Staffordshire County Council

Appendix 3.4

Local Model Validation Report, 2010

Stafford Western Access Improvements

Local Model Validation Report

2nd February 2010

Notice

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1. Introduction

Overview

1.1 Atkins Transport Planning has been appointed by Staffordshire County Council (SCC) to update the Stafford transport model for the purpose of assessing the impact of the proposed Stafford Western Access Improvements.

1.2 The Stafford transport model was originally developed by Atkins in 2008 for a technical study to understand the implications of proposed growth around Stafford on the transportation network. The model has been updated to enable variable demand modelling, in line with DfT WebTAG guidance.

Study Overview

1.3 The Stafford Western Access Improvements include a proposed link between the A518 and the A34 utilising stretches of Martin Drive and Doxey Road.

1.4 The A518 Primary Route, which provides a key link between the A5/M54 at Telford, the M6, and the A50 at Uttoxeter, passes through Stafford Town Centre, resulting in the severance of many critical Town Centre activities, and acting as a restraint on proposals to regenerate a significant number of edge of centre locations. In particular, two of the largest car parks for the Town Centre are situated immediately adjacent to the A518, resulting in significant pedestrian movements across the traffic flow accessed directly from the A518 and additional traffic volumes are anticipated as a result.

1.5 Stafford is also expected to see significant housing and employment growth over the next 15-20 years following the review of the West Midlands Regional Spatial Strategy; one of the few sites currently available to accommodate this growth can currently be accessed only from the A518. The proposed solution is to construct a new link to the West of Stafford Town, open up the major mixed use regeneration site immediately to the west of the West Coast Main Line, address traffic congestion issues to the west of Stafford, remove traffic from existing streets within the urban core, improving conditions for pedestrians and cyclists, and support the regeneration of other edge of centre sites.

1.6 The objectives of the Stafford Western Access proposals are: removal of through traffic from central Stafford, enhancing conditions for pedestrians; support for continued retail and leisure growth within the Town Centre by removing severance and enable the integration of edge of centre sites; provide improved access to Stafford Station by all modes; alleviation of congestion and reduction of accidents in the western sector of Stafford; and to facilitate the regeneration of former industrial sites to the west of the Town Centre.

Report Structure

1.7 Following this Introduction, the remainder of the report is structured as follows:

- **Section 2** provides a **Description of the Model and Traffic Data** used to assess the schemes;
- **Section 3** describes the **Model Development** process;
- **Section 4** provides results from the **Model Calibration**, demonstrating the extent to which the model meets the criteria set out in the Highways Agency's Design Manual for Roads and Bridges (DMRB);

- **Section 5** presents the results from **Model Validation**, in accordance with the criteria set out in DMRB; and
- **Section 6** provides some **Conclusions and Recommendations** on the basis of the preceding analysis.

1.8 The LMVR summarises the process and results from the development of base year traffic models. Detailed supporting information and statistics are presented in appendices, as follow:

- **Appendix A** presents details of the **Link and Turning Flow Calibration**;
- **Appendix B** describes the **Screenline Validation**;
- **Appendix C** presents details of the **Link Flow Validation**; and
- **Appendix D** describes the **Journey Time Validation**.

2. Description of the Model & Traffic Data

The Traffic Model

History of the Model

2.1 The Stafford transport model was originally developed by Atkins in 2008 for a technical study to understand the implications of proposed growth around Stafford on the transportation network.

2.2 As part of this study, the model has been updated using the original 2007 traffic data to ensure DfT compliancy. The key revision to the model has been to include demand segmentation with generalised costs for both time and distance to enable variable demand modelling using DIADEM.

Type of Model

2.3 The traffic model developed to assess the Stafford Western Access Improvements is entirely highway-based. The model is coded in 'simulation' detail in the Stafford area and in the 'buffer' format for the wider Staffordshire area. Adopting detailed 'simulation' coding for the key study area has the benefit of allowing vehicle delay to be modelled, providing a more realistic representation of journey costs and routing decisions. This is beneficial in terms of assessing traffic impacts in the model, and also for subsequent calculation of monetised costs and benefits generated by the Stafford Western Access Improvements.

Software Package Used

Highway Assignment Modelling

2.4 The highway traffic model has been developed using the SATURN 10.9.12 modelling suite, the latest available when work on the model update commenced. SATURN is widely recognised as one of the major software tools for the development of highway traffic models and the subsequent assessment of highway schemes. It is recognised as suitable for the assessment of major highway schemes and for forming the basis of business case development, in accordance with DfT guidance.

Variable Demand Modelling

2.5 The updated Stafford model follows a 'variable trip matrix' approach whereby the demand matrix is allowed to change between two scenarios, following a change in travel costs as a result of the highway improvements. The variable demand modelling has been undertaken using DIADEM, the recommended software package for undertaking this type of assessment.

2.6 Whilst the majority of the variable demand modelling is undertaken in respect of the future year forecasts, initial 'realism' tests are undertaken on the base year traffic model, to ensure that it is suitable as a basis for the future year modelling. Further details on the realism testing are presented in a separate technical note, to be submitted separately to this LMVR.

Modelled Time Periods

2.7 Models have been developed to represent traffic conditions at two different times of day for a 2007 base year:

- AM peak hour (0800-0900); and
- PM peak hour (1700-1800).

Modelled User Classes

2.8 Six vehicle user classes have been modelled to enable the different demand responses to changes in travel costs to be accurately reflected, as shown in Table 2.1:

Table 2.1 – User Classes

User Class		Description
Lights	UC1	Car – Business
	UC2	Car – Commuting
	UC3	Car – Other
	UC4	Light Goods Vehicles (LGV)
Heavies	UC5	Other Goods Vehicles 1 (OGV1)
	UC6	Other Goods Vehicles 2 (OGV2)

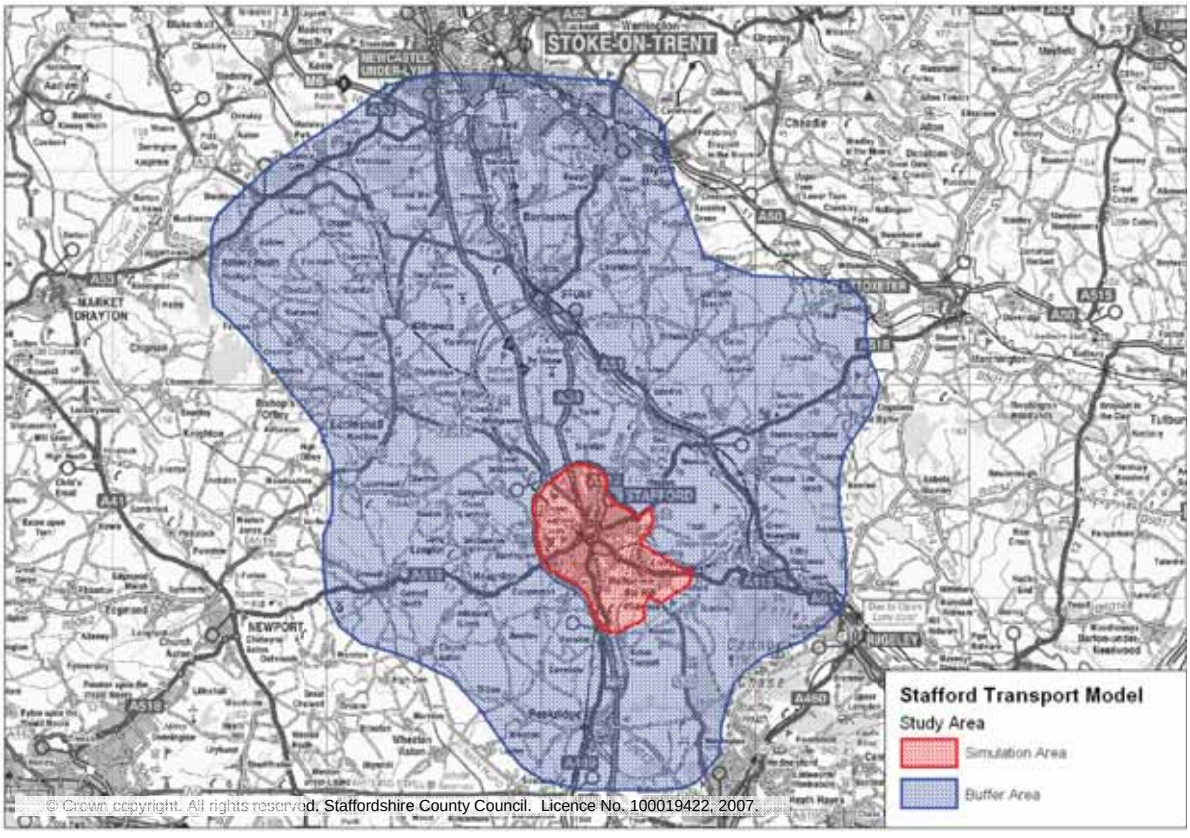
2.9 The splitting of the matrix into these six user classes is discussed in Section 3.

2.10 A Passenger Car Unit (PCU) factor of 1.0, 1.0 and 2.0 are applied for the Cars, Light Goods and Heavy Goods user classes respectively. A PCU factor of 3.0 is used for buses.

Geographic Coverage

2.11 The study area for the Stafford Transport Model is shown in Figure 2.1 with the extents of the model shown in blue and the Key Study Area (KSA) in red.

Figure 2.1 – Stafford Transport Model Study Area



2.12 The modelled study area is sufficiently wide in coverage to allow a detailed analysis of the routing decisions that will likely be affected by the proposed Stafford Western Access Improvements, without being so large as to increase the risk of model noise being incorporated into subsequent economic assessment.

Traffic Data Used in the Development of the Traffic Model

Overview

2.13 In order for transport models to be deemed suitable for assessing the impact of highway schemes, they must demonstrate an ability to accurately represent observed traffic conditions. A range of traffic data have been employed in the development of the base year traffic models.

2.14 An audit of existing data was carried out to assess the requirements and locations for surveys. The existing data was primarily Traffic Count Data (automatic and manual, both passing and turning movements) provided by SCC.

2.15 Based on this, the following surveys were undertaken to develop the Stafford Transport Model to a Base Year of 2007:

- Roadside Interviews (RSI) - the data from these is used to identify travel patterns at strategic locations in the model, and then to form a section of the travel demand matrix, which represents origin-destination movements around the model;
- Car Park Surveys - the data from these is used to identify travel patterns to and from car parks in the model, and then to form a section of the travel demand matrix, which represents origin-destination movements around the model;
- Journey Time Surveys - the survey data is used to validate the model to ensure that traffic travelling along important sections of the model is moving at the correct speeds, and to accurately represent levels of congestion on the highway network; and
- Traffic Counts - this data is used to calibrate and validate the model, to ensure that the model provides a robust representation of actual traffic conditions.

2.16 In addition to this, the following secondary data was collated from various sources to enable the calibration of the model:

- Journey to Work Census data;
- Junction Traffic Signal Timings;
- Junction Layout and Operational Information;
- Speed Limits;
- HGV Bans; and
- On-Street Parking.

2.17 This chapter provides a brief summary of the surveys completed and data collected for this study. However, full details of the data collected as part of the study can be found in the Survey Completion and Survey Analysis Reports.

Roadside Interviews

2.18 Road-Side Interviews (RSIs) have been undertaken at eleven locations in Stafford and were designed to ensure that all key traffic movements entering the town were captured. The surveys were carried out for a 12 hour period between 0700 and 1900, at the locations illustrated in Figure 2.2. Table 2.2 summarises the RSI location descriptions and the methods used in this study.

Figure 2.2 – Stafford Roadside Interview Locations

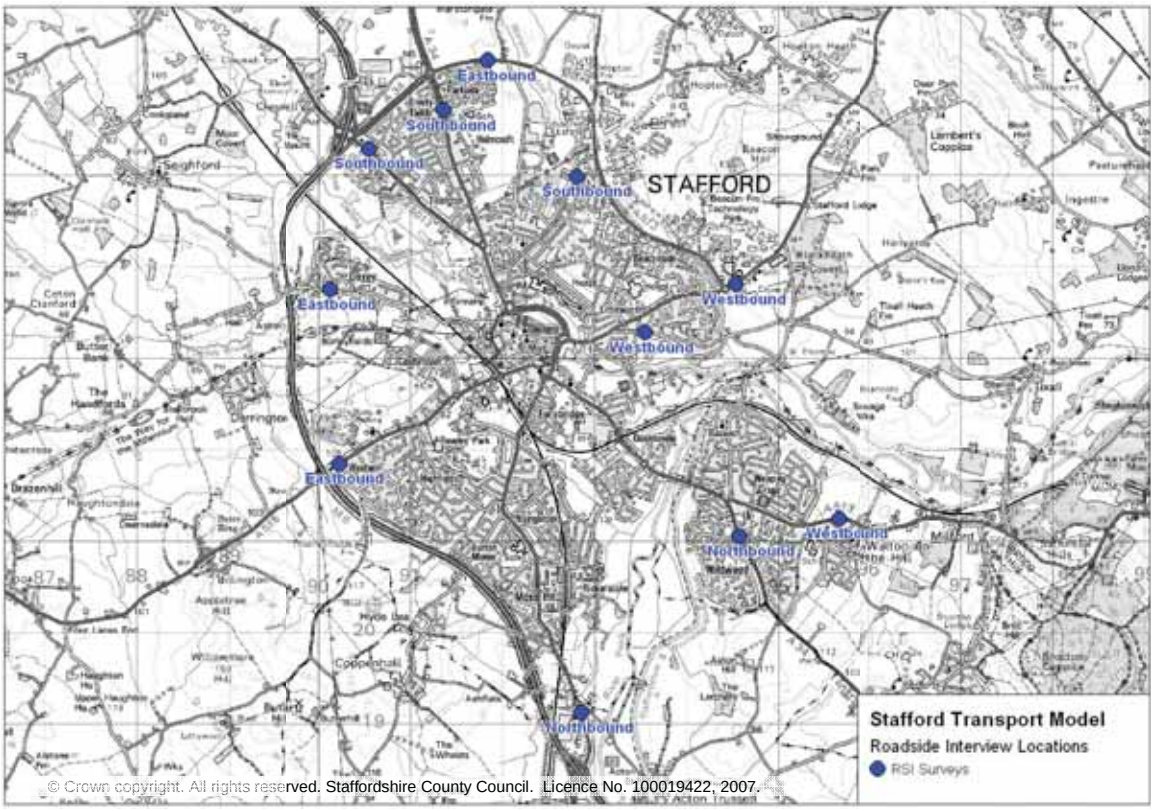


Table 2.2 - Stafford Roadside Interview Descriptions

Site No	Location	Survey Method
1	A449 Mosspit South of Argos Roundabout/Mill Lane	Interview Bay
2	A34 Stone Road South of A513 (Dual Carriageway Section)	Interview Bay
3	A34 Cannock Road Between Overhill Road & Wildwood Drive	Interview Bay
4	A513 Milford Road Adjacent to The Crescent	All Stop Postcard
5	A518 Weston Road East of A513 Between Beaconside & Blackheath Lane	All Stop Postcard
6	A518 Castle Bank Between Sundown Drive & M6	Interview Bay
7	A5013 Eccleshall Road Between M6 J14 & Crab Lane	All Stop Interview + Postcard
8	A513 Beaconside Between Marston Lane & Parkside Avenue	All Stop Postcard
9	Doxey Road West of Greensome Lane	All Stop Interview
10	B5066 Sandon Road Between Tenby Drive & A513 Beaconside	All Stop Interview
11	Tixall Road West of St Thomas Lane	All Stop Interview

2.19 Vehicle classifications surveyed during the RSIs are as follows:

- Motorcycles;
- Cars / Taxis;

- Light Goods Vehicles (LGVs);
- Other Goods Vehicles – category 1 (OGV1);
- Other Goods Vehicles – category 2 (OGV2);
- Public Service Vehicles.

Car Park Surveys

2.20 Car Park surveys were undertaken in key central car parks to obtain data on key internal traffic movements within the town, and to supplement the RSI survey information.

2.21 Interviews were carried out at 19 central area car parks and a count of traffic entering and leaving each car park was carried out throughout the survey period to allow the sample interviews to be expanded.

2.22 Due to differing travel conditions in the AM and PM peak, it was decided to survey a mixture of public and private off street car parks, including both short and long stay parking durations. Car park surveys were carried out during the AM (0800-1100) and PM (1500-1800) Peak Periods, between 24 September and 2 October 2007.

2.23 Figure 2.3 illustrates the location of the surveyed car parks in Stafford. The survey schedule, including type of car park and car park capacity, is set out in Table 2.3.

Figure 2.3 – Stafford Car Park Survey Locations

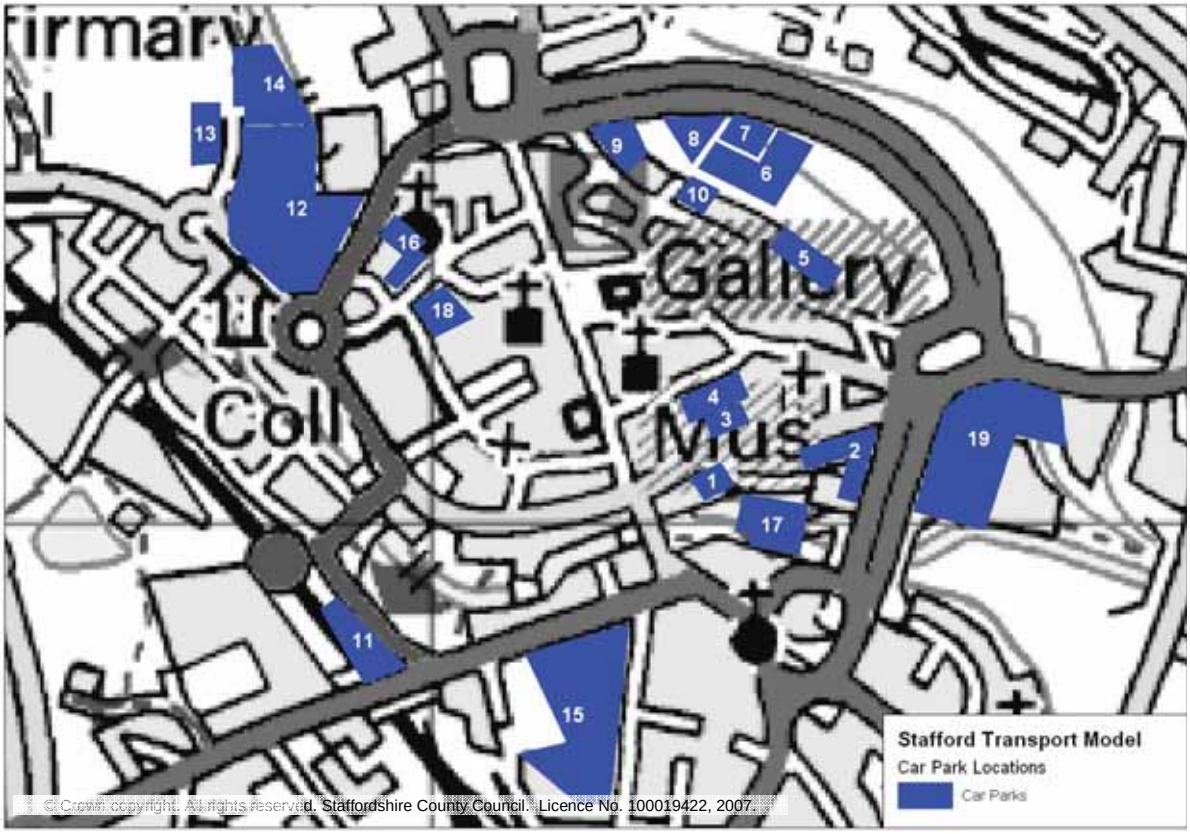


Table 2.3 – Stafford Locations of Car Park Surveys

Site	Car Park Name	Ownership	Capacity	Term
1	Civic Centre	SBC	79	Short
2	Riverside	SBC	96	Short
3	South Walls	SBC	50	Short
4	Tipping Street	SBC	173	Short
5	Lammascote	SBC	76	Long
6	Kingsmead	SBC	456	Short
7	Kingsmead	SBC	106	Long
8	Kingsmead	SBC	182	Short
9	The Walls	SBC	51	Short
10	North Walls	SBC	52	Short
11	Railway Station	Virgin Trains	350	Long
12	Doxey Road (Sainsbury's)	SBC	716	Short
13	Doxey Road	SBC	130	Long
14	Doxey Road	SBC	336	Long
15	Newport Road Tesco	Tesco	N/A	Short
16	Broad Street	SBC	145	Short
17	Bridge Street	SBC	466	Short
18	Guildhall Shopping Centre	Private	270	Short
19	Queensway Asda	Asda	N/A	Short

Journey Time Surveys

2.24 Journey Time surveys have been undertaken along eleven routes in and around Stafford by SCC for the following routes during both the AM and PM Peak periods:

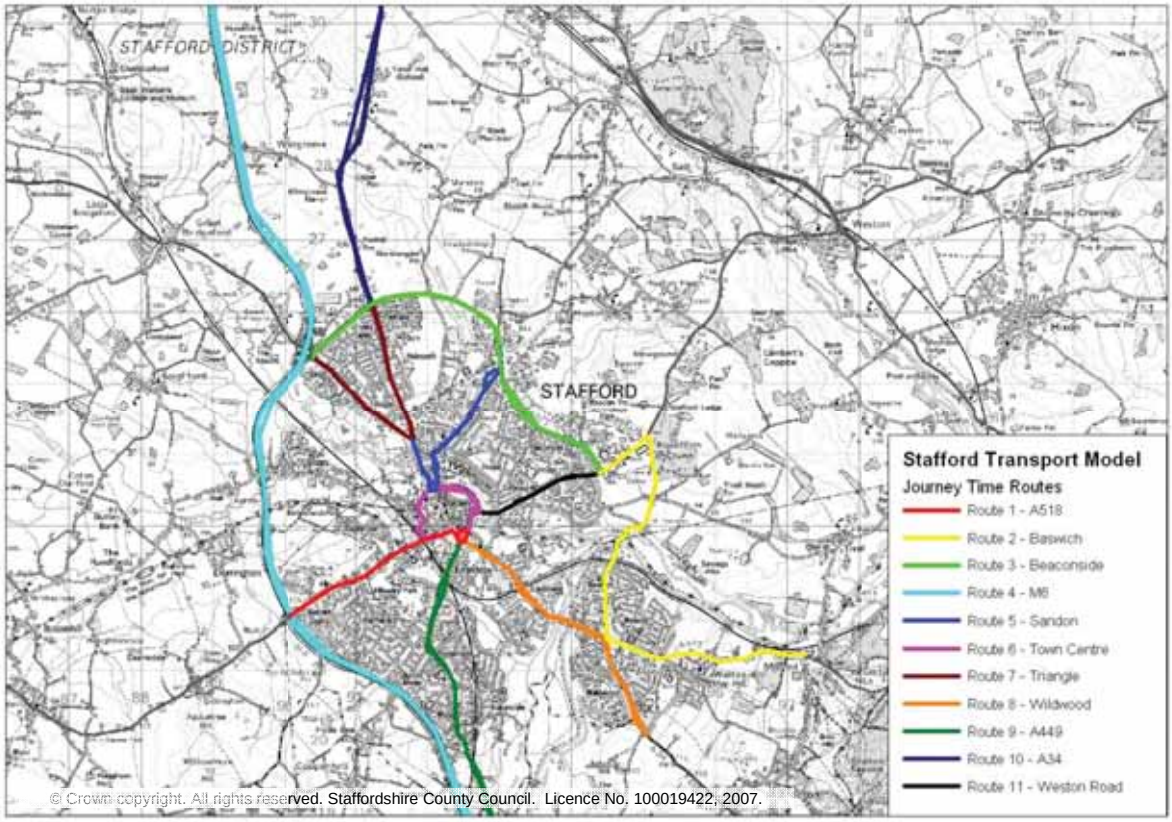
- *Route 1 –* A518: Bridge under M6 to A34 / A449 / A518 (Rbt);
- *Route 2 –* Beaconside (A513) / Weston Road (Rbt) – Blackheath Lane – Baswich Lane – A513 Weeping Cross to Brocton Road junction;
- *Route 3 –* A513 Beaconside: From M6 Junction 14 to Weston Road;
- *Route 4 –* M6: Junction 13 to Junction 15;
- *Route 5 –* Stone Road / Grey Friars / Eccleshall Road (Rbt) – A34 / A518 / B5066 (Rbt) – Sandon Road – A513 / B5066 junction;
- *Route 6 –* Town Centre: A34 Queensway – A518 Chell Road – Tenterbanks - Victoria Road – Station Road – Newport Road – Lichfield Road;
- *Route 7 –* A34 / M6 (Rbt) – A34 Stone Road – Eccleshall Road - A34 / M6 (Rbt);
- *Route 8 –* A449 / A34 / A518 (Rbt) – Cannock Road / Old Croft Road junction;
- *Route 9 –* A449: M6 Junction13 to A449 / A34 / A518 (Rbt);
- *Route 10 –* A34: Redhill Roundabout to A500 to M6 junction 15; and
- *Route 11 –* A34 / A518 / B5066 (Rbt) – A518 / Queensway (Rbt) – A518 Weston Road / A513 Beaconside.

2.25 Surveys of journey times are important to help build up a picture of existing congestion problems on the network and also to provide data against which the journey times predicted by the model can be independently validated. Information from the journey time surveys will enable us to verify the main areas of congestion and also ensure that the speed/flow relationships used in traffic modelling are adequately reflecting local conditions.

2.26 The modelling of the route choice between the M6 and A34 corridors to the north of Stafford is an important feature of the buffer network. As a result journey time surveys were also undertaken on the M6 (Route 4). The DfT Journey Time Database through the TRADS interface was also interrogated for information on journey speeds on the M6 between Junctions 13 and 15, however the available data was listed as poor quality.

2.27 Figure 2.4 illustrates the eleven Journey Time Routes surveyed for the study.

Figure 2.4 – Stafford Journey Time Survey Routes



Traffic Count Data

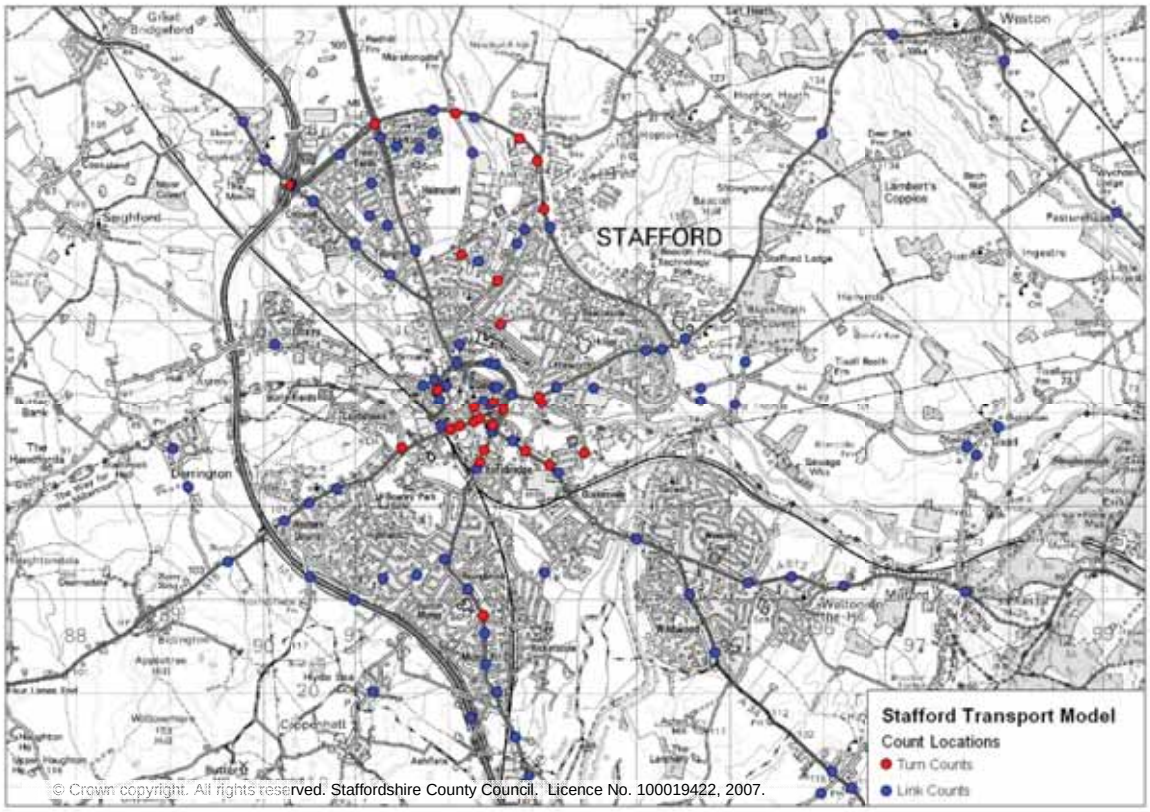
2.28 Traffic count information is essential for both travel demand and network capacity reasons. A wide range of historic traffic count data from the last four years was made available by SCC both within the town itself and also in the surrounding buffer area. The Highways Agency's TRADS database was also interrogated for count information on the trunk roads. Appropriate growth factors were used to ensure all data was converted to a common base year of 2007.

2.29 As a result of land use and network modifications new traffic counts were undertaken at two locations (Newport Road, between its junction with Station Road and Bridge Street, and Lichfield Road between its junction with Riverway and St. Leonard's Avenue) to ensure the model is up to date.

2.30 In addition to this, in order to improve the model and for use in model calibration and validation, traffic counts were undertaken at the roadside interview locations (classified manual counts and automatic counts) and at key junctions in the network (turning counts).

2.31 Figure 2.5 illustrates all the link and turning traffic counts carried out in the urban area during the last four year period. Further details of these counts can be found in the Survey Completion and Survey Analysis Reports.

Figure 2.5 – Stafford Traffic Count Locations (2003-2007)



2.32 All available count data was processed into a database, and standardised to a neutral month for the model Base Year of 2007. This data has also been compiled into 'estimation deck' format for use within the SATURN Matrix Estimation program, discussed later in this report.

Secondary Data

2.33 A range of other data was also collected to enable the building of the Stafford Transport Model networks and matrices. This included the following information:

- Journey to Work Census Data;
- Junction Traffic Signal Timings;
- Junction Layout and Operational Information;
- Speed Limits;
- HGV Bans;
- On-Street Parking; and
- Bus Routes and Timetable Information.

2.34 These data sources and the purpose of their collection are briefly mentioned in this section. All of the data mentioned in this section has been used to update the Stafford Transport Model networks and / or matrices.

Journey to Work Census Data

2.35 Journey to Work Census data from the 2001 Census was interrogated to provide information on traffic movements between zones that will not be picked up by either the RSI or Car Park surveys.

Generic relationships have been used to relate this data to the specific modelled peak hour periods.

2.36 Within the urban area this will identify internal traffic movements that are not generated by the Town Centre. It will also be used to identify through traffic movements which use the buffer network but which do not enter Stafford itself. Together with observed peak hour traffic count information, this will then provide total traffic flows on all links in the buffer network. This is essential to the accurate determination of travel speeds and route choice in this part of the model.

2.37 The development of the Journey to Work matrices will be further detailed in the Matrix Development chapter later in this report.

Junction Traffic Signal Timings

2.38 The major factor affecting network capacity in urban areas are junctions, and in Stafford a significant number of junctions are traffic signal controlled. The system is a SCOOT based package which continually monitors traffic flow across a series of traffic loops in the road. The system then updates the signal settings in response to changes in vehicle demand. This enables the operation of the system to be optimised and delays to traffic to be minimised.

2.39 A significant amount of information is available from the system and SCC's Traffic Engineers have provided signal settings including cycle time, stage diagrams, green times, inter green times and pedestrian stages for all junctions in the study area for the modelled AM and PM peak periods.

Junction Layout and Operational Information

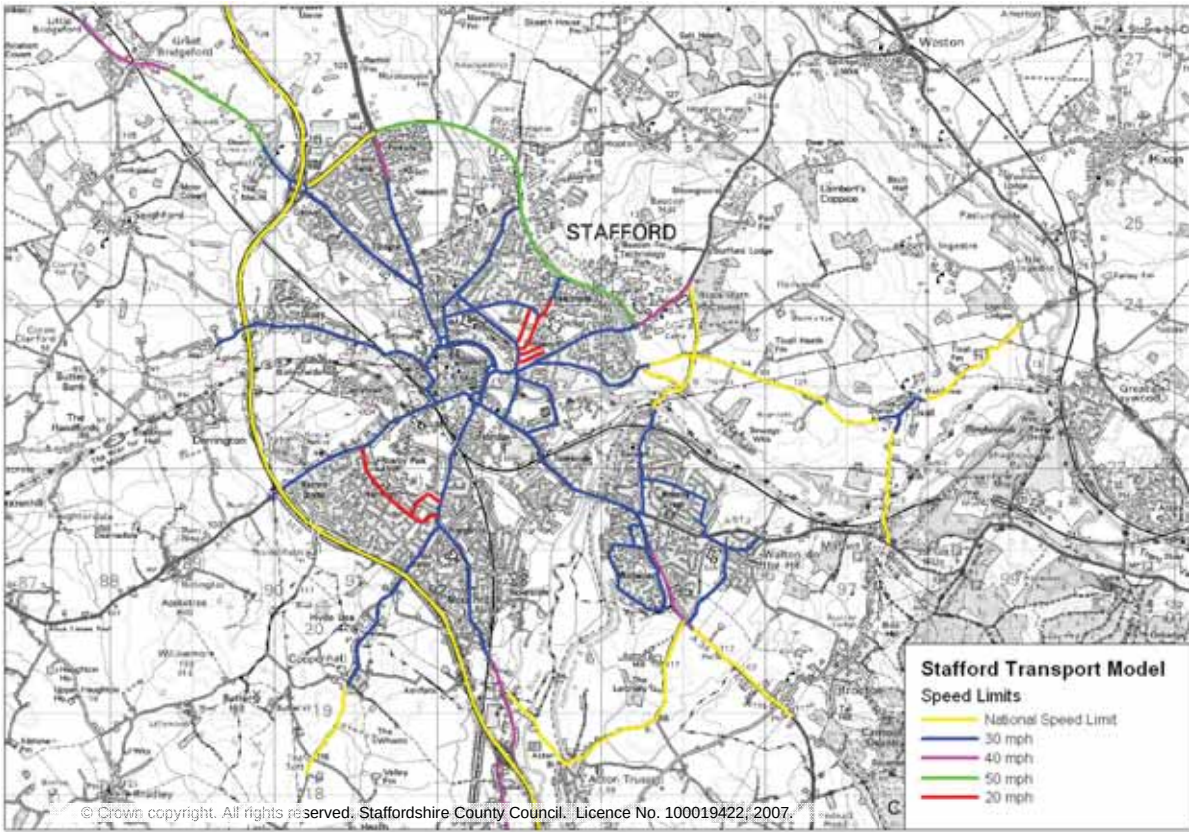
2.40 Information on the layout and operation of all junctions including signalised, roundabout and traditional priority junctions has also been collected. In order to gather this information Atkins has performed site visits to Stafford to collect junction layout information at various times during the data collection and model development stages of the study.

2.41 Aerial photographs and Ordnance Survey maps have also been used to supplement information on the physical characteristics of junctions throughout Stafford.

Speed Limits

2.42 During the site visits to Stafford, posted highway speed limits on the main highway routes were noted and are presented in Figure 2.6.

Figure 2.6 – Stafford Posted Speed Limits



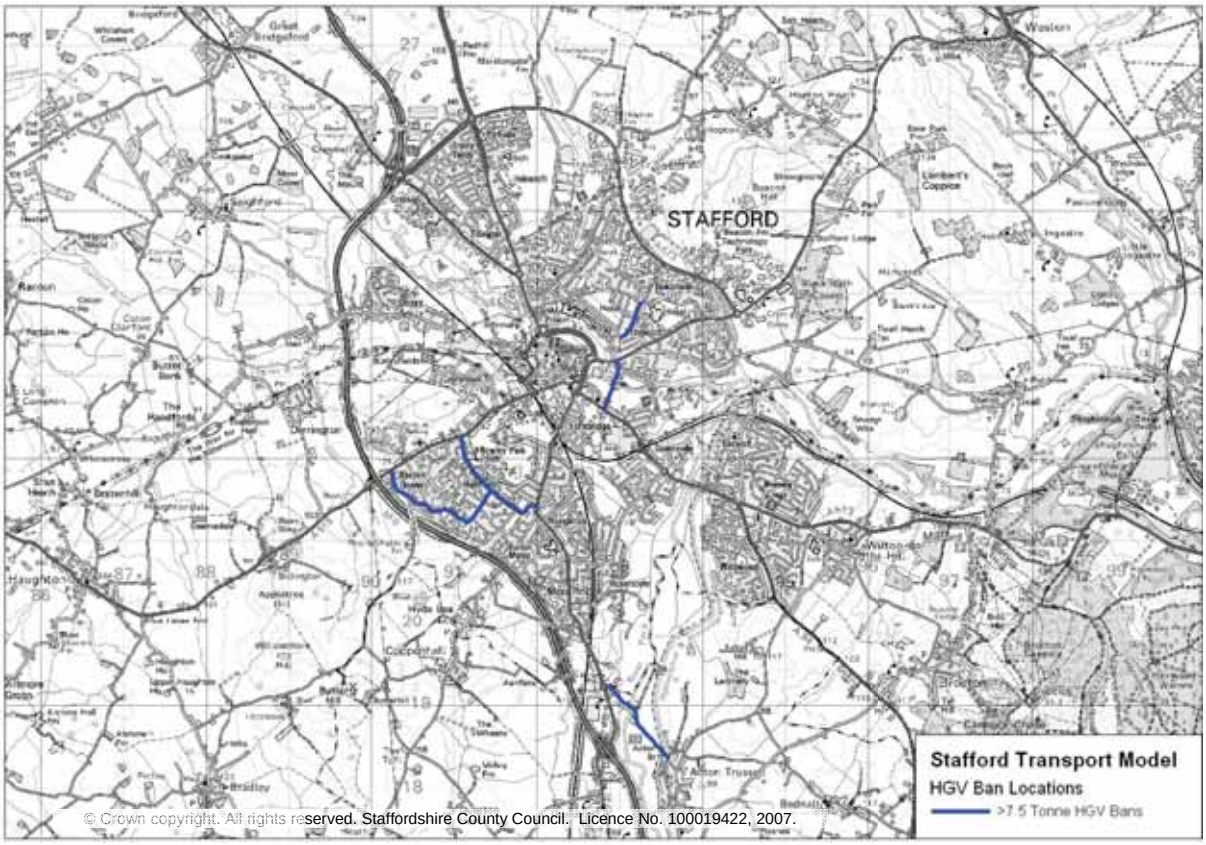
2.43 Figure 2.6 shows that the majority of the network has a 30mph speed limit. These speeds were then used as an input to the Stafford Transport Model to ensure that traffic speeds are accurately reflected in the model.

