8466	109	112	107	110	-2	-2	0.2	0.2
8465	383	381	407	409	24	28	1.2	1.4
8463	351	327	353	350	2	23	0.1	1.3
8467	126	105	100	79	-26	-26	2.4	2.7
8469	1,062	1,053	1,064	1,007	2	-46	0.1	1.4
5954	45	40	79	76	34	36	4.3	4.7
8470	370	353	414	403	44	50	2.2	2.6
8472	98	143	146	137	48	-6	4.3	0.5
8475	64	44	19	30	-45	-14	7.0	2.3
8474	978	946	960	964	-18	18	0.6	0.6
8473	199	233	198	220	-1	-13	0.1	0.9
8355	12	14	-	-	-12	-14	4.9	5.3
8353	-	-	-	-	0	0	0.0	0.0
8354	1	-	4	5	3	5	1.9	3.2
8357	37	42	34	31	-3	-11	0.5	1.8
8358	1,178	1,146	1,129	1,083	-49	-63	1.4	1.9
8351	19	23	28	29	9	6	1.9	1.2
8349	1	-	8	16	7	16	3.3	5.7
8352	2	-	15	11	13	11	4.5	4.7
8359	15	9	16	10	1	1	0.3	0.3
8361	1,369	1,311	1,368	1,380	-1	69	0.0	1.9
8394	1,445	1,381	1,414	1,347	-31	-34	0.8	0.9
8390	-	-	10	15	10	15	4.5	5.5
8392	94	101	61	51	-33	-50	3.7	5.7
8395	30	30	41	40	11	10	1.8	1.7
8396	1,339	1,330	1,348	1,387	9	57	0.2	1.5
11250	1,403	1,306	1,391	1,298	-12	-8	0.3	0.2
11249	345	325	350	344	5	19	0.3	1.0
11246	304	272	293	281	-11	9	0.6	0.5
11248	102	135	60	64	-42	-71	4.7	7.1
11251	72	70	57	64	-15	-6	1.9	0.7
11252	1,308	1,301	1,319	1,348	11	47	0.3	1.3
7813	293	255	292	263	-1	8	0.1	0.5
7811	185	237	178	241	-7	4	0.5	0.3
7814	147	164	146	166	-1	2	0.1	0.2
7815	1,460	1,389	1,453	1,402	-7	13	0.2	0.3
7817	1,311	1,385	1,318	1,426	7	41	0.2	1.1
7816	235	213	254	218	19	5	1.2	0.3
105321	9	13	12	18	3	5	0.9	1.3
105322	74	58	71	62	-3	4	0.4	0.5
105323	3	2	-	-	-3	-2	2.4	2.0

CAR	Observed		Modelled		Difference		GEH	
ID	17:15	18:15	17:15	18:15	17:15	18:15	17:15	18:15
105320	4	-	-	-	-4	0	2.8	0.0
105317	21	17	25	17	4	0	0.8	0.0
105318	32	23	32	26	0	3	0.0	0.6
105315	37	47	34	45	-3	-2	0.5	0.3
105316	103	98	110	95	7	-3	0.7	0.3
105313	69	71	73	68	4	-3	0.5	0.4
105310	48	36	45	33	-3	-3	0.4	0.5
105311	34	22	35	21	1	-1	0.2	0.2
105312	4	9	6	16	2	7	0.9	2.0
105309	-	-	-	-	0	0	0.0	0.0
105324	-	-	-	-	0	0	0.0	0.0
105319	1	-	-	-	-1	0	1.4	0.0
105314	2	6	-	-	-2	-6	2.0	3.5
105441	9	10	6	4	-3	-6	1.1	2.3
105438	331	301	341	332	10	31	0.5	1.7
105439	25	33	18	27	-7	-6	1.5	1.1
105436	65	62	16	13	-49	-49	7.7	8.0
105437	149	162	153	166	4	4	0.3	0.3
105434	43	44	50	53	7	9	1.0	1.3
105431	73	72	95	88	22	16	2.4	1.8
105432	368	378	367	389	-1	11	0.1	0.6
105433	29	28	27	33	-2	5	0.4	0.9
105442	48	60	47	67	-1	7	0.1	0.9
105443	133	147	129	146	-4	-1	0.3	0.1
105444	19	17	18	11	-1	-6	0.2	1.6
105445	1	3	-	-	-1	-3	1.4	2.4
105440	-	3	-	-	0	-3	0.0	2.4
105435	2	-	-	-	-2	0	2.0	0.0
105430	3	1	-	-	-3	-1	2.4	1.4
105877	149	152	139	105	-10	-47	0.8	4.1
105876	318	313	279	216	-39	-97	2.3	6.0
105878	328	326	446	340	118	14	6.0	0.8
105880	189	208	186	153	-3	-55	0.2	4.1
105882	201	201	191	138	-10	-63	0.7	4.8
105881	166	185	186	144	20	-41	1.5	3.2
105875	14	5	-	-	-14	-5	5.3	3.2
105879	-	2	-	-	0	-2	0.0	2.0
105883	1	-	-	-	-1	0	1.4	0.0
105520	52	42	61	56	9	14	1.2	2.0
105522	192	252	239	253	47	1	3.2	0.1
105524	285	291	274	197	-11	-94	0.7	6.0
105523	431	447	460	349	29	-98	1.4	4.9
105519	417	436	361	283	-56	-153	2.8	8.1
105518	49	24	47	19	-2	-5	0.3	1.1
105517	1	2	-	-	-1	-2	1.4	2.0
105521	-	-	-	-	0	0	0.0	0.0
105525	4	9	-	-	-4	-9	2.8	4.2
105579	290	309	296	175	6	-134	0.4	8.6
105577	504	501	583	413	79	-88	3.4	4.1
105575	564	554	599	496	35	-58	1.5	2.5
105576	212	205	212	181	0	-24	0.0	1.7
105580	226	202	227	172	1	-30	0.1	2.2
105581	299	290	300	200	1	-90	0.1	5.7
105582	2	1	-	-	-2	-1	2.0	1.4
105578	2	3	-	-	-2	-3	2.0	2.4
105574	1	2	-	-	-1	-2	1.4	2.0

CAR	Observed		Modelled		Difference		GEH	
ID	17:15	18:15	17:15	18:15	17:15	18:15	17:15	18:15
105602	386	375	435	361	49	-14	2.4	0.7
106312	31	40	81	64	50	24	6.7	3.3
105598	52	60	51	48	-1	-12	0.1	1.6
105599	398	389	380	311	-18	-78	0.9	4.2
106313	342	320	348	250	6	-70	0.3	4.1
105604	393	382	458	340	65	-42	3.2	2.2
105605	-	-	-	-	0	0	0.0	0.0
105601	3	1	-	-	-3	-1	2.4	1.4
106311	1	4	-	-	-1	-4	1.4	2.8
105550	44	62	42	46	-2	-16	0.3	2.2
105551	221	269	283	293	62	24	3.9	1.4
105548	32	21	20	4	-12	-17	2.4	4.8
105545	18	27	7	6	-11	-21	3.1	5.2
105546	10	10	-	2	-10	-8	4.5	3.3
105547	2	2	17	18	15	16	4.9	5.1
105556	-	2	6	5	6	3	3.5	1.6
105557	324	306	316	211	-8	-95	0.4	5.9
105558	16	19	-	-	-16	-19	5.7	6.2
105555	19	27	-	-	-19	-27	6.2	7.3
105552	16	17	20	12	4	-5	0.9	1.3
105553	79	69	31	24	-48	-45	6.5	6.6
105554	-	2	-	-	0	-2	0.0	2.0
105549	-	-	-	-	0	0	0.0	0.0
105544	-	-	-	-	0	0	0.0	0.0
105559	2	4	-	-	-2	-4	2.0	2.8
105685	1	-	-	-	-1	0	1.4	0.0
105682	-	-	-	1	0	1	0.0	1.4
105683	-	2	4	-	4	-2	2.8	2.0
106296	2	1	2	1	0	0	0.0	0.0
105681	32	28	-	-	-32	-28	8.0	7.5
105678	293	334	353	322	60	-12	3.3	0.7
105675	387	359	391	251	4	-108	0.2	6.2
106295	-	1	1	3	1	2	1.4	1.4
105677	31	33	-	-	-31	-33	7.9	8.1
105686	12	24	-	-	-12	-24	4.9	6.9
105687	17	22	16	15	-1	-7	0.2	1.6
106298	-	-	-	-	0	0	0.0	0.0
105689	-	2	-	-	0	-2	0.0	2.0
106297	-	-	-	-	0	0	0.0	0.0
105679	4	5	-	-	-4	-5	2.8	3.2
105674	-	1	-	-	0	-1	0.0	1.4
105630	41	45	44	37	3	-8	0.5	1.2
105631	718	712	805	538	87	-174	3.2	7.0
105628	90	96	72	62	-18	-34	2.0	3.8
105625	92	100	55	14	-37	-86	4.3	11.4
105626	16	23	1	1	-15	-22	5.1	6.4
105627	83	106	81	64	-2	-42	0.2	4.6
105636	106	91	111	71	5	-20	0.5	2.2
105637	655	744	704	611	49	-133	1.9	5.1
105638	6	4	10	2	4	-2	1.4	1.2
105635	7	6	9	2	2	-4	0.7	2.0
105632	4	6	-	1	-4	-5	2.8	2.7
105633	19	21	-	-	-19	-21	6.2	6.5
105634	-	-	-	-	0	0	0.0	0.0
105629	4	1	-	-	-4	-1	2.8	1.4
105624	1	-	-	-	-1	0	1.4	0.0

CAR	Observed		Modelled		Difference		GEH	
ID	17:15	18:15	17:15	18:15	17:15	18:15	17:15	18:15
105639	3	5	-	-	-3	-5	2.4	3.2
105857	111	112	114	85	3	-27	0.3	2.7
105856	154	162	103	62	-51	-100	4.5	9.4
105858	160	150	159	103	-1	-47	0.1	4.2
105860	594	579	635	500	41	-79	1.7	3.4
105862	615	629	676	525	61	-104	2.4	4.3
105861	184	176	165	101	-19	-75	1.4	6.4
105863	1	1	-	-	-1	-1	1.4	1.4
105855	2	1	-	-	-2	-1	2.0	1.4
105859	-	2	-	-	0	-2	0.0	2.0
105974	118	117	129	106	11	-11	1.0	1.0
105972	225	249	268	218	43	-31	2.7	2.0
105970	297	319	265	189	-32	-130	1.9	8.2
105971	14	23	16	21	2	-2	0.5	0.4
105975	27	27	38	31	11	4	1.9	0.7
105976	81	67	88	41	7	-26	0.8	3.5
105973	4	4	11	8	7	4	2.6	1.6
105969	-	-	-	-	0	0	0.0	0.0
105977	6	4	-	-	-6	-4	3.5	2.8
106020	45	40	27	22	-18	-18	3.0	3.2
106021	31	20	22	13	-9	-7	1.7	1.7
106018	4	6	6	6	2	0	0.9	0.0
106015	5	5	2	-	-3	-5	1.6	3.2
106016	135	143	113	96	-22	-47	2.0	4.3
106017	1	3	1	6	0	3	0.0	1.4
106026	12	5	2	-	-10	-5	3.8	3.2
106027	31	32	26	23	-5	-9	0.9	1.7
106028	10	15	11	9	1	-6	0.3	1.7
106025	5	6	10	5	5	-1	1.8	0.4
106022	105	81	97	55	-8	-26	0.8	3.2
106023	28	21	17	11	-11	-10	2.3	2.5
106024	-	4	-	-	0	-4	0.0	2.8
106019	2	-	-	-	-2	0	2.0	0.0
106014	-	-	-	-	0	0	0.0	0.0
106029	-	1	-	-	0	-1	0.0	1.4
105908	75	79	57	54	-18	-25	2.2	3.1
105909	515	501	539	386	24	-115	1.0	5.5
105906	12	23	-	-	-12	-23	4.9	6.8
105903	33	27	-	-	-33	-27	8.1	7.3
105904	81	96	86	72	5	-24	0.5	2.6
105905	117	111	117	92	0	-19	0.0	1.9
105914	39	43	36	32	-3	-11	0.5	1.8
105915	467	477	491	411	24	-66	1.1	3.1
105916	208	181	218	151	10	-30	0.7	2.3
105913	174	204	181	137	7	-67	0.5	5.1
105910	66	63	82	65	16	2	1.9	0.3
105911	32	49	29	39	-3	-10	0.5	1.5
105912	-	-	-	-	0	0	0.0	0.0
105907	2	4	-	-	-2	-4	2.0	2.8
105902	-	1	-	-	0	-1	0.0	1.4
105917	2	-	-	-	-2	0	2.0	0.0