Heavy Goods Vehicle Bans

2.44 Heavy Goods Vehicle (HGV) bans were noted on the following road sections (>7.5 tonnes), and are shown in Figure 2.7:

- Tithe Barn Road;
- Riverway;
- West Way;
- Sundown Drive; and
- Mill Lane.

Figure 2.7 – Stafford HGV Bans



On Street Parking

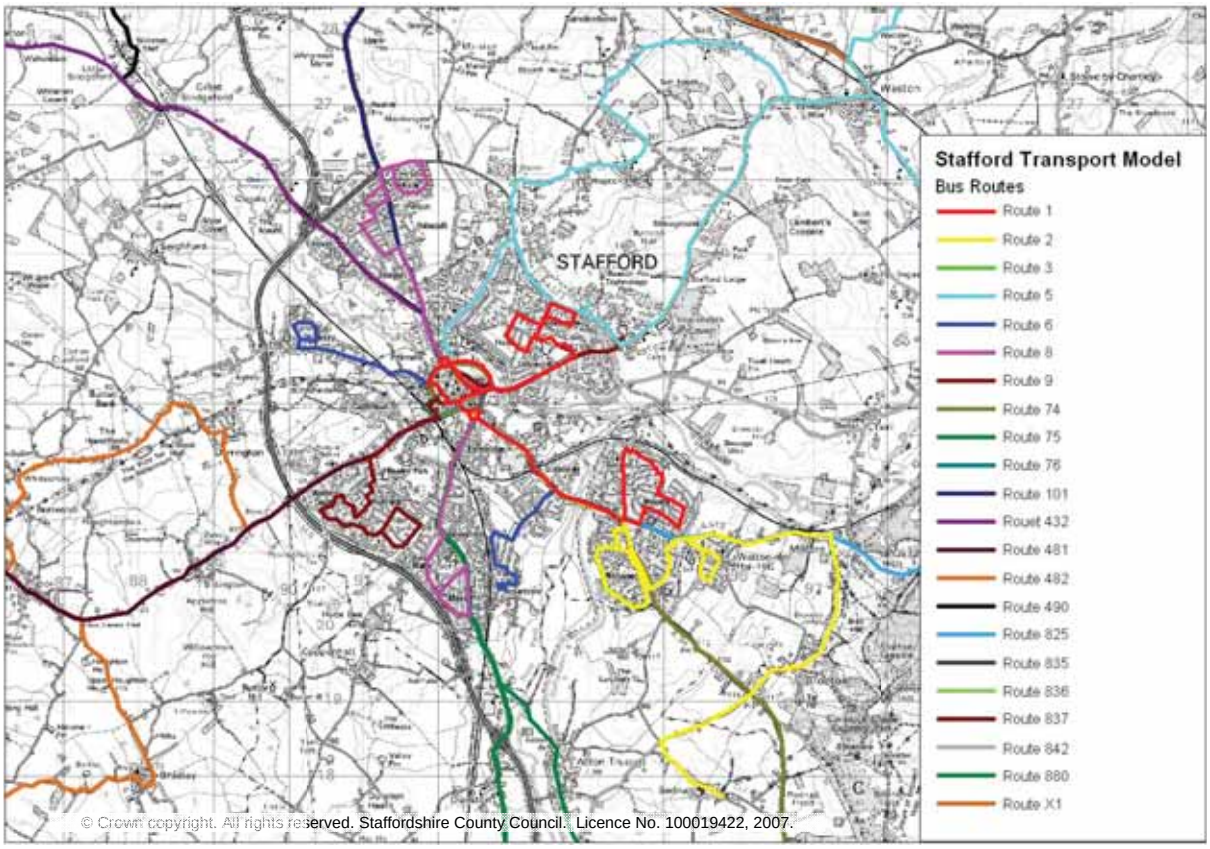
2.45 On street parking that encroaches into the carriageway can sometimes reduce capacity on a route in the parked direction and also has an impact on the capacity in the opposite direction. The effect of this on operating conditions on the network is reflected in the journey time surveys that were carried out. Observed travel times on links in the simulation network were then input directly into the model.

Bus Routes and Timetable Information

2.46 Bus routes and peak hour timetable information was collected to be incorporated within the model. This information was mostly obtained from published timetables provided by Staffordshire County Council, and has been scrutinised heavily before inclusion into the model.

2.47 Figure 2.8 shows the 22 Bus Routes servicing Stafford as included in the model.

Figure 2.8 – Stafford Bus Routes



3. Model Development

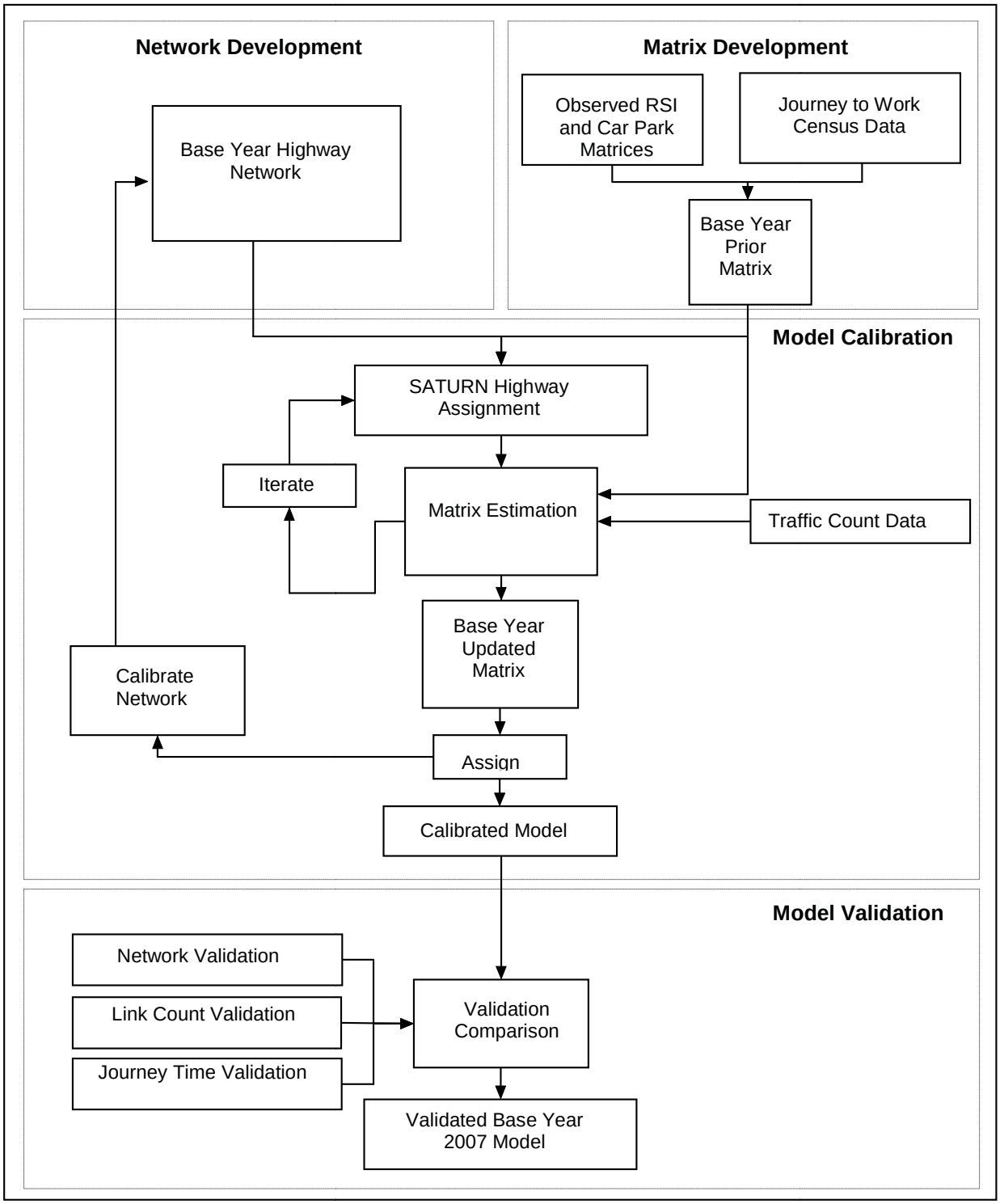
Overview

3.1 The main elements of the model are as follow:

- a detailed representation of the road network;
- matrices of trips divided by time period; and
- a procedure for assigning, or loading, the matrix of trips onto the road network.

3.2 An overview of the model process adopted for the development, calibration and validation of the current 2007 base year highway traffic model is shown in Figure 3.1. The relationship between network and matrix development, and the interaction of the assignment process with observed traffic data at the model calibration stage, is clearly displayed. The approach to model development is shown to be an iterative procedure, with movement from calibration to validation dependent on the extent to which the models satisfy the requirements for a 'good' model. The calibration and validation of the highway model is discussed in more detail in Sections 4 and 5.

Figure 3.1 - Overview of Approach to Highway Model Development

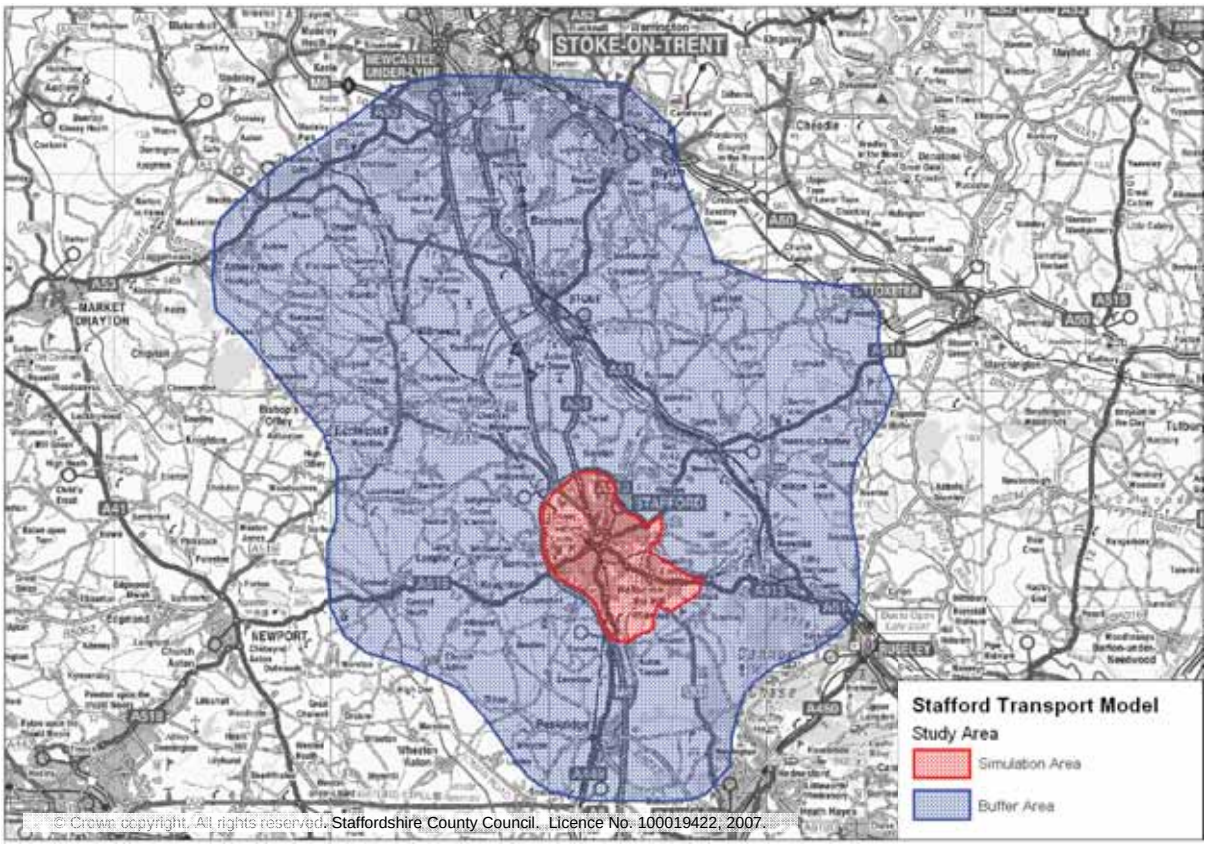


Network Development

3.3 The study area for the Stafford Transport Model is shown in Figure 3.2 with the extents of the model shown in blue and the Key Study Area (KSA) in red.

3.4 Two levels of detail are modelled in the SATURN network, 'Buffer' in the outer (blue) areas of the model and 'Simulation' in the KSA (red). Within the KSA, the model network is represented by coding each junction to a high level of detail – this is referred to as simulation coding. In the Buffer area the network is less detailed, and is only represented by major road links. The difference in modelled detail will be further explained later in this chapter.

Figure 3.2 - Stafford Transport Model Study Area



3.5 Within the Simulation network, junctions are modelled explicitly in SATURN and therefore will accurately replicate delays experienced by vehicles at these junctions. All major 'A' and 'B' and most collector roads are included in the Highway model within the Simulation area. For further details relating to how links and junctions were coded within the simulation area, please refer to the Network Development Report (Atkins, 2007).

3.6 In the Buffer area, the network is sparser, but still includes all major routes. Junctions are not explicitly modelled; however their effects are approximated on the links. The Buffer network is used to ensure that trips from the more peripheral and external zones use appropriate routes to access the Simulation network, and ensure that the model is robust. For further details relating to how links in the buffer area were coded, please refer to the Network Development Report (Atkins, 2007).

3.7 All available information was used to develop the modelled networks including the Secondary Data as detailed in the Data Collection chapter:

- Junction Traffic Signal Timings;
- Junction Layout and Operational Information;
- Speed Limits;
- HGV Bans; and
- On Street Parking.

3.8 This information was supplemented using freely available aerial mapping websites, and used to develop accurate Highway model networks.

3.9 The SATURN Highway network developed for the Stafford Transport Model is shown for the Simulation and overall model networks in Figure 3.3 and Figure 3.4 respectively.

Figure 3.3 - Stafford SATURN Model Simulation Network

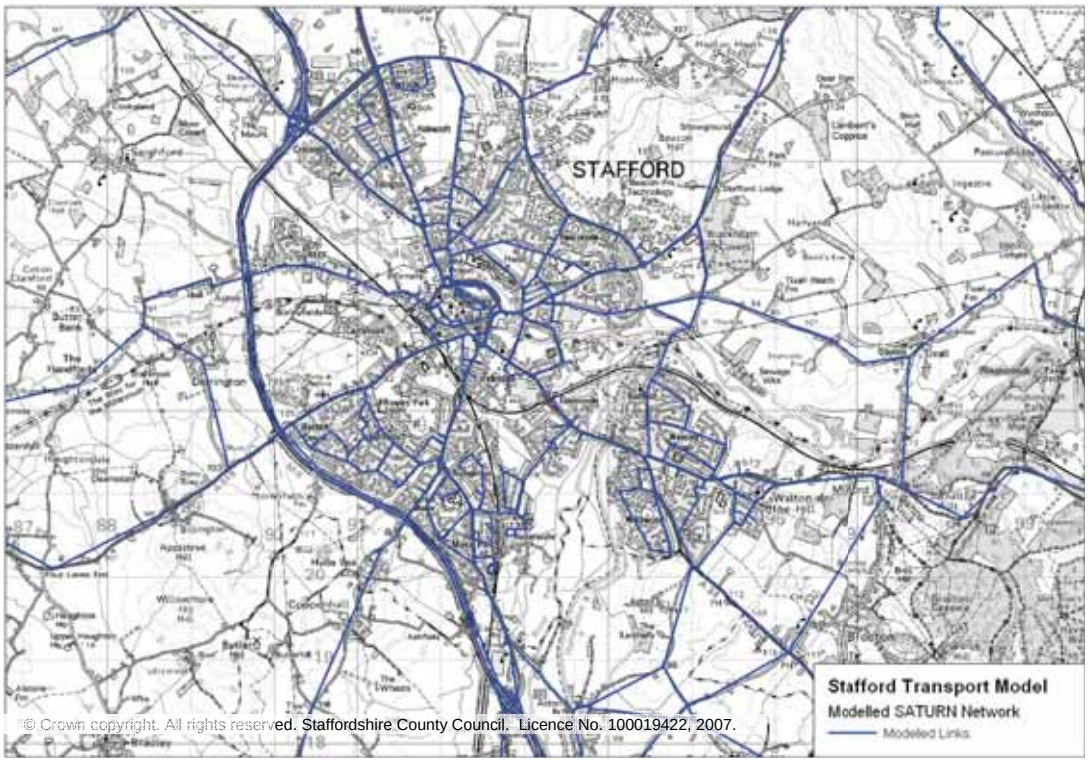
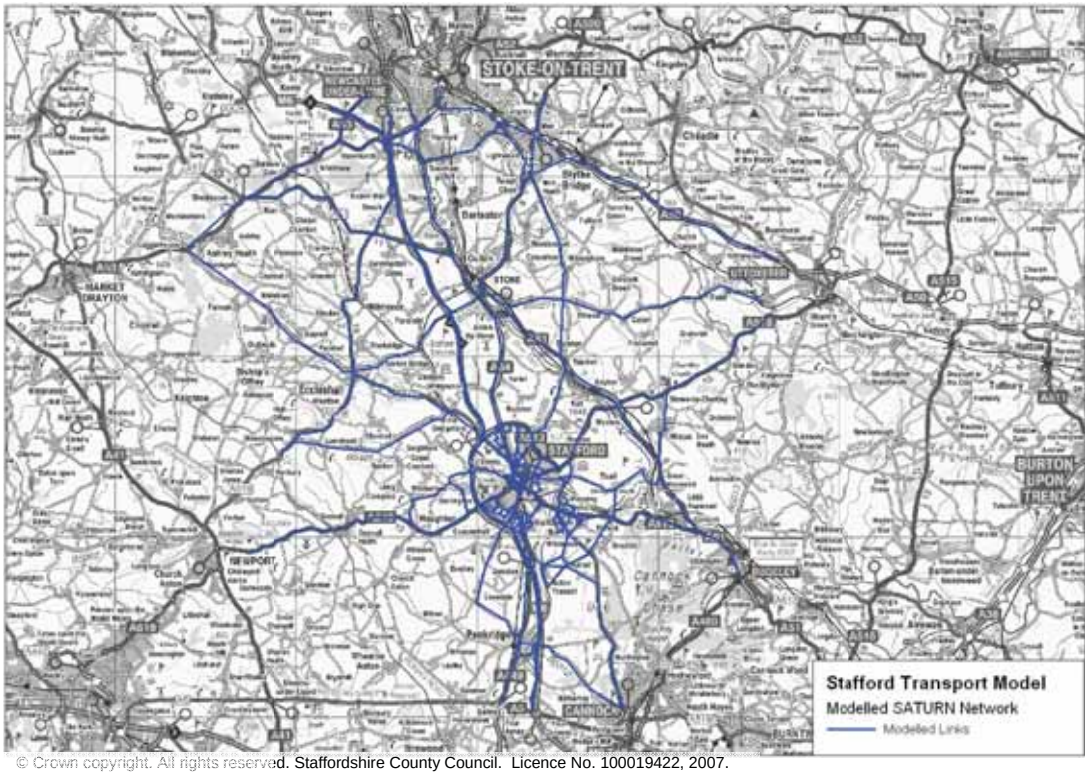


Figure 3.4 - Stafford SATURN Model Network



Matrix Development

Zone Structure

3.10 A three tier zoning system has been developed for the Stafford Transport Model:

- *Internal Zones within Stafford Town Centre:* This is the most detailed zone level, which has been based on Census Output Areas and aggregations of these Output Areas. This also includes zones that represent Car Parks in the Town Centre;
- *Zones within the Buffer Area:* An intermediate level of zonal detail in the Buffer area surrounding the KSA, and the rest of Staffordshire including towns such as Stone, Penkridge, Gnosall etc, that have been modelled in less detail based on Ward Boundaries and aggregations; and
- *External Zones:* The third tier of zones includes large, external (regional) zones to represent regions of the rest of the United Kingdom.

3.11 Each zone boundary has been determined following consideration of its land use characteristics and how traffic from that area is expected to load onto the highway network. The zones have been based on aggregations of Census Output Areas.

3.12 The zone system for the Simulation network in the Key Study Area is presented in Figure 3.5. The zone system for the study area (both Simulation and Buffer) is shown in Figure 3.6.

Figure 3.5 – Stafford Model Zone System within the Key Study Area

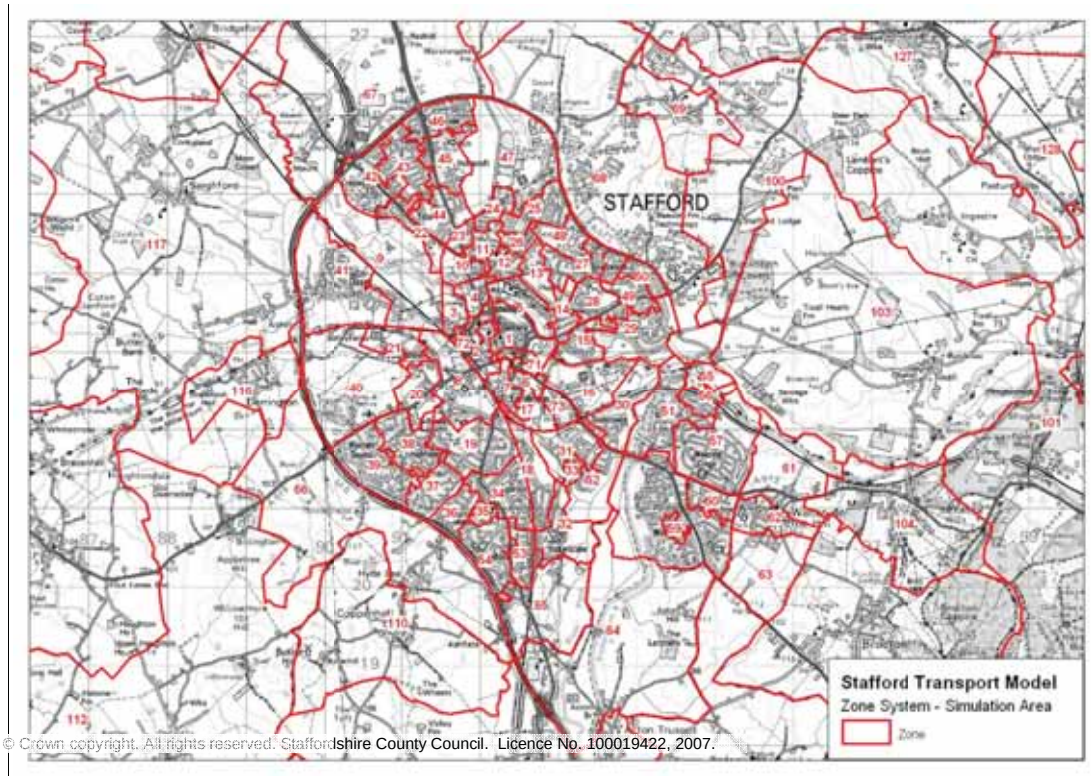
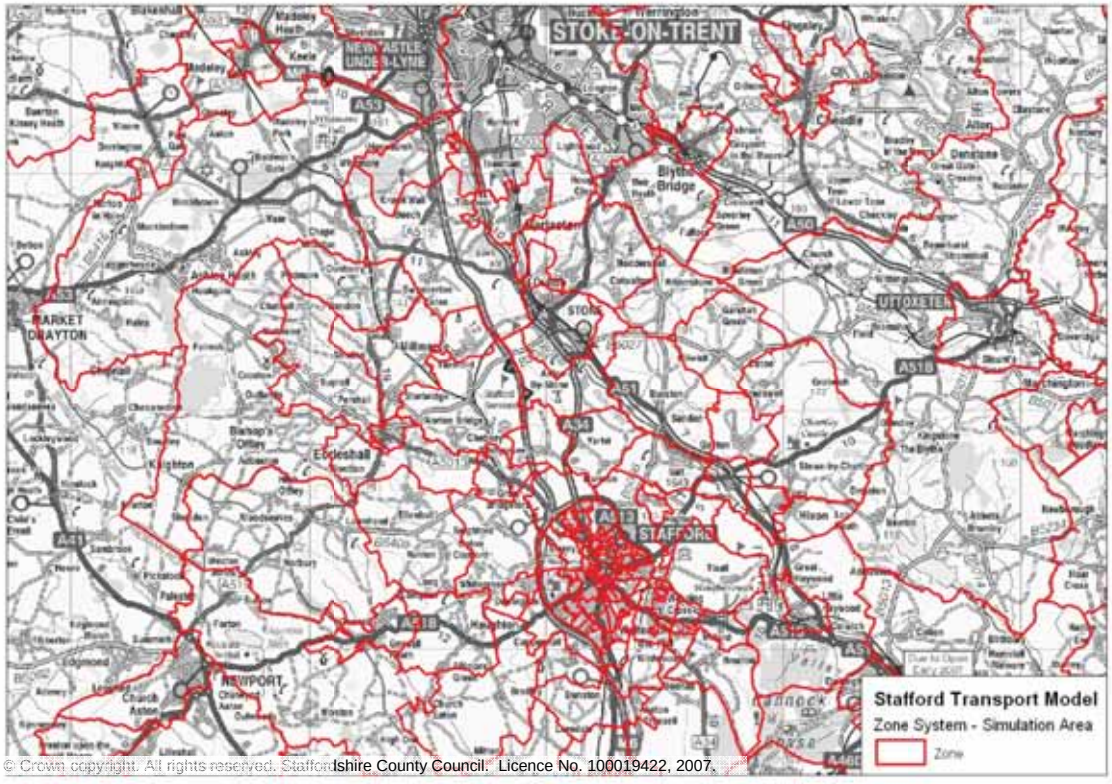


Figure 3.6 – Stafford Model Zone System within the Study Area



Prior Matrix Development

3.13 The development of the 'Prior' Demand Matrices for the Stafford Transport Model comprised of the following sub-tasks:

- Car Park Matrices;
- RSI Matrices;
- Preparation of Pre-Merge Matrices; and
- Matrix Merging.

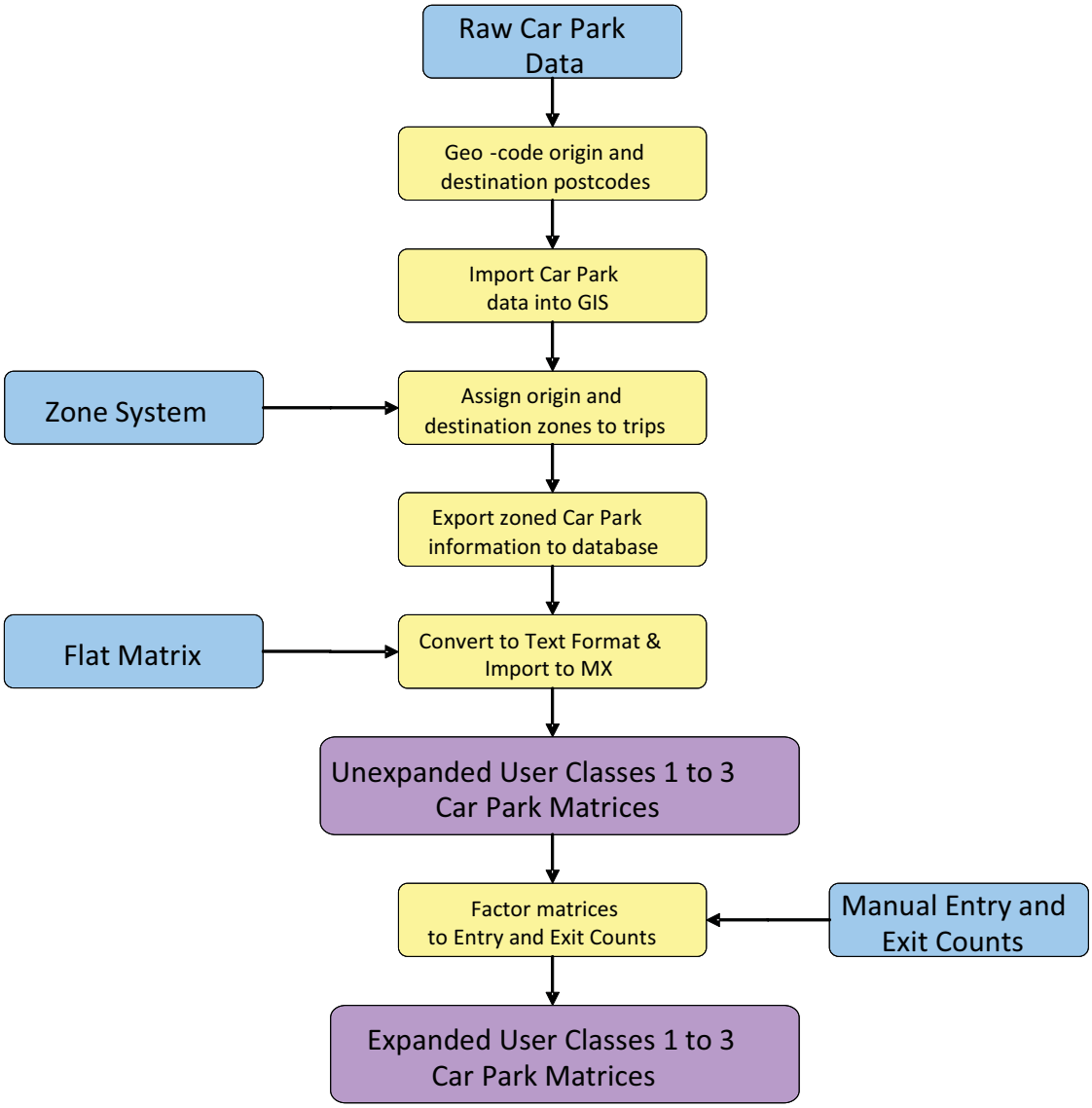
3.14 These sub-tasks are described in the following sections.

Car Park Matrices

3.15 O-D interview surveys were undertaken at nineteen Car Parks in Stafford. LGV and HGV trips into and out of Car Parks were not observed during the surveys, and hence only Cars (User Classes 1 to 3) were considered for the Car Park Site Matrices.

3.16 The process of creating Car Park Site Matrices for User Classes 1-3 (Cars) for the AM and PM Peak periods is presented in Figure 3.7. The splitting of cars into separate journey purposes is considered in Section 3.34.

Figure 3.7 - Development of Stafford Car Park Matrices for User Classes 1-3 (Cars)



3.17 The development of the User Classes 1 to 3 Car Park Matrices are summarised as follows:

- The Raw Car Park data was 'geo-coded' to give coordinates for the Origin and Destination (O-D) postcodes, and imported into MapInfo for processing;
- Each Car Park trip pair was assigned Stafford Model zones for the stated Origin and (intended) Destination corresponding to the post code coordinates and a zone number representing the Car Park. Therefore each interview represents two trips, being from the Origin to the Car Park, and from the Car Park to the intended Destination at a later time (this was a part of the interview). This information was exported back to the Car Park database;
- The Car Park trips were imported into MX along with a 'Flat' matrix (zeros in all cells), to produce Unexpanded User Classes 1 to 3 Car Park Matrices;
- The observed Car Park matrices were expanded to Entry and Exit counts collected on the day of the interviews to create Expanded User Classes 1 to 3 Matrices for each Car Park.

3.18 The overall expansion factors for the Car Park Matrices are contained in Table 3.1 and Table 3.2 for the AM and PM Peaks respectively. The Car Park site locations were previously shown in Figure 2.3 and are detailed in Table 2.3.

Table 3.1 - Stafford Car Park Expansion Factors: AM Peak 2007

Car Park No.	Entry – Exit Counts (0800-0900)		Car Park Interviews		Expansion Factors	
	In	Out	In	Out	In	Out
1	19	23	12	11	1.6	2.1
2	46	5	31	18 (0)	1.5	0.3
3	29	6	23	7	1.3	0.9
4	60	7	54	18 (0)	1.1	0.4
5	71	0	56	0	1.3	0.0
6-10	333	48	314	26	1.1	1.8
11	42	25	50	2	0.8	12.5
12	95	40	68	38	1.4	1.1
13	51	1	47	39 (0)	1.1	0.0
14	202	4	137	39 (1)	1.5	0.1
15	220	138	73	75	3.0	1.8
16	74	20	28	12	2.6	1.7
17	115	1	110	3	1.0	0.3
18	72	3	27	4	2.7	0.8
19	198	136	71	82	2.8	1.7

Table 3.2 - Stafford Car Park Expansion Factors: PM Peak 2007

Car Park No.	Entry – Exit Counts (1700-1800)		Car Park Interviews		Expansion Factors	
	In	Out	In	Out	In	Out
1	40	45	15 (9)	17	2.7	2.6
2	44	39	28	47	1.6	0.8
3	19	53	15 (6)	23	1.3	2.3
4	1	63	4	61	0.3	1.0
5	3	45	3	46	1.0	1.0
6-10	34	319	27	301	1.3	1.1
11	25	62	3	42	8.3	1.5
12	152	190	55	99	2.8	1.9
13	1	25	56 (0)	43	0.02	0.6
14	5	134	56 (1)	109	0.1	1.2
15	424	441	75	77	5.7	5.7
16	90	115	20	23	4.5	5.0
17	3	99	3	103	1.0	1.0
18	3	47	3	37	1.0	1.3
19	354	368	53	62	6.7	5.9

3.19 The following points should be noted about the development of the Car Park User Classes 1 to 3 Matrices:

- Due to the interdependency of Car Parks six to ten (in the northeast of the Town Centre as shown in Figure 2.2) and their common accesses, these five Car Parks have been aggregated into one zone in the model;
- Where sample sizes were low (and producing corresponding high expansion factors) these distributions were aggregated with those from nearby car parks to boost the sample rates. Where this has occurred, the original sample is included beside the aggregated sample in brackets. This was observed at a few sites in the off peak direction in each time period, being the AM Peak 'Out' and the PM Peak 'In'. For example, in Table 3.1, Car Park 2, 'Out' direction shows a value of 18 (0), meaning the interview sample was 0 for this location. The 'Out' interview distributions of Car Parks 1 and 3 were then aggregated to give a sample of 18 (11+7) for this site;
- As is common practice with interview surveys, longer Car Park interview periods were used to give a broader sample of the types of journeys being made in and around the Peak Periods. As the trip distributions in these extended interview periods were observed to be similar, this methodology ensures that Peak hour trips before the modelled periods are included in and will enhance the trip distributions;
- In the AM Peak (Table 3.1) the interview sample period of 07:30 to 09:30 (two hours) was used for the 'In' direction, and 07:30 to 10:30 (3 hours) for the 'Out' direction;
- In the PM Peak (Table 3.2) the interview sample period of 16:30 to 18:30 (two hours) was generally used for both the 'In' and 'Out' directions. Car Parks 15, 16 and 19 did not observe cars entering the site after 18:30, and therefore a sample period of 16:00 to 18:00 (two hours) was used;

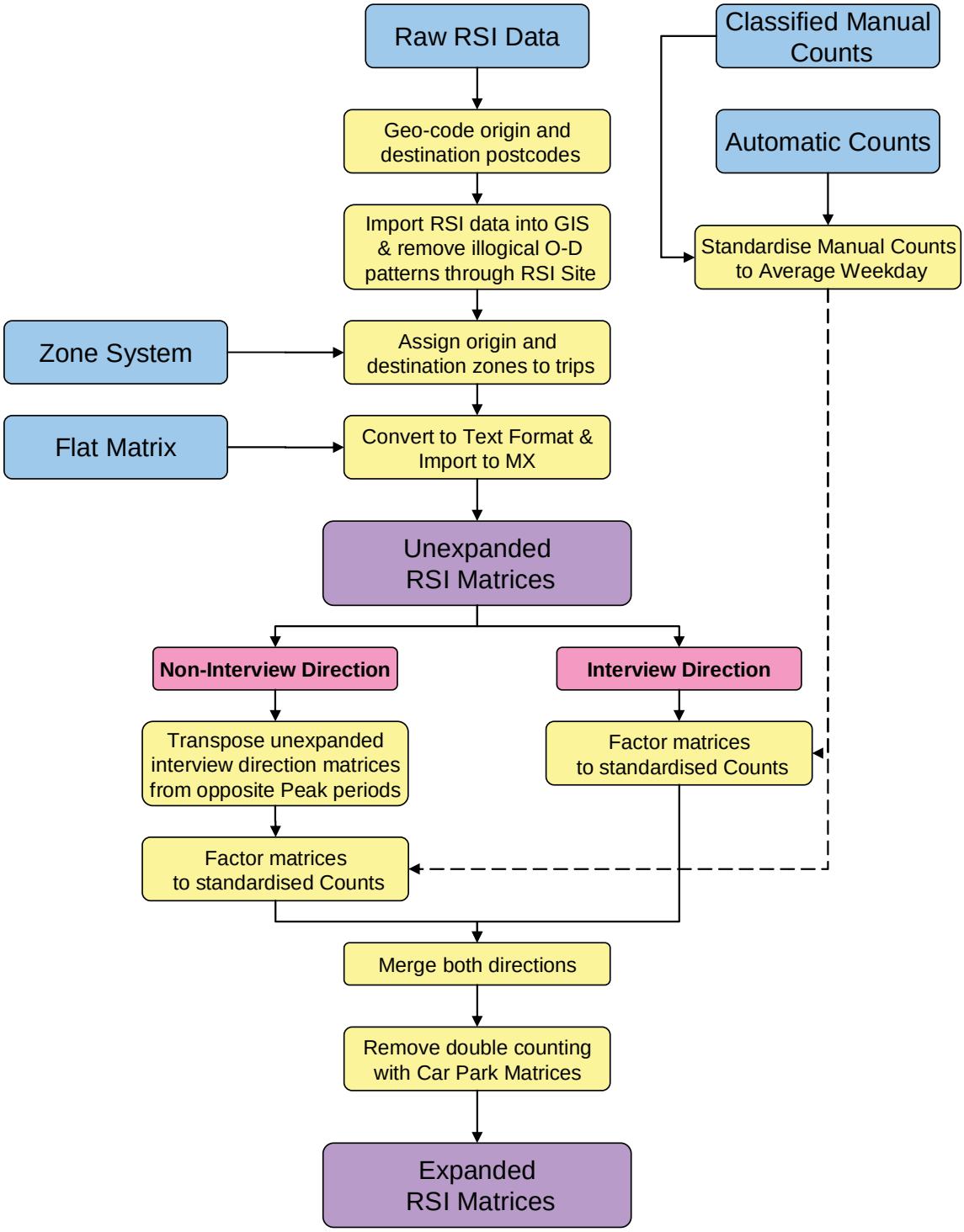
- Some locations in Table 3.1 and Table 3.2 show expansion factors less than one, indicating that less trips were counted entering or exiting the Car Park than are included in the longer interview sample period used. Hence the observed matrices were reduced to match the counts.