Truck	Observed		Modelled		Difference		GEH	
ID	17:15	18:15	17:15	18:15	17:15	18:15	17:15	18:15
8657	-	-	-	-	0	0	0.0	0.0
8658	-	-	-	-	0	0	0.0	0.0
8656	-	-	-	-	0	0	0.0	0.0
8652	-	-	-	-	0	0	0.0	0.0
8650	3	1	1	-	-2	-1	1.4	1.4
8651	1	-	-	-	-1	0	1.4	0.0
8653	-	-	-	-	0	0	0.0	0.0
8655	-	-	-	-	0	0	0.0	0.0
8654	1	2	-	-	-1	-2	1.4	2.0
8648	2	1	-	-	-2	-1	2.0	1.4
8646	3	4	-	-	-3	-4	2.4	2.8
8649	-	-	-	-	0	0	0.0	0.0
8750	-	-	-	-	0	0	0.0	0.0
8752	-	-	-	-	0	0	0.0	0.0
8753	5	1	1	-	-4	-1	2.3	1.4
8802	-	-	-	-	0	0	0.0	0.0
6970	-	1	1	-	1	-1	1.4	1.4
8780	-	-	-	-	0	0	0.0	0.0
8782	3	4	-	-	-3	-4	2.4	2.8
7119	-	-	-	-	0	0	0.0	0.0
7118	9	3	10	4	1	1	0.3	0.5
7117	-	-	-	-	0	0	0.0	0.0
7112	-	-	-	-	0	0	0.0	0.0
7113	1	3	-	-	-1	-3	1.4	2.4
7110	16	9	-	-	-16	-9	5.7	4.2
7114	13	14	6	-	-7	-14	2.3	5.3
7115	3	1	7	4	4	3	1.8	1.9
7116	-	1	9	1	9	0	4.2	0.0
7121	-	-	-	1	0	1	0.0	1.4
7120	2	2	-	-	-2	-2	2.0	2.0
7122	-	-	2	2	2	2	2.0	2.0
7162	-	1	-	-	0	-1	0.0	1.4
7164	6	3	9	4	3	1	1.1	0.5
7165	-	1	-	-	0	-1	0.0	1.4
7149	-	-	-	-	0	0	0.0	0.0
7148	3	4	9	6	6	2	2.4	0.9
7145	-	-	-	-	0	0	0.0	0.0
105919	1	1	-	-	-1	-1	1.4	1.4
105920	15	12	-	-	-15	-12	5.5	4.9
105923	15	14	-	-	-15	-14	5.5	5.3
105924	-	-	-	-	0	0	0.0	0.0
105922	-	-	-	-	0	0	0.0	0.0
105921	-	-	-	-	0	0	0.0	0.0
6235	5	2	2	2	-3	0	1.6	0.0
6234	5	3	9	4	4	1	1.5	0.5
6233	2	-	9	3	7	3	3.0	2.4
6231	1	3	-	2	-1	-1	1.4	0.6
13115	2	2	-	-	-2	-2	2.0	2.0
6237	2	2	-	-	-2	-2	2.0	2.0
11531	7	4	8	4	1	0	0.4	0.0
11529	23	17	17	18	-6	1	1.3	0.2
11532	23	22	23	25	0	3	0.0	0.6
11533	3	1	2	2	-1	1	0.6	0.8
11535	-	1	-	-	0	-1	0.0	1.4
11534	5	1	10	3	5	2	1.8	1.4
9844	30	24	25	23	-5	-1	1.0	0.2

Truck	Observed		Modelled		Difference		GEH	
ID	17:15	18:15	17:15	18:15	17:15	18:15	17:15	18:15
13205	1	2	-	-	-1	-2	1.4	2.0
13203	1	2	-	-	-1	-2	1.4	2.0
13204	2	-	-	-	-2	0	2.0	0.0
13202	1	-	-	-	-1	0	1.4	0.0
9846	23	20	32	29	9	9	1.7	1.8
105935	-	-	-	-	0	0	0.0	0.0
105937	23	22	25	23	2	1	0.4	0.2
105931	-	-	-	-	0	0	0.0	0.0
105933	1	-	-	-	-1	0	1.4	0.0
105934	23	22	32	29	9	7	1.7	1.4
105927	7	5	-	-	-7	-5	3.7	3.2
13265	21	20	24	23	3	3	0.6	0.6
13266	17	13	-	-	-17	-13	5.8	5.1
13268	13	14	-	-	-13	-14	5.1	5.3
13267	2	1	-	-	-2	-1	2.0	1.4
13262	3	-	1	-	-2	0	1.4	0.0
13261	20	22	31	30	11	8	2.2	1.6
13263	-	-	-	-	0	0	0.0	0.0
13264	-	-	-	-	0	0	0.0	0.0
10017	-	-	-	-	0	0	0.0	0.0
7261	-	-	-	-	0	0	0.0	0.0
7262	36	33	24	23	-12	-10	2.2	1.9
7260	36	36	33	30	-3	-6	0.5	1.0
7256	2	-	-	-	-2	0	2.0	0.0
5943	-	-	-	-	0	0	0.0	0.0
5944	35	31	24	23	-11	-8	2.0	1.5
13473	1	-	-	-	-1	0	1.4	0.0
5950	1	-	-	-	-1	0	1.4	0.0
5949	-	-	-	-	0	0	0.0	0.0
5951	2	-	-	-	-2	0	2.0	0.0
5948	-	-	-	-	0	0	0.0	0.0
5947	37	34	32	30	-5	-4	0.9	0.7
5946	-	1	-	-	0	-1	0.0	1.4
5941	-	1	-	-	0	-1	0.0	1.4
5942	-	2	-	-	0	-2	0.0	2.0
5939	-	-	-	-	0	0	0.0	0.0
105946	2	-	-	-	-2	0	2.0	0.0
105947	33	27	26	22	-7	-5	1.3	1.0
105945	1	-	-	-	-1	0	1.4	0.0
105941	-	1	-	-	0	-1	0.0	1.4
105939	-	-	-	-	0	0	0.0	0.0
105940	-	-	-	-	0	0	0.0	0.0
105948	-	-	-	-	0	0	0.0	0.0
105950	31	31	32	30	1	-1	0.2	0.2
105949	5	4	-	-	-5	-4	3.2	2.8
105943	3	5	-	-	-3	-5	2.4	3.2
105942	-	-	-	-	0	0	0.0	0.0
105944	1	-	-	-	-1	0	1.4	0.0
7358	-	-	-	-	0	0	0.0	0.0
7359	8	7	8	7	0	0	0.0	0.0
7361	11	12	7	14	-4	2	1.3	0.6
7360	-	-	-	-	0	0	0.0	0.0
7355	-	-	-	-	0	0	0.0	0.0
7357	-	-	-	-	0	0	0.0	0.0
8485	-	1	23	10	23	9	6.8	3.8
8483	6	3	4	5	-2	2	0.9	1.0

Truck	Observed		Modelled		Difference		GEH	
ID	17:15	18:15	17:15	18:15	17:15	18:15	17:15	18:15
8484	1	1	-	-	-1	-1	1.4	1.4
8487	2	-	-	1	-2	1	2.0	1.4
8488	30	33	44	41	14	8	2.3	1.3
8486	2	2	-	2	-2	0	2.0	0.0
8481	1	1	2	-	1	-1	0.8	1.4
8479	7	8	1	7	-6	-1	3.0	0.4
8482	3	2	4	6	1	4	0.5	2.0
8489	1	2	4	-	3	-2	1.9	2.0
8491	18	18	30	22	12	4	2.4	0.9
8375	40	39	45	43	5	4	0.8	0.6
8374	8	5	-	-	-8	-5	4.0	3.2
8369	1	1	-	-	-1	-1	1.4	1.4
8371	1	1	-	-	-1	-1	1.4	1.4
8372	-	-	-	-	0	0	0.0	0.0
8373	22	19	32	22	10	3	1.9	0.7
8466	3	3	-	1	-3	-2	2.4	1.4
8465	22	14	20	22	-2	8	0.4	1.9
8463	6	6	9	4	3	-2	1.1	0.9
8467	3	5	2	5	-1	0	0.6	0.0
8469	31	28	33	29	2	1	0.4	0.2
5954	7	6	4	7	-3	1	1.3	0.4
8470	14	16	16	11	2	-5	0.5	1.4
8472	8	9	14	11	6	2	1.8	0.6
8475	8	5	8	-	0	-5	0.0	3.2
8474	15	10	18	20	3	10	0.7	2.6
8473	2	1	5	3	3	2	1.6	1.4
8355	-	1	-	-	0	-1	0.0	1.4
8353	-	-	1	-	1	0	1.4	0.0
8354	-	-	-	-	0	0	0.0	0.0
8357	-	-	-	-	0	0	0.0	0.0
8358	31	32	32	36	1	4	0.2	0.7
8351	-	-	-	-	0	0	0.0	0.0
8349	-	-	2	-	2	0	2.0	0.0
8352	-	-	3	-	3	0	2.4	0.0
8359	-	-	-	-	0	0	0.0	0.0
8361	26	22	31	31	5	9	0.9	1.7
8394	36	36	31	36	-5	0	0.9	0.0
8390	-	-	1	-	1	0	1.4	0.0
8392	-	-	-	-	0	0	0.0	0.0
8395	-	-	-	-	0	0	0.0	0.0
8396	22	22	30	29	8	7	1.6	1.4
11250	36	33	34	34	-2	1	0.3	0.2
11249	6	6	5	5	-1	-1	0.4	0.4
11246	4	2	-	-	-4	-2	2.8	2.0
11248	4	1	1	-	-3	-1	1.9	1.4
11251	2	-	-	-	-2	0	2.0	0.0
11252	28	21	30	22	2	1	0.4	0.2
7813	5	1	4	-	-1	-1	0.5	1.4
7811	3	2	4	2	1	0	0.5	0.0
7814	3	6	3	6	0	0	0.0	0.0
7815	37	38	35	40	-2	2	0.3	0.3
7817	30	19	30	21	0	2	0.0	0.4
7816	1	1	-	1	-1	0	1.4	0.0
105321	-	-	5	3	5	3	3.2	2.4
105322	1	1	6	5	5	4	2.7	2.3
105323	-	-	-	-	0	0	0.0	0.0

Truck	Observed		Modelled		Difference		GEH	
ID	17:15	18:15	17:15	18:15	17:15	18:15	17:15	18:15
105320	-	-	-	-	0	0	0.0	0.0
105317	2	3	2	-	0	-3	0.0	2.4
105318	1	1	1	1	0	0	0.0	0.0
105315	1	1	-	-	-1	-1	1.4	1.4
105316	1	1	1	-	0	-1	0.0	1.4
105313	3	-	3	2	0	2	0.0	2.0
105310	-	-	1	2	1	2	1.4	2.0
105311	2	1	2	-	0	-1	0.0	1.4
105312	-	-	3	3	3	3	2.4	2.4
105309	-	-	-	-	0	0	0.0	0.0
105324	-	-	-	-	0	0	0.0	0.0
105319	-	-	-	-	0	0	0.0	0.0
105314	-	-	-	-	0	0	0.0	0.0
105441	-	-	-	-	0	0	0.0	0.0
105438	1	4	5	3	4	-1	2.3	0.5
105439	-	-	-	-	0	0	0.0	0.0
105436	1	1	-	-	-1	-1	1.4	1.4
105437	4	6	9	1	5	-5	2.0	2.7
105434	-	-	-	1	0	1	0.0	1.4
105431	-	1	2	-	2	-1	2.0	1.4
105432	-	1	7	8	7	7	3.7	3.3
105433	-	-	-	-	0	0	0.0	0.0
105442	2	-	-	-	-2	0	2.0	0.0
105443	2	2	-	1	-2	-1	2.0	0.8
105444	-	-	-	-	0	0	0.0	0.0
105445	-	-	-	-	0	0	0.0	0.0
105440	-	-	-	-	0	0	0.0	0.0
105435	-	-	-	-	0	0	0.0	0.0
105430	-	-	-	-	0	0	0.0	0.0
105877	14	10	-	-	-14	-10	5.3	4.5
105876	8	8	17	14	9	6	2.5	1.8
105878	15	10	25	18	10	8	2.2	2.1
105880	3	3	-	-	-3	-3	2.4	2.4
105882	2	2	-	-	-2	-2	2.0	2.0
105881	13	12	-	-	-13	-12	5.1	4.9
105875	-	-	-	-	0	0	0.0	0.0
105879	-	-	-	-	0	0	0.0	0.0
105883	-	-	-	-	0	0	0.0	0.0
105520	2	-	-	-	-2	0	2.0	0.0
105522	3	2	4	-	1	-2	0.5	2.0
105524	7	1	3	3	-4	2	1.8	1.4
105523	15	12	27	19	12	7	2.6	1.8
105519	10	10	17	14	7	4	1.9	1.2
105518	-	-	-	-	0	0	0.0	0.0
105517	-	-	-	-	0	0	0.0	0.0
105521	-	-	-	-	0	0	0.0	0.0
105525	-	-	-	-	0	0	0.0	0.0
105579	2	-	-	-	-2	0	2.0	0.0
105577	2	5	5	5	3	0	1.6	0.0
105575	2	6	5	10	3	4	1.6	1.4
105576	4	1	1	-	-3	-1	1.9	1.4
105580	3	2	-	-	-3	-2	2.4	2.0
105581	2	4	4	-	2	-4	1.2	2.8
105582	-	-	-	-	0	0	0.0	0.0
105578	-	-	-	-	0	0	0.0	0.0
105574	-	-	-	-	0	0	0.0	0.0

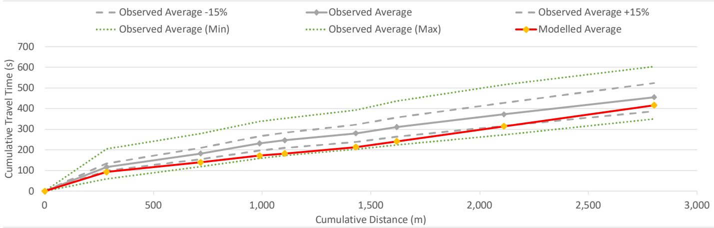
Truck	Observed		Modelled		Difference		GEH	
ID	17:15	18:15	17:15	18:15	17:15	18:15	17:15	18:15
105602	6	3	1	2	-5	-1	2.7	0.6
106312	-	1	1	-	1	-1	1.4	1.4
105598	-	-	-	-	0	0	0.0	0.0
105599	-	3	5	8	5	5	3.2	2.1
106313	1	3	5	3	4	0	2.3	0.0
105604	4	5	-	2	-4	-3	2.8	1.6
105605	-	-	-	-	0	0	0.0	0.0
105601	-	-	-	-	0	0	0.0	0.0
106311	-	-	-	-	0	0	0.0	0.0
105550	-	-	-	-	0	0	0.0	0.0
105551	5	2	4	-	-1	-2	0.5	2.0
105548	1	-	-	-	-1	0	1.4	0.0
105545	-	1	-	-	0	-1	0.0	1.4
105546	-	-	-	-	0	0	0.0	0.0
105547	-	1	-	-	0	-1	0.0	1.4
105556	-	-	-	-	0	0	0.0	0.0
105557	3	1	3	3	0	2	0.0	1.4
105558	1	-	-	-	-1	0	1.4	0.0
105555	-	-	-	-	0	0	0.0	0.0
105552	-	-	-	-	0	0	0.0	0.0
105553	-	-	-	-	0	0	0.0	0.0
105554	-	-	-	-	0	0	0.0	0.0
105549	-	-	-	-	0	0	0.0	0.0
105544	-	-	-	-	0	0	0.0	0.0
105559	-	-	-	-	0	0	0.0	0.0
105685	-	-	-	-	0	0	0.0	0.0
105682	-	-	-	-	0	0	0.0	0.0
105683	-	-	-	-	0	0	0.0	0.0
106296	-	-	-	-	0	0	0.0	0.0
105681	-	-	-	-	0	0	0.0	0.0
105678	5	-	4	-	-1	0	0.5	0.0
105675	6	1	1	-	-5	-1	2.7	1.4
106295	-	-	-	-	0	0	0.0	0.0
105677	-	1	-	-	0	-1	0.0	1.4
105686	-	-	-	-	0	0	0.0	0.0
105687	-	-	-	-	0	0	0.0	0.0
106298	-	-	-	-	0	0	0.0	0.0
105689	-	-	-	-	0	0	0.0	0.0
106297	-	-	-	-	0	0	0.0	0.0
105679	-	-	-	-	0	0	0.0	0.0
105674	-	-	-	-	0	0	0.0	0.0
105630	1	1	-	-	-1	-1	1.4	1.4
105631	4	4	5	5	1	1	0.5	0.5
105628	2	-	-	-	-2	0	2.0	0.0
105625	1	4	-	-	-1	-4	1.4	2.8
105626	-	-	-	-	0	0	0.0	0.0
105627	1	-	-	-	-1	0	1.4	0.0
105636	1	2	-	-	-1	-2	1.4	2.0
105637	4	7	9	10	5	3	2.0	1.0
105638	-	-	-	-	0	0	0.0	0.0
105635	-	-	-	-	0	0	0.0	0.0
105632	-	-	-	-	0	0	0.0	0.0
105633	1	1	-	-	-1	-1	1.4	1.4
105634	-	-	-	-	0	0	0.0	0.0
105629	-	-	-	-	0	0	0.0	0.0
105624	-	-	-	-	0	0	0.0	0.0

Truck	Observed		Modelled		Difference		GEH	
ID	17:15	18:15	17:15	18:15	17:15	18:15	17:15	18:15
105639	-	-	-	-	0	0	0.0	0.0
105857	1	2	-	-	-1	-2	1.4	2.0
105856	-	-	-	-	0	0	0.0	0.0
105858	1	1	-	-	-1	-1	1.4	1.4
105860	4	9	8	11	4	2	1.6	0.6
105862	7	4	5	5	-2	1	0.8	0.5
105861	1	2	-	-	-1	-2	1.4	2.0
105863	-	-	-	-	0	0	0.0	0.0
105855	-	-	-	-	0	0	0.0	0.0
105859	-	-	-	-	0	0	0.0	0.0
105974	3	3	-	-	-3	-3	2.4	2.4
105972	4	-	4	-	0	0	0.0	0.0
105970	3	2	1	-	-2	-2	1.4	2.0
105971	3	-	-	-	-3	0	2.4	0.0
105975	-	-	-	-	0	0	0.0	0.0
105976	-	-	-	-	0	0	0.0	0.0
105973	-	-	-	-	0	0	0.0	0.0
105969	-	-	-	-	0	0	0.0	0.0
105977	-	-	-	-	0	0	0.0	0.0
106020	-	-	-	-	0	0	0.0	0.0
106021	-	1	-	-	0	-1	0.0	1.4
106018	-	1	-	-	0	-1	0.0	1.4
106015	-	-	-	-	0	0	0.0	0.0
106016	3	1	-	-	-3	-1	2.4	1.4
106017	4	1	-	-	-4	-1	2.8	1.4
106026	-	2	-	-	0	-2	0.0	2.0
106027	3	-	-	-	-3	0	2.4	0.0
106028	3	2	-	-	-3	-2	2.4	2.0
106025	3	-	-	-	-3	0	2.4	0.0
106022	1	2	-	-	-1	-2	1.4	2.0
106023	-	-	-	-	0	0	0.0	0.0
106024	-	-	-	-	0	0	0.0	0.0
106019	-	-	-	-	0	0	0.0	0.0
106014	-	-	-	-	0	0	0.0	0.0
106029	-	-	-	-	0	0	0.0	0.0
105908	1	-	2	2	1	2	0.8	2.0
105909	4	2	5	5	1	3	0.5	1.6
105906	3	4	-	-	-3	-4	2.4	2.8
105903	6	4	-	-	-6	-4	3.5	2.8
105904	-	-	-	-	0	0	0.0	0.0
105905	3	-	-	-	-3	0	2.4	0.0
105914	-	1	-	-	0	-1	0.0	1.4
105915	5	7	7	10	2	3	0.8	1.0
105916	1	3	1	1	0	-2	0.0	1.4
105913	2	3	-	-	-2	-3	2.0	2.4
105910	2	2	-	-	-2	-2	2.0	2.0
105911	-	-	-	-	0	0	0.0	0.0
105912	-	-	-	-	0	0	0.0	0.0
105907	-	-	-	-	0	0	0.0	0.0
105902	-	-	-	-	0	0	0.0	0.0
105917	-	-	-	-	0	0	0.0	0.0