RSI Matrices

3.20 As reviewed in the Survey Completion and Survey Analysis Reports, and in the previous chapter of this report, eleven RSI surveys were undertaken in and around Stafford. The process of creating the RSI Site Matrices for the six user classes for the AM and PM Peak periods is presented in Figure 3.8 and summarised as follows:

- The Raw RSI data was 'geo-coded' to give coordinates for the Origin and Destination (O-D) postcodes, and imported into MapInfo for processing;
- The data was 'cleaned' by interrogating trips for logic between their specified Origin, RSI Site, and Destination locations, and any illogical trips were removed from the observed data. This is a very time consuming process, but is extremely important to ensure that the RSI matrices contain as few errors as possible as these are multiplied when expanding the sample to observed counts;
- Each RSI trip was assigned Stafford Model zones for the Origin and Destination corresponding to the post code coordinates, and this information was exported back to the RSI database;
- The RSI trips were imported into MX (the matrix manipulation suite in SATURN) along with a 'Flat' matrix (zeros in all cells), to produce Unexpanded RSI Matrices;
- In the Interview direction, the observed matrices were expanded to standardised counts. These comprised classified manual counts collected on the day of the interview surveys, standardised against two week automatic counts at the same locations;
- In the Non-Interview direction, O-D patterns were used from the transpose of the Interview direction in the opposite time period. For example, the AM Peak Non-Interview patterns are the transpose of the PM Peak Interview direction matrices. These were then expanded to the standardised counts in the Non-Interview direction;
- The expanded matrices from both directions were then merged to create Expanded Matrices for each RSI site and User Class; and
- There is inherently double counting between the RSI and Car Park surveys for User Classes 1 to 3, as drivers can be interviewed at both locations. These trips were identified in the RSI matrices, and then removed to ensure that in the combined observed matrices (RSI + Car Park) double counting was minimised. This resulted in the final Expanded Matrices for each RSI site and User Class.

Figure 3.8 - Development of Stafford RSI Matrices for all User Classes



3.21 The expansion factors used to factor the observed trips to the counts (before removal of the double counted trips) are shown in the following tables for the AM and PM Peaks respectively:

- User Classes 1 to 3 (Cars): Table 3.3 and Table 3.4;
- User Class 4 (LGVs): Table 3.5 and Table 3.6; and
- User Class 5 to 6 (HGVs): Table 3.7 and Table 3.8.

3.22 The locations of the RSI Sites are shown in Figure 2.1 and detailed in Table 2.1.

3.23 The following points should be noted about the development of the RSI Matrices for the three user classes:

- As mentioned previously for the Car Park surveys, longer RSI sample periods were used to give a broader sample of the types of journeys being made in and around the Peak Periods;
- For User Classes 1 to 3 (Cars), an interview sample of 07:30 to 09:30 was used for the AM Peak, and 16:30 to 18:30 for the PM Peak, being a two hour period for each Peak;
- For Site 11, Interview direction in the PM Peak, only 14 interviews were recorded, generating an expansion factor of 14.6. This was not considered acceptable, and therefore a generic expansion factor of 5.0 was used (indicated using a '*'). Matrix estimation has been used on trips through this site during the calibration process to achieve any further expansion, rather than unreasonably expanding the observed trips;
- For User Classes 4 to 6 (LGVs and HGVs), an interview sample of 07:00 to 10:00 was used for the AM Peak, and 15:30 to 18:30 for the PM Peak, being a three hour period for each Peak. This was extended to three hours from the two hours used for User Classes 1 to 3 to further assist the sample rates, and obtain a better distribution;
- After reviewing the sample rates for HGVs (User Classes 5 to 6) as presented in the Survey Analysis Report, the distributions for the LGVs (User Class 4) were used to bolster the distributions. This was considered reasonable, as the LGVs trip patterns are the most similar to the HGVs. The original sample sizes for the HGVs are included in parentheses for the Interview direction only in Table 3.7 and Table 3.8; and
- As shown in the Car Park expansion factors, some RSI locations show expansion factors less than one, indicating that less trips were counted passing through the interview site than are included in the longer interview sample period used. Hence the observed matrices were reduced to match the counts.

3.24 The Cars, LGV and HGV RSI Matrices were then summed to create RSI Site Matrices for the eleven sites.

Table 3.3 – RSI Expansion Factors User Classes 1-3: AM Peak 2007

RSI Site	Interview Direction			Non-Interview Direction		
	Counts (0800-0900)	Interviews (0730-0930)	Expansion Factors	Counts (0800-0900)	Interviews (0730-0930)	Expansion Factors
Site 1	714	185	3.9	817	274	3.0
Site 2	704	306	2.3	401	219	1.8
Site 3	707	381	1.9	602	329	1.8
Site 4	290	164	1.8	330	114	2.9
Site 5	735	141	5.2	354	82	4.3
Site 6	405	240	1.7	193	163	1.2
Site 7	725	239	3.0	402	125	3.2
Site 8	980	106	9.2	538	91	5.9
Site 9	257	258	1.0	117	69	1.7
Site 10	443	258	1.7	303	87	3.5
Site 11	700	202	3.5	158	14	5.0 *

Table 3.4 - RSI Expansion Factors User Classes 1-3: PM Peak 2007

RSI Site	Interview Direction			Non-Interview Direction		
	Counts (0800-0900)	Interviews (0730-0930)	Expansion Factors	Counts (0800-0900)	Interviews (0730-0930)	Expansion Factors
Site 1	861	274	3.1	604	185	3.3
Site 2	488	219	2.2	729	306	2.4
Site 3	614	329	1.9	507	381	1.3
Site 4	369	114	3.2	332	164	2.0
Site 5	569	82	6.9	903	141	6.4
Site 6	185	163	1.1	497	240	2.1
Site 7	487	125	3.896	645	239	2.7
Site 8	541	91	5.9	825	106	7.8
Site 9	106	69	1.5	289	258	1.1
Site 10	357	87	4.1	456	258	1.8
Site 11	204	14	5.0 *	570	202	2.8

Table 3.5 - RSI Expansion Factors User Class 4: AM Peak 2007

RSI Site	Interview Direction			Non-Interview Direction		
	Counts (0800-0900)	Interviews (0730-0930)	Expansion Factors	Counts (0800-0900)	Interviews (0730-0930)	Expansion Factors
Site 1	60	40	1.5	50	27	1.9
Site 2	99	54	1.8	43	30	1.4
Site 3	40	27	1.5	44	36	1.2
Site 4	17	8	2.1	31	5	6.2
Site 5	56	4	14.0	45	4	11.3

RSI Site	Interview Direction			Non-Interview Direction		
	Counts (0800-0900)	Interviews (0730-0930)	Expansion Factors	Counts (0800-0900)	Interviews (0730-0930)	Expansion Factors
Site 6	28	26	1.1	27	34	0.8
Site 7	49	14	3.5	59	7	8.4
Site 8	145	6	24.2	95	7	13.6
Site 9	14	9	1.6	14	8	1.8
Site 10	48	39	1.2	31	11	2.8
Site 11	32	7	4.6	18	2	9.0

Table 3.6 - RSI Expansion Factors User Class 4: PM Peak 2007

RSI Site	Interview Direction			Non-Interview Direction		
	Counts (0800-0900)	Interviews (0730-0930)	Expansion Factors	Counts (0800-0900)	Interviews (0730-0930)	Expansion Factors
Site 1	49	27	1.8	38	40	1.0
Site 2	40	30	1.3	60	54	1.1
Site 3	21	36	0.6	17	27	0.6
Site 4	19	5	3.8	14	8	1.8
Site 5	62	4	15.5	51	4	12.8
Site 6	14	34	0.4	22	26	0.8
Site 7	42	7	6.0	38	14	2.7
Site 8	74	7	10.6	96	6	16.0
Site 9	4	8	0.5	25	9	2.8
Site 10	23	11	2.1	30	39	0.8
Site 11	11	2	5.5	24	7	3.4

Table 3.7 - RSI Expansion Factors User Classes 5-6: AM Peak 2007

RSI Site	Interview Direction			Non-Interview Direction		
	Counts (0800-0900)	Interviews (0730-0930)	Expansion Factors	Counts (0800-0900)	Interviews (0730-0930)	Expansion Factors
Site 1	66	53 (13)	1.2	87	30	2.9
Site 2	51	60 (6)	0.9	43	30	1.4
Site 3	40	29 (2)	1.4	70	37	1.9
Site 4	20	9 (1)	2.2	27	5	5.4
Site 5	28	5 (1)	5.6	58	5	11.6
Site 6	44	37 (11)	1.2	16	34	0.5
Site 7	35	16 (2)	2.2	32	7	4.8
Site 8	143	6 (0)	23.8	128	9	14.2
Site 9	8	10 (1)	0.8	7	9	0.8
Site 10	14	44 (5)	0.3	27	11	2.5
Site 11	15	7 (0)	2.1	12	2	6.0

Table 3.8 - RSI Expansion Factors User Classes 5-6: PM Peak 2007

RSI Site	Interview Direction			Non-Interview Direction		
	Counts (0800-0900)	Interviews (0730-0930)	Expansion Factors	Counts (0800-0900)	Interviews (0730-0930)	Expansion Factors
Site 1	56	30 (3)	1.9	36	53	0.7
Site 2	20	30 (0)	0.7	25	60	0.4
Site 3	13	37 (1)	0.4	8	29	0.3
Site 4	10	5 (0)	2.0	18	9	2.0
Site 5	35	5 (1)	7.0	37	5	7.4
Site 6	4	34 (0)	0.1	10	37	0.3
Site 7	25	7 (0)	3.6	18	16	1.1
Site 8	67	9 (2)	7.4	81	6	13.5
Site 9	8	9 (1)	0.9	4	10	0.4
Site 10	20	11 (0)	1.8	18	44	0.4
Site 11	9	2 (0)	4.5	4	7	0.6

Preparation of Pre-Merge Matrices

3.25 The 'Pre-Merge' Matrices for the Stafford Transport Model refer to the base matrices assigned to the model, prior to the replacement of trips with observed O-D movements as will be explained in the next section. These matrices represent an initial 'best estimate' of existing movements based on available data, and will be subject to change during the calibration process.

3.26 Two techniques were used for the development of Pre-Merge Matrices, Journey to Work for Cars, and a combination of Road Side Interview information for LGVs and HGVs. These two methodologies will be explained in this section.

Journey to Work Matrices

3.27 Journey to Work (JTW) Census data from the 2001 Census was interrogated to provide information on traffic movements between all Stafford Model Zones (aside from the 15 Car Park Zones). This produced a matrix of all journey to work trips for a typical workday for a 24 hour period. This matrix was then factored to 2007 using NRTF (1997). Finally, trips between external zones that would not logically travel through the Stafford Study Area were removed, to produce the Journey to Work Matrix.

3.28 The Cars (User Classes 1 to 3) JTW Matrix for the AM Peak was developed by taking 35.4% of the JTW Matrix, added to 1.9% of the transpose of the JTW Matrix. These proportions were extracted from the RSI Survey data which showed that 35.4% of all 'Home to Work' trip purposes (out of the 12 hour survey period) were observed in the AM Peak hour, and 1.9% in the PM Peak. It is acknowledged that this makes the assumption that no journeys to work occur outside the 12 hour survey period, however this assumption is considered a reasonable estimate for the starting point of this matrix. Conversely the PM Peak Cars JTW Matrix was 35.4% of the transpose of the Journey to Work Matrix, added to 1.9% of Journey to Work Matrix.

Road Side Interview Matrices

3.29 The JTW approach is only applicable to Car Drivers, and therefore a different technique was required for LGVs and HGVs, as movements from these two user classes are predominantly commercial and these trips (generally) have different Origins and Destinations than Cars.

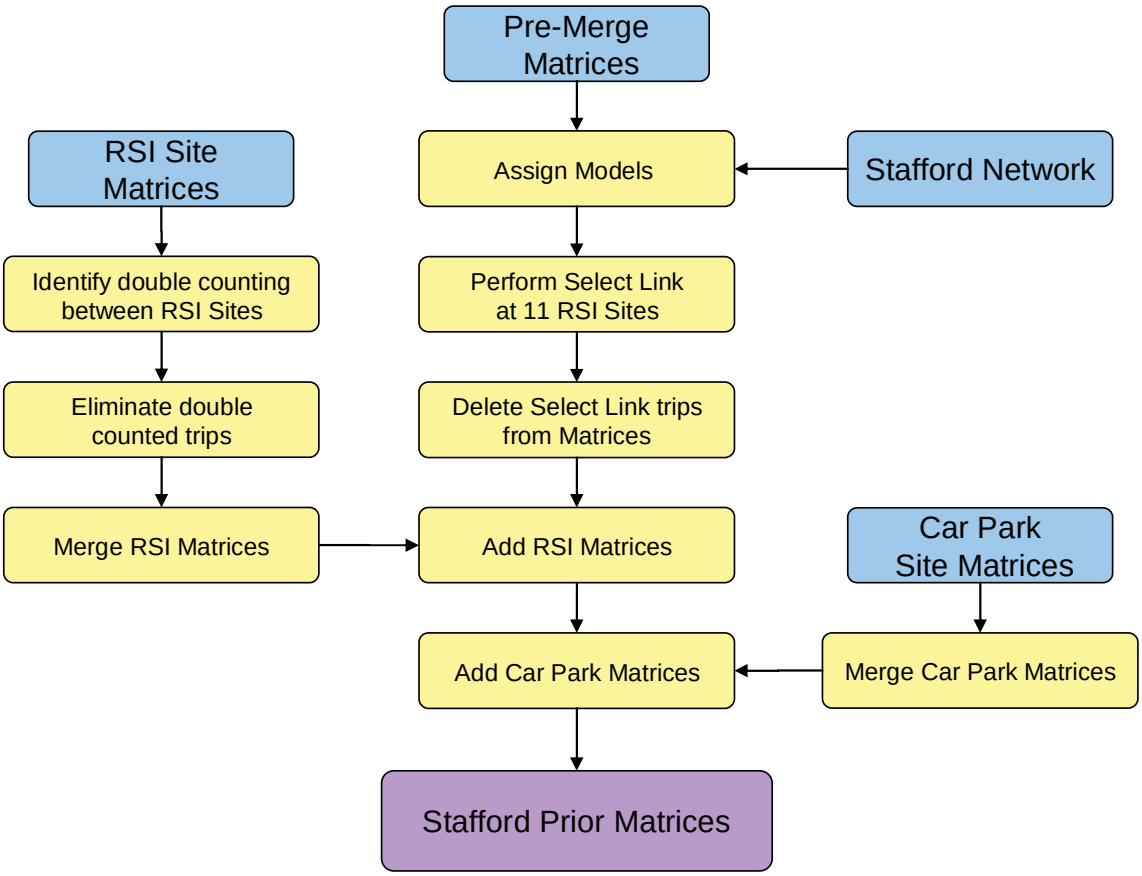
3.30 The Pre-Merge Matrices for User Classes 4 to 6 (LGVs and HGVs) were developed using all of the available twelve hour information from the eleven Road Side Interviews. The sample rates for HGVs were low, and therefore the matrices for both user classes were added together, and applied as a base for both LGVs and HGVs. A global factor was applied to each matrix to approximate the correct volume of traffic against the count data. It was also necessary to use count information to manually 'seed in' longer distance through trips (i.e. the M6 North to South etc) as the RSI information does not include these.

3.31 The output matrices from this process are the Pre-Merge Matrices for User Class 4 (LGVs) and User Classes 5 to 6 (HGVs).

Matrix Merging

3.32 This section details the merging of the RSI Site, Car Park and Pre-Merge Matrices into the 2007 AM and PM Peak Prior Matrices. The process of merging the matrices is described in Figure 3.9.

Figure 3.9 - Stafford Matrix Merge Process



3.33 The process described in Figure 3.9 is summarised as follows:

- The Pre-Merge Matrices were assigned to the Stafford Network;
- Select Link Matrices were produced for each RSI Site location, and then deleted from the Pre-Merge Matrices;
- Double counting between RSI sites was minimised by identifying those O-D movements also observed at other RSIs, and overwriting those movements where necessary. The RSI Site Matrices were then merged together; and

- The RSI and Car Park Matrices were added to the modified Pre-Merge Matrices to produce the Prior Matrices.

Demand Segmentation

3.34 The prior matrices have been split into six user classes using the following methodology.

3.35 For User Classes 1 to 3 (Cars):

- The Car Park matrices have been split between journey purposes based on observed splits at each car park site. The user class splits for each site are shown in Table 3.9.
- The RSI site matrices have been split between journey purposes based on observed splits at each RSI site. The user class splits for each site are shown in Table 3.10.
- The other trips within the matrices have been split bases on national average journey purpose splits, shown in Table 3.11.

3.36 For User Classes 5 to 6 (HGVs)

- The HGV matrices have been split between OGV1 and OGV2 based on observed traffic counts, shown in Table 3.12.

Table 3.9 - Car Park User Classes Split

Car Park Site	AM Peak			PM Peak		
	Business	Commuting	Other	Business	Commuting	Other
1	10%	20%	70%	6%	33%	61%
2	0%	100%	0%	6%	49%	45%
3	15%	38%	46%	6%	75%	20%
4	8%	80%	13%	16%	73%	11%
5	3%	90%	6%	2%	88%	10%
6-10	8%	73%	19%	6%	72%	22%
11	7%	65%	28%	6%	74%	21%
12	7%	11%	83%	6%	15%	80%
13	7%	73%	20%	5%	74%	21%
14	7%	76%	17%	6%	0%	95%
15	7%	33%	61%	6%	35%	59%
16	7%	24%	70%	9%	36%	55%
17	3%	87%	10%	5%	81%	13%
18	7%	50%	43%	6%	45%	50%
19	8%	22%	69%	6%	38%	56%

Table 3.10 – RSI User Classes Split

RSI Site	AM Peak			PM Peak		
	Business	Commuting	Other	Business	Commuting	Other
1	7%	71%	22%	16%	66%	18%
2	6%	72%	23%	11%	49%	40%
3	13%	55%	32%	11%	45%	43%
4	5%	68%	27%	7%	67%	26%
5	7%	81%	12%	15%	68%	17%
6	5%	61%	34%	4%	43%	53%
7	6%	77%	17%	6%	71%	23%
8	9%	87%	5%	6%	84%	10%
9	4%	70%	26%	3%	49%	49%
10	5%	75%	20%	5%	76%	20%
11	4%	77%	19%	0%	57%	43%

Table 3.11 – National Average Journey Purpose Split

AM Peak			PM Peak		
Business	Commuting	Other	Business	Commuting	Other
6.8%	40.6%	52.7%	5.5%	32.3%	62.2%

Table 3.12 – HGV Split

	AM Peak	PM Peak
OGV1	67%	54%
OGV2	33%	46%

Assignment Parameters

3.37 The cost of travel is expressed in terms of generalised cost which combines separate components such as journey, vehicle operating costs and tolls. Each component has a separate value that is used to convert units into monetary terms. SATURN employs two values, ‘pence per minute’ (PPM) and ‘pence per kilometre’ (PPK).

3.38 Values of PPK and PPM have been calculated following advice in WebTAG, separately for each of the six user classes. Table 3.13 shows these values for each time-period modelled.

Table 3.13 - Generalised Cost Parameters Used in the 2007 Model

User Class		AM Peak		PM Peak	
		PPM	PPK	PPM	PPK
Light	Car - Business	52.55	9.17	50.84	9.10
	Car - Commuting	10.61	5.97	10.36	5.89
	Car – Other	12.89	5.97	13.52	5.89
	Light Goods Vehicles	18.92	13.05	18.92	13.30
Heavy	Other Goods Vehicles 1	19.53	29.13	19.53	29.13
	Other Goods Vehicles 2	22.87	40.54	22.87	40.38

4. Model Calibration

Overview

4.1 The calibration of the highway model has been undertaken using a standard approach where the network and matrices are adjusted to ensure that the model gives plausible and expected routeing and speeds.

4.2 The process incorporated matrix estimation to aid in the development of trip matrices, which contain travel patterns that reflect the observed traffic counts. The results of the matrix estimation process have been closely monitored to ensure both stability and realistic trip matrices. The match between observed and modelled traffic flows has been closely monitored to improve model routing and travel patterns.

Calibration Process

4.3 The calibration procedure involved the following activities.

- Adjustment and checking of the network to ensure plausible and realistic routing of traffic;
- Checks to ensure that link speeds on the network were realistic, and speed flow calculations were operating as expected;
- Checks to ensure that delay calculations at junctions were realistic; and
- Use of matrix estimation to adjust the prior trip matrices to match observed traffic flows from link and turning counts.

4.4 The outcomes from these processes are set out below, examining the extent of calibration of the network, matrix and assignment.

Network Calibration

4.5 Highway network calibration was undertaken in order to achieve observed traffic characteristics in terms of speeds, throughputs and delays by investigating pinch points and problem areas highlighted by the initial model assignments.

4.6 The process involved checking and adjusting of the highway network principally along the major corridors. Checks were undertaken to ensure that link lengths and turn capacities and saturation flows were correct, using saturation flows which fall within the acceptable range of flows used in other SATURN models.

4.7 The allocation of centroid connectors for internal zones was examined to verify that trips were loading onto the network at locations that are both sensible and realistic.

4.8 Once highway network calibration had been satisfactorily completed, matrix estimation was applied to the prior matrix to calibrate the matrices against observed directional link counts and turning counts at key intersections across screenlines, making use of appropriate traffic counts.

Matrix Calibration

4.9 Matrix calibration involved checking the validity of the trip data used to produce the matrices and focused principally on ensuring that traffic was correctly assigning itself to the network.

4.10 The SATURN modules SATME2 and SATPIJA are used to make minor controlled adjustments to the trip matrices in recognition that only a proportion of each movement will have been interviewed and that some elements of the matrices would have been over estimated as a result and some underestimated. That adjustment process is known as matrix estimation and in combination attempts to match assigned link flows in the model with observed traffic counts.

Matrix Estimation

4.11 The matrix estimation process is an integral part of the model calibration. It is undertaken within SATURN using the SATME2 element of the program suite. The basic function of matrix estimation is to produce an updated matrix using traffic counts. Trips are adjusted in the matrix to produce an estimated matrix that is consistent with the traffic counts. The equation used may be written as:

$$T_{ij} = tij \prod_a X_a^{Pija}$$

where:

T_{ij}	is the output matrix of OD pairs ij;
tij	is the prior matrix of OD pairs ij;
$\prod_a$	product over all counted links a;
X_a	is the balancing factor associated with counted link;
Pija	is the fraction of trips from I to j using link a.

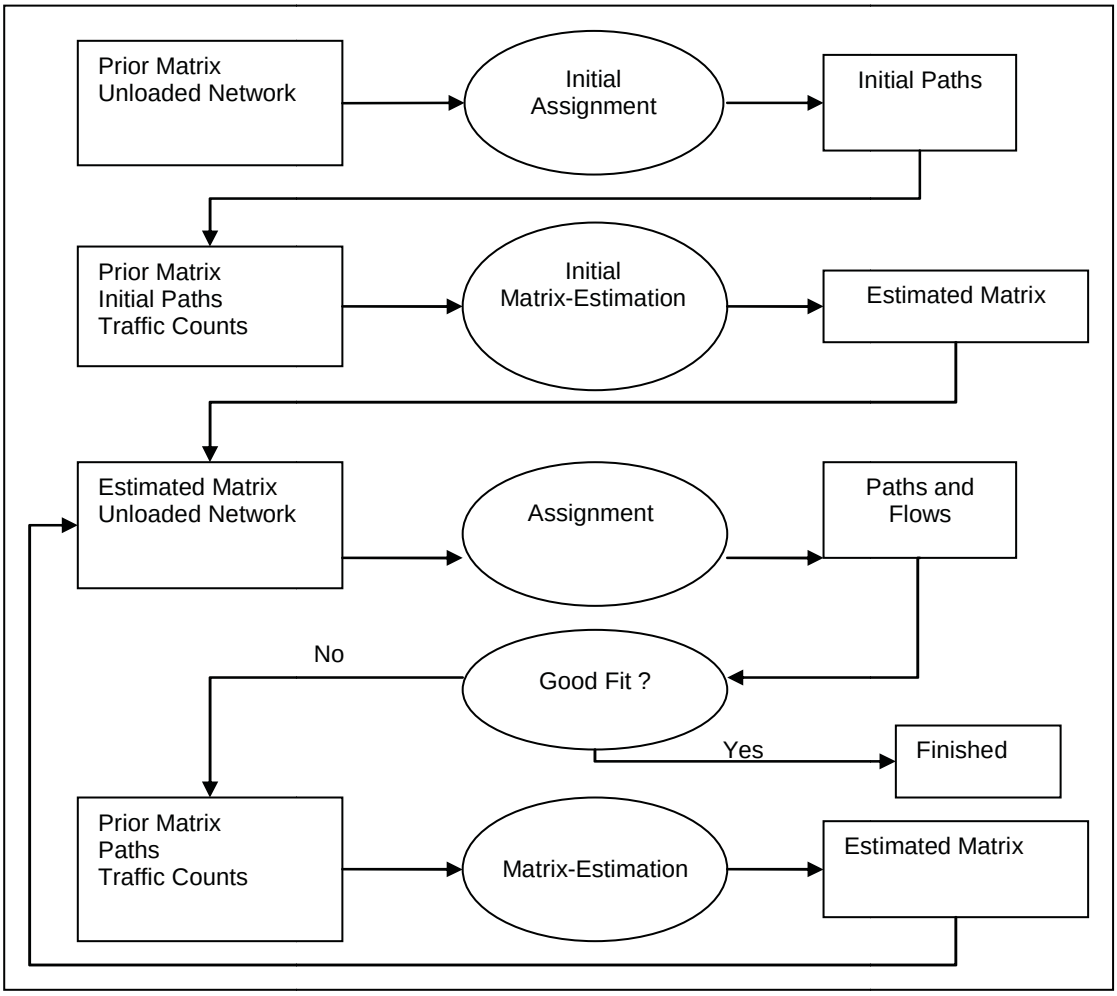
4.12 This process is dependent on several factors including the quality of the prior matrix, traffic routeing, and the order and consistency of the observed traffic counts. It is, therefore, essential that the process be monitored closely to ensure the following.

- The trip matrix is converging to a stable solution; and
- Travel patterns at a sector level are reasonable.

4.13 The matrix estimation from maximum entropy (ME2) process provides a method by which an initial estimate of the trip matrix can be adjusted in order to reflect observed traffic count data. This process is accomplished within SATURN through use of the SATPIJA program, which creates a file in which each element represents the proportion (P) of the trips between a particular origin-destination pair (IJ) which uses the counted link (A). The SATME2 program which then uses the PIJA file to adjust the prior matrix to create the most likely trip matrix consistent with the information contained in the count file. Finally the output matrix is assigned back to the model network, and is compared to the observed count and journey time data to gauge the degree to which these match. This process is looped for a limited number of iterations until satisfactory model calibration is achieved. Figure 4.1 shows the matrix estimation process as a flow chart.

4.14 All observed RSI and Car Park trips in the Prior Matrix were frozen during the ME2 process. This ensured that the interview O-D data observed as a part of this study was retained in full, and only those matrix trips not observed were eligible for manipulation by ME2. Freezing these matrix cells ensures that the integrity of the observed matrix was maintained throughout.

Figure 4.1 – Matrix Estimation Process



Results from the Matrix Estimation Process: Comparison of Prior & Post ME2 Matrices

4.15 The matrix estimation process was monitored to ensure the estimated matrix converged to a stable solution. The total trips produced at each stage of the matrix estimation procedure are shown in Tables 4.1 and 4.2 for the AM and PM Peak models respectively.

Table 4.1 - The Impact of Matrix Estimation on Matrix Totals (AM Peak)

	UC1	UC2	UC3	UC4	UC5	UC6	Total
Prior	1680	13015	9591	2183	3210	1590	31269
It 1	1790	13705	10438	2839	2760	1864	33396
	7%	5%	9%	30%	-14%	17%	7%
It 2	1796	13750	10484	2940	3836	1902	34708
	0.3%	0.3%	0.4%	3.6%	39.0%	2.0%	3.9%
It 3	1814	13854	10611	2915	3764	1866	34824
	1.0%	0.8%	1.2%	-0.9%	-1.9%	-1.9%	0.3%
Overall	8%	6%	11%	34%	17%	17%	11%

Table 4.2 - The Impact of Matrix Estimation on Matrix Totals (PM Peak)

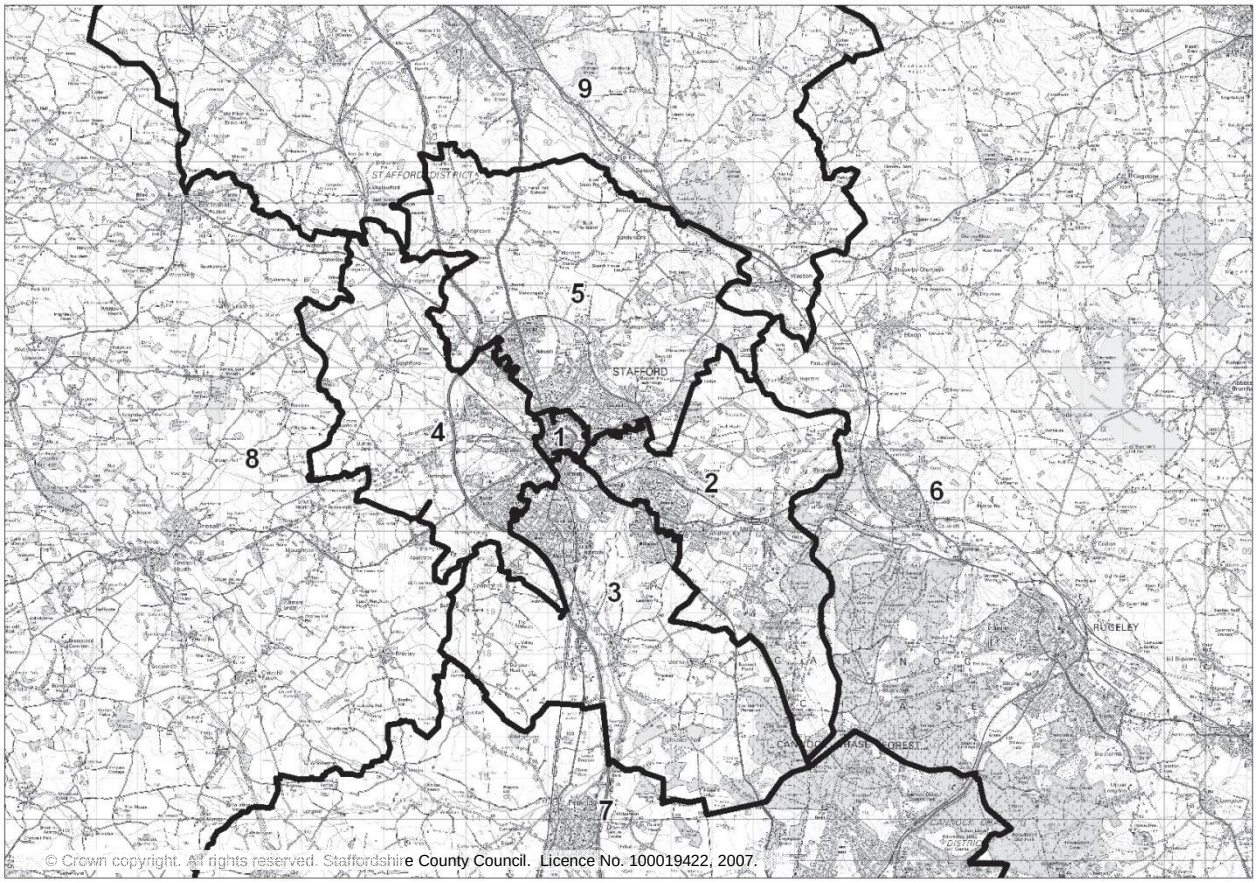
	UC1	UC2	UC3	UC4	UC5	UC6	Total
Prior	1902	12286	12953	1992	2067	1726	32926
It 1	1992	12779	13892	2795	2488	2077	36023
	5%	4%	7%	40%	20%	20%	9%
It 2	1996	12804	13939	2804	2541	2121	36205
	0.2%	0.2%	0.3%	0.3%	2.1%	2.1%	0.5%
It 3	2004	12836	14040	2790	2508	2094	36272
	0.4%	0.2%	0.7%	-0.5%	-1.3%	-1.3%	0.2%
It 4	2004	12855	14033	2827	2543	2124	36386
	0.0%	0.1%	0.0%	1.3%	1.4%	1.4%	0.3%
It 5	2014	12920	14143	2801	2512	2098	36488
	0.5%	0.5%	0.8%	-0.9%	-1.2%	-1.2%	0.3%
It 6	2016	12892	14165	2814	2543	2124	36554
	0.1%	-0.2%	0.2%	0.5%	1.2%	1.2%	0.2%
Overall	6%	5%	9%	41%	23%	23%	11%

4.16 The tables confirm that for both the AM and PM peak the matrix converged upon a solution rapidly.

Comparison of Prior and Post Matrix Estimation Sector Movements

4.17 The effects of matrix estimation on the prior trip matrices (compressed to 9 sectors) are shown for each time period in Tables 4.3 and 4.4. The sector diagram is shown in Figure 4.2.

Figure 4.2 – Sector Diagram



4.18 Tables 4.3 and 4.4 show that the matrix estimation process has increased the number of trips in the AM and PM peaks by 11%.