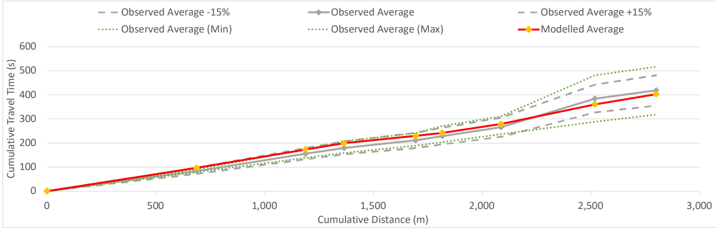
C. VALIDATION RESULTS

C

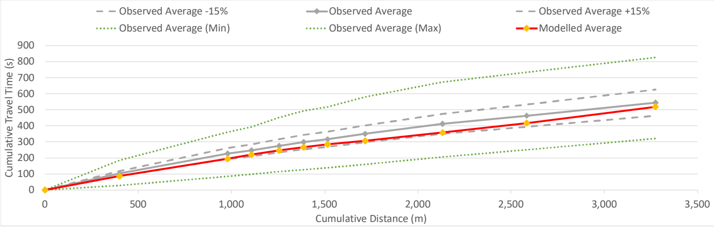
NB 1 - Lees Ave, Second Ave, Ninth Ave, Loch St, Evaline St, Loftus St, Thorncraft Pde - Between Linthorn Ave and Sunbeam St (0730-0830_TT)



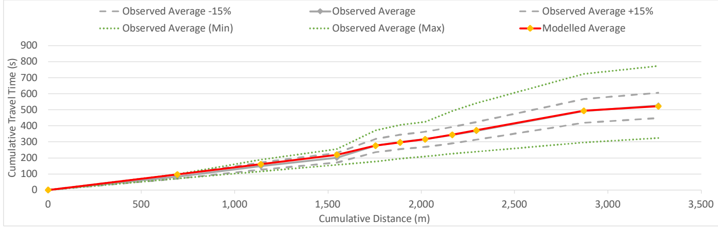
NB 1 - Lees Ave, Second Ave, Ninth Ave, Loch St, Evaline St, Loftus St, Thorncraft Pde - Between Linthorn Ave and Sunbeam St (0730-0830_TT)



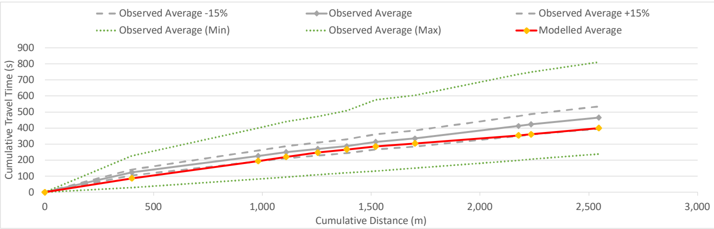
NB 2 - Lees Ave, Second Ave, Ninth Ave, Beamish St, Bexley Rd - Between Linthorn Ave and Cross St (0730-0830_TT)



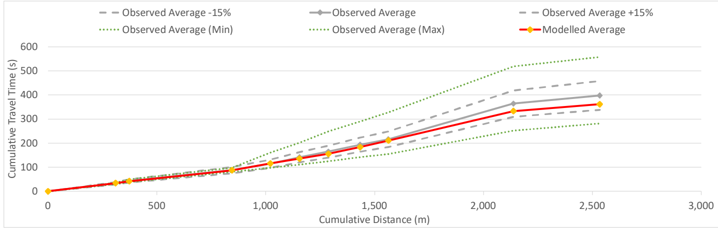
SB 2 - Lees Ave, Second Ave, Ninth Ave, Beamish St, Bexley Rd - Between Linthorn Ave and Cross St (0730-0830_TT)



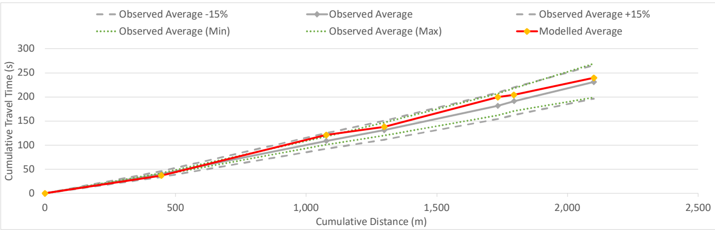
NB 3 - Brighton Ave, Beamish St, Bexley Rd - Between Albert Rd and Cross St (0730-0830_TT)



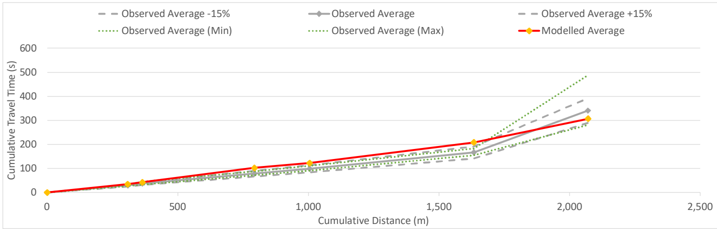
SB 3 - Brighton Ave, Beamish St, Bexley Rd - Between Albert Rd and Cross St (0730-0830_TT)



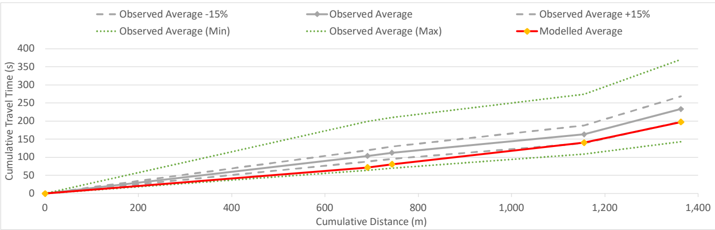
NB 4 - Brighton Ave, Moore St, Bellombi St, Nowra St, Wairao St, Wonga St - Between Albert Rd and Canterbury Rd (0730-0830_TT)



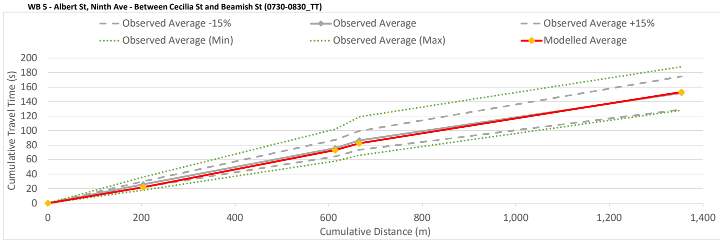
SB 4 - Brighton Ave, Moore St, Bellombi St, Nowra St, Wairao St, Wonga St - Between Albert Rd and Canterbury Rd (0730-0830_TT)



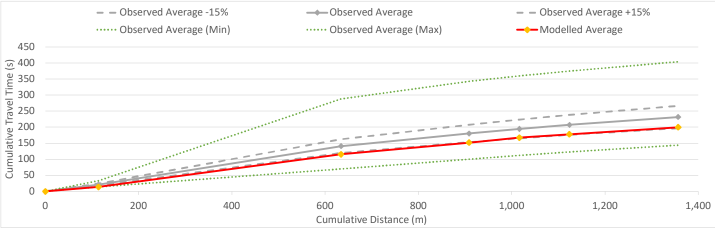
EB 5 - Albert St, Ninth Ave - Between Cecilia St and Beamish St (0730-0830_TT)



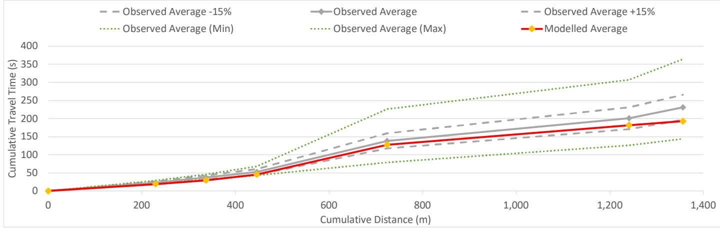
WB 5 - Albert St, Ninth Ave - Between Cecilia St and Beamish St (0730-0830_TT)



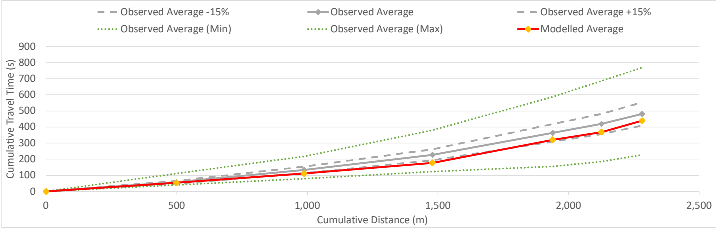
EB 6 - Evaline St - Between Loftus St and Wonga St (0730-0830_TT)



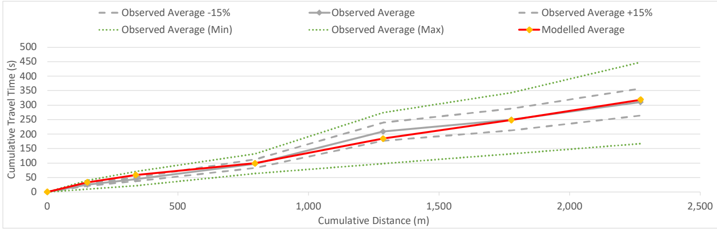
WB 6 - Evaline St - Between Loftus St and Wonga St (0730-0830_TT)



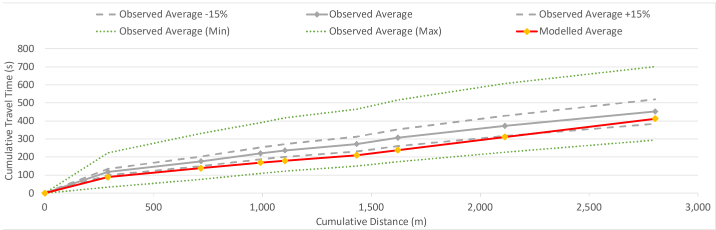
EB 7 - Cantebury Rd - Between Platts Ave and Cooks River Crossing (0730-0830_TT)



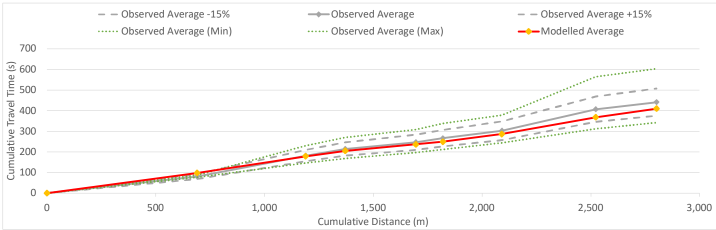
WB 7 - Cantebury Rd - Between Platts Ave and Cooks River Crossing (0730-0830_TT)



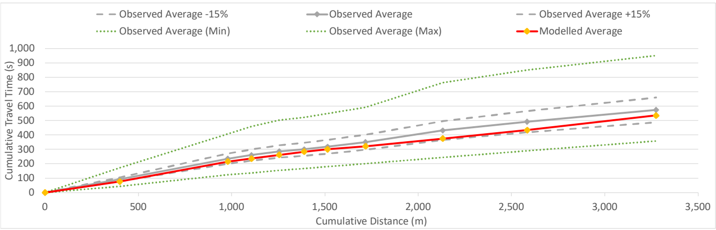
NB 1 - Lees Ave, Second Ave, Ninth Ave, Loch St, Evaline St, Loftus St, Thorncraft Pde - Between Linthorn Ave and Sunbeam St (0830-0930_TT)



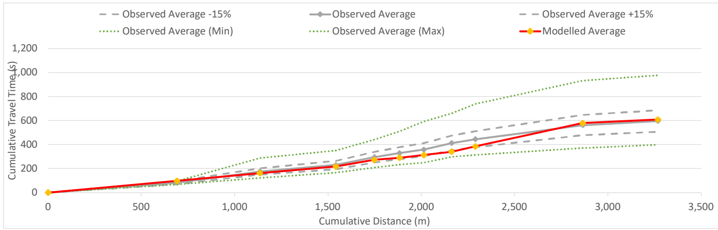
NB 1 - Lees Ave, Second Ave, Ninth Ave, Loch St, Evaline St, Loftus St, Thorncraft Pde - Between Linthorn Ave and Sunbeam St (0830-0930_TT)



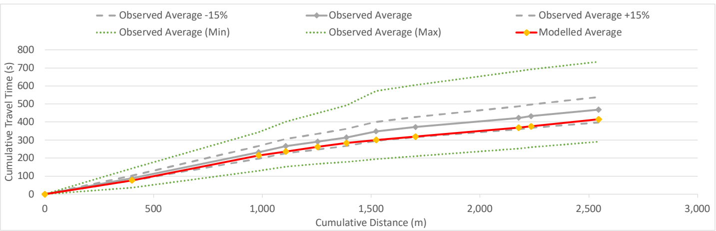
NB 2 - Lees Ave, Second Ave, Ninth Ave, Beamish St, Bexley Rd - Between Linthorn Ave and Cross St (0830-0930_TT)



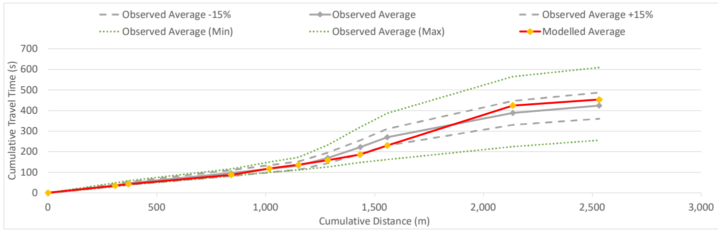
SB 2 - Lees Ave, Second Ave, Ninth Ave, Beamish St, Bexley Rd - Between Linthorn Ave and Cross St (0830-0930_TT)



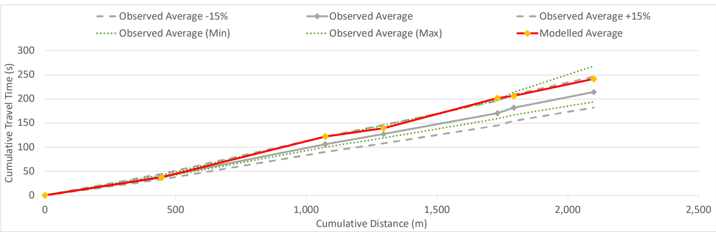
NB 3 - Brighton Ave, Beamish St, Bexley Rd - Between Albert Rd and Cross St (0830-0930_TT)



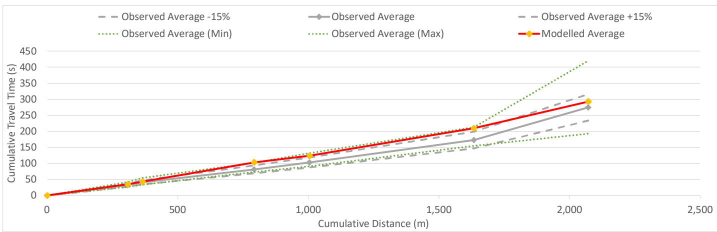
SB 3 - Brighton Ave, Beamish St, Bexley Rd - Between Albert Rd and Cross St (0830-0930_TT)



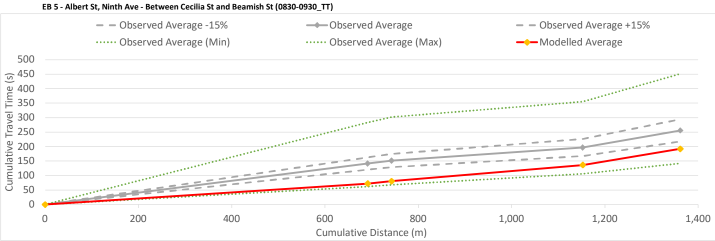
NB 4 - Brighton Ave, Moore St, Bellombi St, Nowra St, Wairao St, Wonga St - Between Albert Rd and Canterbury Rd (0830-0930_TT)



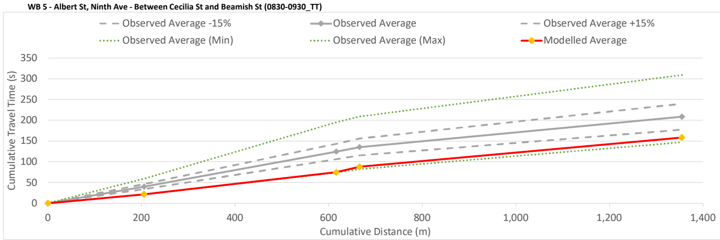
SB 4 - Brighton Ave, Moore St, Bellombi St, Nowra St, Wairao St, Wonga St - Between Albert Rd and Canterbury Rd (0830-0930_TT)



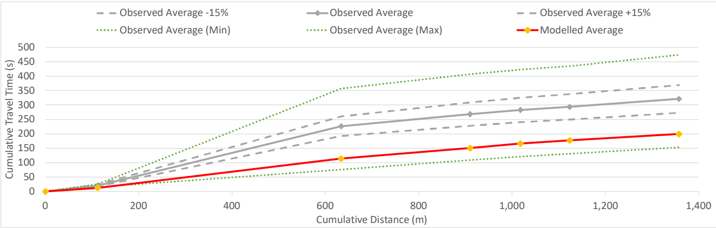
EB 5 - Albert St, Ninth Ave - Between Cecilia St and Beamish St (0830-0930_TT)



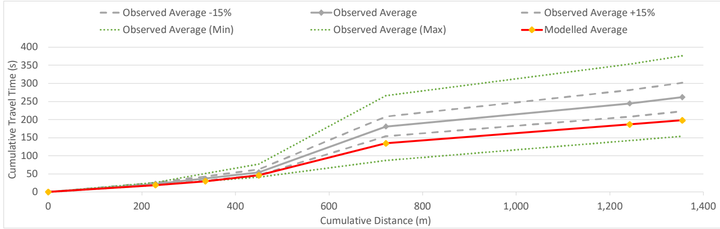
WB 5 - Albert St, Ninth Ave - Between Cecilia St and Beamish St (0830-0930_TT)



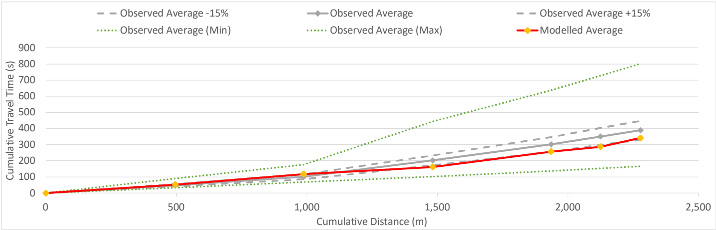
EB 6 - Evaline St - Between Loftus St and Wonga St (0830-0930_TT)



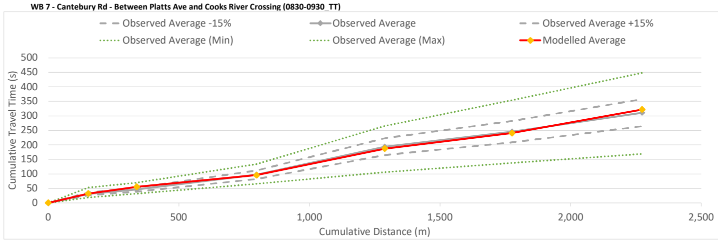
WB 6 - Evaline St - Between Loftus St and Wonga St (0830-0930_TT)



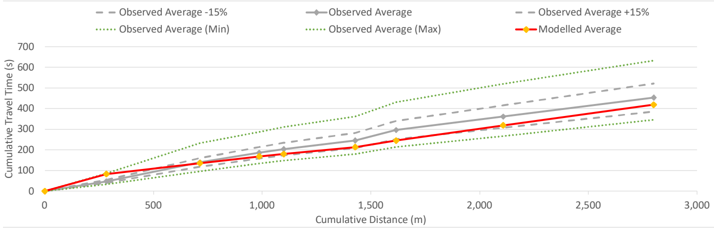
EB 7 - Cantebury Rd - Between Platts Ave and Cooks River Crossing (0830-0930_TT)



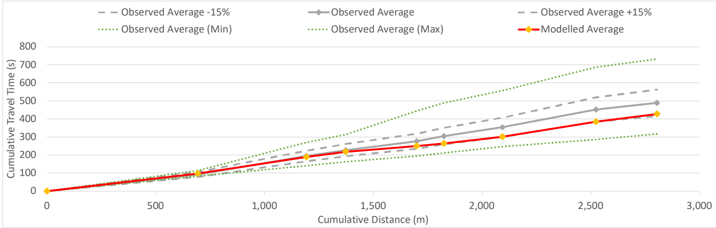
WB 7 - Cantebury Rd - Between Platts Ave and Cooks River Crossing (0830-0930_TT)



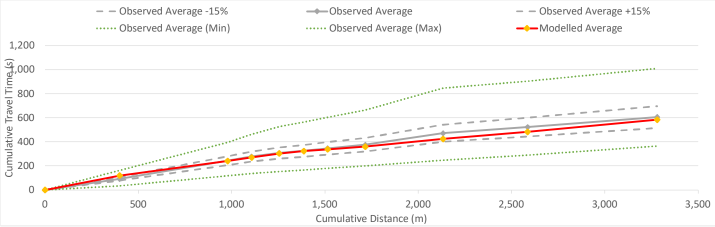
NB 1 - Lees Ave, Second Ave, Ninth Ave, Loch St, Evaline St, Loftus St, Thorncraft Pde - Between Linthorn Ave and Sunbeam St (1615-1715_TT)



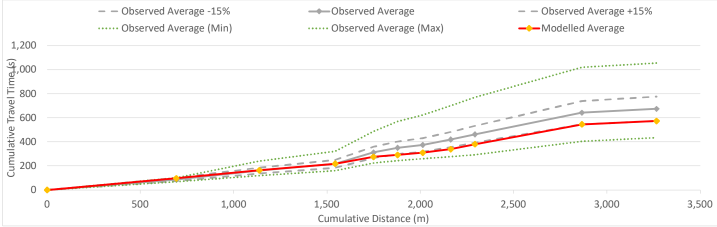
NB 1 - Lees Ave, Second Ave, Ninth Ave, Loch St, Evaline St, Loftus St, Thorncraft Pde - Between Linthorn Ave and Sunbeam St (1615-1715_TT)