Table 4.3 - Comparison between Prior and Estimated Matrices – AM Peak

Origin	Sector		Destination									
			1	2	3	4	5	6	7	8	9	Total
1	Central Stafford	Prior	121	102	122	87	178	59	155	61	142	1027
		Post	126	90	93	94	215	56	153	61	142	1031
		Diff	5	-11	-29	7	37	-3	-2	0	0	4
		% Diff	4%	-11%	-24%	8%	21%	-5%	-1%	0%	0%	0%
2	East Stafford	Prior	355	165	183	85	335	172	268	57	203	1823
		Post	348	209	229	111	327	167	264	70	240	1964
		Diff	-7	44	46	25	-8	-5	-4	13	37	141
		% Diff	-2%	27%	25%	30%	-2%	-3%	-2%	23%	18%	8%
3	South Stafford	Prior	468	223	340	175	536	206	470	88	224	2730
		Post	342	261	285	236	305	255	443	87	235	2450
		Diff	-126	38	-55	61	-231	49	-27	-1	11	-280
		% Diff	-27%	17%	-16%	35%	-43%	24%	-6%	-1%	5%	-10%
4	West Stafford	Prior	341	106	204	139	378	132	216	105	248	1870
		Post	255	108	222	338	514	140	213	142	263	2193
		Diff	-87	2	18	199	135	8	-3	37	15	323
		% Diff	-25%	2%	9%	143%	36%	6%	-1%	35%	6%	17%

Origin	Sector		Destination									
			1	2	3	4	5	6	7	8	9	Total
5	North Stafford	Prior	420	231	284	207	701	288	309	209	522	3173
		Post	374	290	357	196	1428	361	405	251	568	4229
		Diff	-46	59	73	-11	728	72	96	41	45	1056
		% Diff	-11%	25%	26%	-6%	104%	25%	31%	20%	9%	33%
6	East Staffordshire	Prior	357	167	189	84	532	431	208	244	396	2607
		Post	357	170	176	81	830	584	161	255	590	3204
		Diff	0	3	-13	-3	298	153	-46	10	194	596
		% Diff	0%	2%	-7%	-3%	56%	36%	-22%	4%	49%	23%
7	South Staffordshire	Prior	513	121	311	144	546	387	410	113	3913	6457
		Post	498	195	291	141	754	253	383	126	4221	6862
		Diff	-15	75	-19	-3	208	-134	-27	13	308	404
		% Diff	-3%	62%	-6%	-2%	38%	-35%	-7%	11%	8%	6%
8	West Staffordshire	Prior	362	109	123	148	421	370	127	258	480	2397
		Post	362	114	123	157	505	434	134	280	540	2648
		Diff	0	6	0	9	84	64	7	23	60	251
		% Diff	0%	5%	0%	6%	20%	17%	5%	9%	12%	10%
9	North Staffordshire	Prior	597	157	211	196	703	284	3923	317	2796	9185
		Post	591	278	215	199	768	613	4163	575	2845	10246
		Diff	-6	121	4	3	65	329	239	258	49	1061
		% Diff	-1%	77%	2%	1%	9%	116%	6%	81%	2%	12%
Total		Prior	3535	1380	1967	1267	4329	2329	6085	1452	8924	31269
		Post	3252	1716	1991	1553	5646	2863	6318	1846	9642	34825
		Diff	-283	336	24	286	1316	533	232	393	718	3557
		% Diff	-8%	24%	1%	23%	30%	23%	4%	27%	8%	11%

Values are in pcus

Table 4.4 - Comparison between Prior and Estimated Matrices – PM Peak

Origin	Sector		Destination									
			1	2	3	4	5	6	7	8	9	Total
1	Central Stafford	Prior	202	368	530	429	565	402	381	371	602	3851
		Post	216	280	340	641	605	402	373	369	602	3828
		Diff	15	-88	-191	212	40	0	-8	-2	0	-23
		% Diff	7%	-24%	-36%	49%	7%	0%	-2%	-1%	0%	-1%
2	East Stafford	Prior	165	172	227	109	239	167	122	95	196	1492
		Post	235	196	418	49	193	160	167	98	157	1674
		Diff	70	24	191	-60	-46	-7	46	3	-39	182
		% Diff	42%	14%	84%	-55%	-19%	-4%	37%	3%	-20%	12%
3	South Stafford	Prior	223	186	328	202	248	193	340	125	195	2040
		Post	214	266	427	290	291	166	344	125	270	2392
		Diff	-9	80	99	88	43	-27	3	1	75	353
		% Diff	-4%	43%	30%	44%	17%	-14%	1%	1%	38%	17%
4	West Stafford	Prior	170	84	154	139	198	75	131	163	188	1302
		Post	239	84	177	301	318	73	122	140	162	1616
		Diff	69	-1	23	161	120	-2	-8	-22	-26	314
		% Diff	40%	-1%	15%	116%	61%	-3%	-6%	-14%	-14%	24%

Origin	Sector		Destination									
			1	2	3	4	5	6	7	8	9	Total
5	North Stafford	Prior	333	316	470	381	710	549	417	375	661	4213
		Post	463	319	347	311	1590	621	493	429	742	5313
		Diff	129	2	-123	-71	880	71	76	53	81	1100
		% Diff	39%	1%	-26%	-19%	124%	13%	18%	14%	12%	26%
6	East Staffordshire	Prior	121	197	220	150	334	434	384	396	423	2657
		Post	114	192	237	145	378	639	290	439	646	3079
		Diff	-7	-5	17	-5	44	206	-94	43	223	421
		% Diff	-6%	-2%	8%	-3%	13%	47%	-25%	11%	53%	16%
7	South Staffordshire	Prior	166	292	575	273	324	274	477	152	4009	6541
		Post	163	261	536	246	396	189	449	144	4107	6492
		Diff	-3	-31	-39	-26	71	-85	-28	-8	98	-49
		% Diff	-2%	-11%	-7%	-10%	22%	-31%	-6%	-5%	2%	-1%
8	West Staffordshire	Prior	76	49	66	94	185	244	91	276	330	1411
		Post	76	43	66	157	259	258	143	310	515	1826
		Diff	0	-7	0	63	74	13	52	34	184	415
		% Diff	0%	-14%	0%	67%	40%	6%	58%	12%	56%	29%
9	North Staffordshire	Prior	158	207	201	245	489	457	3897	526	3239	9418
		Post	187	415	195	241	481	537	4300	491	3489	10335
		Diff	29	208	-6	-4	-8	79	404	-35	250	917
		% Diff	18%	101%	-3%	-1%	-2%	17%	10%	-7%	8%	10%
Total		Prior	1614	1871	2771	2022	3292	2795	6239	2479	9843	32926
		Post	1907	2054	2742	2380	4510	3045	6681	2547	10689	36555
		Diff	293	183	-28	359	1218	250	442	67	846	3628
		% Diff	18%	10%	-1%	18%	37%	9%	7%	3%	9%	11%

Values are in pcus

4.19 It can be observed from Tables 4.3 and 4.4 that the main increase in trips occurs for trips to and from Sector 5 (North Stafford). The majority of this increase is internal unobserved trips within Sector 5.

Trip Length Distributions

4.20 An analysis of the trip-length distributions of the matrices split by light and heavy vehicles before and after matrix-estimation has been undertaken. The results of this are shown in Figures 4.3 to 4.6 for the AM and PM Peaks, respectively. Each figure shows the number of trips in each category: the number in the matrix before matrix estimation (prior) is represented by the blue column to the left; the number in the matrix after matrix estimation (post) is represented by the maroon column to the right.

4.21 To indicate a stable traffic model the trip-length distribution between the prior and post matrices should not change significantly. The analysis presented in Figures 4.3 to 4.6 shows that this is the case for the Stafford model.

Figure 4.3 - Trip Length Distribution – AM Peak – Light Vehicles

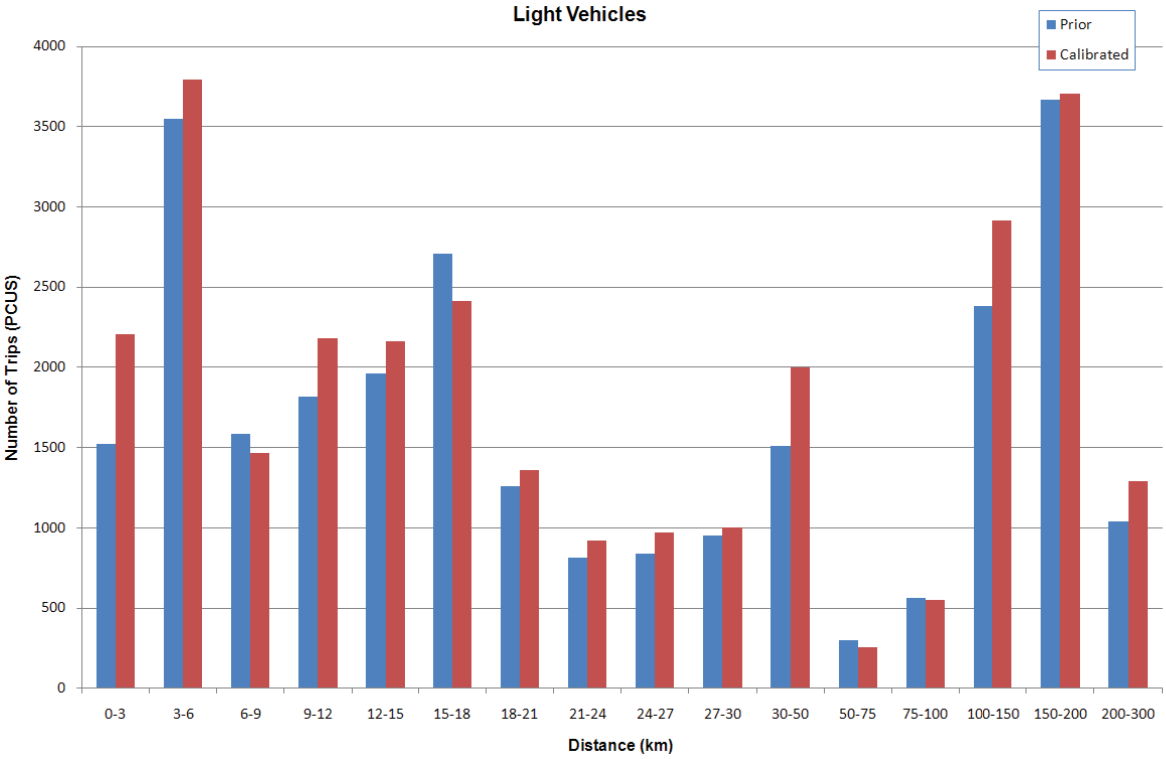


Figure 4.4 - Trip Length Distribution – AM Peak – Heavy Vehicles

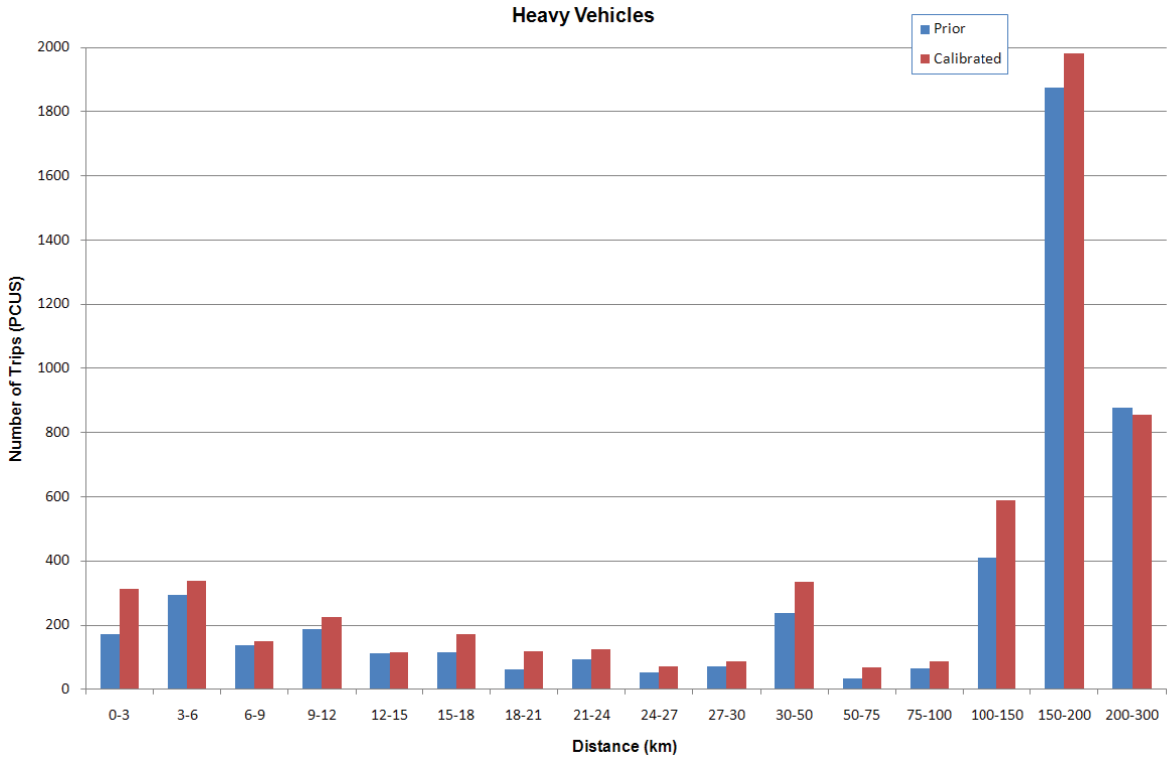


Figure 4.5 - Trip Length Distribution – PM Peak – Light Vehicles

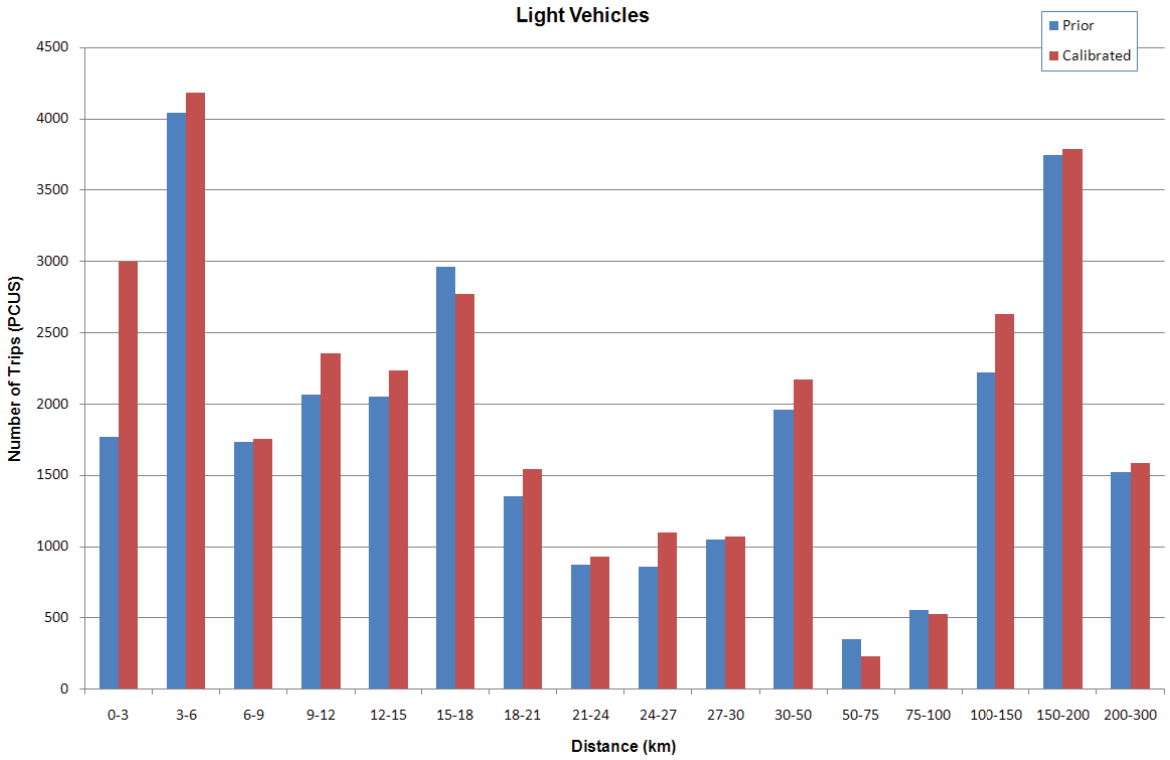
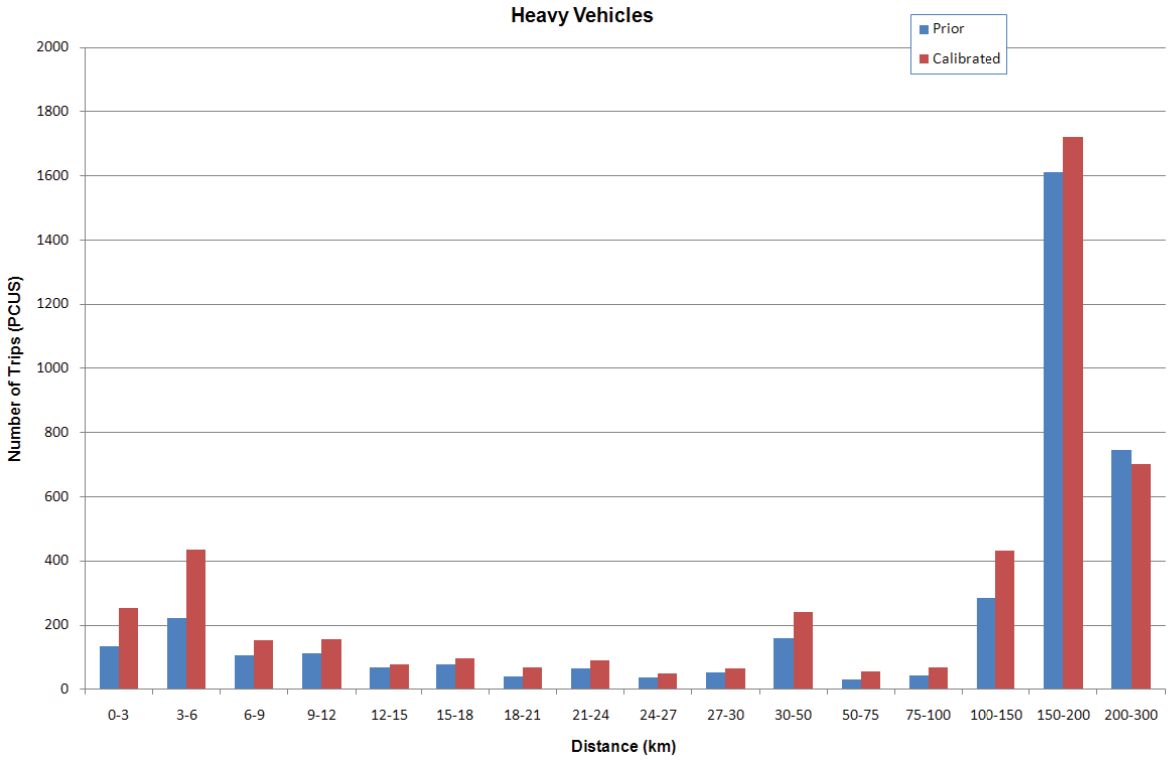


Figure 4.6 - Trip Length Distribution – PM Peak – Heavy Vehicles



Assignment Calibration

Assignment Convergence

4.22 Model assignment of trips to the highway network was undertaken using a standard approach based on a 'Wardrop User Equilibrium', which seeks to minimise travel costs for all vehicles in the network. The Wardrop User Equilibrium is based on the following proposition,

4.23 'Traffic arranges itself on congested networks such that the cost of travel on all routes used between each origin-destination pair is equal to the minimum cost of travel and unused routes have equal or greater costs.'

4.24 The Highway Agency's Traffic Appraisal in Urban Areas (DMRB Vol. 12a) advice recommends two criteria for Wardrop User Equilibrium assignment to ensure a satisfactory model convergence:

- Delta – should be less than 1%, or at least stable, with convergence fully documented and all other criteria met. Delta is the measure of convergence of the final assignment to ensure that the alternative routes used in the assignment process do not differ significantly from the final minimum cost. It is the difference between costs on the various multiple assigned routes and those along the final minimum cost routes, as a percentage of minimum cost routes.
- Flow change (P) – should be less than 5% for four consecutive iterations for 90% of links. P is the measure of convergence of assignment-simulation loops. It is the percentage of links where assigned flows change by less than 5% between successive assignment-simulation loops.

4.25 The terminating criteria for the assignment-simulation iterative procedure used in the model resulted in flow changes of less than 5% on 99% of all model links, which ensured that the above criteria would definitely be met by the model. The convergence for each model period is summarised in Table 4.5. This shows that the model for each time period converged satisfactorily within the DMRB guidelines.

Table 4.5 - Convergence of the 2007 Model

Time Period	Assignment / Simulation Iteration	Delta (%)	Percentage Flow within 5% of previous
AM Peak	13	0.014	99.58
	12		99.29
	11		98.91
	10		98.73
PM Peak	13	0.011	100.00
	12		99.98
	11		99.84
	10		99.09

4.26 The modelled routing of traffic throughout the network has been assessed utilising the 'Forest Trees' option within SATURN, which provides the proportional split of vehicles routing between an origin and destination zone.

4.27 A check on the validity of route choices in the model was undertaken by examining key modelled routes to and within Stafford. This enables the assessment of the accuracy of observed and

predicted routes in the model. Diagrammatic representations of six routing trees are provided for the 2007 AM Peak in Figures 4.7 to Figure 4.12.

4.28 Figures 4.7 to 4.12 shows that 'sensible' route choice decisions are being made in the Stafford Transport Model, with the majority of vehicles using the quicker, better-quality routes. However, where congestion is more significant, some multi-routing is shown, particularly in and around Stafford Town Centre. Note that the green and red stars represent origin and destination respectively.

4.29 The various diagrams, presented below, show that multi-routing is occurring in the network and therefore reflect the rat-running in the Stafford area.

Figure 4.7 - Route Choice between Stoke-on-Trent and Stafford Town Centre

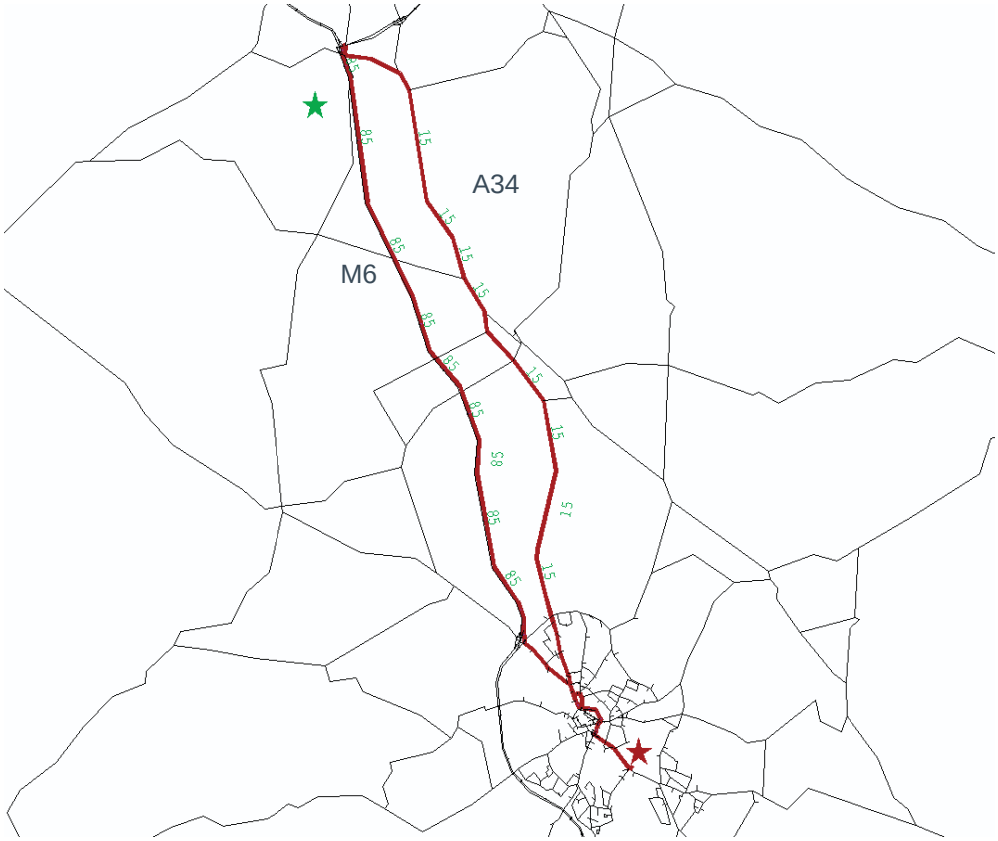


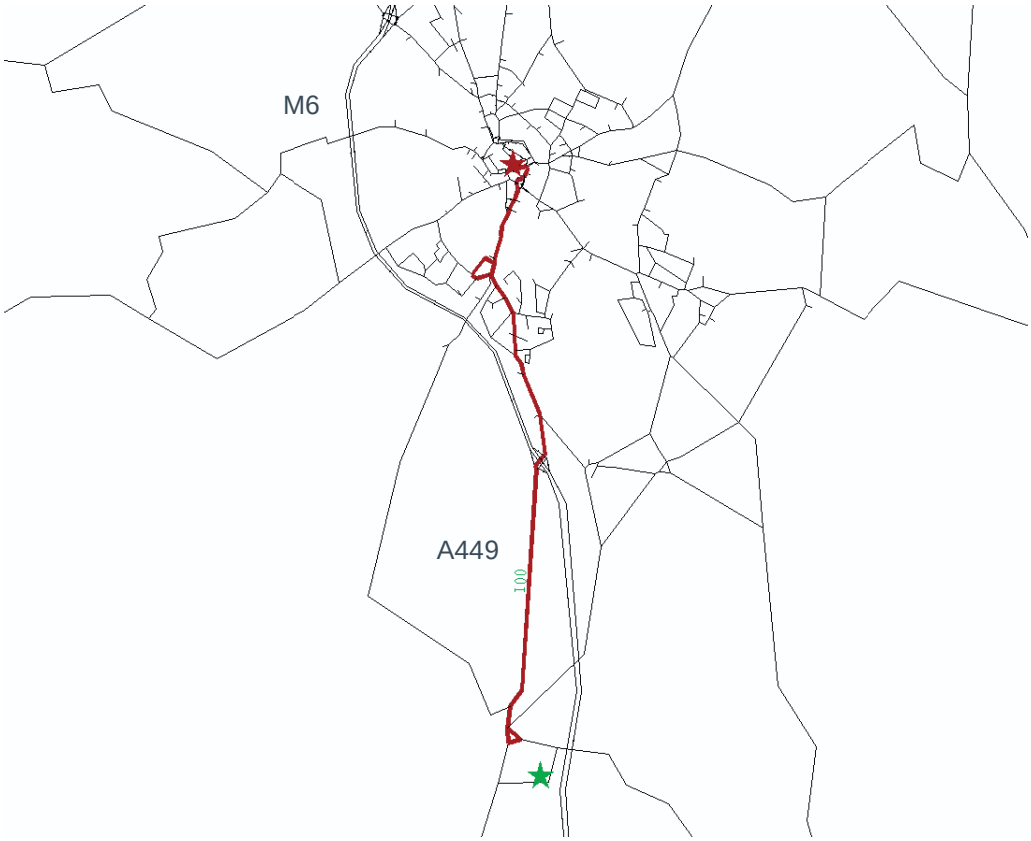
Figure 4.8 – Route Choice between Parkside Avenue and Town Centre

Figure 4.9 – Route Choice between Rugeley and Aston-by-Doxey

Figure 4.10 – Route Choice between Uttoxeter and Stafford Town Centre

Figure 4.11 – Route Choice between Silkmore Lane and Doxey

Figure 4.12 – Route Choice between Penkridge and Stafford Town Centre



Link Flow Calibration

Calibration Guidelines

Flow & GEH Guidelines

4.30 The assignment acceptability guidelines set out in Design Manual for Roads and Bridges (DMRB) are shown in Table 4.6. The flow criteria are less stringent at low traffic flows as compared to GEH criteria, but are more stringent at higher traffic flows.

Table 4.6 - DMRB Assignment Acceptability Guidelines

Criteria and Measure		Acceptability Guideline	
1	Observed flow < 700 vph	Modelled flow within ±100 vph	> 85 % of links
	Observed flow 700 - 2,700 vph	Modelled flow within ±15%	
	Observed flow > 2,700 vph	Modelled flow within ±400 vph	
2	Total screenline flows (normally >5 links) to be within ±5%		All (or nearly all) screenlines
3	GEH Statistic for individual links < 5		> 85 % of links
4	GEH Statistic for screenline totals < 4		All (or nearly all) screenlines

Note : 1. Criteria relate to comparison of assigned model hourly flows with observed flows
2. All comparisons should be based on directional hourly flows.

GEH Statistic

4.31 The GEH statistic is based on a comparison of observed and modelled flows and is used as an indicator of 'goodness of fit'. The form of the GEH statistic is as follows:

$$GEH = \sqrt{\frac{(M - C)^2}{(M + C)/2}}$$

where M = modelled flow;

C = observed flow (or count)

4.32 A GEH value can be calculated for individual links or groups of links. Multiple links can be combined either as screenlines or across networks.

R-Squared

4.33 The R-Squared statistic is a correlation coefficient between two data sets and is obtained by undertaking a statistical regression of the two data sets. 'Goodness of fit' is measured as a value between 0 and 1, with zero indicating no correlation and 1 indicating a perfect fit. R-squared values of 0.95 or greater are generally accepted as being good fits. The statistical regression can also be used to estimate the extent of over or under-modelling via analysis of the gradient of the fitted straight line. A value of 1 equates to no over or under-modelling. Gradient values between 0.9 and 1.1 are generally acceptable.

4.34 Following the update of both the network and matrices and their subsequent assignment, checks have been undertaken to ensure that the Stafford base year 2007 model is fit for purpose.

Calibration Results

Link Flow Calibration

4.35 Figures 4.13 and 4.14 show the location of calibration link count data in the wider and Town Centre areas respectively. A summary of the flow calibration carried out is given in Table 4.7 which confirms that in both the AM and PM peak, the modelled flows calibrate well against the observed data.

Figure 4.13 - Stafford Calibration Link Count Data Wider Area

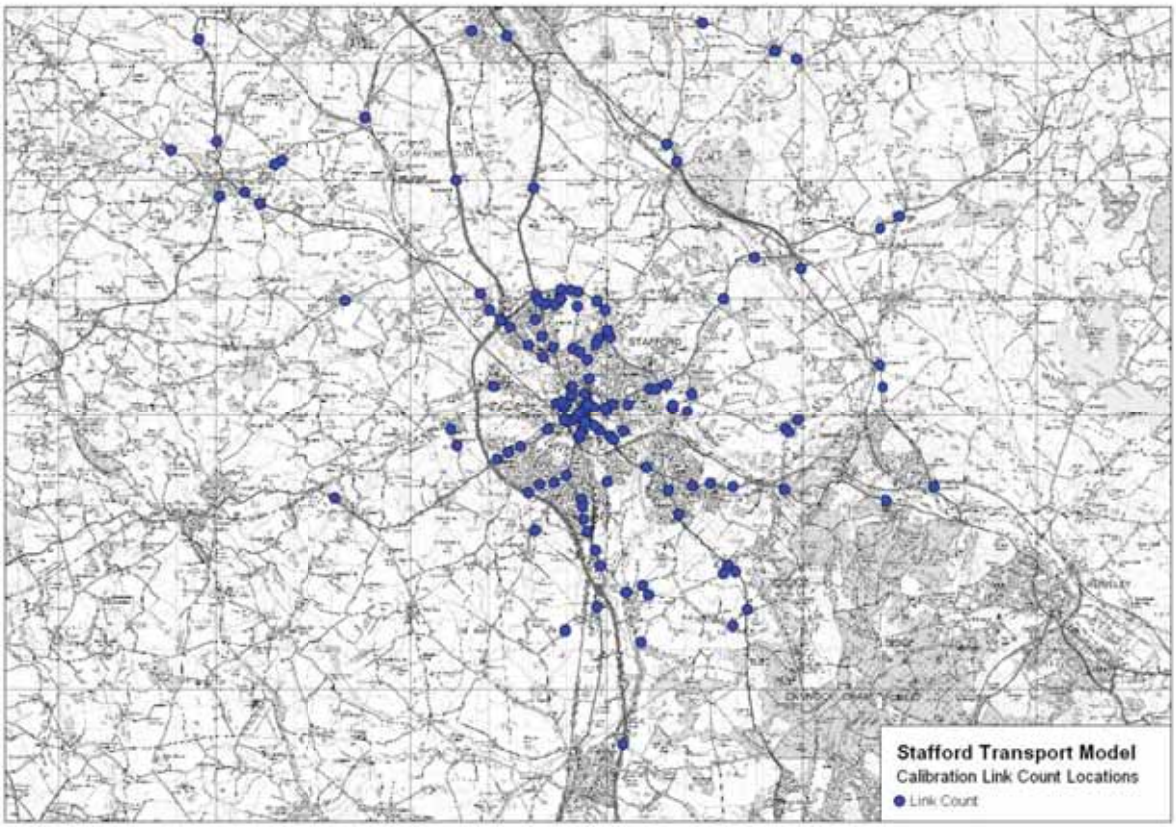


Figure 4.14 - Stafford Calibration Link Count Data Town Centre

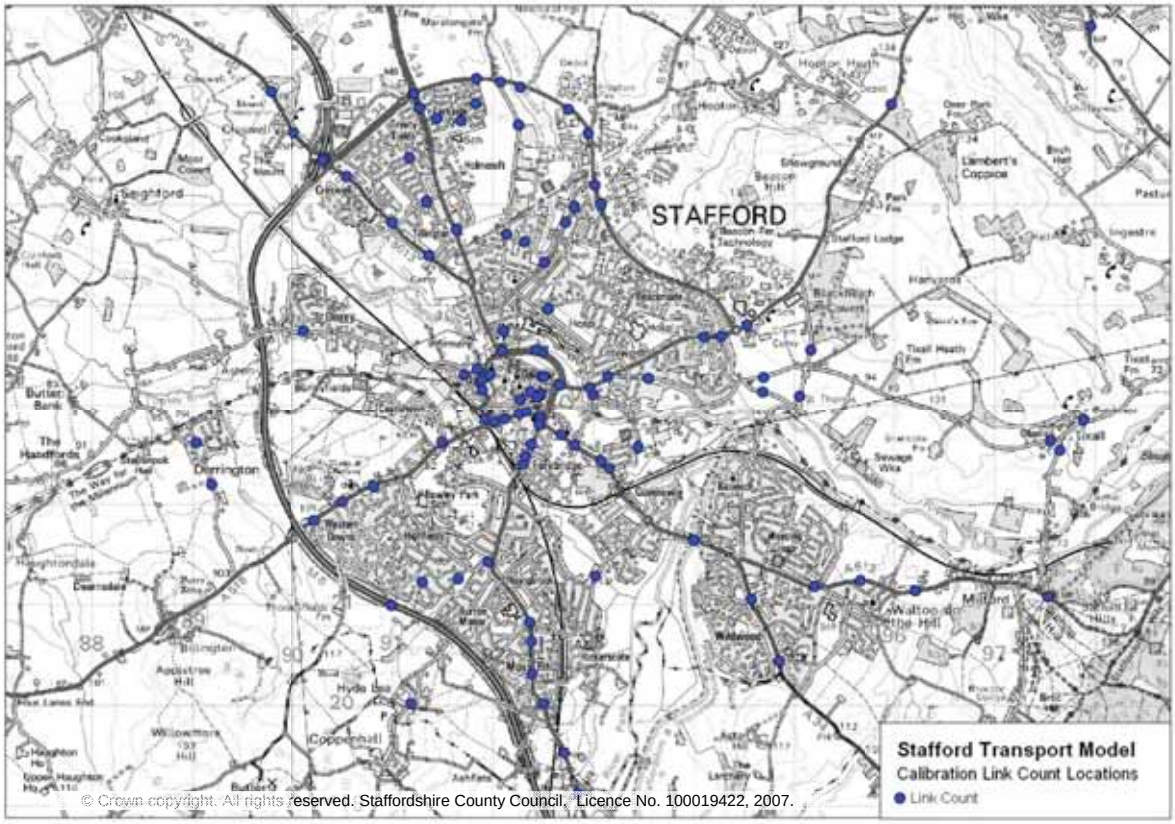


Table 4.7 – Summary of Link Flow Calibration

	AM Peak	PM Peak
Minimum DMRB Criteria	85%	85%
% links meeting Flow Criterion	85%	86%
% links meeting GEH Criterion	86%	85%

4.36 The link flow calibration shows a good correlation between the observed and modelled data with the Stafford Transport Model exceeding the 85% criteria in both time periods. The full link flow calibration tables for the AM and PM Peak periods are provided in Appendix A. There was one count (PC90) that was only undertaken in the AM Peak, and therefore PM Peak results have not been presented.

4.37 The link flow calibration for HGVs has also been determined to ensure that these have been modelled correctly, as presented in Table 4.8. It can be observed that there is very good correlation between the observed and modelled HGV flows.

Table 4.8 - Summary of HGV Link Flow Calibration

	AM Peak	PM Peak
% links meeting Flow Criterion	100%	99%

Screenline Calibration

4.38 Ten highway screenlines were considered as part of the Highway model calibration – these are shown in red in Figures 4.15 and 4.16.

4.39 The identities of each of the screenlines are as follows:

- Screenline 1: North Town Centre;
- Screenline 2: South Town Centre;
- Screenline 3: East Town Centre;
- Screenline 4: West Town Centre;
- Screenline 5: Inner North;
- Screenline 6: Inner South;
- Screenline 7: Inner East;
- Screenline 8: Inner West;
- Screenline 9: Wider North; and
- Screenline 10: Wider South.

Figure 4.15 - Stafford Highway Screenlines

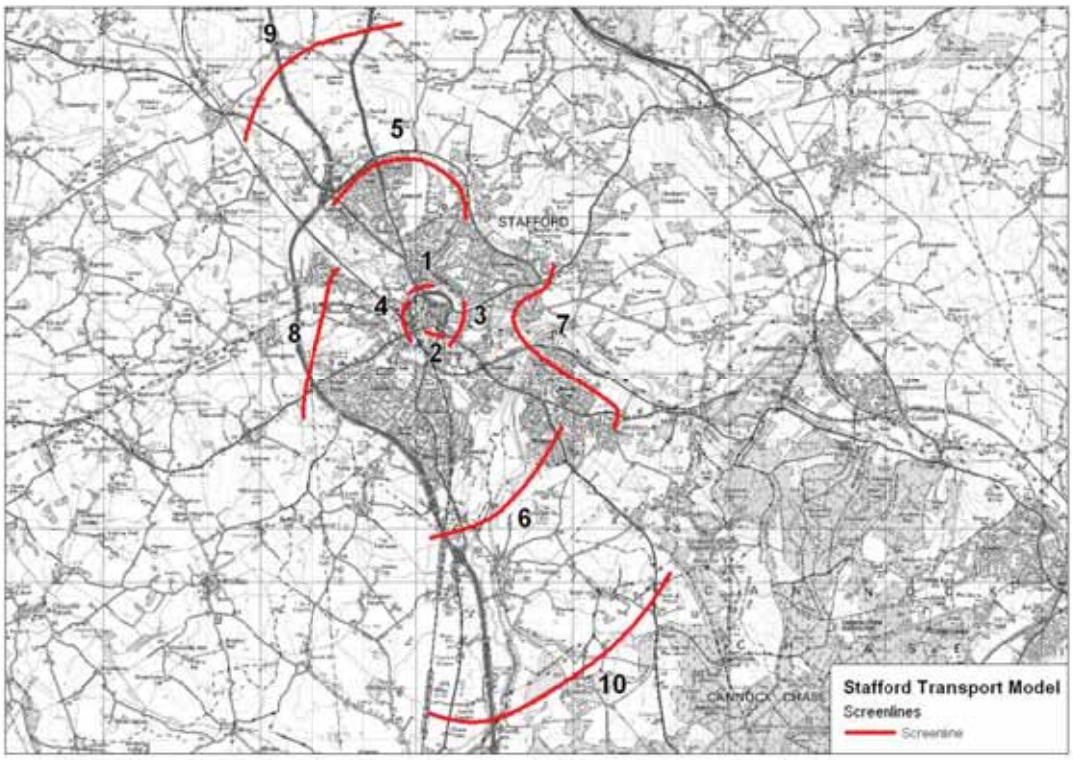
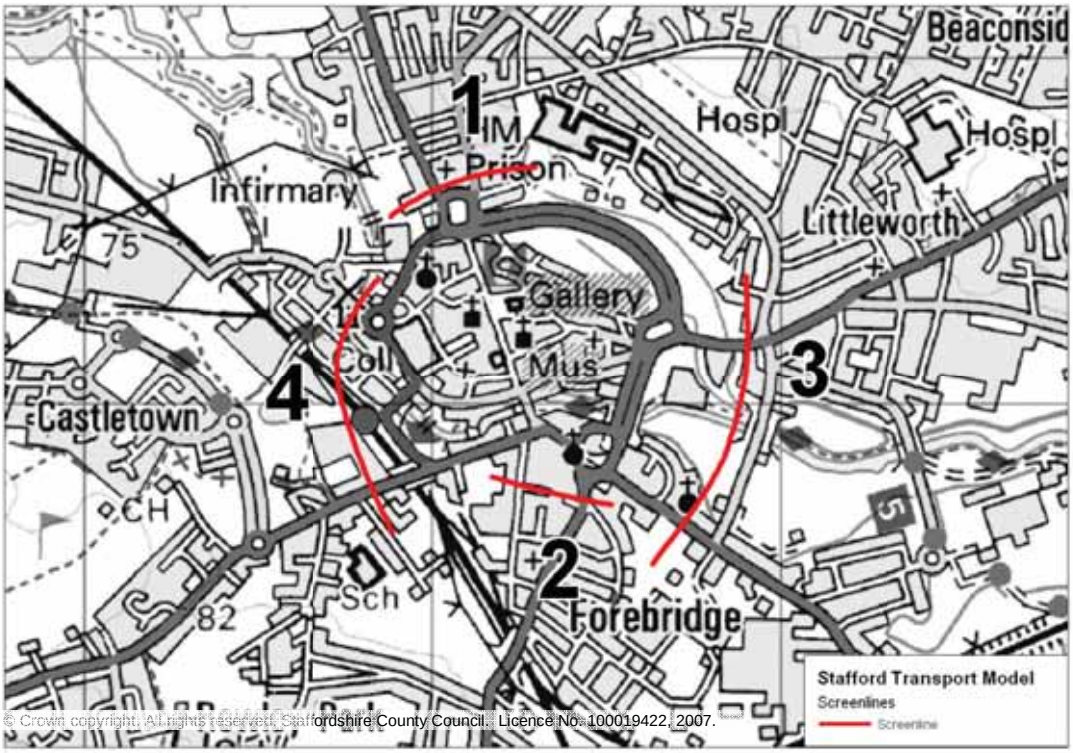


Figure 4.16 – Stafford Highway Screenlines, Town Centres



4.40 Tables 4.9 and 4.10 show the comparisons between modelled and observed flows at these screenlines in the AM and PM Peak periods respectively.