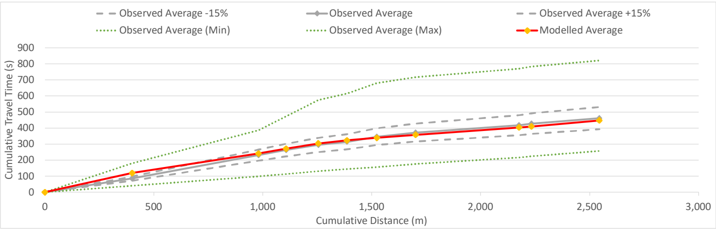
NB 2 - Lees Ave, Second Ave, Ninth Ave, Beamish St, Bexley Rd - Between Linthorn Ave and Cross St (1615-1715_TT)



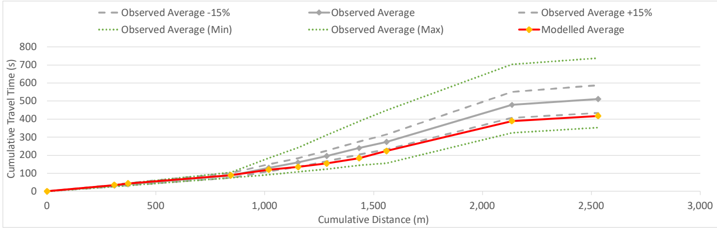
SB 2 - Lees Ave, Second Ave, Ninth Ave, Beamish St, Bexley Rd - Between Linthorn Ave and Cross St (1615-1715_TT)



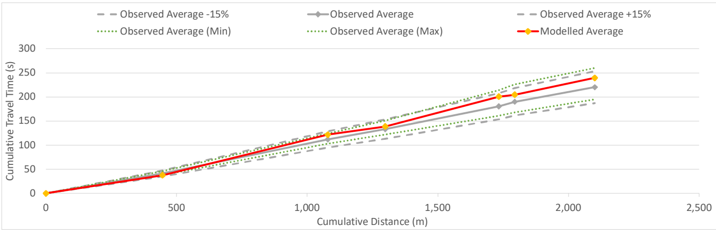
NB 3 - Brighton Ave, Beamish St, Bexley Rd - Between Albert Rd and Cross St (1615-1715_TT)



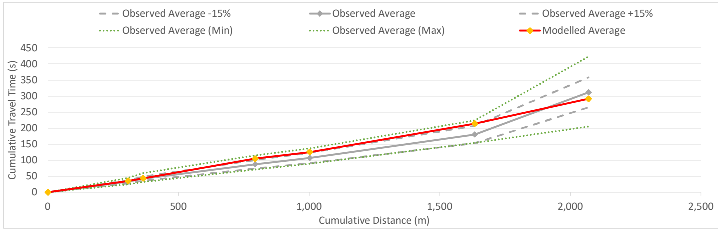
SB 3 - Brighton Ave, Beamish St, Bexley Rd - Between Albert Rd and Cross St (1615-1715_TT)



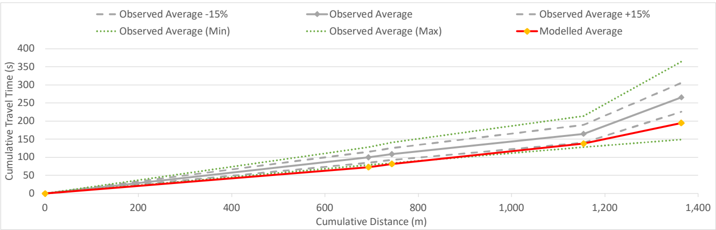
NB 4 - Brighton Ave, Moore St, Bellombi St, Nowra St, Wairao St, Wonga St - Between Albert Rd and Canterbury Rd (1615-1715_TT)



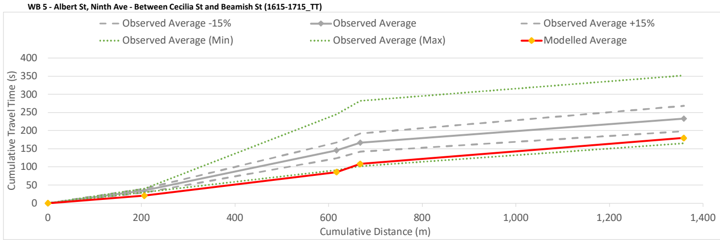
SB 4 - Brighton Ave, Moore St, Bellombi St, Nowra St, Wairao St, Wonga St - Between Albert Rd and Canterbury Rd (1615-1715_TT)



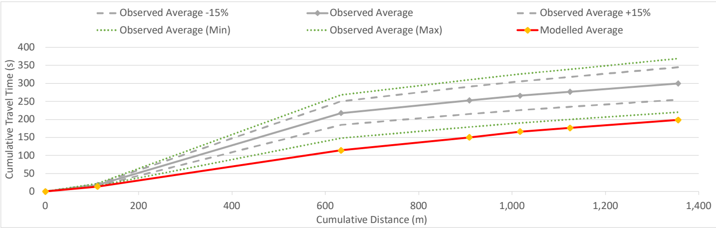
EB 5 - Albert St, Ninth Ave - Between Cecilia St and Beamish St (1615-1715_TT)



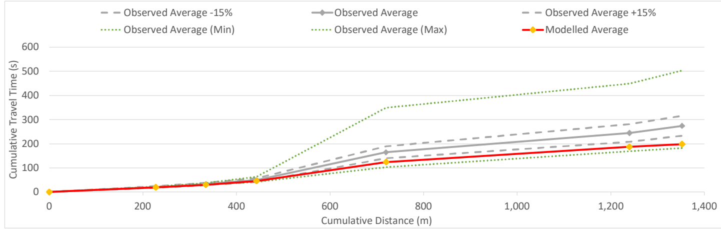
WB 5 - Albert St, Ninth Ave - Between Cecilia St and Beamish St (1615-1715_TT)



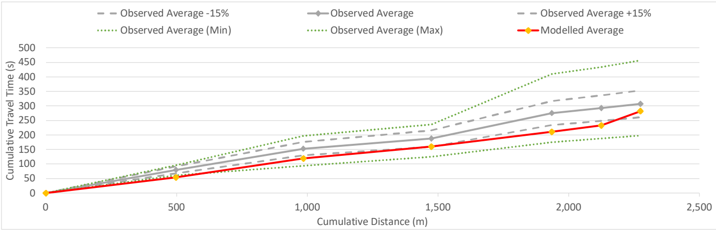
EB 6 - Evaline St - Between Loftus St and Wonga St (1615-1715_TT)



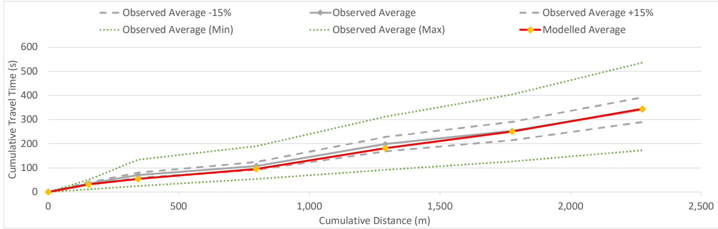
WB 6 - Evaline St - Between Loftus St and Wonga St (1615-1715_TT)



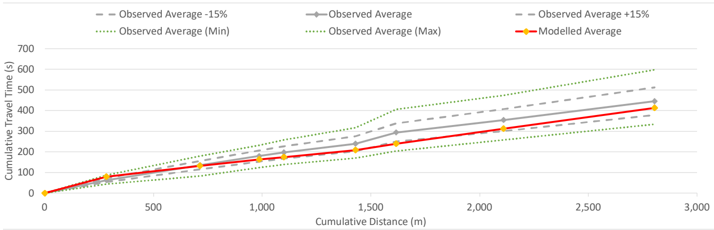
EB 7 - Cantebury Rd - Between Platts Ave and Cooks River Crossing (1615-1715_TT)



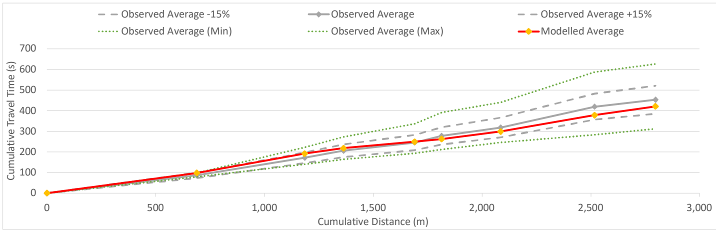
WB 7 - Cantebury Rd - Between Platts Ave and Cooks River Crossing (1615-1715_TT)



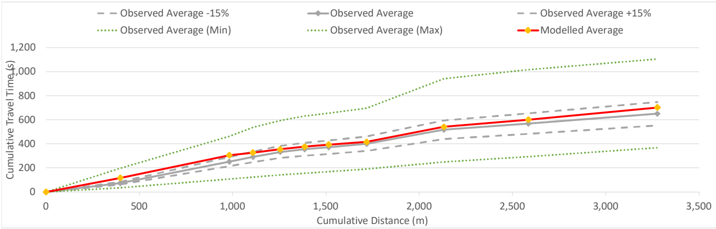
NB 1 - Lees Ave, Second Ave, Ninth Ave, Loch St, Evaline St, Loftus St, Thorncraft Pde - Between Linthorn Ave and Sunbeam St (1715-1815_TT)



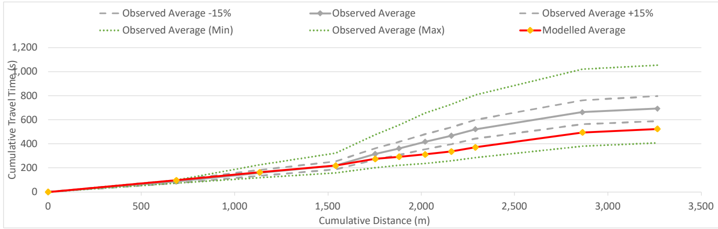
NB 1 - Lees Ave, Second Ave, Ninth Ave, Loch St, Evaline St, Loftus St, Thorncraft Pde - Between Linthorn Ave and Sunbeam St (1715-1815_TT)



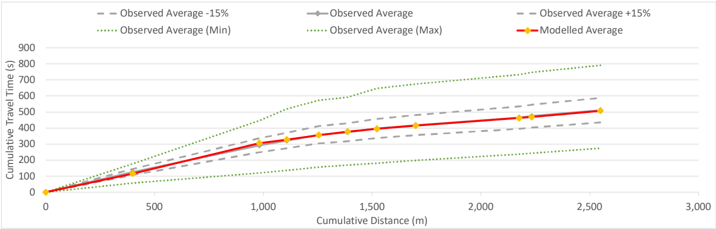
NB 2 - Lees Ave, Second Ave, Ninth Ave, Beamish St, Bexley Rd - Between Linthorn Ave and Cross St (1715-1815_TT)



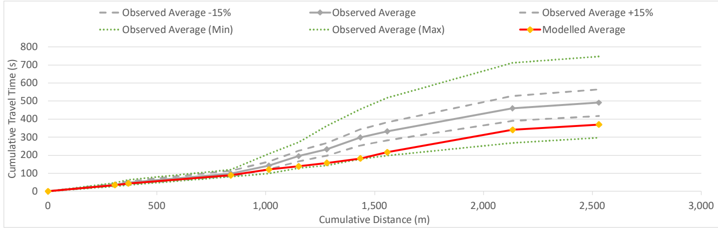
SB 2 - Lees Ave, Second Ave, Ninth Ave, Beamish St, Bexley Rd - Between Linthorn Ave and Cross St (1715-1815_TT)



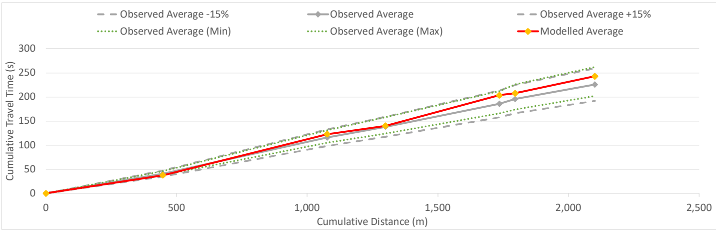
NB 3 - Brighton Ave, Beamish St, Bexley Rd - Between Albert Rd and Cross St (1715-1815_TT)



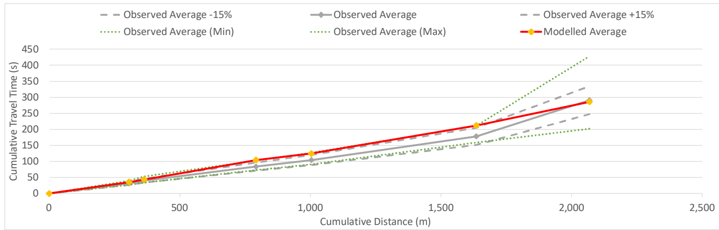
SB 3 - Brighton Ave, Beamish St, Bexley Rd - Between Albert Rd and Cross St (1715-1815_TT)



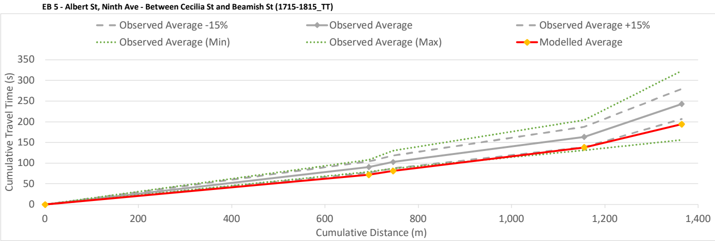
NB 4 - Brighton Ave, Moore St, Bellombi St, Nowra St, Wairao St, Wonga St - Between Albert Rd and Canterbury Rd (1715-1815_TT)



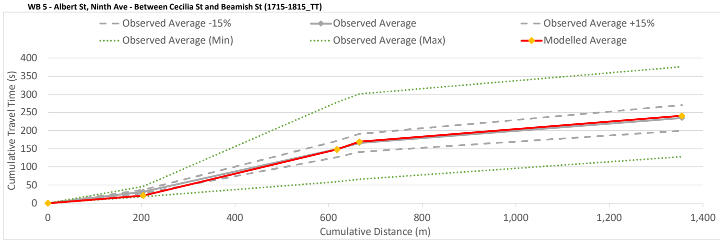
SB 4 - Brighton Ave, Moore St, Bellombi St, Nowra St, Wairao St, Wonga St - Between Albert Rd and Canterbury Rd (1715-1815_TT)



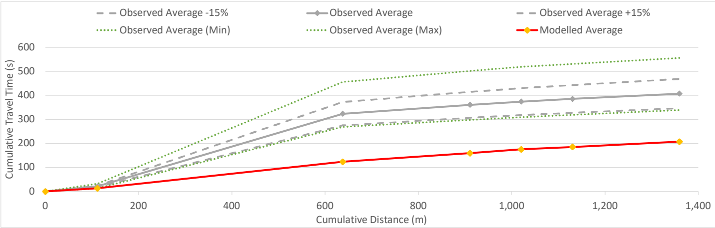
EB 5 - Albert St, Ninth Ave - Between Cecilia St and Beamish St (1715-1815_TT)



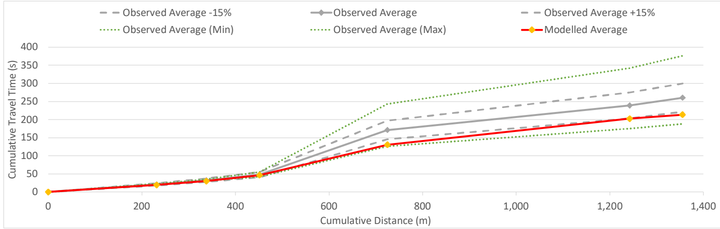
WB 5 - Albert St, Ninth Ave - Between Cecilia St and Beamish St (1715-1815_TT)



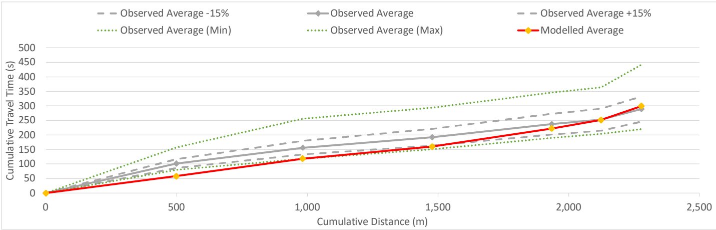
EB 6 - Evaline St - Between Loftus St and Wonga St (1715-1815_TT)



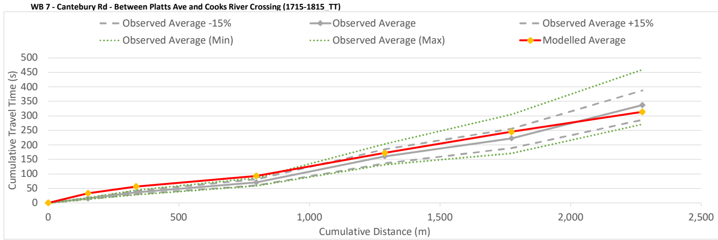
WB 6 - Evaline St - Between Loftus St and Wonga St (1715-1815_TT)



EB 7 - Cantebury Rd - Between Platts Ave and Cooks River Crossing (1715-1815_TT)



WB 7 - Cantebury Rd - Between Platts Ave and Cooks River Crossing (1715-1815_TT)



D. TRAFFIC SURVEY DATA

D

Campsie IC - Traffic Flows

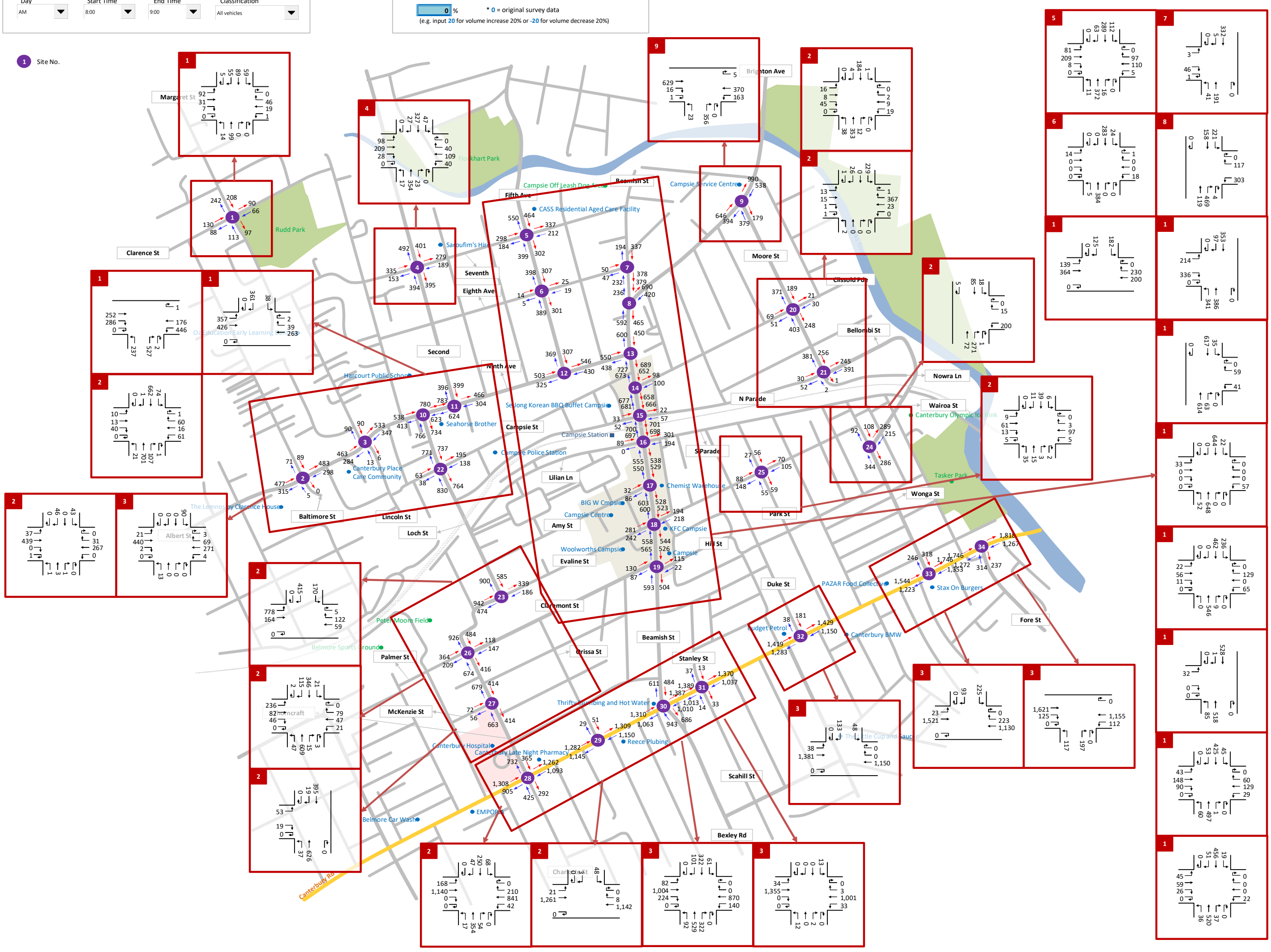
MATRIX Traffic and Transport Data

Search By Time and Classification

Day: AM | Start Time: 8:00 | End Time: 9:00 | Classification: All vehicles

Volume Forecasting

0 % * 0 = original survey data (e.g. input 20 for volume increase 20% or -20 for volume decrease 20%)