4.41 It can be observed that there is good correlations between the observed and modelled screenline flows in all peak periods. All but three of the screenlines (85%) in each of the Peak periods show GEH of less than 4 as detailed in DRMB criteria.

Table 4.9 - AM Peak Highway Screenline Calibration

Screenline	Observed Flow In	Modelled Flow In	GEH	Observed Flow Out	Modelled Flow Out	GEH
1	2167	2159	0	1340	1424	2
2	1627	1792	4	1670	1588	2
3	1893	2219	7	1032	1232	6
4	757	765	0	373	429	3
5	2041	2086	1	1541	1497	1
6	922	975	2	731	741	0
7	1753	1825	2	1490	1598	3
8	1705	1735	1	1106	1121	0
9	6584	6792	3	6019	6038	0
10	6205	6562	4	5873	5994	2

Table 4.10 - PM Peak Highway Screenline Calibration

Screenline	Observed Flow In	Modelled Flow In	GEH	Observed Flow Out	Modelled Flow Out	GEH
1	1502	1635	3	2019	1972	1
2	1614	1573	1	1211	1402	5
3	1288	1325	1	1953	1984	1
4	321	448	6	847	815	1
5	1660	1765	3	2147	2200	1
6	794	783	0	1013	1063	2
7	1675	1630	1	1717	2037	7
8	1412	1282	4	1830	1786	1
9	6086	6262	2	6291	6477	2
10	5922	6018	1	6354	6180	2

4.42 Table 4.11 contains a summary of the screenline calibration and shows that 85% of screenlines have a GEH of less than 4 in both peak periods. These results show that the model fulfils the GEH criteria, giving confidence that both the local and strategic routes travelling on the major arterials through Stafford and its environs are well represented in the SATURN model.

Table 4.11 – Screenline Flow Calibration Summary

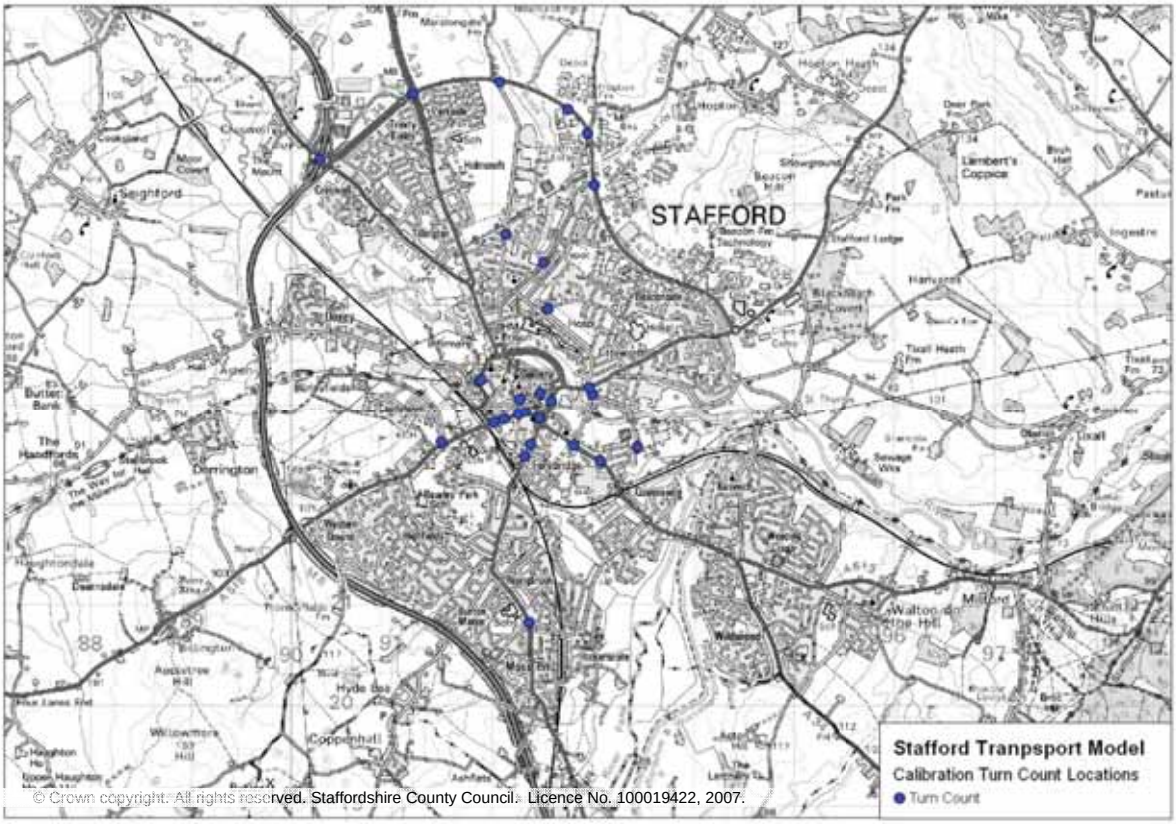
Area	AM Peak	PM Peak
Minimum DMRB Criteria	85%	85%
Study Area	85%	85%

4.43 The individual screenline link calibration statistics are provided in Appendix B.

Turn Flow Calibration

4.44 Figure 4.17 shows the location of available calibration turn count data in Stafford.

Figure 4.17 - Stafford Calibration Turn Count Data



4.45 The DRMB suggests that turn flow calibration is only undertaken at 'key' junctions which exert influence over the model. However, given the limited number of turn counts, all available turn count data was utilised. Table 4.12 summarises the turn flow calibration of in terms of the number of counts satisfying the flow criteria.

Table 4.12 – Turn Flow Calibration Summary

Area	AM Peak	PM Peak
Study Area	82%	83%

4.46 It can be observed from Table 4.12 that a good level of turn flow calibration is achieved.

R Squared Statistic

4.47 Figures 4.18 and 4.19 show plots of the observed versus modelled calibration link-flows for the AM and PM peak hours. The linear regression trend line is also shown on each Figure. The associated R-squared value is above 0.97 in each time-period indicating a very good fit between modelled and observed flows.

4.48 The R squared results are summarised in Table 4.13.

Table 4.13 – R Squared Statistic Summary

Area	AM Peak	PM Peak
Study Area	0.981	0.976

Figure 4.18 – Observed versus Modelled Calibration Flows: 2007 AM Peak

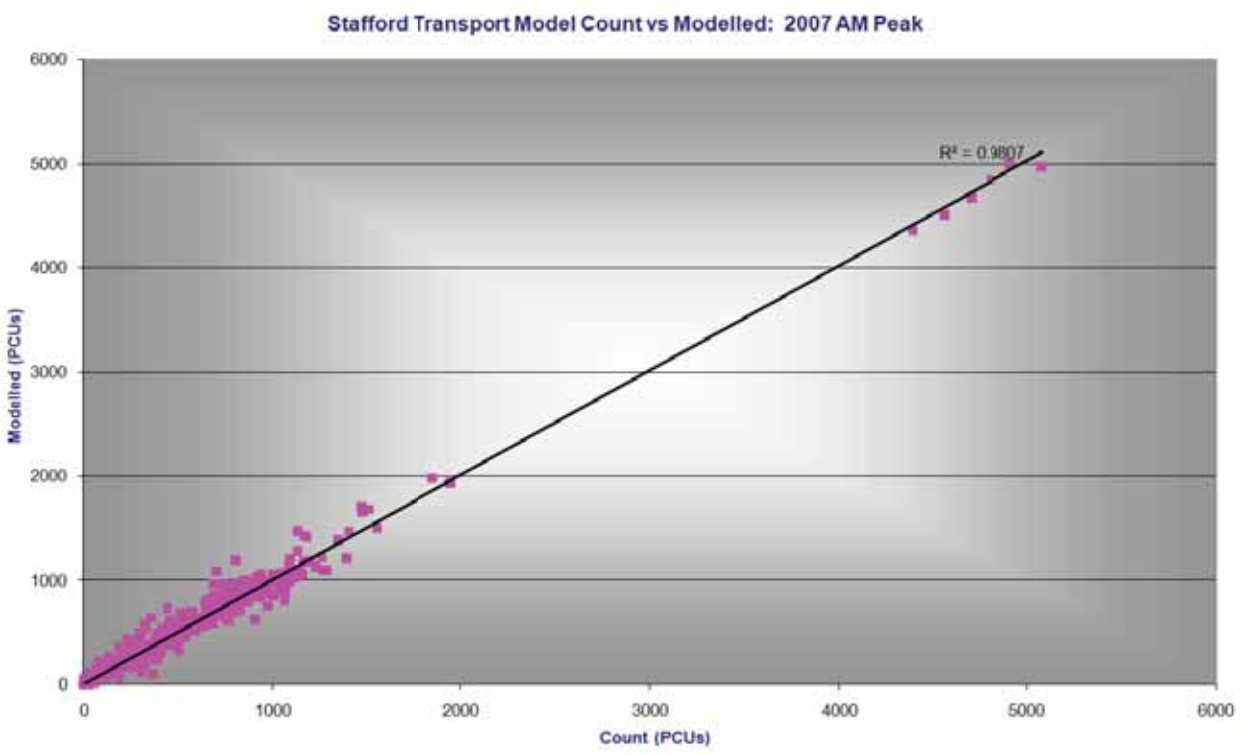
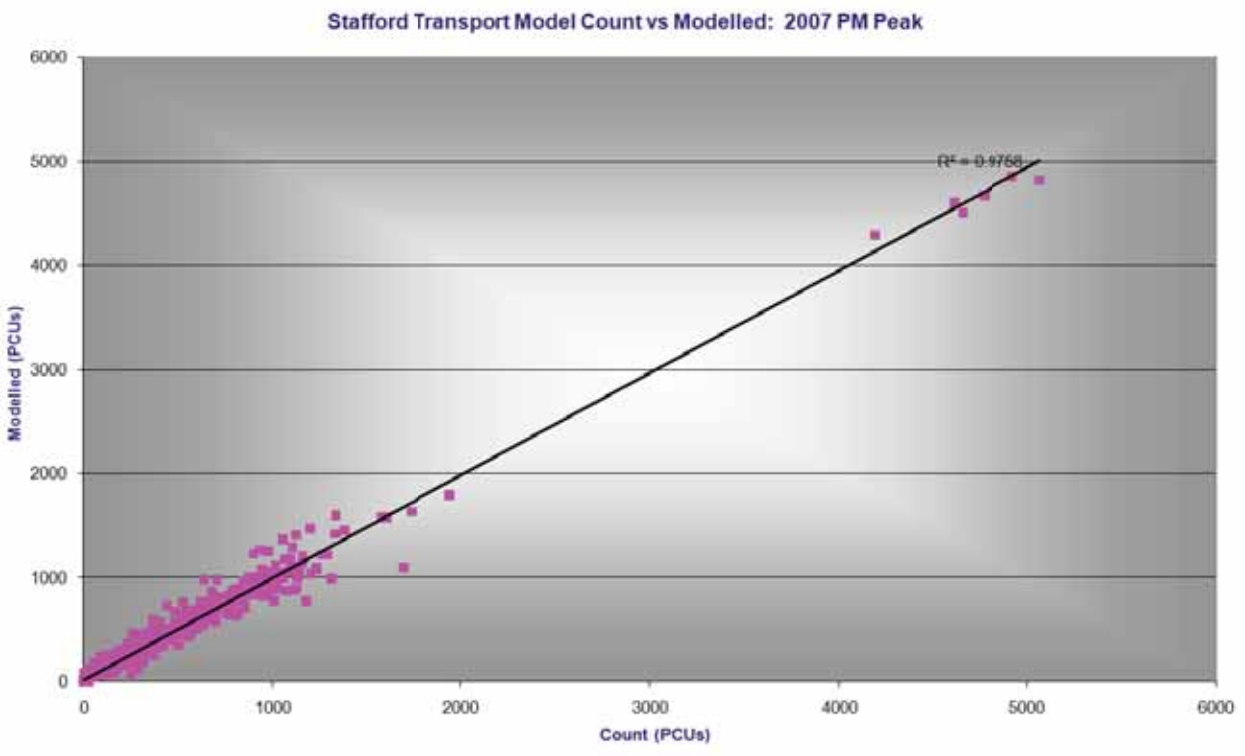


Figure 4.19 - Observed versus Modelled Calibration Flows: 2007 PM Peak



5. Model Validation

Model Validation Process

5.1 The validation of a model is undertaken to demonstrate that the model reproduces the existing travel patterns within the study area in a robust manner. As such, analysis of the model assignments is required to summarise the accuracy of the base model and establish that it is suitable as a basis from which to prepare forecasts.

5.2 Validation of the model considers the following aspects:

- Network validation, such as range checks and logical routing; this is undertaken to establish that the network structure is suitable and characteristics of the network are realistically represented in the model;
- Matrix validation; this is undertaken to check that the key routing patterns in the study area are accurately represented in the model;
- Assignment validation / traffic flow validation (link based validation). This is undertaken to establish that the traffic flow volumes on a selection of key roads across the study area are accurately represented and overall travel patterns are consistent with expectations;
- Journey time validation. This is undertaken to ensure that travel times are accurately represented and delays (congestion) are represented at appropriate junctions.

Independent Link Flow Validation

5.3 The majority of the available link count data (204 out of 289 counts) were used for the development and calibration of the model and demand matrices to ensure that it was as robust as possible. However, the remaining 85 counts were kept aside for independent validation purposes. Figure 5.1 shows the location of validation link count data in Stafford.

5.4 Table 5.1 summarises the link flow validation of this data in terms of the number of counts satisfying the flow and GEH criteria (DMRB Vol12a).

Table 5.1 - Link Flow Validation Summary

Area	AM Peak	PM Peak
Minimum DMRB criteria	85%	85%
% links meeting Flow Criterion	84%	83%
% links meeting GEH Criterion	86%	85%

5.5 The link flow validation shows a good correlation between the observed and modelled data with the Stafford Transport Model exceeding the 85% criteria in both time periods for the GEH Criterion. Although the model is slightly outside the required criteria for the Flow Criterion, the model validates well in the area of interest around the proposed scheme. It should be noted that if the flow criteria for low flows was increased from ‘within 100’ to ‘within 110’ the 85% validation would be achieved.

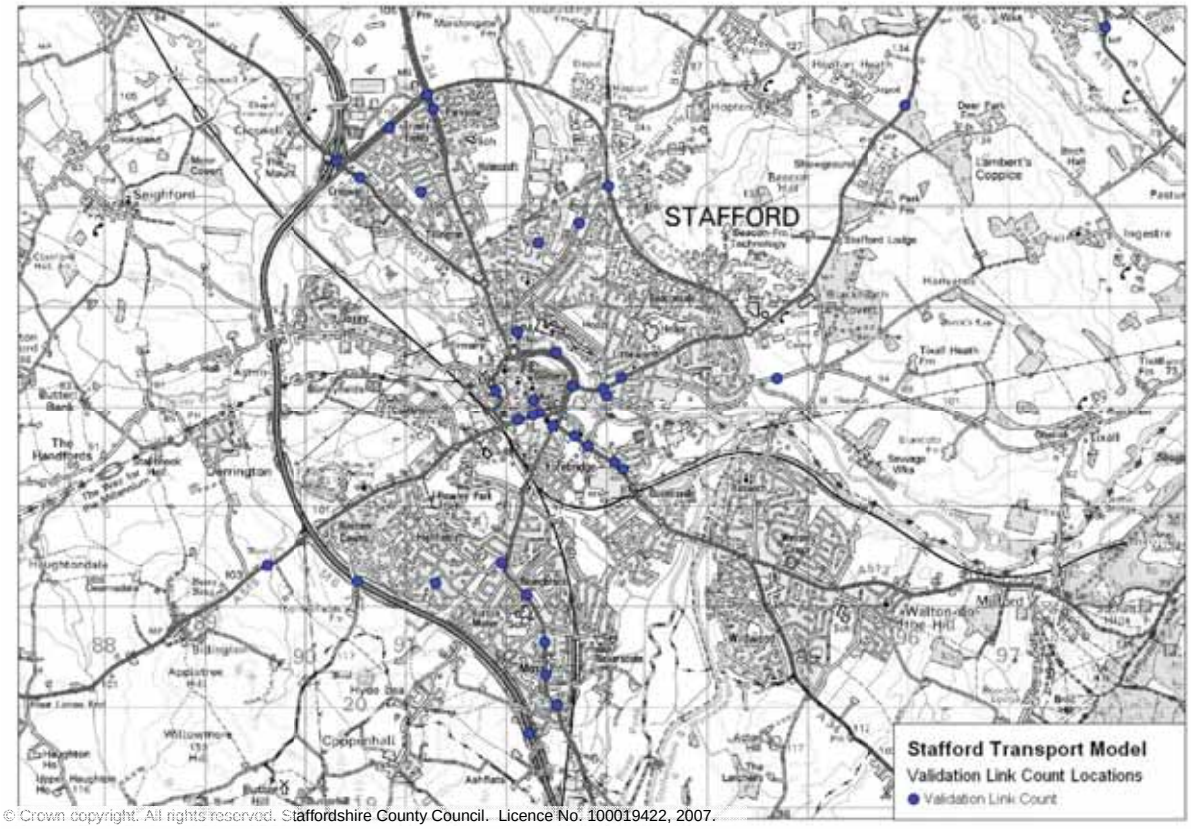
5.6 The full link flow validation tables for the AM and PM Peak periods are provided in Appendix C.

5.7 The link flow validation for HGVs has also been determined to ensure that these have been modelled correctly, as presented in Table 5.2. It can be observed that there is very good correlation between the observed and modelled HGV flows.

Table 5.2 – HGV Link Flow Validation Summary

Area	AM Peak	PM Peak
% links meeting Flow Criterion	95%	95%

Figure 5.1 – Stafford Validation Link Count Data



Roadside Interview Matrix Calibration

5.8 In addition to the comparison of the whole prior and estimated matrices, comparisons of observed and modelled trip matrices at the eleven Roadside Interview (RSI) survey locations were also carried out on a sector basis. This was to indicate that the pattern and volume of trips through the RSI site is represented in the model. The sector locations are shown on Figure 4.2.

Table 5.3 - Summary of RSI Matrix Calibration at Site 1

	Sectors									Total
	1	2	3	4	5	6	7	8	9	
AM Peak										
Observed destination	13%	3%	17%	5%	8%	3%	39%	4%	8%	1794
Modelled destination	17%	2%	10%	4%	14%	7%	36%	7%	3%	1902
Observed origins	4%	6%	23%	10%	6%	4%	40%	3%	5%	1794
Modelled origins	5%	7%	18%	7%	7%	3%	36%	16%	2%	1902
PM Peak										
Observed destination	4%	7%	25%	11%	6%	4%	35%	3%	5%	1644
Modelled destination	6%	6%	21%	8%	6%	2%	34%	14%	2%	1670
Observed origins	11%	3%	15%	5%	7%	3%	44%	4%	9%	1644
Modelled origins	14%	3%	14%	4%	12%	5%	42%	5%	3%	1670

Table 5.4 - Summary of RSI Matrix Calibration at Site 2

	1	2	3	4	5	6	7	8	9	Total
AM Peak										
Observed destination	21%	4%	8%	7%	24%	2%	4%	2%	26%	1341
Modelled destination	29%	2%	8%	7%	16%	2%	3%	2%	31%	1525
Observed origins	7%	1%	5%	8%	24%	2%	4%	2%	46%	1341
Modelled origins	8%	3%	6%	8%	19%	1%	1%	1%	54%	1525
PM Peak										
Observed destination	8%	1%	6%	9%	25%	2%	4%	2%	44%	1362
Modelled destination	8%	7%	6%	7%	21%	1%	1%	1%	48%	1466
Observed origins	20%	4%	7%	7%	24%	3%	4%	2%	29%	1362
Modelled origins	30%	2%	5%	6%	18%	3%	1%	2%	34%	1466

Table 5.5 - Summary of RSI Matrix Calibration at Site 3

	1	2	3	4	5	6	7	8	9	Total
AM Peak										
Observed destination	18%	8%	14%	2%	17%	2%	36%	1%	2%	1503
Modelled destination	20%	11%	10%	1%	22%	0%	33%	1%	1%	1468
Observed origins	5%	13%	24%	2%	8%	2%	41%	2%	3%	1503
Modelled origins	5%	10%	20%	2%	10%	1%	45%	4%	4%	1468
PM Peak										
Observed destination	6%	13%	27%	3%	9%	2%	36%	2%	4%	1180
Modelled destination	6%	12%	22%	2%	11%	1%	37%	3%	6%	1322
Observed origins	15%	8%	14%	1%	15%	2%	41%	1%	2%	1180
Modelled origins	18%	10%	11%	1%	18%	0%	39%	2%	1%	1322

Table 5.6 - Summary of RSI Matrix Calibration at Site 4

	1	2	3	4	5	6	7	8	9	Total
AM Peak										
Observed destination	13%	16%	13%	4%	5%	40%	6%	0%	2%	715
Modelled destination	16%	7%	13%	7%	7%	48%	0%	2%	0%	766
Observed origins	2%	25%	17%	6%	6%	31%	4%	7%	1%	715
Modelled origins	3%	14%	14%	9%	6%	47%	0%	6%	0%	766
PM Peak										
Observed destination	3%	26%	17%	7%	5%	32%	4%	5%	1%	762
Modelled destination	6%	13%	13%	7%	2%	53%	0%	5%	0%	826
Observed origins	14%	17%	13%	4%	5%	39%	6%	1%	2%	762
Modelled origins	20%	8%	12%	6%	11%	41%	0%	2%	0%	826

Table 5.7 - Summary of RSI Matrix Calibration at Site 5

	1	2	3	4	5	6	7	8	9	Total
AM Peak										
Observed destination	11%	7%	5%	2%	41%	21%	1%	4%	7%	1276
Modelled destination	8%	12%	3%	2%	38%	23%	4%	2%	8%	1550
Observed origins	1%	11%	8%	2%	18%	36%	4%	6%	14%	1276
Modelled origins	3%	11%	6%	2%	16%	35%	8%	5%	13%	1550

	1	2	3	4	5	6	7	8	9	Total
PM Peak										
Observed destination	2%	11%	8%	3%	19%	34%	4%	6%	14%	1657
Modelled destination	4%	18%	4%	3%	22%	30%	5%	4%	12%	1617
Observed origins	10%	8%	5%	2%	40%	22%	1%	4%	8%	1657
Modelled origins	11%	8%	5%	1%	27%	25%	5%	1%	16%	1617

Table 5.8 - Summary of RSI Matrix Calibration at Site 6

	1	2	3	4	5	6	7	8	9	Total
AM Peak										
Observed destination	16%	4%	8%	16%	15%	6%	4%	26%	4%	713
Modelled destination	16%	4%	7%	11%	14%	11%	4%	30%	3%	782
Observed origins	5%	3%	8%	14%	5%	2%	2%	58%	3%	713
Modelled origins	4%	2%	6%	9%	6%	5%	2%	62%	5%	782
PM Peak										
Observed destination	4%	2%	7%	13%	4%	2%	2%	63%	2%	732
Modelled destination	6%	1%	4%	8%	5%	6%	2%	56%	11%	740
Observed origins	19%	4%	10%	16%	15%	6%	4%	22%	4%	732
Modelled origins	11%	5%	9%	12%	10%	10%	4%	36%	3%	740

Table 5.9 - Summary of RSI Matrix Calibration at Site 7

	1	2	3	4	5	6	7	8	9	Total
AM Peak										
Observed destination	26%	4%	6%	7%	19%	2%	10%	5%	21%	1302
Modelled destination	21%	4%	7%	10%	18%	2%	6%	9%	23%	1424
Observed origins	2%	2%	4%	19%	15%	0%	8%	18%	31%	1302
Modelled origins	4%	4%	5%	15%	15%	4%	6%	17%	30%	1424
PM Peak										
Observed destination	3%	2%	5%	21%	17%	0%	7%	17%	28%	1255
Modelled destination	5%	4%	5%	18%	12%	6%	4%	18%	28%	1389
Observed origins	23%	4%	5%	7%	18%	2%	11%	7%	24%	1255
Modelled origins	23%	3%	6%	9%	16%	3%	6%	8%	26%	1389

Table 5.10 - Summary of RSI Matrix Calibration at Site 8

	1	2	3	4	5	6	7	8	9	Total
AM Peak										
Observed destination	5%	6%	2%	3%	47%	7%	6%	5%	20%	2029
Modelled destination	0%	9%	0%	1%	54%	9%	2%	7%	18%	1685
Observed origins	2%	9%	5%	1%	27%	2%	12%	19%	23%	2029
Modelled origins	0%	7%	2%	2%	30%	6%	5%	11%	37%	1685
PM Peak										
Observed destination	2%	9%	6%	1%	28%	3%	11%	17%	23%	1684
Modelled destination	0%	16%	0%	2%	38%	2%	2%	8%	30%	1531
Observed origins	4%	5%	2%	3%	46%	6%	7%	5%	22%	1684
Modelled origins	2%	5%	2%	1%	43%	11%	6%	4%	26%	1531

Table 5.11 - Summary of RSI Matrix Calibration at Site 9

	1	2	3	4	5	6	7	8	9	Total
AM Peak										
Observed destination	28%	3%	4%	26%	18%	1%	1%	11%	9%	417
Modelled destination	22%	12%	6%	36%	7%	4%	2%	8%	3%	374
Observed origins	12%	1%	4%	32%	6%	0%	1%	39%	5%	417
Modelled origins	11%	7%	3%	32%	9%	1%	0%	33%	2%	374
PM Peak										
Observed destination	10%	1%	3%	33%	4%	0%	1%	43%	5%	436
Modelled destination	7%	5%	3%	25%	5%	1%	1%	51%	2%	482
Observed origins	30%	3%	4%	23%	20%	1%	1%	9%	9%	436
Modelled origins	32%	7%	4%	26%	14%	3%	1%	6%	7%	482

Table 5.12 - Summary of RSI Matrix Calibration at Site 10

	1	2	3	4	5	6	7	8	9	Total
AM Peak										
Observed destination	20%	2%	2%	6%	47%	6%	4%	1%	12%	866
Modelled destination	10%	3%	2%	4%	59%	7%	0%	5%	11%	604
Observed origins	4%	2%	5%	7%	39%	15%	3%	2%	22%	866
Modelled origins	6%	1%	4%	3%	58%	12%	3%	5%	9%	604
PM Peak										
Observed destination	5%	2%	6%	8%	39%	15%	3%	2%	21%	904
Modelled destination	10%	0%	1%	2%	52%	4%	1%	5%	26%	710
Observed origins	20%	2%	2%	6%	48%	6%	4%	1%	12%	904
Modelled origins	7%	1%	12%	2%	39%	11%	2%	11%	15%	710

Table 5.13 - Summary of RSI Matrix Calibration at Site 11

	1	2	3	4	5	6	7	8	9	Total
AM Peak										
Observed destination	35%	15%	3%	6%	32%	2%	2%	3%	2%	847
Modelled destination	23%	20%	2%	3%	39%	4%	2%	1%	5%	1110
Observed origins	4%	33%	7%	2%	8%	33%	11%	1%	1%	847
Modelled origins	3%	37%	5%	1%	12%	27%	12%	3%	1%	1110
PM Peak										
Observed destination	5%	33%	7%	3%	7%	33%	10%	1%	1%	688
Modelled destination	8%	36%	5%	1%	14%	21%	10%	3%	2%	847
Observed origins	34%	16%	3%	6%	31%	3%	2%	3%	2%	688
Modelled origins	20%	24%	2%	2%	34%	7%	4%	1%	7%	847

5.9 Tables 5.3 to Table 5.13 demonstrate that there is a good correlation between the modelled SLA and the observed RSI data at the 11 sites, with the key modelled movements similar to the observed.

Journey Time Validation

5.10 The eleven Journey Time routes collated as part of the data collection exercise have been used to check the modelled journey times against observed data. The purpose of monitoring these specific Journey Time routes is to identify to what extent the model is capable of reflecting the

current congestion conditions i.e. journey times and delays. The eleven routes were chosen to provide a broad coverage of strategic and local routes around Stafford as shown previously in Figure 2.3.

5.11 The DMRB recommends that for a 'good fit', modelled times should be within 15% (or 1 minute or lower) for 85% of routes.

5.12 Journey Time Variability (JTV) is defined by the DfT as unpredictable variation in journey times, and hence JTV is confined to random effects. It excludes predictable variation relating to varying levels of demand by time of day, day of week, and seasonal effects.

5.13 Table 5.15 and Table 5.16 show comparisons between the average observed and modelled journey time on the eleven Journey Time routes.

5.14 In both Peak periods, over 85% of routes lie within +/-15% of observed values as shown in Table 5.14. All but three of the journey time routes fall within the required 15% interval in both peak periods. In the AM peak, 86% of journey times meet the criteria of being within 15% of the observed values whilst 91% achieve this criteria in the PM peak.

5.15 Cumulative Journey Time plots of the observed versus modelled highway journey times are shown for the eleven routes in the AM and PM Peak periods in Appendix D. These cumulative diagrams indicate that the routes show a good correlation between modelled and observed data along each route. This is a sign that junction delays and free flowing sections are paralleled in the model.

5.16 The plots in Appendix D highlight that the modelled cumulative time profile mirrors that of the observed times. This demonstrates that the modelled delays are generally at the correct locations.

5.17 In general it is considered that the modelled journey times are representative of those observed, and that the Stafford Transport Model accurately replicates observed 2007 journey times and delays.

Table 5.14 – Journey Time Validation Summary

Area	AM Peak	PM Peak
Minimum DMRB criteria	85%	85%
% Routes meeting Criterion	86%	91%

Table 5.15 – Stafford Journey Time Validation: 2007 AM Peak

Route	Date	Description	Direction	Modelled Time (sec)	2007 AM Peak Observed Time (Sec)					% Diff	<+/- 15%?
					-15%	Lower CI	Average	Upper CI	+15%		
1	2007	Route 1 A518 E to W	WB	274	252	265	296	327	340	-7%	✔
		Route 1 A518 W to E	EB	348	323	245	380	515	437	-8%	✔
2	2007	Route 2 Baswich NW to SE	EB	530	516	573	607	641	698	-13%	✔
		Route 2 Baswich SE to NW	WB	652	503	545	592	639	681	10%	✔
3	2007	Route 3 Beaconside W to E	EB	333	319	227	375	523	431	-11%	✔
		Route 3 Beaconside E to W	WB	317	312	349	367	385	422	-14%	✔
4	2007	Route 4 M6 S to N	NB	1100	803	897	945	993	1086	16%	✘
		Route 4 M6 N to S	SB	1042	850	872	1000	1107	1150	4%	✔
5	2007	Route 5 Sandon E to W	WB	371	300	320	353	385	405	5%	✔
		Route 5 Sandon W to E	EB	323	268	272	315	358	362	3%	✔
6	2007	Route 6 TC Anticlockwise	AC	319	258	284	303	322	348	5%	✔
		Route 6 TC Clockwise	C	386	291	330	343	355	394	13%	✔
7	2007	Route 7 Triangle Anticlockwise	AC	380	375	395	441	487	507	-14%	✔
		Route 7 Triangle Clockwise	C	429	361	403	425	447	489	1%	✔
8	2007	Route 8 Wildwood W to E	EB	316	297	311	350	389	402	-10%	✔
		Route 8 Wildwood E to W	WB	494	357	336	420	504	483	18%	✘
9	2007	Route 9 A449 S to N	NB	498	388	263	456	650	525	9%	✔
		Route 9 A449 N to S	SB	357	351	387	413	439	475	-14%	✔
10	2007	Route 10 A34 S to N	NB	934	905	827	1065	1302	1224	-12%	✔
		Route 10 A34 N to S	SB	992	895	919	1053	1186	1210	-6%	✔
11	2007	Route 11 Weston Rd Eastbound	EB	263	354	313	416	520	479	-37%	✘
		Route 11 Weston Rd Westbound	WB	370	321	320	378	436	434	-2%	✔

Table 5.16 - Stafford Journey Time Validation: 2007 PM Peak

Route	Date	Description	Direction	Modelled Time (sec)	2007 AM Peak Observed Time (Sec)					% Diff	<+/- 15%?
					-15%	Lower CI	Average	Upper CI	+15%		
1	2007	Route 1 A518 E to W	WB	285	250	261	294	327	338	-3%	✔
		Route 1 A518 W to E	EB	356	270	270	318	366	365	12%	✔
2	2007	Route 2 Baswich NW to SE	EB	636	489	544	576	608	662	10%	✔
		Route 2 Baswich SE to NW	WB	529	473	530	556	582	639	-5%	✔
3	2007	Route 3 Beaconside W to E	EB	347	305	351	359	366	413	-3%	✔
		Route 3 Beaconside E to W	WB	326	302	314	356	397	409	-8%	✔
4	2007	Route 4 M6 S to N	NB	1050	879	1007	1035	1063	1190	2%	✔
		Route 4 M6 N to S	SB	1071	845	976	994	1012	1143	8%	✔
5	2007	Route 5 Sandon E to W	WB	386	322	266	379	492	436	2%	✔
		Route 5 Sandon W to E	EB	328	258	273	304	335	349	8%	✔
6	2007	Route 6 TC Anticlockwise	AC	350	268	274	315	356	362	11%	✔
		Route 6 TC Clockwise	C	390	289	276	340	403	390	15%	✔
7	2007	Route 7 Triangle Anticlockwise	AC	371	323	350	381	411	438	-2%	✔
		Route 7 Triangle Clockwise	C	430	397	444	467	490	537	-8%	✔
8	2007	Route 8 Wildwood W to E	EB	445	464	398	546	694	628	-18%	✘
		Route 8 Wildwood E to W	WB	386	344	378	405	432	466	-5%	✔
9	2007	Route 9 A449 S to N	NB	426	381	425	448	470	515	-5%	✔
		Route 9 A449 N to S	SB	382	333	353	392	431	451	-2%	✔
10	2007	Route 10 A34 S to N	NB	948	966	1026	1137	1248	1307	-17%	✘
		Route 10 A34 N to S	SB	964	937	1018	1102	1186	1267	-12%	✔
11	2007	Route 11 Weston Rd Eastbound	EB	268	233	220	274	328	315	-2%	✔
		Route 11 Weston Rd Westbound	WB	361	311	261	366	471	421	-1%	✔

Calibration and Validation Summary

5.18 The SATURN highway model was built from Car Park Surveys and Roadside Interviews undertaken in the key modelled area. The comparison of the observed and modelled flows at these Car Park and RSI sites show very good correlation and gives confidence to the starting point of validation.

5.19 Based on the calibration and validation results summarised in Table 5.17, for the AM and PM peaks, it has been clearly demonstrated that the Stafford Transport Model is 'fit for purpose' and hence is considered acceptable for the development of future year forecasts and assessment of future growth and land use development in Stafford.

Table 5.17 - Stafford Transport Model Calibration and Validation Summary

Criteria	AM Peak	PM Peak
Link Flow Calibration	86%	86%
Screenline Calibration	85%	85%
Turn Flow Calibration	82%	83%
R Squared Stat.	0.981	0.976
Link Flow Validation	86%	85%
Journey Time Validation	86%	91%

6. Conclusions

Overview

6.1 This Stafford Transport Model Validation Report has been prepared as part of the Stafford Western Access Improvements study. It details the calibration and validation of the Base Year AM and PM Peak models to 2007, and highlights the high levels of validation achieved.

6.2 Our modelling exercise has focused on the ensuring the highway model provides a good representation of traffic flows and operating conditions in the Stafford area.

Model Development and Calibration

6.3 The Stafford SATURN model was developed by Atkins in 2008 as part of a study to understand the implications of proposed growth around Stafford on the transportation network. The model has been updated as part of this study to include demand segmentation to enable variable demand modelling, in line with DfT guidance.

6.4 The calibration monitoring process has confirmed that the model network, matrices and assignments have converged to a satisfactory level. There is a good level of fit between modelled and observed flows.

Model Validation

6.5 Model validation was undertaken by comparing modelled traffic flows at a number of independent validation sites, using screenline data, and against observed journey times around the study area.

6.6 The model is shown to validate well against observed count data in both time periods, meeting DMRB criteria on over 85% of links in the model.

6.7 The validation across screenlines was achieved, meeting the DMRB criteria for the majority of observations. Only 3/20 screenline locations were outside the DMRB criteria in the AM and PM peaks.

6.8 The journey time validation showed that the majority of journey time routes around the study area were accurately modelled: 86% and 91% in the AM peak and PM peak respectively.

Conclusions and Recommendations

6.9 The models have been through a rigorous model development, calibration and validation process, using the most appropriate source data to provide accurate representations of 2007 base traffic conditions in and around the study area.

6.10 Both time period models are shown to calibrate and validate well against observed traffic data across the majority of the traffic model, with good calibration and validation in the areas of most interest to the Stafford Western Access Improvements.

6.11 The models are therefore deemed an accurate representation of current network conditions and suitable for use in future forecasting.

Appendix A
Observed v Modelled Count Calibration

Table A.1 – Stafford Link Flow Calibration – AM Peak 2007

Ref	Year	Count Location	Direction	2007 AM Peak - PCUs						
				Count	Modelled	Diff	%Diff	GEH	GEH criteria	Flow criteria
RSI01	2007	A449 MOSS PIT	NB	840	989	149	18%	5	✓	×
	2007		SB	955	912	-42	-4%	1	✓	✓
RSI02	2007	A34 STONE ROAD	SB	854	977	123	14%	4	✓	✓
	2007		NB	486	576	90	19%	4	✓	✓
RSI03	2007	A34 CANNOCK ROAD	NB	788	803	16	2%	1	✓	✓
	2007		SB	716	676	-40	-6%	2	✓	✓
RSI04	2007	A513 MILFORD ROAD	WB	327	359	32	10%	2	✓	✓
	2007		EB	387	384	-3	-1%	0	✓	✓
RSI05	2007	A518 WESTON ROAD	WB	819	958	139	17%	5	✓	×
	2007		EB	456	617	160	35%	7	×	×
RSI06	2007	A518 CASTLE BANK	EB	478	529	51	11%	2	✓	✓
	2007		WB	236	274	38	16%	2	✓	✓
RSI07	2007	A5013 ECCLESHALL ROAD	EB	809	850	41	5%	1	✓	✓
	2007		WB	494	574	80	16%	3	✓	✓
RSI08	2007	A513 BEACONSIDE	EB	1268	1093	-175	-14%	5	✓	✓
	2007		WB	761	606	-155	-20%	6	×	×
RSI09	2007	DOXEY ROAD	EB	279	236	-43	-15%	3	✓	✓
	2007		WB	137	156	18	13%	2	✓	✓
RSI10	2007	B5066 SANDON ROAD	SB	504	332	-173	-34%	8	×	×
	2007		NB	361	275	-86	-24%	5	✓	✓
RSI11	2007	TIXALL ROAD	WB	747	903	155	21%	5	✓	×
	2007		EB	188	231	43	23%	3	✓	✓
TRADS01	2007	M6 J13-14	NB	5081	4975	-106	-2%	1	✓	✓
	2007		SB	4696	4671	-25	-1%	0	✓	✓
TRADS02	2007	M6 J14-15	NB	4554	4510	-44	-1%	1	✓	✓
	2007		SB	4386	4360	-26	-1%	0	✓	✓
TRADS03	2007	M6 J12-13	NB	4910	5002	92	2%	1	✓	✓
	2007		SB	4803	4848	45	1%	1	✓	✓
M6 J13	2005	A449 (N) SLIP	NB	857	989	132	15%	4	✓	×
	2005		SB	976	912	-63	-6%	2	✓	✓
M6 J13	2005	M6 (S) SLIP	SB	454	572	118	26%	5	✓	×
	2005		NB	328	578	249	76%	12	×	×
M6 J13	2005	A449 (S) SLIP	SB	641	604	-37	-6%	1	✓	✓
	2005		NB	802	830	29	4%	1	✓	✓
M6 J13	2005	M6 (N) SLIP	NB	574	551	-23	-4%	1	✓	✓
	2005		SB	421	396	-25	-6%	1	✓	✓
M6 J13	2005	ROUNDABOUT	CW	305	366	61	20%	3	✓	✓
	2005		CW	827	706	-121	-15%	4	✓	✓
	2005		CW	514	679	166	32%	7	×	×
	2005		CW	741	959	218	29%	7	×	×
M6 RBT	2005	ON ROUNDABOUT	CW	1165	1168	3	0%	0	✓	✓
	2005	ON ROUNDABOUT	CW	1552	1500	-51	-3%	1	✓	✓
	2005	ON ROUNDABOUT	CW	953	947	-6	-1%	0	✓	✓
	2005	ON ROUNDABOUT	CW	1065	998	-67	-6%	2	✓	✓
	2005	ON ROUNDABOUT	CW	697	721	23	3%	1	✓	✓
	2005	TO CRESSWELL GROVE	WB	477	461	-17	-3%	1	✓	✓
	2005	FROM CRESSWELL GROVE	EB	778	775	-3	0%	0	✓	✓
	2005	TO M6 NORTH	NB	391	443	52	13%	3	✓	✓
	2005	FROM M6 NORTH	SB	538	540	2	0%	0	✓	✓
	2005	TO A34	CW	1137	1093	-43	-4%	1	✓	✓
	2005	FROM A34	CW	978	902	-77	-8%	2	✓	✓
	2005	TO ECCLESHALL ROAD	EB	866	850	-16	-2%	1	✓	✓
	2005	FROM ECCLESHALL ROAD	WB	523	574	51	10%	2	✓	✓
	2005	TO M6 SOUTH	SB	890	851	-39	-4%	1	✓	✓
	2005	TO M6 NORTH	NB	945	908	-37	-4%	1	✓	✓
RBT01	2004	FROM QUEENSWAY	SB	912	939	27	3%	1	✓	✓
	2004	ROUNDABOUT	CW	665	658	-7	-1%	0	✓	✓
	2004	ROUNDABOUT	CW	554	525	-28	-5%	1	✓	✓
	2004	TO LICHFIELD ROAD	EB	709	741	32	5%	1	✓	✓
	2004	FROM LICHFIELD ROAD	WB	825	898	73	9%	2	✓	✓
	2004	TO WOLVERHAMPTON ROAD	SB	545	553	8	1%	0	✓	✓
	2004	FROM WOLVERHAMPTON ROAD	NB	731	812	81	11%	3	✓	✓
	2004	ROUNDABOUT	CW	834	870	36	4%	1	✓	✓
	2004	TO NEWPORT ROAD	WB	433	404	-28	-7%	1	✓	✓
	2004	ROUNDABOUT	CW	1133	1278	146	13%	4	✓	✓
	2004	FROM NEWPORT ROAD	EB	683	658	-25	-4%	1	✓	✓
	2004	ROUNDABOUT	CW	1852	1978	127	7%	3	✓	✓
	2004	TO QUEENSWAY	NB	1180	1412	232	20%	6	×	×
	2004	ROUNDABOUT	CW	462	459	-2	-1%	0	✓	✓
PC03	2004	A518 TENTERBANKS	SEB	749	735	-13	-2%	0	✓	✓
	2004		NWB	992	993	1	0%	0	✓	✓

Ref	Year	Count Location	Direction	2007 AM Peak - PCUs						
				Count	Modelled	Diff	%Diff	GEH	GEH criteria	Flow criteria
PC20	2004	D385 SCHOOL LANE	NEB	20	10	-10	-51%	3	✓	✓
	2004		SWB	8	15	7	96%	2	✓	✓
PC39	2005	A519 NEWCASTLE ROAD	NB	237	232	-5	-2%	0	✓	✓
	2005		SB	235	235	0	0%	0	✓	✓
PC42	2005	A5013 CRESSWELL GROVE	SEB	745	775	31	4%	1	✓	✓
	2005		NWB	510	461	-49	-10%	2	✓	✓
PC45	2005	A34 QUEENSWAY	SEB	1170	1183	12	1%	0	✓	✓
	2005		NWB	940	835	-105	-11%	4	✓	✓
PC53	2006	A519 NEWCASTLE ROAD	NEB	619	639	19	3%	1	✓	✓
	2006		SWB	509	512	3	1%	0	✓	✓
PC54	2006	A5013 STAFFORD ROAD	SEB	403	467	63	16%	3	✓	✓
	2006		NWB	235	236	1	0%	0	✓	✓
PC56	2006	A51	SEB	524	518	-7	-1%	0	✓	✓
	2006		NWB	550	581	30	6%	1	✓	✓
PC60	2006	A34 STONE ROAD	NB	1070	1066	-5	0%	0	✓	✓
	2006		SB	1477	1657	181	12%	5	✓	✓
PC62	2006	D385 SCHOOL LANE	NEB	33	10	-23	-70%	5	✓	✓
	2006		SWB	15	15	0	-2%	0	✓	✓
PC63	2006	A518	NEB	440	435	-5	-1%	0	✓	✓
	2006		SWB	745	765	21	3%	1	✓	✓
PC64	2006	A34 STONE ROAD	NEB	1019	993	-26	-3%	1	✓	✓
	2006		SWB	1068	946	-122	-11%	4	✓	✓
PC65	2006	A51 STONE ROAD	SEB	368	323	-44	-12%	2	✓	✓
	2006		NWB	327	289	-38	-12%	2	✓	✓
PC08	2004	A513	SEB	422	462	40	9%	2	✓	✓
	2004		NWB	597	617	20	3%	1	✓	✓
PC48	2006	D33 WEST WAY	SEB	466	378	-88	-19%	4	✓	✓
	2006		NWB	379	424	45	12%	2	✓	✓
PC71	2007	A520 LONGTON ROAD	NB	364	346	-18	-5%	1	✓	✓
	2007		SB	407	402	-5	-1%	0	✓	✓
PC72	2007	A513 BEACONSIDE	SEB	908	621	-287	-32%	10	×	×
	2007		NWB	575	583	8	1%	0	✓	✓
PC73	2007	A34	NB	447	730	284	64%	12	×	×
	2007		SB	419	541	122	29%	6	×	×
PC74	2007	A518 UTTOXETER ROAD	NEB	338	302	-35	-10%	2	✓	✓
	2007		SWB	441	405	-36	-8%	2	✓	✓
PC75	2007	B5026 CHESTER ROAD	SEB	205	245	40	20%	3	✓	✓
	2007		NWB	78	89	11	14%	1	✓	✓
PC76	2007	A520 STAFFORD ROAD	NEB	753	760	7	1%	0	✓	✓
	2007		SWB	857	965	108	13%	4	✓	✓
PC77	2007	A34 STAFFORD ROAD	SEB	1950	1936	-14	-1%	0	✓	✓
	2007		NWB	1349	1388	40	3%	1	✓	✓
PC78	2007	A518 WESTON ROAD	NEB	646	767	122	19%	5	✓	×
	2007		SWB	891	972	81	9%	3	✓	✓
PC79	2007	B5066 SANDON ROAD	NEB	331	323	-7	-2%	0	✓	✓
	2007		SWB	514	485	-29	-6%	1	✓	✓
PC80	2007	A519 NEWCASTLE ROAD	NB	229	234	5	2%	0	✓	✓
	2007		SB	198	209	11	5%	1	✓	✓
PC81	2007	A449 WOLVERHAMPTON ROAD	SEB	753	874	121	16%	4	✓	×
	2007		NWB	722	959	237	33%	8	×	×
PC82	2007	A34	SEB	1050	1067	17	2%	1	✓	✓
	2007		NWB	1261	1217	-43	-3%	1	✓	✓
TC11-1	2004	D67 KINGSWAY	SB	236	234	-2	-1%	0	✓	✓
	2004		NB	105	67	-38	-36%	4	✓	✓
TC11-2	2004	A518 NEWPORT ROAD (E)	WB	512	469	-43	-8%	2	✓	✓
	2004		EB	1000	1063	62	6%	2	✓	✓
TC11-3	2004	A518 NEWPORT ROAD (W)	EB	900	930	30	3%	1	✓	✓
	2004		WB	544	504	-40	-7%	2	✓	✓
TC13-1	2004	A519 NEWCASTLE ROAD (NE)	SWB	160	235	75	47%	5	✓	✓
	2004		NEB	194	232	38	20%	3	✓	✓
TC13-3	2004	A519 NEWCASTLE ROAD (SW)	NEB	228	241	13	6%	1	✓	✓
	2004		SWB	210	257	48	23%	3	✓	✓
TC13-4	2004	A51 STONE ROAD (W)	EB	278	230	-48	-17%	3	✓	✓
	2004		WB	194	182	-11	-6%	1	✓	✓
TC14-3	2004	A513 MAIN ROAD (SE)	NWB	574	700	125	22%	5	✓	×
	2004		SEB	418	486	68	16%	3	✓	✓
SDR38	2006	A513 MAIN ROAD MILFORD	EB	388	488	100	26%	5	✓	×
	2006		WB	413	435	22	5%	1	✓	✓
TC20-1	2004	A449 RISING BROOK (N)	SB	652	791	138	21%	5	✓	×
	2004		NB	804	1193	389	48%	12	×	×
TC20-2	2004	C75 RICKERSCOTE ROAD	WB	541	457	-84	-16%	4	✓	✓
	2004		EB	408	311	-97	-24%	5	✓	✓

Ref	Year	Count Location	Direction	2007 AM Peak - PCUs						
				Count	Modelled	Diff	%Diff	GEH	GEH criteria	Flow criteria
TC20-4	2004	D32 CHURCHILL WAY	EB	32	0	-32	-100%	8	×	✓
	2004		WB	64	12	-52	-81%	8	×	✓
TC22-1	2004	D8 CORPORATION ST (NW)	SEB	290	285	-5	-2%	0	✓	✓
	2004		NWB	276	254	-22	-8%	1	✓	✓
TC22-2	2004	D7 PROSPECT ROAD	WB	122	91	-31	-26%	3	✓	✓
	2004		EB	108	86	-23	-21%	2	✓	✓
TC22-3	2004	D8 CORPORATION ST (SE)	NWB	330	537	207	63%	10	×	×
	2004		SEB	358	380	22	6%	1	✓	✓
TC22-4	2004	D7 CROOKED BRIDGE ROAD	EB	189	163	-27	-14%	2	✓	✓
	2004		WB	189	355	166	88%	10	×	×
TC23-3	2005	A513 BEACONSIDE (W)	EB	1284	1093	-191	-15%	6	×	✓
	2005		WB	769	606	-163	-21%	6	×	×
TC24-2	2005	D14 SANDALWOOD DRIVE	WB	33	72	39	119%	5	✓	✓
	2005		EB	13	43	30	228%	6	×	✓
TC24-3	2005	B5066 SANDON ROAD (S)	NB	418	398	-20	-5%	1	✓	✓
	2005		SB	596	588	-8	-1%	0	✓	✓
TC25-1	2005	D6 COMMON ROAD (N)	SB	349	324	-25	-7%	1	✓	✓
	2005		NB	226	343	117	52%	7	×	×
TC25-2	2005	D44 ASTONFIELDS ROAD	WB	280	291	11	4%	1	✓	✓
	2005		EB	380	290	-90	-24%	5	✓	✓
TC25-3	2005	D6 COMMON ROAD (S)	NB	184	202	17	9%	1	✓	✓
	2005		SB	161	184	23	14%	2	✓	✓
TC28-1	2005	A513 BEACONSIDE (N)	SB	894	881	-13	-1%	0	✓	✓
	2005		NB	744	685	-59	-8%	2	✓	✓
TC28-3	2005	A513 BEACONSIDE (S)	NB	669	646	-24	-4%	1	✓	✓
	2005		SB	1158	1059	-99	-9%	3	✓	✓
TC29-3	2005	D68 TOLLGATE DRIVE	NEB	151	127	-24	-16%	2	✓	✓
	2005		SWB	313	287	-26	-8%	2	✓	✓
TC30-2	2005	A513 BEACONSIDE (S)	NB	741	724	-17	-2%	1	✓	✓
	2005		SB	1114	1081	-32	-3%	1	✓	✓
TC40-3	2006	D37 PARK STREET	WB	242	163	-79	-33%	6	×	✓
TC41-3	2006	D37 TELEGRAPH STREET	WB	25	0	-25	-100%	7	×	✓
TC42-3	2006	D37 AUSTIN FRIARS	EB	158	188	30	19%	2	✓	✓
TC43-2	2006	D37 FRIARS ROAD	NB	191	163	-28	-15%	2	✓	✓
	2006		SB	187	188	2	1%	0	✓	✓
TC45-1	2007	C376 RIVERWAY (N)	SB	431	375	-56	-13%	3	✓	✓
	2007		NB	597	514	-82	-14%	3	✓	✓
TC45-2	2007	D3019 FAIRWAY	WB	327	339	12	4%	1	✓	✓
	2007		EB	174	157	-17	-10%	1	✓	✓
TC45-3	2007	C376 RIVERWAY (S)	NB	381	232	-148	-39%	8	×	×
	2007		SB	368	275	-93	-25%	5	✓	✓
TC46-4	2007	A518 LAMMASCOTE ROAD	EB	809	857	48	6%	2	✓	✓
	2007		WB	928	927	-1	0%	0	✓	✓
TC48-1	2007	C376 RIVERWAY	SWB	300	275	-25	-8%	1	✓	✓
	2007		NEB	390	232	-158	-40%	9	×	×
TC48-2	2007	A34 LICHFIELD ROAD (SE)	NWB	763	823	60	8%	2	✓	✓
	2007		SEB	760	782	23	3%	1	✓	✓
TC48-3	2007	N/A UNKNOWN	NEB	354	332	-21	-6%	1	✓	✓
	2007		SWB	80	217	137	171%	11	×	×
TC49-1	2007	A34 LICHFIELD ROAD (NW)	SEB	830	814	-15	-2%	1	✓	✓
	2007		NWB	1089	1138	50	5%	1	✓	✓
TC49-2	2007	D3019 ST LEONARDS AVENUE	WB	71	141	70	99%	7	×	✓
	2007		EB	309	369	60	20%	3	✓	✓
TC50-2	2007	D3019 ST LEONARDS AVE (E)	WB	39	41	2	4%	0	✓	✓
	2007		EB	215	211	-4	-2%	0	✓	✓
TC52-1	2007	U/C TESCO SUPERSTORE	NB	151	133	-18	-12%	1	✓	✓
	2007		SB	161	220	59	37%	4	✓	✓
TC52-2	2007	A518 NEWPORT ROAD (W)	EB	576	631	55	10%	2	✓	✓
	2007		WB	500	544	44	9%	2	✓	✓
TC52-3	2007	A518 NEWPORT ROAD (E)	WB	515	596	81	16%	3	✓	✓
	2007		EB	581	596	15	3%	1	✓	✓
TC53-1	2007	D58 BRIDGE STREET	SB	278	325	47	17%	3	✓	✓
	2007		NB	25	47	22	91%	4	✓	✓
TC53-2	2007	A518 LICHFIELD ROAD	WB	382	404	22	6%	1	✓	✓
	2007		EB	715	658	-57	-8%	2	✓	✓
TC53-3	2007	A518 NEWPORT ROAD	EB	525	452	-73	-14%	3	✓	✓
	2007		WB	446	478	32	7%	1	✓	✓
TC54-1	2007	A5187 STATION ROAD	SB	566	549	-17	-3%	1	✓	✓
	2007		NB	729	848	119	16%	4	✓	×
TC54-3	2007	A518 NEWPORT ROAD (W)	EB	873	932	59	7%	2	✓	✓
	2007		WB	550	541	-9	-2%	0	✓	✓

Ref	Year	Count Location	Direction	2007 AM Peak - PCUs						
				Count	Modelled	Diff	%Diff	GEH	GEH criteria	Flow criteria
TC32-1	2005	A519 NEWPORT ROAD (N)	SB	312	340	28	9%	2	✓	✓
	2005		NB	340	349	8	2%	0	✓	✓
TC33-2	2005	B5027 LICHFIELD STREET	WB	485	439	-46	-9%	2	✓	✓
	2005		EB	257	331	73	29%	4	✓	✓
TC37-1	2006	B5026 STONE ROAD (NE)	SWB	185	191	6	3%	0	✓	✓
	2006		NEB	250	234	-15	-6%	1	✓	✓
TC38-3	2006	B5066 SANDON ROAD	NB	166	163	-3	-2%	0	✓	✓
	2006		SB	470	463	-6	-1%	0	✓	✓
TC47-3	2007	A34 LICHFIELD ROAD (SE)	NWB	1404	1467	63	4%	2	✓	✓
	2007		SEB	881	921	40	5%	1	✓	✓
TC06-2	2004	COPE STREET	NB	622	644	22	4%	1	✓	✓
TC06-3	2004	SOUTH WALLS (W)	EB	226	215	-11	-5%	1	✓	✓
	2004		WB	548	598	51	9%	2	✓	✓
TC08-1	2004	GREENGATE STREET (N)	SB	103	211	108	105%	9	×	×
TC08-2	2004	SOUTH WALLS	WB	302	500	199	66%	10	×	×
	2004		EB	251	210	-41	-16%	3	✓	✓
TC08-4	2004	MILL BANK	EB	313	204	-109	-35%	7	×	×
	2004		WB	229	426	197	86%	11	×	×
TC02-3	2004	A34 (N)	SB	1469	1703	234	16%	6	×	×
	2004		NB	938	1063	125	13%	4	✓	✓
TC10-2	2004	A513 BEACONSIDE	WB	1064	803	-261	-25%	9	×	×
	2004		EB	1391	1214	-177	-13%	5	✓	✓
TC10-4	2004	A34 TO/FROM M6 J14	EB	1142	1039	-102	-9%	3	✓	✓
	2004		WB	968	867	-101	-10%	3	✓	✓
PVOL24	2007	A34 QUEENSWAY (NORTH OF ASDA) STAFFORD	NB	1164	1428	264	23%	7	×	×
	2007		SB	960	954	-6	-1%	0	✓	✓
SF3	2005	SOUTH WALLS	WB	914	1028	114	13%	4	✓	✓
SF4	2005	NORTH WALLS	SEB	246	201	-45	-18%	3	✓	✓
SF5	2005	A34 QUEENSWAY EAST ENTRY/EXIT TO GAOL SQUARE	EB	1190	1183	-8	-1%	0	✓	✓
	2005		WB	791	685	-106	-13%	4	✓	✓
SF6	2005	A518 CHELL ROAD	WB	1090	988	-102	-9%	3	✓	✓
	2005		EB	1067	890	-177	-17%	6	×	×
SF7	2005	A34 FOREGATE ROAD NORTH ENTRY/EXIT TO GAOL SQUARE	NB	1046	1031	-15	-1%	0	✓	✓
	2005		SB	1509	1679	169	11%	4	✓	✓
ACLS01	2004	B5066 SANDON ROAD, HILDERSTONE	NB	213	202	-11	-5%	1	✓	✓
	2004		SB	532	475	-57	-11%	3	✓	✓
ACLS02	2005	D321 ST. THOMAS LANE, STAFFORD	EB	70	66	-4	-5%	0	✓	✓
	2005		WB	459	404	-55	-12%	3	✓	✓
ACLS03	2006	C375 SILKMORE LANE, STAFFORD	NB	400	360	-40	-10%	2	✓	✓
	2006		SB	400	399	-1	0%	0	✓	✓
ACLS04	2006	C278 COMMON LANE, BEDNALL	NB	38	92	54	144%	7	×	✓
	2006		SB	36	102	67	188%	8	×	✓
ACLS05	2006	D3041 PARKSIDE AVENUE, STAFFORD	NB	173	246	73	42%	5	✓	✓
	2006		SB	113	196	83	73%	7	×	✓
ACLS07	2004	D304 ACTON HILL ROAD ACTON TRUSSELL	SB	140	140	0	0%	0	✓	✓
	2004		NB	88	62	-27	-30%	3	✓	✓
ACLS08	2006	D34 BARNES ROAD,STAFFORD	SB	5	61	56	1039%	10	×	✓
	2006		NB	110	87	-23	-21%	2	✓	✓
ACLS10	2006	D34 BARNES ROAD,STAFFORD	NB	40	115	75	189%	9	×	✓
	2006		SB	120	100	-21	-17%	2	✓	✓
ACLS11	2005	D41 PARKSIDE AVENUE, STAFFORD	EB	52	87	35	68%	4	✓	✓
	2005		WB	96	61	-35	-36%	4	✓	✓
ACLS12	2005	B5027 DAYHILLS, MILWICH	EB	68	73	5	7%	1	✓	✓
	2005		WB	90	110	20	22%	2	✓	✓
ACLS13	2005	C93 HYDE LEA, STAFFORD	SB	38	57	19	52%	3	✓	✓
	2005		NB	73	74	1	1%	0	✓	✓
ACLS14	2004	A519 SLINDON NR. ECCLESHALL	SB	195	209	14	7%	1	✓	✓
	2004		NB	229	234	4	2%	0	✓	✓
ACLS15	2004	C27 TIXALL ROAD, TIXALL	EB	150	166	16	11%	1	✓	✓
	2004		WB	290	212	-78	-27%	5	✓	✓
ACLS16	2004	C28 TIXALL ROAD, TIXALL	EB	133	266	133	100%	9	×	×
	2004		WB	465	510	45	10%	2	✓	✓
ACLS17	2004	C27 HOLDIFORD ROAD, TIXALL	NB	301	411	109	36%	6	×	×
	2004		SB	125	143	18	14%	2	✓	✓
LCLS01	2006	A51 LICHFIELD ROADSANDON	NB	511	529	18	3%	1	✓	✓
	2006		SB	506	501	-5	-1%	0	✓	✓
LCLS04	2006	A513 WEEPING CROSS STAFFORD	EB	507	469	-38	-7%	2	✓	✓
	2006		WB	536	542	6	1%	0	✓	✓
LCLS05	2007	A34 STONE ROAD TITTENSOR CHASE	SB	1083	1060	-23	-2%	1	✓	✓
LCLS06	2007	A34 STONE ROAD DARLASTON	NB	1110	1015	-95	-9%	3	✓	✓
LCLS07	2007	A34 STONE ROAD DARLASTON	SB	1043	1060	17	2%	1	✓	✓

Ref	Year	Count Location	Direction	2007 AM Peak - PCUs						
				Count	Modelled	Diff	%Diff	GEH	GEH criteria	Flow criteria
LCLS08	2007	A34 THE FILLEYBROOKS STONE	SB	1229	1124	-105	-9%	3	✓	✓
LCLS09	2007	A34 CANNOCK ROAD STAFFORD	NB	763	847	83	11%	3	✓	✓
	2007		SB	715	755	40	6%	1	✓	✓
LCLS10	2007	A34 CANNOCK ROAD BROCTON	NB	808	803	-5	-1%	0	✓	✓
	2007		SB	754	644	-111	-15%	4	✓	✓
LCLS11	2007	A34 CANNOCK ROAD BROCTON	NB	767	880	114	15%	4	✓	✓
	2007		SB	654	685	31	5%	1	✓	✓
PVOL07	2007	A34 STONE ROAD STAFFORD	NB	684	576	-107	-16%	4	✓	×
	2007		SB	979	977	-2	0%	0	✓	✓
LCLS13	2007	A449 MOSS PIT STAFFORD	NB	688	964	276	40%	10	×	×
	2007		SB	686	860	174	25%	6	×	×
LCLS14	2007	A449 DUNSTON	NB	848	830	-18	-2%	1	✓	✓
	2007		SB	651	604	-46	-7%	2	✓	✓
LCLS15	2007	A51 LICHFIELD ROAD COLWICH	NB	628	636	8	1%	0	✓	✓
	2007		SB	628	584	-44	-7%	2	✓	✓
LCLS16	2007	A34 STONE ROAD STAFFORD	NB	524	557	33	6%	1	✓	✓
	2007		SB	1092	1202	110	10%	3	✓	✓
LCLS17	2007	A449 RISING BROOK STAFFORD	NB	704	1083	380	54%	13	×	×
	2007		SB	661	814	153	23%	6	×	×
LCLS18	2007	A518 NEWPORT ROAD STAFFORD	EB	549	694	146	27%	6	×	×
	2007		WB	289	300	11	4%	1	✓	✓
LCLS19	2007	A518 WESTON ROAD STAFFORD	EB	544	606	62	11%	3	✓	✓
	2007		WB	843	795	-48	-6%	2	✓	✓
PVOL01	2007	A34 RADFORD BANK	EB	1128	1095	-33	-3%	1	✓	✓
	2007		WB	1132	1473	341	30%	9	×	×
PVOL02	2007	B5405 WOODSEAVES ROAD, BROAD HEATH	EB	283	176	-107	-38%	7	×	×
	2007		WB	155	161	7	4%	1	✓	✓
PVOL03	2007	B5026 STONE ROAD, ECCLESHALL	EB	232	234	2	1%	0	✓	✓
	2007		WB	173	191	18	10%	1	✓	✓
PVOL04	2007	A51 HIXON	NB	828	784	-44	-5%	2	✓	✓
	2007		SB	683	671	-12	-2%	0	✓	✓
PVOL05	2007	A5013 STAFFORD ROAD, ECCLESHALL	NB	247	237	-11	-4%	1	✓	✓
	2007		SB	441	441	0	0%	0	✓	✓
PVOL06	2007	A518 WESTON ROAD STAFFORD	EB	600	606	6	1%	0	✓	✓
	2007		WB	868	795	-73	-8%	3	✓	✓
PVOL10	2007	C93 HYDE LEA BANK STAFFORD	NB	108	74	-34	-31%	4	✓	✓
	2007		SB	46	57	11	24%	2	✓	✓
PVOL11	2007	A513 MAIN ROAD MILFORD	EB	457	411	-46	-10%	2	✓	✓
	2007		WB	425	419	-6	-1%	0	✓	✓
PVOL12	2007	C252 BLACKHEATH LANE STAFFORD	NB	517	463	-54	-10%	2	✓	✓
	2007		SB	271	264	-7	-3%	0	✓	✓
PVOL13	2007	D6 COMMON ROAD STAFFORD	NB	192	61	-131	-68%	12	×	×
	2007		SB	370	101	-269	-73%	18	×	×
PVOL14	2007	A34 LICHFIELD ROAD STAFFORD	NB	681	741	60	9%	2	✓	✓
	2007		SB	825	898	73	9%	2	✓	✓
PVOL15	2007	A449 MOSS PIT STAFFORD	NB	776	946	170	22%	6	×	×
	2007		SB	952	909	-43	-5%	1	✓	✓
PVOL16	2007	A34 QUEENSWAY (GAOL SQUARE) STAFFORD CMT	EB	1198	1183	-15	-1%	0	✓	✓
	2007		WB	925	835	-90	-10%	3	✓	✓
SDR01	2006	B5026 ECCLESHALL ROAD WALTON	EB	353	303	-51	-14%	3	✓	✓
	2006		WB	292	316	24	8%	1	✓	✓
SDR02	2006	B5026 ECCLESHALL ROAD NORTON BRIDGE	SB	351	366	15	4%	1	✓	✓
	2006		NB	275	374	99	36%	5	✓	✓
LCLS31	2007	A51 LONDON ROAD WESTON	NEB	722	722	0	0%	0	✓	✓
	2007		SWB	697	745	48	7%	2	✓	✓
SDR04	2007	A51 LICHFIELD ROAD SANDON	NB	648	680	32	5%	1	✓	✓
	2007		SB	976	753	-222	-23%	8	×	×
SDR05	2007	C28 TIXALL ROAD STAFFORD	EB	92	93	0	1%	0	✓	✓
	2007		WB	274	393	119	44%	7	×	×
SDR06	2007	C252 BLACKHEATH LANE STAFFORD	NB	643	570	-73	-11%	3	✓	✓
	2007		SB	262	426	164	62%	9	×	×
SDR07	2007	A5013 CRESWELL GROVE CRESWELL	SB	721	775	54	7%	2	✓	✓
	2007		NB	395	462	67	17%	3	✓	✓
SF9	2005	B5066 GAOL ROAD	NB	485	465	-19	-4%	1	✓	✓
	2005		SB	502	407	-95	-19%	4	✓	✓
SDR09	2006	D3041 PARKSIDE AVENUE STAFFORD	SB	82	61	-20	-25%	2	✓	✓
	2006		NB	44	87	43	96%	5	✓	✓
SDR10	2006	A5103 ECCLESHALL ROAD STAFFORD	SB	1009	847	-162	-16%	5	✓	×
	2006		NB	502	414	-88	-18%	4	✓	✓
SDR11	2006	A5013 ECCLESHALL ROAD STAFFORD	SB	1036	1003	-33	-3%	1	✓	✓
	2006		NB	478	517	39	8%	2	✓	✓

Ref	Year	Count Location	Direction	2007 AM Peak - PCUs						
				Count	Modelled	Diff	%Diff	GEH	GEH criteria	Flow criteria
SDR12	2006	D3040 FIRST AVENUE STAFFORD	NB	75	80	5	6%	1	✓	✓
	2006		SB	81	57	-24	-30%	3	✓	✓
SDR14	2006	D3040 HOLMCROFT ROAD STAFFORD	WB	123	158	35	29%	3	✓	✓
	2006		EB	142	193	51	36%	4	✓	✓
SDR15	2006	A518 UTTOXETER ROAD STOWE	EB	362	365	3	1%	0	✓	✓
	2006		WB	355	370	15	4%	1	✓	✓
SDR16	2007	A518 WESTON BANK WESTON	EB	495	511	16	3%	1	✓	✓
	2007		WB	832	793	-39	-5%	1	✓	✓
SDR19	2006	A519 NEWCASTLE ROAD COTES HEATH	NB	201	234	33	16%	2	✓	✓
	2006		SB	171	209	38	22%	3	✓	✓
SDR20	2006	A519 NEWCASTLE ROAD HANCHURCH	SB	273	235	-38	-14%	2	✓	✓
	2006		NB	235	232	-3	-1%	0	✓	✓
SDR21	2006	B5027 STONE ROAD MILWICH	EB	74	73	0	0%	0	✓	✓
	2006		WB	109	110	1	1%	0	✓	✓
SDR22	2006	B5027 THE LEVEL MILWICH	EB	80	60	-20	-25%	2	✓	✓
	2006		WB	101	65	-36	-36%	4	✓	✓
SDR23	2006	C279 MILL LANE ACTON TRUSSELL	SB	150	171	22	15%	2	✓	✓
	2006		NB	325	185	-140	-43%	9	×	×
TC23-1	2005	A513 BEACONSIDE (E)	WB	640	564	-76	-12%	3	✓	✓
	2005		EB	932	1012	79	8%	3	✓	✓
SDR26	2006	D44 ALSTONFIELDS ROAD STAFFORD	EB	256	290	34	13%	2	✓	✓
	2006		WB	324	291	-33	-10%	2	✓	✓
SDR27	2006	C26 TEDDESLEY ROAD BROCTON	EB	153	141	-12	-8%	1	✓	✓
	2006		WB	308	118	-190	-62%	13	×	×
SDR28	2006	A518 NEWPORT ROAD HAUGHTON	EB	460	429	-31	-7%	1	✓	✓
	2006		WB	271	247	-23	-9%	1	✓	✓
SDR29	2006	A5005 LIGHTWOOD ROAD ROUGH CLOSE	NB	271	165	-106	-39%	7	×	×
	2006		SB	309	202	-106	-34%	7	×	×
SDR30	2005	C26 TEDDESLEY ROAD ACTON TRUSSELL	SB	187	189	1	1%	0	✓	✓
	2005		NB	119	130	12	10%	1	✓	✓
SDR31	2006	C278 BEDNALL ROAD ACTON TRUSSELL	WB	140	144	4	3%	0	✓	✓
	2006		EB	77	111	34	43%	3	✓	✓
VOL01	2004	B5066 NORTH WALLS STAFFORD	EB	180	167	-14	-8%	1	✓	✓
TC03-1	2004	CHELL ROAD	SWB	861	1000	139	16%	5	✓	×
	2004		NEB	1035	908	-126	-12%	4	✓	✓
TC03-2	2004	BROAD STREET	WB	57	63	5	9%	1	✓	✓
	2004		EB	358	635	277	77%	12	×	×
TC03-4	2004	BROAD EYE HILL	SEB	832	803	-29	-3%	1	✓	✓
	2004		NWB	557	580	23	4%	1	✓	✓
TC51-6	2004	BRIDGE STREET SERVICE ROAD	SEB	1	1	0	-8%	0	✓	✓
	2004		NWB	115	108	-7	-7%	1	✓	✓
TC51-7	2004	OUTBOUND LICHFIELD ROAD CENTRAL	WB	51	43	-8	-16%	1	✓	✓
TC51-7	2004	INBOUND LICHFIELD ROAD CENTRAL	WB	114	132	18	16%	2	✓	✓
VOL02	2005	C230 BILLINGTON LANE DERRINGTON	NB	167	94	-73	-44%	6	×	✓
	2005		SB	69	53	-16	-23%	2	✓	✓
ACLS19	2005	C230 DERRINGTON LANE DERRINGTON	NB	128	60	-69	-53%	7	×	✓
	2005		SB	75	75	0	0%	0	✓	✓
LCLS03	2006	A518 CASTLE BANKSTAFFORD	EB	579	694	115	20%	5	✓	×
	2006		WB	297	300	2	1%	0	✓	✓
CP12-14	2007	CAR PARK 12-14	NB	348	338	-10	-3%	1	✓	✓
	2007		SB	45	44	-1	-2%	0	✓	✓
CP1-2	2007	CAR PARK 1-2	SB	65	57	-8	-13%	1	✓	✓
	2007		NB	28	30	2	6%	0	✓	✓
CP3-4	2007	CAR PARK 3-4	NB	89	76	-13	-14%	1	✓	✓
	2007		SB	13	10	-3	-24%	1	✓	✓
CP5	2007	CAR PARK 5	EB	71	62	-9	-13%	1	✓	✓
	2007		WB	0	0	0	0%	0	✓	✓
CP11	2007	CAR PARK 11	WB	42	42	0	-1%	0	✓	✓
	2007		EB	25	24	-1	-4%	0	✓	✓
CP16	2007	CAR PARK 16	NB	74	72	-2	-3%	0	✓	✓
	2007		SB	20	19	-1	-3%	0	✓	✓
CP17	2007	CAR PARK 17	NB	115	108	-7	-7%	1	✓	✓
	2007		SB	1	1	0	-8%	0	✓	✓
PC90	2006	D3010 CASTLE STREET	NEB	27	33	6	20%	1	✓	✓
	2006		SWB	38	20	-18	-47%	3	✓	✓