Campsie IC - Traffic Flows

Search By Time and Classification

Day	Start Time	End Time	Classification
AM	8:00	9:00	All vehicles

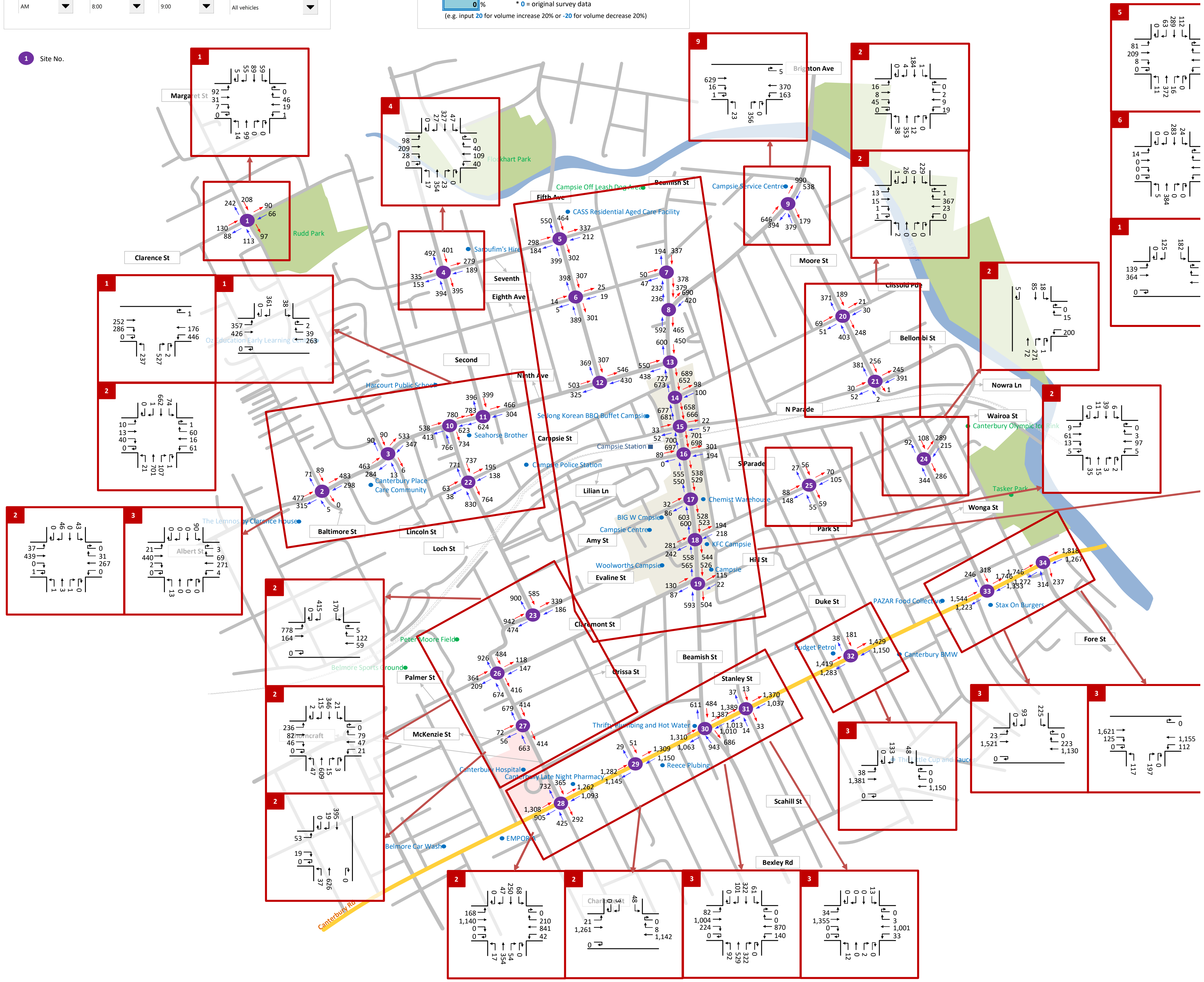
Volume Forecasting

0 % * 0 = original survey data

(e.g. input 20 for volume increase 20% or -20 for volume decrease 20%)

MATRIX Traffic and Transport Data

1 Site No.



MATRIX
Traffic and Transport Data

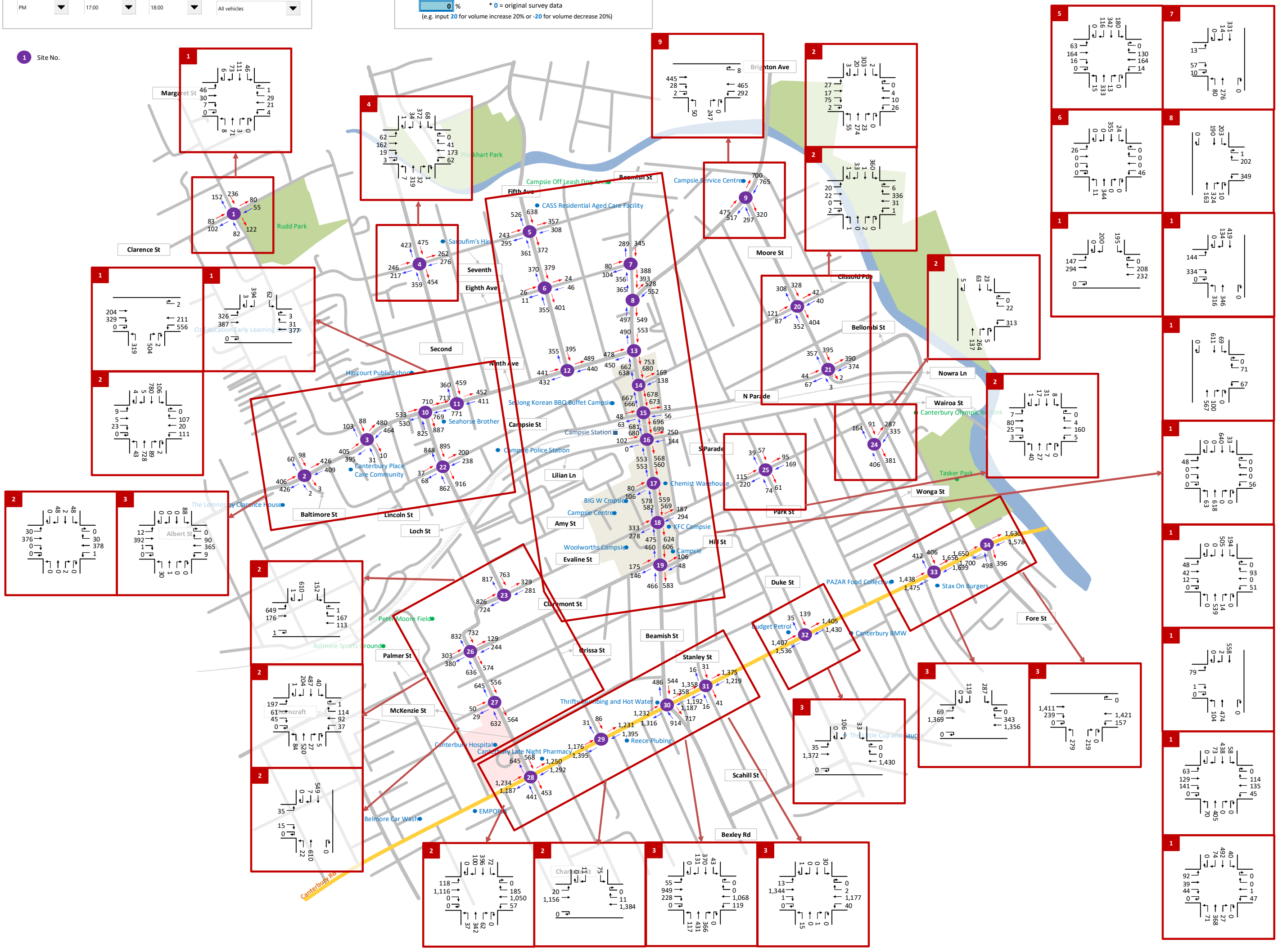
Campsie IC - Traffic Flows

Search By Time and Classfication

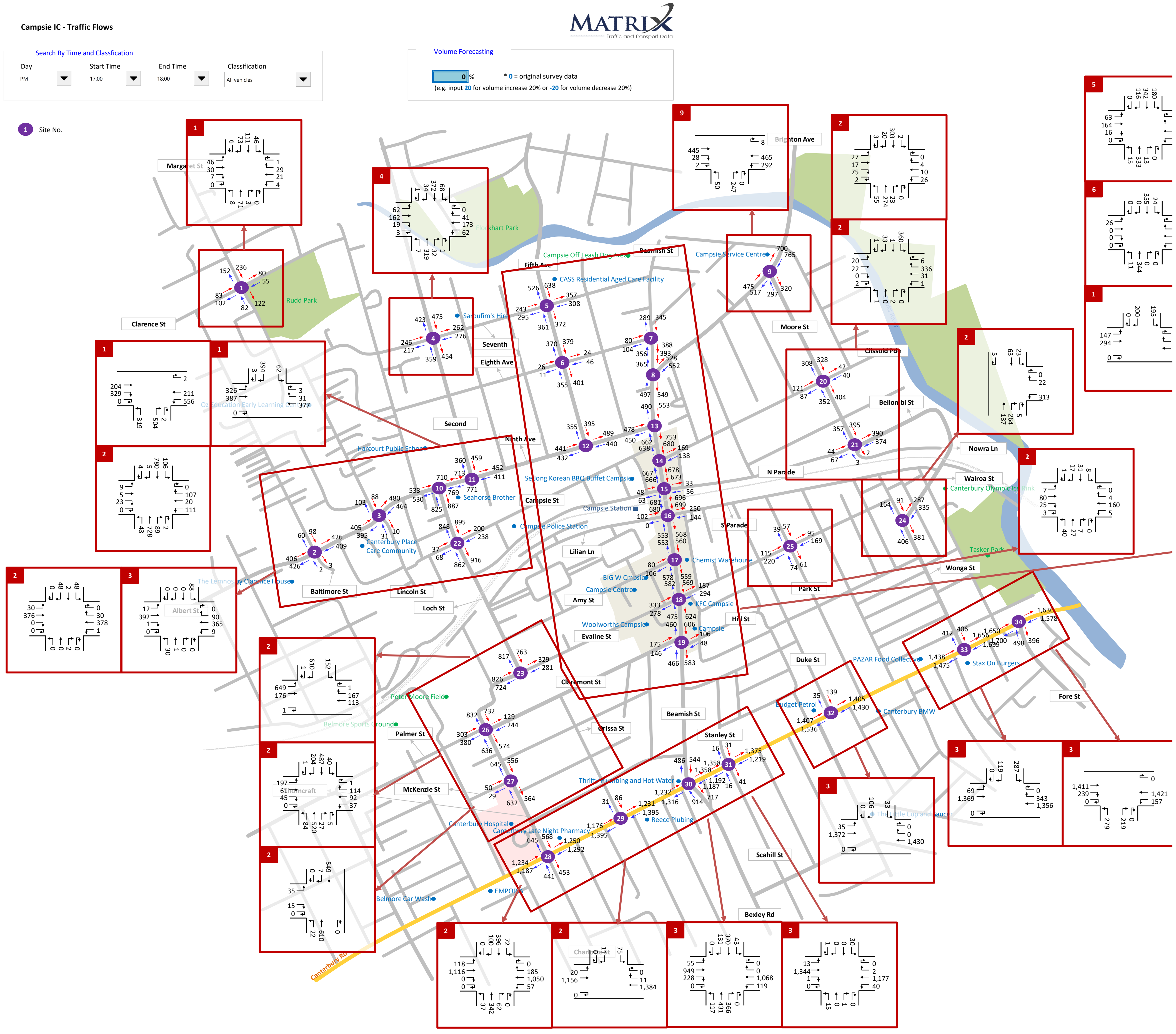
Day	Start Time	End Time	Classification
PM	17:00	18:00	All vehicles

Volume Forecasting

0 % * 0 = original survey data
(e.g. input 20 for volume increase 20% or -20 for volume decrease 20%)



Campsie IC - Traffic Flows



GTAconsultants now Stantec