Table A.2 – Stafford Link Flow Calibration – PM Peak 2007

Ref	Year	Count Location	Direction	2007 PM Peak - PCUs						
				Count	Modelled	Diff	%Diff	GEH	GEH criteria	Flow criteria
RSI01	2007	A449 MOSS PIT	NB	966	850	-116	-12%	4	✓	✓
	2007		SB	679	761	82	12%	3	✓	✓
RSI02	2007	A34 STONE ROAD	SB	548	673	125	23%	5	✓	×
	2007		NB	814	820	6	1%	0	✓	✓
RSI03	2007	A34 CANNOCK ROAD	NB	648	722	74	11%	3	✓	✓
	2007		SB	532	642	110	21%	5	✓	×
RSI04	2007	A513 MILFORD ROAD	WB	398	361	-37	-9%	2	✓	✓
	2007		EB	364	489	125	34%	6	×	×
RSI05	2007	A518 WESTON ROAD	WB	666	699	33	5%	1	✓	✓
	2007		EB	991	925	-66	-7%	2	✓	✓
RSI06	2007	A518 CASTLE BANK	EB	203	305	102	50%	6	×	×
	2007		WB	529	441	-88	-17%	4	✓	✓
RSI07	2007	A5013 ECCLESHALL ROAD	EB	554	593	39	7%	2	✓	✓
	2007		WB	701	805	104	15%	4	✓	✓
RSI08	2007	A513 BEACONSIDE	EB	682	626	-56	-8%	2	✓	✓
	2007		WB	1002	931	-72	-7%	2	✓	✓
RSI09	2007	DOXEY ROAD	EB	118	143	25	21%	2	✓	✓
	2007		WB	318	374	56	18%	3	✓	✓
RSI10	2007	B5066 SANDON ROAD	SB	400	368	-32	-8%	2	✓	✓
	2007		NB	504	347	-156	-31%	8	×	×
RSI11	2007	TIXALL ROAD	WB	224	266	42	19%	3	✓	✓
	2007		EB	598	570	-28	-5%	1	✓	✓
TRADS01	2007	M6 J13-14	NB	4766	4673	-93	-2%	1	✓	✓
	2007		SB	5068	4822	-246	-5%	3	✓	✓
TRADS02	2007	M6 J14-15	NB	4186	4293	107	3%	2	✓	✓
	2007		SB	4652	4507	-145	-3%	2	✓	✓
TRADS03	2007	M6 J12-13	NB	4607	4605	-2	0%	0	✓	✓
	2007		SB	4923	4858	-65	-1%	1	✓	✓
M6 J13	2005	A449 (N) SLIP	NB	984	850	-133	-14%	4	✓	✓
	2005		SB	692	826	134	19%	5	✓	×
M6 J13	2005	M6 (S) SLIP	SB	265	458	193	73%	10	×	×
	2005		NB	323	385	62	19%	3	✓	✓
M6 J13	2005	A449 (S) SLIP	SB	687	702	16	2%	1	✓	✓
	2005		NB	868	831	-37	-4%	1	✓	✓
M6 J13	2005	M6 (N) SLIP	NB	503	453	-50	-10%	2	✓	✓
	2005		SB	556	422	-134	-24%	6	×	×
M6 J13	2005	ROUNDABOUT	CW	354	370	16	5%	1	✓	✓
	2005		CW	781	738	-43	-5%	2	✓	✓
	2005		CW	417	421	4	1%	0	✓	✓
	2005		CW	782	799	17	2%	1	✓	✓
M6 RBT	2005	ON ROUNDABOUT	CW	1064	1179	114	11%	3	✓	✓
	2005	ON ROUNDABOUT	CW	1264	1217	-48	-4%	1	✓	✓
	2005	ON ROUNDABOUT	CW	628	731	103	16%	4	✓	×
	2005	ON ROUNDABOUT	CW	1060	1029	-32	-3%	1	✓	✓
	2005	ON ROUNDABOUT	CW	963	1059	96	10%	3	✓	✓
	2005	TO CRESSWELL GROVE	WB	763	729	-34	-4%	1	✓	✓
	2005	FROM CRESSWELL GROVE	EB	540	505	-35	-7%	2	✓	✓
	2005	TO M6 NORTH	NB	340	467	126	37%	6	×	×
	2005	FROM M6 NORTH	SB	371	460	89	24%	4	✓	✓
	2005	TO A34	CW	1007	945	-62	-6%	2	✓	✓
	2005	FROM A34	CW	1020	891	-129	-13%	4	✓	✓
	2005	TO ECCLESHALL ROAD	EB	588	593	5	1%	0	✓	✓
	2005	FROM ECCLESHALL ROAD	WB	751	805	54	7%	2	✓	✓
	2005	TO M6 SOUTH	SB	848	775	-74	-9%	3	✓	✓
	2005	TO M6 NORTH	NB	865	848	-17	-2%	1	✓	✓
RBT01	2004	FROM QUEENSWAY	SB	1124	1411	287	25%	8	×	×
	2004	ROUNDABOUT	CW	1015	1120	105	10%	3	✓	✓
	2004	ROUNDABOUT	CW	941	1046	105	11%	3	✓	✓
	2004	TO LICHFIELD ROAD	EB	708	979	271	38%	9	×	×
	2004	FROM LICHFIELD ROAD	WB	649	700	51	8%	2	✓	✓
	2004	TO WOLVERHAMPTON ROAD	SB	804	871	67	8%	2	✓	✓
	2004	FROM WOLVERHAMPTON ROAD	NB	598	609	11	2%	0	✓	✓
	2004	ROUNDABOUT	CW	786	875	89	11%	3	✓	✓
	2004	TO NEWPORT ROAD	WB	544	640	96	18%	4	✓	✓
	2004	ROUNDABOUT	CW	840	844	5	1%	0	✓	✓
	2004	FROM NEWPORT ROAD	EB	808	625	-183	-23%	7	×	×
	2004	ROUNDABOUT	CW	1737	1633	-104	-6%	3	✓	✓
	2004	TO QUEENSWAY	NB	1201	1036	-165	-14%	5	✓	✓
	2004	ROUNDABOUT	CW	599	688	89	15%	4	✓	✓
PC03	2004	A518 TENTERBANKS	SEB	836	772	-64	-8%	2	✓	✓
	2004		NWB	849	961	112	13%	4	✓	✓

Ref	Year	Count Location	Direction	2007 PM Peak - PCUs						
				Count	Modelled	Diff	%Diff	GEH	GEH criteria	Flow criteria
PC20	2004	D385 SCHOOL LANE	NEB	13	82	69	546%	10	×	✓
	2004		SWB	20	18	-2	-9%	0	✓	✓
PC39	2005	A519 NEWCASTLE ROAD	NB	244	246	2	1%	0	✓	✓
	2005		SB	266	296	31	12%	2	✓	✓
PC42	2005	A5013 CRESSWELL GROVE	SEB	424	505	81	19%	4	✓	✓
	2005		NWB	751	729	-23	-3%	1	✓	✓
PC45	2005	A34 QUEENSWAY	SEB	875	998	123	14%	4	✓	✓
	2005		NWB	1179	774	-405	-34%	13	×	×
PC53	2006	A519 NEWCASTLE ROAD	NEB	565	569	5	1%	0	✓	✓
	2006		SWB	657	668	11	2%	0	✓	✓
PC54	2006	A5013 STAFFORD ROAD	SEB	254	230	-24	-9%	2	✓	✓
	2006		NWB	360	403	43	12%	2	✓	✓
PC56	2006	A51	SEB	540	593	52	10%	2	✓	✓
	2006		NWB	504	516	11	2%	0	✓	✓
PC60	2006	A34 STONE ROAD	NB	1379	1451	72	5%	2	✓	✓
	2006		SB	974	1250	276	28%	8	×	×
PC62	2006	D385 SCHOOL LANE	NEB	8	82	74	916%	11	×	✓
	2006		SWB	26	18	-8	-32%	2	✓	✓
PC63	2006	A518	NEB	563	560	-2	0%	0	✓	✓
	2006		SWB	501	481	-20	-4%	1	✓	✓
PC64	2006	A34 STONE ROAD	NEB	1311	989	-323	-25%	10	×	×
	2006		SWB	1694	1096	-598	-35%	16	×	×
PC65	2006	A51 STONE ROAD	SEB	361	313	-48	-13%	3	✓	✓
	2006		NWB	347	326	-21	-6%	1	✓	✓
PC08	2004	A513	SEB	547	686	139	25%	6	×	×
	2004		NWB	443	477	35	8%	2	✓	✓
PC48	2006	D33 WEST WAY	SEB	390	326	-63	-16%	3	✓	✓
	2006		NWB	501	474	-26	-5%	1	✓	✓
PC71	2007	A520 LONGTON ROAD	NB	559	537	-22	-4%	1	✓	✓
	2007		SB	382	344	-37	-10%	2	✓	✓
PC72	2007	A513 BEACONSIDE	SEB	634	541	-93	-15%	4	✓	✓
	2007		NWB	670	683	14	2%	1	✓	✓
PC73	2007	A34	NB	546	582	36	7%	2	✓	✓
	2007		SB	574	619	45	8%	2	✓	✓
PC74	2007	A518 UTTOXETER ROAD	NEB	354	347	-7	-2%	0	✓	✓
	2007		SWB	428	412	-15	-4%	1	✓	✓
PC75	2007	B5026 CHESTER ROAD	SEB	96	122	26	27%	2	✓	✓
	2007		NWB	217	235	18	8%	1	✓	✓
PC76	2007	A520 STAFFORD ROAD	NEB	879	959	80	9%	3	✓	✓
	2007		SWB	826	849	23	3%	1	✓	✓
PC77	2007	A34 STAFFORD ROAD	SEB	1334	1420	87	7%	2	✓	✓
	2007		NWB	1943	1789	-153	-8%	4	✓	✓
PC78	2007	A518 WESTON ROAD	NEB	899	902	3	0%	0	✓	✓
	2007		SWB	756	743	-13	-2%	0	✓	✓
PC79	2007	B5066 SANDON ROAD	NEB	441	729	288	65%	12	×	×
	2007		SWB	377	435	58	15%	3	✓	✓
PC80	2007	A519 NEWCASTLE ROAD	NB	177	209	32	18%	2	✓	✓
	2007		SB	245	228	-17	-7%	1	✓	✓
PC81	2007	A449 WOLVERHAMPTON ROAD	SEB	617	767	150	24%	6	×	×
	2007		NWB	830	847	17	2%	1	✓	✓
PC82	2007	A34	SEB	1160	1204	44	4%	1	✓	✓
	2007		NWB	1108	1107	-1	0%	0	✓	✓
TC11-1	2004	D67 KINGSWAY	SB	107	101	-6	-6%	1	✓	✓
	2004		NB	283	280	-3	-1%	0	✓	✓
TC11-2	2004	A518 NEWPORT ROAD (E)	WB	1156	1141	-14	-1%	0	✓	✓
	2004		EB	491	466	-25	-5%	1	✓	✓
TC11-3	2004	A518 NEWPORT ROAD (W)	EB	598	563	-34	-6%	1	✓	✓
	2004		WB	1087	1060	-27	-2%	1	✓	✓
TC13-1	2004	A519 NEWCASTLE ROAD (NE)	SWB	224	296	72	32%	4	✓	✓
	2004		NEB	179	246	67	37%	5	✓	✓
TC13-3	2004	A519 NEWCASTLE ROAD (SW)	NEB	223	277	54	24%	3	✓	✓
	2004		SWB	273	285	12	4%	1	✓	✓
TC13-4	2004	A51 STONE ROAD (W)	EB	207	198	-9	-4%	1	✓	✓
	2004		WB	375	253	-123	-33%	7	×	×
TC14-3	2004	A513 MAIN ROAD (SE)	NWB	515	546	31	6%	1	✓	✓
	2004		SEB	529	758	229	43%	9	×	×
SDR38	2006	A513 MAIN ROAD MILFORD	EB	406	566	160	39%	7	×	×
	2006		WB	440	503	63	14%	3	✓	✓
TC20-1	2004	A449 RISING BROOK (N)	SB	944	1076	132	14%	4	✓	✓
	2004		NB	967	957	-10	-1%	0	✓	✓
TC20-2	2004	C75 RICKERSCOTE ROAD	WB	539	525	-14	-3%	1	✓	✓
	2004		EB	703	571	-132	-19%	5	✓	×

Ref	Year	Count Location	Direction	2007 PM Peak - PCUs						
				Count	Modelled	Diff	%Diff	GEH	GEH criteria	Flow criteria
TC20-4	2004	D32 CHURCHILL WAY	EB	33	0	-33	-100%	8	×	✓
	2004		WB	58	73	15	26%	2	✓	✓
TC22-1	2004	D8 CORPORATION ST (NW)	SEB	300	317	16	5%	1	✓	✓
	2004		NWB	334	299	-35	-11%	2	✓	✓
TC22-2	2004	D7 PROSPECT ROAD	WB	84	53	-32	-37%	4	✓	✓
	2004		EB	200	188	-12	-6%	1	✓	✓
TC22-3	2004	D8 CORPORATION ST (SE)	NWB	407	555	148	36%	7	×	×
	2004		SEB	371	396	25	7%	1	✓	✓
TC22-4	2004	D7 CROOKED BRIDGE ROAD	EB	298	256	-42	-14%	3	✓	✓
	2004		WB	184	297	113	62%	7	×	×
TC23-3	2005	A513 BEACONSIDE (W)	EB	603	626	23	4%	1	✓	✓
	2005		WB	1024	931	-93	-9%	3	✓	✓
TC24-2	2005	D14 SANDALWOOD DRIVE	WB	15	28	13	83%	3	✓	✓
	2005		EB	37	97	59	159%	7	×	✓
TC24-3	2005	B5066 SANDON ROAD (S)	NB	775	769	-6	-1%	0	✓	✓
	2005		SB	606	511	-95	-16%	4	✓	✓
TC25-1	2005	D6 COMMON ROAD (N)	SB	237	366	129	55%	7	×	×
	2005		NB	322	352	31	10%	2	✓	✓
TC25-2	2005	D44 ASTONFIELDS ROAD	WB	294	229	-65	-22%	4	✓	✓
	2005		EB	349	334	-15	-4%	1	✓	✓
TC25-3	2005	D6 COMMON ROAD (S)	NB	280	318	39	14%	2	✓	✓
	2005		SB	169	227	58	35%	4	✓	✓
TC28-1	2005	A513 BEACONSIDE (N)	SB	784	730	-54	-7%	2	✓	✓
	2005		NB	749	728	-21	-3%	1	✓	✓
TC28-3	2005	A513 BEACONSIDE (S)	NB	936	914	-22	-2%	1	✓	✓
	2005		SB	711	693	-18	-3%	1	✓	✓
TC29-3	2005	D68 TOLLGATE DRIVE	NEB	273	305	32	12%	2	✓	✓
	2005		SWB	84	62	-22	-26%	3	✓	✓
TC30-2	2005	A513 BEACONSIDE (S)	NB	904	885	-19	-2%	1	✓	✓
	2005		SB	765	642	-123	-16%	5	✓	×
TC40-3	2006	D37 PARK STREET	WB	122	174	52	42%	4	✓	✓
TC41-3	2006	D37 TELEGRAPH STREET	WB	16	0	-16	-100%	6	×	✓
TC42-3	2006	D37 AUSTIN FRIARS	EB	214	192	-21	-10%	2	✓	✓
TC43-2	2006	D37 FRIARS ROAD	NB	144	174	30	21%	2	✓	✓
	2006		SB	163	192	30	18%	2	✓	✓
TC45-1	2007	C376 RIVERWAY (N)	SB	545	529	-16	-3%	1	✓	✓
	2007		NB	567	454	-112	-20%	5	✓	×
TC45-2	2007	D3019 FAIRWAY	WB	286	217	-69	-24%	4	✓	✓
	2007		EB	187	178	-9	-5%	1	✓	✓
TC45-3	2007	C376 RIVERWAY (S)	NB	423	341	-82	-19%	4	✓	✓
	2007		SB	501	455	-46	-9%	2	✓	✓
TC46-4	2007	A518 LAMMASCOTE ROAD	EB	1079	1058	-21	-2%	1	✓	✓
	2007		WB	1022	930	-92	-9%	3	✓	✓
TC48-1	2007	C376 RIVERWAY	SWB	427	455	28	6%	1	✓	✓
	2007		NEB	299	341	43	14%	2	✓	✓
TC48-2	2007	A34 LICHFIELD ROAD (SE)	NWB	484	668	184	38%	8	×	×
	2007		SEB	899	1225	326	36%	10	×	×
TC48-3	2007	N/A UNKNOWN	NEB	326	359	33	10%	2	✓	✓
	2007		SWB	62	179	118	191%	11	×	×
TC49-1	2007	A34 LICHFIELD ROAD (NW)	SEB	1055	1367	312	30%	9	×	×
	2007		NWB	836	892	56	7%	2	✓	✓
TC49-2	2007	D3019 ST LEONARDS AVENUE	WB	161	232	71	44%	5	✓	✓
	2007		EB	166	79	-87	-52%	8	×	✓
TC50-2	2007	D3019 ST LEONARDS AVE (E)	WB	189	198	9	5%	1	✓	✓
	2007		EB	32	69	37	119%	5	✓	✓
TC52-1	2007	U/C TESCO SUPERSTORE	NB	405	420	15	4%	1	✓	✓
	2007		SB	419	367	-51	-12%	3	✓	✓
TC52-2	2007	A518 NEWPORT ROAD (W)	EB	474	483	9	2%	0	✓	✓
	2007		WB	1041	1046	5	0%	0	✓	✓
TC52-3	2007	A518 NEWPORT ROAD (E)	WB	992	1004	13	1%	0	✓	✓
	2007		EB	411	494	83	20%	4	✓	✓
TC53-1	2007	D58 BRIDGE STREET	SB	485	565	81	17%	4	✓	✓
	2007		NB	37	51	14	37%	2	✓	✓
TC53-2	2007	A518 LICHFIELD ROAD	WB	640	640	0	0%	0	✓	✓
	2007		EB	647	625	-22	-3%	1	✓	✓
TC53-3	2007	A518 NEWPORT ROAD	EB	368	307	-61	-17%	3	✓	✓
	2007		WB	809	836	28	3%	1	✓	✓
TC54-1	2007	A5187 STATION ROAD	SB	840	781	-59	-7%	2	✓	✓
	2007		NB	802	839	38	5%	1	✓	✓
TC54-3	2007	A518 NEWPORT ROAD (W)	EB	635	585	-49	-8%	2	✓	✓
	2007		WB	1231	1101	-129	-11%	4	✓	✓

Ref	Year	Count Location	Direction	2007 PM Peak - PCUs						
				Count	Modelled	Diff	%Diff	GEH	GEH criteria	Flow criteria
TC32-1	2005	A519 NEWPORT ROAD (N)	SB	351	355	3	1%	0	✓	✓
	2005		NB	299	300	1	0%	0	✓	✓
TC33-2	2005	B5027 LICHFIELD STREET	WB	439	451	12	3%	1	✓	✓
	2005		EB	464	429	-35	-7%	2	✓	✓
TC37-1	2006	B5026 STONE ROAD (NE)	SWB	199	191	-7	-4%	1	✓	✓
	2006		NEB	189	169	-19	-10%	1	✓	✓
TC38-3	2006	B5066 SANDON ROAD	NB	456	447	-10	-2%	0	✓	✓
	2006		SB	230	228	-2	-1%	0	✓	✓
TC47-3	2007	A34 LICHFIELD ROAD (SE)	NWB	943	956	13	1%	0	✓	✓
	2007		SEB	1577	1576	0	0%	0	✓	✓
TC06-2	2004	COPE STREET	NB	595	657	63	11%	3	✓	✓
TC06-3	2004	SOUTH WALLS (W)	EB	400	477	77	19%	4	✓	✓
	2004		WB	359	337	-22	-6%	1	✓	✓
TC08-1	2004	GREENGATE STREET (N)	SB	165	255	90	55%	6	×	✓
TC08-2	2004	SOUTH WALLS	WB	318	287	-31	-10%	2	✓	✓
	2004		EB	247	346	99	40%	6	×	✓
TC08-4	2004	MILL BANK	EB	370	525	155	42%	7	×	×
	2004		WB	182	205	22	12%	2	✓	✓
TC02-3	2004	A34 (N)	SB	934	1266	332	36%	10	×	×
	2004		NB	1200	1475	275	23%	8	×	×
TC10-2	2004	A513 BEACONSIDE	WB	1125	899	-227	-20%	7	×	×
	2004		EB	932	841	-91	-10%	3	✓	✓
TC10-4	2004	A34 TO/FROM M6 J14	EB	890	838	-53	-6%	2	✓	✓
	2004		WB	903	833	-70	-8%	2	✓	✓
PVOL24	2007	A34 QUEENSWAY (NORTH OF ASDA) STAFFORD	NB	1230	1071	-159	-13%	5	✓	✓
	2007		SB	1106	1292	186	17%	5	✓	×
SF3	2005	SOUTH WALLS	WB	584	517	-67	-11%	3	✓	✓
SF4	2005	NORTH WALLS	SEB	634	768	134	21%	5	✓	×
SF5	2005	A34 QUEENSWAY EAST ENTRY/EXIT TO GAOL SQUARE	EB	892	998	106	12%	3	✓	✓
	2005		WB	1292	1216	-76	-6%	2	✓	✓
SF6	2005	A518 CHELL ROAD	WB	1070	872	-198	-19%	6	×	×
	2005		EB	1136	1084	-52	-5%	2	✓	✓
SF7	2005	A34 FOREGATE ROAD NORTH ENTRY/EXIT TO GAOL SQUARE	NB	1602	1579	-23	-1%	1	✓	✓
	2005		SB	1096	1188	92	8%	3	✓	✓
ACLS01	2004	B5066 SANDON ROAD, HILDERSTONE	NB	458	419	-39	-9%	2	✓	✓
	2004		SB	214	194	-20	-9%	1	✓	✓
ACLS02	2005	D321 ST. THOMAS LANE, STAFFORD	EB	277	272	-5	-2%	0	✓	✓
	2005		WB	98	138	39	40%	4	✓	✓
ACLS03	2006	C375 SILKMORE LANE, STAFFORD	NB	692	616	-76	-11%	3	✓	✓
	2006		SB	618	561	-57	-9%	2	✓	✓
ACLS04	2006	C278 COMMON LANE, BEDNALL	NB	33	105	72	215%	9	×	✓
	2006		SB	22	112	91	422%	11	×	✓
ACLS05	2006	D3041 PARKSIDE AVENUE, STAFFORD	NB	86	101	15	17%	2	✓	✓
	2006		SB	95	238	143	151%	11	×	×
ACLS07	2004	D304 ACTON HILL ROAD ACTON TRUSSELL	SB	50	46	-4	-8%	1	✓	✓
	2004		NB	118	126	8	6%	1	✓	✓
ACLS08	2006	D34 BARNES ROAD,STAFFORD	SB	4	18	14	321%	4	✓	✓
	2006		NB	200	208	8	4%	1	✓	✓
ACLS10	2006	D34 BARNES ROAD,STAFFORD	NB	27	58	31	116%	5	✓	✓
	2006		SB	261	207	-53	-20%	3	✓	✓
ACLS11	2005	D41 PARKSIDE AVENUE, STAFFORD	EB	51	35	-16	-31%	2	✓	✓
	2005		WB	72	145	72	100%	7	×	✓
ACLS12	2005	B5027 DAYHILLS, MILWICH	EB	64	88	24	37%	3	✓	✓
	2005		WB	63	96	32	51%	4	✓	✓
ACLS13	2005	C93 HYDE LEA, STAFFORD	SB	61	76	15	25%	2	✓	✓
	2005		NB	38	60	22	59%	3	✓	✓
ACLS14	2004	A519 SLINDON NR. ECCLESHALL	SB	226	228	3	1%	0	✓	✓
	2004		NB	227	209	-18	-8%	1	✓	✓
ACLS15	2004	C27 TIXALL ROAD, TIXALL	EB	241	187	-54	-22%	4	✓	✓
	2004		WB	124	149	26	21%	2	✓	✓
ACLS16	2004	C28 TIXALL ROAD, TIXALL	EB	352	375	23	7%	1	✓	✓
	2004		WB	134	257	123	91%	9	×	×
ACLS17	2004	C27 HOLDIFORD ROAD, TIXALL	NB	127	165	38	30%	3	✓	✓
	2004		SB	228	314	86	38%	5	✓	✓
LCLS01	2006	A51 LICHFIELD ROADSANDON	NB	568	511	-57	-10%	2	✓	✓
	2006		SB	513	496	-17	-3%	1	✓	✓
LCLS04	2006	A513 WEEPING CROSS STAFFORD	EB	546	678	132	24%	5	✓	×
	2006		WB	531	481	-49	-9%	2	✓	✓
LCLS05	2007	A34 STONE ROAD TITTENSOR CHASE	SB	1129	996	-134	-12%	4	✓	✓
LCLS06	2007	A34 STONE ROAD DARLASTON	NB	1144	1025	-119	-10%	4	✓	✓
LCLS07	2007	A34 STONE ROAD DARLASTON	SB	1057	996	-61	-6%	2	✓	✓

Ref	Year	Count Location	Direction	2007 PM Peak - PCUs						
				Count	Modelled	Diff	%Diff	GEH	GEH criteria	Flow criteria
LCLS08	2007	A34 THE FILLEYBROOKS STONE	SB	1115	876	-239	-21%	8	×	×
LCLS09	2007	A34 CANNOCK ROAD STAFFORD	NB	763	776	13	2%	0	✓	✓
	2007		SB	808	668	-141	-17%	5	✓	×
LCLS10	2007	A34 CANNOCK ROAD BROCTON	NB	758	656	-101	-13%	4	✓	✓
	2007		SB	824	652	-172	-21%	6	×	×
LCLS11	2007	A34 CANNOCK ROAD BROCTON	NB	668	706	38	6%	1	✓	✓
	2007		SB	762	720	-42	-6%	2	✓	✓
PVOL07	2007	A34 STONE ROAD STAFFORD	NB	951	820	-131	-14%	4	✓	✓
	2007		SB	690	673	-16	-2%	1	✓	✓
LCLS13	2007	A449 MOSS PIT STAFFORD	NB	817	777	-40	-5%	1	✓	✓
	2007		SB	663	684	21	3%	1	✓	✓
LCLS14	2007	A449 DUNSTON	NB	769	831	62	8%	2	✓	✓
	2007		SB	857	703	-155	-18%	6	×	×
LCLS15	2007	A51 LICHFIELD ROAD COLWICH	NB	568	558	-10	-2%	0	✓	✓
	2007		SB	595	598	3	1%	0	✓	✓
LCLS16	2007	A34 STONE ROAD STAFFORD	NB	1004	1039	35	3%	1	✓	✓
	2007		SB	677	680	2	0%	0	✓	✓
LCLS17	2007	A449 RISING BROOK STAFFORD	NB	812	896	83	10%	3	✓	✓
	2007		SB	680	866	186	27%	7	×	×
LCLS18	2007	A518 NEWPORT ROAD STAFFORD	EB	416	370	-46	-11%	2	✓	✓
	2007		WB	747	698	-49	-7%	2	✓	✓
LCLS19	2007	A518 WESTON ROAD STAFFORD	EB	742	752	9	1%	0	✓	✓
	2007		WB	674	604	-70	-10%	3	✓	✓
PVOL01	2007	A34 RADFORD BANK	EB	1334	1601	267	20%	7	×	×
	2007		WB	1126	1062	-63	-6%	2	✓	✓
PVOL02	2007	B5405 WOODSEAVES ROAD, BROAD HEATH	EB	151	149	-2	-1%	0	✓	✓
	2007		WB	284	186	-99	-35%	6	×	✓
PVOL03	2007	B5026 STONE ROAD, ECCLESHALL	EB	174	169	-5	-3%	0	✓	✓
	2007		WB	214	191	-23	-11%	2	✓	✓
PVOL04	2007	A51 HIXON	NB	674	654	-20	-3%	1	✓	✓
	2007		SB	814	777	-37	-5%	1	✓	✓
PVOL05	2007	A5013 STAFFORD ROAD, ECCLESHALL	NB	407	376	-31	-8%	2	✓	✓
	2007		SB	242	217	-24	-10%	2	✓	✓
PVOL06	2007	A518 WESTON ROAD STAFFORD	EB	745	752	7	1%	0	✓	✓
	2007		WB	649	604	-44	-7%	2	✓	✓
PVOL10	2007	C93 HYDE LEA BANK STAFFORD	NB	50	60	10	20%	1	✓	✓
	2007		SB	95	76	-19	-20%	2	✓	✓
PVOL11	2007	A513 MAIN ROAD MILFORD	EB	407	542	135	33%	6	×	×
	2007		WB	470	395	-75	-16%	4	✓	✓
PVOL12	2007	C252 BLACKHEATH LANE STAFFORD	NB	269	290	22	8%	1	✓	✓
	2007		SB	580	493	-87	-15%	4	✓	✓
PVOL13	2007	D6 COMMON ROAD STAFFORD	NB	291	121	-170	-58%	12	×	×
	2007		SB	140	65	-75	-53%	7	×	✓
PVOL14	2007	A34 LICHFIELD ROAD STAFFORD	NB	638	979	341	54%	12	×	×
	2007		SB	653	700	48	7%	2	✓	✓
PVOL15	2007	A449 MOSS PIT STAFFORD	NB	989	909	-79	-8%	3	✓	✓
	2007		SB	703	761	58	8%	2	✓	✓
PVOL16	2007	A34 QUEENSWAY (GAOL SQUARE) STAFFORD CMT	EB	932	998	66	7%	2	✓	✓
	2007		WB	1008	774	-234	-23%	8	×	×
SDR01	2006	B5026 ECCLESHALL ROAD WALTON	EB	320	183	-137	-43%	9	×	×
	2006		WB	245	240	-5	-2%	0	✓	✓
SDR02	2006	B5026 ECCLESHALL ROAD NORTON BRIDGE	SB	267	331	64	24%	4	✓	✓
	2006		NB	278	286	8	3%	1	✓	✓
LCLS31	2007	A51 LONDON ROAD WESTON	NEB	649	674	26	4%	1	✓	✓
	2007		SWB	641	638	-3	0%	0	✓	✓
SDR04	2007	A51 LICHFIELD ROAD SANDON	NB	923	869	-53	-6%	2	✓	✓
	2007		SB	611	634	23	4%	1	✓	✓
SDR05	2007	C28 TIXALL ROAD STAFFORD	EB	219	217	-2	-1%	0	✓	✓
	2007		WB	94	102	7	8%	1	✓	✓
SDR06	2007	C252 BLACKHEATH LANE STAFFORD	NB	290	447	157	54%	8	×	×
	2007		SB	620	659	39	6%	2	✓	✓
SDR07	2007	A5013 CRESWELL GROVE CRESWELL	SB	460	505	45	10%	2	✓	✓
	2007		NB	726	733	8	1%	0	✓	✓
SF9	2005	B5066 GAOL ROAD	NB	530	622	91	17%	4	✓	✓
	2005		SB	573	576	3	1%	0	✓	✓
SDR09	2006	D3041 PARKSIDE AVENUE STAFFORD	SB	88	145	56	64%	5	✓	✓
	2006		NB	33	35	2	5%	0	✓	✓
SDR10	2006	A5103 ECCLESHALL ROAD STAFFORD	SB	500	457	-42	-8%	2	✓	✓
	2006		NB	963	833	-130	-13%	4	✓	✓
SDR11	2006	A5013 ECCLESHALL ROAD STAFFORD	SB	503	557	54	11%	2	✓	✓
	2006		NB	890	916	27	3%	1	✓	✓

Ref	Year	Count Location	Direction	2007 PM Peak - PCUs						
				Count	Modelled	Diff	%Diff	GEH	GEH criteria	Flow criteria
SDR12	2006	D3040 FIRST AVENUE STAFFORD	NB	73	59	-15	-20%	2	✓	✓
	2006		SB	72	115	43	60%	4	✓	✓
SDR14	2006	D3040 HOLMCROFT ROAD STAFFORD	WB	129	124	-6	-4%	0	✓	✓
	2006		EB	178	117	-61	-34%	5	✓	✓
SDR15	2006	A518 UTTOXETER ROAD STOWE	EB	455	448	-7	-2%	0	✓	✓
	2006		WB	445	440	-5	-1%	0	✓	✓
SDR16	2007	A518 WESTON BANK WESTON	EB	371	592	222	60%	10	×	×
	2007		WB	469	495	26	6%	1	✓	✓
SDR19	2006	A519 NEWCASTLE ROAD COTES HEATH	NB	172	209	37	21%	3	✓	✓
	2006		SB	184	228	44	24%	3	✓	✓
SDR20	2006	A519 NEWCASTLE ROAD HANCHURCH	SB	360	296	-63	-18%	4	✓	✓
	2006		NB	290	246	-44	-15%	3	✓	✓
SDR21	2006	B5027 STONE ROAD MILWICH	EB	92	88	-4	-4%	0	✓	✓
	2006		WB	93	96	3	3%	0	✓	✓
SDR22	2006	B5027 THE LEVEL MILWICH	EB	83	48	-35	-42%	4	✓	✓
	2006		WB	97	83	-15	-15%	2	✓	✓
SDR23	2006	C279 MILL LANE ACTON TRUSSELL	SB	224	155	-69	-31%	5	✓	✓
	2006		NB	94	190	96	103%	8	×	✓
TC23-1	2005	A513 BEACONSIDE (E)	WB	737	810	73	10%	3	✓	✓
	2005		EB	583	561	-22	-4%	1	✓	✓
SDR26	2006	D44 ALSTONFIELDS ROAD STAFFORD	EB	345	334	-10	-3%	1	✓	✓
	2006		WB	199	229	30	15%	2	✓	✓
SDR27	2006	C26 TEDDESLEY ROAD BROCTON	EB	255	69	-187	-73%	15	×	×
	2006		WB	151	149	-2	-1%	0	✓	✓
SDR28	2006	A518 NEWPORT ROAD HAUGHTON	EB	322	289	-33	-10%	2	✓	✓
	2006		WB	483	441	-42	-9%	2	✓	✓
SDR29	2006	A5005 LIGHTWOOD ROAD ROUGH CLOSE	NB	339	259	-80	-24%	5	✓	✓
	2006		SB	265	198	-67	-25%	4	✓	✓
SDR30	2005	C26 TEDDESLEY ROAD ACTON TRUSSELL	SB	105	125	20	19%	2	✓	✓
	2005		NB	180	182	2	1%	0	✓	✓
SDR31	2006	C278 BEDNALL ROAD ACTON TRUSSELL	WB	48	121	73	151%	8	×	✓
	2006		EB	82	143	61	75%	6	×	✓
VOL01	2004	B5066 NORTH WALLS STAFFORD	EB	352	399	47	13%	2	✓	✓
TC03-1	2004	CHELL ROAD	SWB	933	884	-48	-5%	2	✓	✓
	2004		NEB	1095	1093	-2	0%	0	✓	✓
TC03-2	2004	BROAD STREET	WB	324	281	-43	-13%	2	✓	✓
	2004		EB	319	274	-45	-14%	3	✓	✓
TC03-4	2004	BROAD EYE HILL	SEB	777	697	-80	-10%	3	✓	✓
	2004		NWB	599	684	85	14%	3	✓	✓
TC51-6	2004	BRIDGE STREET SERVICE ROAD	SEB	99	93	-6	-6%	1	✓	✓
	2004		NWB	3	3	0	-15%	0	✓	✓
TC51-7	2004	OUTBOUND LICHFIELD ROAD CENTRAL	WB	116	164	48	41%	4	✓	✓
TC51-7	2004	INBOUND LICHFIELD ROAD CENTRAL	WB	80	74	-6	-7%	1	✓	✓
VOL02	2005	C230 BILLINGTON LANE DERRINGTON	NB	88	46	-42	-48%	5	✓	✓
	2005		SB	112	107	-5	-5%	0	✓	✓
ACLS19	2005	C230 DERRINGTON LANE DERRINGTON	NB	96	91	-5	-6%	1	✓	✓
	2005		SB	70	79	9	13%	1	✓	✓
LCLS03	2006	A518 CASTLE BANKSTAFFORD	EB	407	370	-38	-9%	2	✓	✓
	2006		WB	692	698	6	1%	0	✓	✓
CP12-14	2007	CAR PARK 12-14	NB	158	140	-18	-11%	1	✓	✓
	2007		SB	349	339	-10	-3%	1	✓	✓
CP1-2	2007	CAR PARK 1-2	SB	84	74	-10	-12%	1	✓	✓
	2007		NB	84	78	-6	-7%	1	✓	✓
CP3-4	2007	CAR PARK 3-4	NB	20	26	6	29%	1	✓	✓
	2007		SB	116	104	-12	-11%	1	✓	✓
CP5	2007	CAR PARK 5	EB	3	0	-3	-100%	2	✓	✓
	2007		WB	45	41	-4	-8%	1	✓	✓
CP11	2007	CAR PARK 11	WB	25	22	-3	-12%	1	✓	✓
	2007		EB	62	59	-3	-5%	0	✓	✓
CP16	2007	CAR PARK 16	NB	90	76	-14	-16%	2	✓	✓
	2007		SB	115	116	1	1%	0	✓	✓
CP17	2007	CAR PARK 17	NB	3	3	0	-15%	0	✓	✓
	2007		SB	99	93	-6	-6%	1	✓	✓

Table A.3 – Stafford Turn Flow Calibration – AM Peak 2007

Ref	Year	Count Location	Turn	To	2007 AM Peak - PCUs					
					Count	Modelled	% Diff	GEH	GEH criteria	Flow criteria
M6 J13	2005	M6(N)	L	A449(N)	164	43	-74%	12	×	×
	2005		A	ROUNDABOUT	257	352	37%	5	✓	✓
	2005	ROUNDABOUT	L	A449(N)	693	945	36%	9	×	×
	2005		A	ROUNDABOUT	48	14	-72%	6	×	✓
	2005	A449(N)	L	M6(S)	406	559	38%	7	×	×
	2005		A	ROUNDABOUT	570	354	-38%	10	×	×
	2005	ROUNDABOUT	L	M6(S)	48	14	-72%	6	×	✓
	2005		A	ROUNDABOUT	257	352	37%	5	✓	✓
	2005	M6(S)	L	A449(S)	15	13	-13%	1	✓	✓
	2005		A	ROUNDABOUT	313	564	80%	12	×	×
	2005	ROUNDABOUT	L	A449(S)	626	591	-6%	1	✓	✓
	2005		A	ROUNDABOUT	200	115	-43%	7	×	✓
	2005	A449(S)	L	M6(N)	374	436	17%	3	✓	✓
	2005		A	ROUNDABOUT	428	395	-8%	2	✓	✓
	2005	ROUNDABOUT	L	M6(N)	200	115	-42%	7	×	✓
	2005		A	ROUNDABOUT	313	564	80%	12	×	×
TC56	2005	A34	L	ECCLESHALL ROAD	69	13	-81%	9	×	✓
	2005		A	ONTO ROUNDABOUT	903	889	-2%	0	✓	✓
	2005	ECCLESHALL ROAD	L	M6 (S) SLIP	116	108	-7%	1	✓	✓
	2005		A	ONTO ROUNDABOUT	404	466	15%	3	✓	✓
	2005	M6 (S) SLIP	L	CRESWELL GROVE	140	154	10%	1	✓	✓
	2005		A	ONTO ROUNDABOUT	799	754	-6%	2	✓	✓
	2005	CRESWELL GROVE	L	M6 (N) SLIP	58	53	-8%	1	✓	✓
	2005		A	ONTO ROUNDABOUT	715	722	1%	0	✓	✓
	2005	M6 (N) SLIP	L	A34	199	176	-12%	2	✓	✓
	2005		A	ONTO ROUNDABOUT	335	364	9%	2	✓	✓
	2005	ROUNDABOUT	L	A34	930	917	-1%	0	✓	✓
	2005		A	ROUNDABOUT	611	583	-5%	1	✓	✓
	2005		L	ECCLESHALL ROAD	792	837	6%	2	✓	✓
	2005		A	ROUNDABOUT	154	109	-29%	4	✓	✓
	2005		L	M6 (S) SLIP	769	744	-3%	1	✓	✓
	2005		A	ROUNDABOUT	289	255	-12%	2	✓	✓
	2005		L	CRESWELL GROVE	334	307	-8%	2	✓	✓
	2005		A	ROUNDABOUT	359	414	15%	3	✓	✓
	2005		L	M6 (N) SLIP	331	390	18%	3	✓	✓
	2005		A	ROUNDABOUT	773	778	1%	0	✓	✓
TC55	2004	LICHFIELD ROAD	L	WOLVERHAMPTON ROAD	111	44	-60%	8	×	✓
	2004		A	ROUNDABOUT	714	853	20%	5	✓	×
	2004	ROUNDABOUT	L	WOLVERHAMPTON ROAD	434	509	17%	3	✓	✓
	2004		A	ROUNDABOUT	120	17	-86%	12	×	×
	2004	WOLVERHAMPTON ROAD	L	NEWPORT ROAD	62	20	-67%	6	×	✓
	2004		A	ROUNDABOUT	670	792	18%	5	✓	×
	2004	ROUNDABOUT	L	NEWPORT ROAD	371	384	3%	1	✓	✓
	2004		A	ROUNDABOUT	463	486	5%	1	✓	✓
	2004	CENTRE GYRATORY	R	ROUNDABOUT	36	43	17%	1	✓	✓
	2004	ROUNDABOUT	R	CENTRE GYRATORY	111	132	19%	2	✓	✓
	2004	QUEENSWAY	L	LICHFIELD ROAD	332	369	11%	2	✓	✓
	2004		A	ROUNDABOUT	580	369	-36%	10	×	×
	2004	ROUNDABOUT	L	LICHFIELD ROAD	377	372	-1%	0	✓	✓
	2004		A	ROUNDABOUT	85	88	4%	0	✓	✓
TC10	2004	A34 STONE ROAD (N)	L	A513 BEACONSIDE	424	473	12%	2	✓	✓
	2004		A	A34 STONE ROAD (S)	551	833	51%	11	×	×
	2004		R	A34 TO/FROM M6 J14	423	396	-6%	1	✓	✓
	2004	A513 BEACONSIDE	L	A34 STONE ROAD (S)	290	104	-64%	13	×	×
	2004		A	A34 TO/FROM M6 J14	452	440	-3%	1	✓	✓
	2004		R	A34 STONE ROAD (N)	287	259	-10%	2	✓	✓
	2004	A34 STONE ROAD (S)	L	A34 TO/FROM M6 J14	69	31	-55%	5	✓	✓
	2004		A	A34 STONE ROAD (N)	296	464	56%	9	×	×
	2004		R	A513 BEACONSIDE	272	81	-70%	14	×	×
	2004	A34 TO/FROM M6 J14	L	A34 STONE ROAD (N)	332	340	3%	0	✓	✓
	2004		A	A513 BEACONSIDE	669	659	-1%	0	✓	✓
	2004		R	A34 STONE ROAD (S)	94	39	-58%	7	×	✓
TC11	2004	D67 KINGSWAY	L	A518 NEWPORT ROAD (E)	165	156	-5%	1	✓	✓
	2004		R	A518 NEWPORT ROAD (W)	72	78	9%	1	✓	✓
	2004	A518 NEWPORT ROAD (E)	A	A518 NEWPORT ROAD (W)	472	425	-10%	2	✓	✓
	2004		R	D67 KINGSWAY	40	44	8%	1	✓	✓
	2004	A518 NEWPORT ROAD (W)	L	D67 KINGSWAY	65	23	-64%	6	×	✓
	2004		A	A518 NEWPORT ROAD (E)	836	907	9%	2	✓	✓

Ref	Year	Count Location	Turn	To	2007 AM Peak - PCUs					
					Count	Modelled	% Diff	GEH	GEH criteria	Flow criteria
TC16	2004	D58 GREENGATE STREET	L	B5066 SOUTH WALLS	22	8	-66%	4	✓	✓
	2004		A	D58 BRIDGE STREET	33	203	520%	16	×	×
	2004		R	B5066 MILL BANK	9	0	-100%	4	✓	✓
	2004	B5066 SOUTH WALLS	L	D58 BRIDGE STREET	98	74	-24%	3	✓	✓
	2004		A	B5066 MILL BANK	170	426	151%	15	×	×
	2004	D58 BRIDGE STREET	L	B5066 MILL BANK	1	0	-100%	1	✓	✓
	2004		R	B5066 SOUTH WALLS	19	47	144%	5	✓	✓
	2004		A	B5066 SOUTH WALLS	198	156	-21%	3	✓	✓
	2004		R	D58 BRIDGE STREET	134	48	-64%	9	×	✓
TC22	2004	D8 CORPORATION ST (NW)	L	D7 PROSPECT ROAD	40	30	-26%	2	✓	✓
	2004		A	D8 CORPORATION ST (SE)	223	255	14%	2	✓	✓
	2004		R	D7 CROOKED BRIDGE ROAD	27	0	-100%	7	×	✓
	2004	D7 PROSPECT ROAD	L	D8 CORPORATION ST (SE)	27	18	-33%	2	✓	✓
	2004		A	D7 CROOKED BRIDGE ROAD	68	43	-37%	3	✓	✓
	2004		R	D8 CORPORATION ST (NW)	28	30	9%	0	✓	✓
	2004	D8 CORPORATION ST (SE)	L	D7 CROOKED BRIDGE ROAD	94	312	233%	15	×	×
	2004		A	D8 CORPORATION ST (NW)	219	224	2%	0	✓	✓
	2004		R	D7 PROSPECT ROAD	17	0	-98%	6	×	✓
	2004	D7 CROOKED BRIDGE ROAD	L	D8 CORPORATION ST (NW)	30	0	-100%	8	×	✓
	2004		A	D7 PROSPECT ROAD	51	56	8%	1	✓	✓
	2004		R	D8 CORPORATION ST (SE)	108	107	-1%	0	✓	✓
TC23	2005	A513 BEACONSIDE (E)	L	D6 COMMON ROAD	63	19	-69%	7	×	✓
	2005		A	A513 BEACONSIDE (W)	577	545	-6%	1	✓	✓
	2005	D6 COMMON ROAD	L	A513 BEACONSIDE (W)	192	61	-68%	12	×	×
	2005		R	A513 BEACONSIDE (E)	13	0	-100%	5	✓	✓
	2005	A513 BEACONSIDE (W)	A	A513 BEACONSIDE (E)	919	1012	10%	3	✓	✓
	2005		R	D6 COMMON ROAD	365	82	-78%	19	×	×
TC24	2005	B5066 SANDON ROAD (N)	L	D14 SANDALWOOD DRIVE	4	3	-32%	1	✓	✓
	2005		A	B5066 SANDON ROAD (S)	388	368	-5%	1	✓	✓
	2005		R	D44 ASTONFIELDS ROAD	159	114	-28%	4	✓	✓
	2005	D14 SANDALWOOD DRIVE	L	B5066 SANDON ROAD (S)	17	32	86%	3	✓	✓
	2005		A	D44 ASTONFIELDS ROAD	12	25	112%	3	✓	✓
	2005		R	B5066 SANDON ROAD (N)	4	15	275%	4	✓	✓
	2005	B5066 SANDON ROAD (S)	L	D44 ASTONFIELDS ROAD	207	152	-26%	4	✓	✓
	2005		A	B5066 SANDON ROAD (N)	205	222	8%	1	✓	✓
	2005		R	D14 SANDALWOOD DRIVE	6	24	295%	5	✓	✓
	2005	D44 ASTONFIELDS ROAD	L	B5066 SANDON ROAD (N)	111	86	-23%	3	✓	✓
	2005		A	D14 SANDALWOOD DRIVE	3	16	442%	4	✓	✓
	2005		R	B5066 SANDON ROAD (S)	191	188	-2%	0	✓	✓
TC25	2005	D6 COMMON ROAD (N)	L	D44 ASTONFIELDS ROAD	244	218	-11%	2	✓	✓
	2005		A	D6 COMMON ROAD (S)	77	106	38%	3	✓	✓
	2005	D44 ASTONFIELDS ROAD	L	D6 COMMON ROAD (S)	82	78	-6%	1	✓	✓
	2005		R	D6 COMMON ROAD (N)	165	213	30%	4	✓	✓
	2005		A	D6 COMMON ROAD (N)	54	129	138%	8	×	✓
	2005		R	D44 ASTONFIELDS ROAD	120	72	-40%	5	✓	✓
TC28	2005	A513 BEACONSIDE (N)	L	B5066 SANDON ROAD	96	109	14%	1	✓	✓
	2005		A	A513 BEACONSIDE (S)	798	772	-3%	1	✓	✓
	2005	B5066 SANDON ROAD	L	A513 BEACONSIDE (S)	360	295	-18%	4	✓	✓
	2005		R	A513 BEACONSIDE (N)	160	129	-20%	3	✓	✓
	2005	A513 BEACONSIDE (S)	A	A513 BEACONSIDE (N)	584	560	-4%	1	✓	✓
	2005		R	B5066 SANDON ROAD	85	86	1%	0	✓	✓
TC29	2005	A513 BEACONSIDE (N)	A	A513 BEACONSIDE (S)	852	754	-12%	3	✓	✓
	2005		R	D68 TOLLGATE DRIVE	151	0	-100%	17	×	×
	2005	A513 BEACONSIDE (S)	L	D68 TOLLGATE DRIVE	162	287	77%	8	×	×
	2005		A	A513 BEACONSIDE (N)	585	398	-32%	8	×	×
	2005	D68 TOLLGATE DRIVE	A	A513 BEACONSIDE (N)	87	0	-100%	13	×	✓
	2005		R	A513 BEACONSIDE (S)	64	127	99%	6	×	✓
TC30	2005	A513 BEACONSIDE (N)	A	A513 BEACONSIDE (S)	917	915	0%	0	✓	✓
	2005		R	B5066 SANDON ROAD	277	144	-48%	9	×	×
	2005	A513 BEACONSIDE (S)	L	B5066 SANDON ROAD	231	187	-19%	3	✓	✓
	2005		A	A513 BEACONSIDE (N)	511	537	5%	1	✓	✓
	2005	B5066 SANDON ROAD	L	A513 BEACONSIDE (N)	166	108	-35%	5	✓	✓
	2005		R	A513 BEACONSIDE (S)	197	166	-16%	2	✓	✓
TC40	2006	A449 WOLVERHAMPTON RD (N)	R	D37 PARK STREET	51	1	-99%	10	×	✓
	2006	A449 WOLVERHAMPTON RD (S)	L	D37 PARK STREET	191	151	-21%	3	✓	✓
TC42	2006	D37 AUSTIN FRIARS	L	A449 WOLVERHAMPTN RD (NE)	80	2	-97%	12	×	✓
	2006		R	A449 WOLVERHAMPTN RD (SW	77	160	106%	8	×	✓

Ref	Year	Count Location	Turn	To	2007 AM Peak - PCUs					
					Count	Modelled	% Diff	GEH	GEH criteria	Flow criteria
TC43	2006	A518 NEWPORT ROAD (E)	L	D37 FRIARS ROAD	51	44	-13%	1	✓	✓
	2006	D37 FRIARS ROAD	L	A518 NEWPORT ROAD (W)	178	163	-9%	1	✓	✓
	2006		R	A518 NEWPORT ROAD (E)	12	0	-100%	5	✓	✓
	2006	A518 NEWPORT ROAD (W)	R	D37 FRIARS ROAD	135	144	6%	1	✓	✓
TC45	2007	C376 RIVERWAY (N)	L	D3019 FAIRWAY	152	145	-4%	1	✓	✓
	2007		A	C376 RIVERWAY (S)	279	230	-17%	3	✓	✓
	2007	D3019 FAIRWAY	L	C376 RIVERWAY (S)	89	44	-50%	5	✓	✓
	2007		R	C376 RIVERWAY (N)	239	294	23%	3	✓	✓
	2007	C376 RIVERWAY (S)	A	C376 RIVERWAY (N)	358	220	-39%	8	×	×
	2007		R	D3019 FAIRWAY	23	12	-45%	2	✓	✓
TC46	2007	D3008 CORPORATION STREET	L	A518 WESTON ROAD	22	65	196%	7	×	✓
	2007		A	C376 RIVERWAY	213	246	16%	2	✓	✓
	2007		R	A518 LAMMASCOTE ROAD	133	81	-39%	5	✓	✓
	2007	A518 WESTON ROAD	L	C376 RIVERWAY	64	39	-39%	4	✓	✓
	2007		A	A518 LAMMASCOTE ROAD	737	741	1%	0	✓	✓
	2007		R	D3008 CORPORATION STREET	85	192	125%	9	×	×
	2007	C376 RIVERWAY	L	A518 LAMMASCOTE ROAD	269	111	-59%	11	×	×
	2007		A	D3008 CORPORATION STREET	206	362	76%	9	×	×
	2007		R	A518 WESTON ROAD	76	41	-46%	5	✓	✓
	2007	A518 LAMMASCOTE ROAD	L	D3008 CORPORATION STREET	110	98	-11%	1	✓	✓
	2007		A	A518 WESTON ROAD	560	661	18%	4	✓	×
	2007		R	C376 RIVERWAY	140	98	-29%	4	✓	✓
TC48	2007	C376 RIVERWAY	L	A34 LICHFIELD ROAD (SE)	212	89	-58%	10	×	×
	2007		A	N/A UNKNOWN	31	181	494%	15	×	×
	2007		R	A34 LICHFIELD ROAD (NW)	57	5	-92%	9	×	✓
	2007	A34 LICHFIELD ROAD (SE)	L	N/A UNKNOWN	6	0	-100%	3	✓	✓
	2007		A	A34 LICHFIELD ROAD (NW)	754	828	10%	3	✓	✓
	2007	N/A UNKNOWN	L	A34 LICHFIELD ROAD (NW)	24	100	318%	10	×	✓
	2007		A	C376 RIVERWAY	333	232	-30%	6	×	×
	2007	A34 LICHFIELD ROAD (NW)	L	C376 RIVERWAY	57	12	-79%	8	×	✓
	2007		A	A34 LICHFIELD ROAD (SE)	548	694	27%	6	×	×
	2007		R	N/A UNKNOWN	44	36	-18%	1	✓	✓
TC49	2007	A34 LICHFIELD ROAD (NW)	L	D3019 ST LEONARDS AVENUE	77	33	-57%	6	×	✓
	2007		A	A34 LICHFIELD ROAD (SE)	753	781	4%	1	✓	✓
	2007	D3019 ST LEONARDS AVENUE	L	A34 LICHFIELD ROAD (SE)	39	140	265%	11	×	×
	2007		R	A34 LICHFIELD ROAD (NW)	33	1	-97%	8	×	✓
	2007	A34 LICHFIELD ROAD (SE)	A	A34 LICHFIELD ROAD (NW)	1056	1137	8%	2	✓	✓
	2007		R	D3019 ST LEONARDS AVENUE	232	337	45%	6	×	×
TC50	2007	D3019 FAIRWAY	L	D3019 ST LEONARDS AVE (E)	120	156	31%	3	✓	✓
	2007		R	D3019 ST LEONARDS AVE (W)	151	124	-18%	2	✓	✓
	2007	D3019 ST LEONARDS AVE (E)	A	D3019 ST LEONARDS AVE (W)	13	17	33%	1	✓	✓
	2007		R	D3019 FAIRWAY	26	23	-10%	1	✓	✓
	2007	D3019 ST LEONARDS AVE (W)	L	D3019 FAIRWAY	185	314	70%	8	×	×
	2007		A	D3019 ST LEONARDS AVE (E)	96	54	-43%	5	✓	✓
TC52	2007	U/C TESCO SUPERSTORE	L	A518 NEWPORT ROAD (W)	67	61	-8%	1	✓	✓
	2007		R	A518 NEWPORT ROAD (E)	85	72	-15%	1	✓	✓
	2007	A518 NEWPORT ROAD (W)	A	A518 NEWPORT ROAD (E)	497	524	6%	1	✓	✓
	2007		R	U/C TESCO SUPERSTORE	79	107	35%	3	✓	✓
	2007	A518 NEWPORT ROAD (E)	L	U/C TESCO SUPERSTORE	82	113	38%	3	✓	✓
	2007		A	A518 NEWPORT ROAD (W)	434	483	11%	2	✓	✓
TC53	2007	D58 BRIDGE STREET	L	A518 LICHFIELD ROAD	196	217	11%	2	✓	✓
	2007		R	A518 NEWPORT ROAD	83	108	31%	3	✓	✓
	2007	A518 LICHFIELD ROAD	A	A518 NEWPORT ROAD	364	370	2%	0	✓	✓
	2007		R	D58 BRIDGE STREET	19	35	88%	3	✓	✓
	2007	A518 NEWPORT ROAD	A	A518 LICHFIELD ROAD	519	440	-15%	4	✓	✓
TC54	2007	A5187 STATION ROAD	L	A518 NEWPORT ROAD (E)	210	204	-3%	0	✓	✓
	2007		R	A518 NEWPORT ROAD (W)	356	345	-3%	1	✓	✓
	2007	A518 NEWPORT ROAD (E)	A	A518 NEWPORT ROAD (W)	194	196	1%	0	✓	✓
	2007		R	A5187 STATION ROAD	270	349	29%	4	✓	✓
	2007	A518 NEWPORT ROAD (W)	L	A5187 STATION ROAD	459	506	10%	2	✓	✓
	2007		A	A518 NEWPORT ROAD (E)	414	426	3%	1	✓	✓
TC20SPLIT	2004	CHURCHILL ROAD	L	RISING BROOK (N)	27	0	-100%	7	×	✓
	2004		R	RISING BROOK BETWEEN JUNCTIONS	5	0	-100%	3	✓	✓
	2004	RISING BROOK (N)	A	RISING BROOK BETWEEN JUNCTIONS	645	791	23%	5	✓	×
	2004		R	CHURCHILL ROAD	7	0	-100%	4	✓	✓
	2004	RISING BROOK BETWEEN JUNCTIONS	L	CHURCHILL ROAD	57	12	-79%	8	×	✓
	2004		A	RISING BROOK (N)	777	1193	54%	13	×	×

Ref	Year	Count Location	Turn	To	2007 AM Peak - PCUs					
					Count	Modelled	% Diff	GEH	GEH criteria	Flow criteria
TC20SPLIT	2004	RICKERSCOTE ROAD	L	RISING BROOK (S)	251	208	-17%	3	✓	✓
	2004		R	RISING BROOK BETWEEN JUNCTIONS	290	249	-14%	3	✓	✓
	2004	RISING BROOK (S)	A	RISING BROOK BETWEEN JUNCTIONS	544	956	76%	15	×	×
	2004		R	RICKERSCOTE ROAD	184	127	-31%	5	✓	✓
	2004	RISING BROOK BETWEEN JUNCTIONS	L	RICKERSCOTE ROAD	225	184	-18%	3	✓	✓
	2004		A	RISING BROOK (S)	426	606	42%	8	×	×
TC06	2004	SOUTH WALLS (E)	R	COPE STREET	396	430	8%	2	✓	✓
	2004		A	SOUTH WALLS (W)	548	598	9%	2	✓	✓
	2004		L	COPE STREET	226	215	-5%	1	✓	✓
TC03	2004	CHELL ROAD	L	BROAD STREET	160	248	55%	6	×	✓
	2004		A	VICTORIA ROAD	427	490	15%	3	✓	✓
	2004		R	BROAD EYE HILL	274	263	-4%	1	✓	✓
	2004	BROAD STREET	L	VICTORIA ROAD	12	11	-5%	0	✓	✓
	2004		A	BROAD EYE HILL	16	14	-13%	1	✓	✓
	2004		R	CHELL ROAD	29	37	29%	1	✓	✓
	2004	VICTORIA ROAD	L	BROAD EYE HILL	263	303	15%	2	✓	✓
	2004		A	CHELL ROAD	551	427	-23%	6	×	×
	2004		R	BROAD STREET	142	263	86%	9	×	×
	2004	BROAD EYE HILL	L	CHELL ROAD	455	444	-2%	0	✓	✓
	2004		A	BROAD STREET	55	125	128%	7	×	✓
	2004		R	VICTORIA ROAD	317	234	-26%	5	✓	✓

Table A.4 – Stafford Turn Flow Calibration – PM Peak 2007

Ref	Year	Count Location	Turn	To	2007 PM Peak - PCUs					
					Count	Modelled	% Diff	GEH	GEH criteria	Flow criteria
M6 J13	2005	M6(N)	L	A449(N)	226	65	-71%	13	×	×
	2005		A	ROUNDABOUT	329	356	8%	1	✓	✓
	2005	ROUNDABOUT	L	A449(N)	758	785	4%	1	✓	✓
	2005		A	ROUNDABOUT	24	14	-44%	2	✓	✓
	2005	A449(N)	L	M6(S)	240	444	85%	11	×	×
	2005		A	ROUNDABOUT	451	382	-15%	3	✓	✓
	2005	ROUNDABOUT	L	M6(S)	24	14	-44%	2	✓	✓
	2005		A	ROUNDABOUT	329	356	8%	1	✓	✓
	2005	M6(S)	L	A449(S)	6	17	173%	3	✓	✓
	2005		A	ROUNDABOUT	317	369	16%	3	✓	✓
	2005	ROUNDABOUT	L	A449(S)	681	686	1%	0	✓	✓
	2005		A	ROUNDABOUT	100	52	-48%	5	✓	✓
	2005	A449(S)	L	M6(N)	403	401	-1%	0	✓	✓
	2005		A	ROUNDABOUT	465	430	-7%	2	✓	✓
	2005	ROUNDABOUT	L	M6(N)	100	53	-47%	5	✓	✓
	2005		A	ROUNDABOUT	317	368	16%	3	✓	✓
TC56	2005	A34	L	ECCLESHALL ROAD	96	45	-53%	6	×	✓
	2005		A	ONTO ROUNDABOUT	918	846	-8%	2	✓	✓
	2005	ECCLESHALL ROAD	L	M6 (S) SLIP	135	80	-41%	5	✓	✓
	2005		A	ONTO ROUNDABOUT	611	725	19%	4	✓	×
	2005	M6 (S) SLIP	L	CRESWELL GROVE	147	138	-6%	1	✓	✓
	2005		A	ONTO ROUNDABOUT	712	710	0%	0	✓	✓
	2005	CRESWELL GROVE	L	M6 (N) SLIP	19	6	-69%	4	✓	✓
	2005		A	ONTO ROUNDABOUT	517	499	-4%	1	✓	✓
	2005	M6 (N) SLIP	L	A34	159	150	-6%	1	✓	✓
	2005		A	ONTO ROUNDABOUT	209	310	48%	6	×	×
	2005	ROUNDABOUT	L	A34	842	795	-6%	2	✓	✓
	2005		A	ROUNDABOUT	414	422	2%	0	✓	✓
	2005		L	ECCLESHALL ROAD	489	549	12%	3	✓	✓
	2005		A	ROUNDABOUT	135	182	35%	4	✓	✓
	2005		L	M6 (S) SLIP	708	694	-2%	1	✓	✓
	2005		A	ROUNDABOUT	346	334	-3%	1	✓	✓
	2005		L	CRESWELL GROVE	611	591	-3%	1	✓	✓
	2005		A	ROUNDABOUT	346	469	36%	6	×	×
	2005		L	M6 (N) SLIP	319	461	44%	7	×	×
	2005		A	ROUNDABOUT	1058	718	-32%	11	×	×
TC55	2004	LICHFIELD ROAD	L	WOLVERHAMPTON ROAD	83	77	-8%	1	✓	✓
	2004		A	ROUNDABOUT	566	624	10%	2	✓	✓
	2004	ROUNDABOUT	L	WOLVERHAMPTON ROAD	721	794	10%	3	✓	✓
	2004		A	ROUNDABOUT	220	251	14%	2	✓	✓
	2004	WOLVERHAMPTON ROAD	L	NEWPORT ROAD	77	21	-73%	8	×	✓
	2004		A	ROUNDABOUT	521	588	13%	3	✓	✓
	2004	ROUNDABOUT	L	NEWPORT ROAD	467	619	33%	7	×	×
	2004		A	ROUNDABOUT	319	256	-20%	4	✓	✓
	2004	CENTRE GYRATORY	R	ROUNDABOUT	89	164	84%	7	×	✓
	2004	ROUNDABOUT	R	CENTRE GYRATORY	74	74	0%	0	✓	✓
	2004	QUEENSWAY	L	LICHFIELD ROAD	303	422	39%	6	×	×
	2004		A	ROUNDABOUT	822	422	-49%	16	×	×
	2004	ROUNDABOUT	L	LICHFIELD ROAD	405	557	37%	7	×	×
	2004		A	ROUNDABOUT	193	131	-32%	5	✓	✓
TC10	2004	A34 STONE ROAD (N)	L	A513 BEACONSIDE	237	349	47%	7	×	×
	2004		A	A34 STONE ROAD (S)	390	495	27%	5	✓	×
	2004		R	A34 TO/FROM M6 J14	271	421	55%	8	×	×
	2004	A513 BEACONSIDE	L	A34 STONE ROAD (S)	199	143	-28%	4	✓	✓
	2004		A	A34 TO/FROM M6 J14	547	372	-32%	8	×	×
	2004		R	A34 STONE ROAD (N)	380	384	1%	0	✓	✓
	2004	A34 STONE ROAD (S)	L	A34 TO/FROM M6 J14	84	40	-53%	6	×	✓
	2004		A	A34 STONE ROAD (N)	611	722	18%	4	✓	×
	2004		R	A513 BEACONSIDE	245	58	-76%	15	×	×
	2004	A34 TO/FROM M6 J14	L	A34 STONE ROAD (N)	366	369	1%	0	✓	✓
	2004		A	A513 BEACONSIDE	450	433	-4%	1	✓	✓
	2004		R	A34 STONE ROAD (S)	75	36	-53%	5	✓	✓
TC11	2004	D67 KINGSWAY	L	A518 NEWPORT ROAD (E)	52	53	3%	0	✓	✓
	2004		R	A518 NEWPORT ROAD (W)	56	48	-14%	1	✓	✓
	2004	A518 NEWPORT ROAD (E)	A	A518 NEWPORT ROAD (W)	1031	1012	-2%	1	✓	✓
	2004		R	D67 KINGSWAY	125	130	4%	0	✓	✓
	2004	A518 NEWPORT ROAD (W)	L	D67 KINGSWAY	159	150	-5%	1	✓	✓
	2004		A	A518 NEWPORT ROAD (E)	439	413	-6%	1	✓	✓

Ref	Year	Count Location	Turn	To	2007 PM Peak - PCUs					
					Count	Modelled	% Diff	GEH	GEH criteria	Flow criteria
TC16	2004	D58 GREENGATE STREET	L	B5066 SOUTH WALLS	40	46	15%	1	✓	✓
	2004		A	D58 BRIDGE STREET	101	210	108%	9	×	×
	2004		R	B5066 MILL BANK	20	0	-100%	6	×	✓
	2004	B5066 SOUTH WALLS	L	D58 BRIDGE STREET	165	83	-50%	7	×	✓
	2004		A	B5066 MILL BANK	154	205	33%	4	✓	✓
	2004	D58 BRIDGE STREET	L	B5066 MILL BANK	1	0	-100%	1	✓	✓
	2004		R	B5066 SOUTH WALLS	30	51	67%	3	✓	✓
	2004		A	B5066 SOUTH WALLS	153	249	63%	7	×	✓
	2004		R	D58 BRIDGE STREET	199	276	38%	5	✓	✓
TC22	2004	D8 CORPORATION ST (NW)	L	D7 PROSPECT ROAD	51	40	-21%	2	✓	✓
	2004		A	D8 CORPORATION ST (SE)	225	276	23%	3	✓	✓
	2004		R	D7 CROOKED BRIDGE ROAD	25	0	-99%	7	×	✓
	2004	D7 PROSPECT ROAD	L	D8 CORPORATION ST (SE)	14	3	-79%	4	✓	✓
	2004		A	D7 CROOKED BRIDGE ROAD	41	32	-22%	1	✓	✓
	2004		R	D8 CORPORATION ST (NW)	29	18	-40%	2	✓	✓
	2004	D8 CORPORATION ST (SE)	L	D7 CROOKED BRIDGE ROAD	118	265	125%	11	×	×
	2004		A	D8 CORPORATION ST (NW)	269	281	4%	1	✓	✓
	2004		R	D7 PROSPECT ROAD	19	8	-57%	3	✓	✓
	2004	D7 CROOKED BRIDGE ROAD	L	D8 CORPORATION ST (NW)	35	0	-100%	8	×	✓
	2004		A	D7 PROSPECT ROAD	130	140	7%	1	✓	✓
	2004		R	D8 CORPORATION ST (SE)	132	116	-12%	1	✓	✓
TC23	2005	A513 BEACONSIDE (E)	L	D6 COMMON ROAD	33	0	-100%	8	×	✓
	2005		A	A513 BEACONSIDE (W)	704	810	15%	4	✓	×
	2005	D6 COMMON ROAD	L	A513 BEACONSIDE (W)	320	121	-62%	13	×	×
	2005		R	A513 BEACONSIDE (E)	69	0	-100%	12	×	✓
	2005	A513 BEACONSIDE (W)	A	A513 BEACONSIDE (E)	514	561	9%	2	✓	✓
	2005		R	D6 COMMON ROAD	89	65	-27%	3	✓	✓
TC24	2005	B5066 SANDON ROAD (N)	L	D14 SANDALWOOD DRIVE	6	32	431%	6	×	✓
	2005		A	B5066 SANDON ROAD (S)	377	346	-8%	2	✓	✓
	2005		R	D44 ASTONFIELDS ROAD	93	57	-39%	4	✓	✓
	2005	D14 SANDALWOOD DRIVE	L	B5066 SANDON ROAD (S)	10	19	86%	2	✓	✓
	2005		A	D44 ASTONFIELDS ROAD	2	6	194%	2	✓	✓
	2005		R	B5066 SANDON ROAD (N)	3	3	1%	0	✓	✓
	2005	B5066 SANDON ROAD (S)	L	D44 ASTONFIELDS ROAD	179	166	-7%	1	✓	✓
	2005		A	B5066 SANDON ROAD (N)	572	568	-1%	0	✓	✓
	2005		R	D14 SANDALWOOD DRIVE	24	35	47%	2	✓	✓
	2005	D44 ASTONFIELDS ROAD	L	B5066 SANDON ROAD (N)	250	159	-37%	6	×	✓
	2005		A	D14 SANDALWOOD DRIVE	8	30	290%	5	✓	✓
	2005		R	B5066 SANDON ROAD (S)	219	146	-33%	5	✓	✓
TC25	2005	D6 COMMON ROAD (N)	L	D44 ASTONFIELDS ROAD	174	184	6%	1	✓	✓
	2005		A	D6 COMMON ROAD (S)	61	183	199%	11	×	×
	2005	D44 ASTONFIELDS ROAD	L	D6 COMMON ROAD (S)	105	44	-58%	7	×	✓
	2005		R	D6 COMMON ROAD (N)	176	185	5%	1	✓	✓
	2005		A	D6 COMMON ROAD (N)	135	167	24%	3	✓	✓
	2005		R	D44 ASTONFIELDS ROAD	142	151	6%	1	✓	✓
TC28	2005	A513 BEACONSIDE (N)	L	B5066 SANDON ROAD	166	145	-12%	2	✓	✓
	2005		A	A513 BEACONSIDE (S)	619	585	-5%	1	✓	✓
	2005	B5066 SANDON ROAD	L	A513 BEACONSIDE (S)	92	107	16%	2	✓	✓
	2005		R	A513 BEACONSIDE (N)	89	81	-8%	1	✓	✓
	2005	A513 BEACONSIDE (S)	A	A513 BEACONSIDE (N)	661	647	-2%	1	✓	✓
	2005		R	B5066 SANDON ROAD	275	268	-3%	0	✓	✓
TC29	2005	A513 BEACONSIDE (N)	A	A513 BEACONSIDE (S)	623	425	-32%	9	×	×
	2005		R	D68 TOLLGATE DRIVE	40	0	-100%	9	×	✓
	2005	A513 BEACONSIDE (S)	L	D68 TOLLGATE DRIVE	44	62	41%	2	✓	✓
	2005		A	A513 BEACONSIDE (N)	703	666	-5%	1	✓	✓
	2005	D68 TOLLGATE DRIVE	A	A513 BEACONSIDE (N)	121	0	-100%	16	×	×
	2005		R	A513 BEACONSIDE (S)	152	305	101%	10	×	×
TC30	2005	A513 BEACONSIDE (N)	A	A513 BEACONSIDE (S)	529	534	1%	0	✓	✓
	2005		R	B5066 SANDON ROAD	175	159	-9%	1	✓	✓
	2005	A513 BEACONSIDE (S)	L	B5066 SANDON ROAD	233	210	-10%	2	✓	✓
	2005		A	A513 BEACONSIDE (N)	671	676	1%	0	✓	✓
	2005	B5066 SANDON ROAD	L	A513 BEACONSIDE (N)	279	239	-15%	3	✓	✓
	2005		R	A513 BEACONSIDE (S)	236	109	-54%	10	×	×
TC40	2006	A449 WOLVERHAMPTON RD (N)	R	D37 PARK STREET	25	0	-100%	7	×	✓
	2006	A449 WOLVERHAMPTON RD (S)	L	D37 PARK STREET	97	158	63%	5	✓	✓
TC42	2006	D37 AUSTIN FRIARS	L	A449 WOLVERHAMPTN RD (NE)	58	11	-80%	8	×	✓
	2006		R	A449 WOLVERHAMPTN RD (SW	156	166	7%	1	✓	✓

Ref	Year	Count Location	Turn	To	2007 PM Peak - PCUs					
					Count	Modelled	% Diff	GEH	GEH criteria	Flow criteria
TC43	2006	A518 NEWPORT ROAD (E)	L	D37 FRIARS ROAD	44	6	-87%	8	×	✓
	2006	D37 FRIARS ROAD	L	A518 NEWPORT ROAD (W)	140	174	24%	3	✓	✓
	2006		R	A518 NEWPORT ROAD (E)	4	0	-100%	3	✓	✓
	2006	A518 NEWPORT ROAD (W)	R	D37 FRIARS ROAD	118	187	58%	6	×	✓
TC45	2007	C376 RIVERWAY (N)	L	D3019 FAIRWAY	142	102	-28%	4	✓	✓
	2007		A	C376 RIVERWAY (S)	403	427	6%	1	✓	✓
	2007	D3019 FAIRWAY	L	C376 RIVERWAY (S)	98	28	-71%	9	×	✓
	2007		R	C376 RIVERWAY (N)	189	189	0%	0	✓	✓
	2007	C376 RIVERWAY (S)	A	C376 RIVERWAY (N)	378	265	-30%	6	×	×
	2007		R	D3019 FAIRWAY	45	76	69%	4	✓	✓
TC46	2007	D3008 CORPORATION STREET	L	A518 WESTON ROAD	48	33	-31%	2	✓	✓
	2007		A	C376 RIVERWAY	211	357	70%	9	×	×
	2007		R	A518 LAMMASCOTE ROAD	136	134	-2%	0	✓	✓
	2007	A518 WESTON ROAD	L	C376 RIVERWAY	90	0	-100%	13	×	✓
	2007		A	A518 LAMMASCOTE ROAD	629	676	8%	2	✓	✓
	2007		R	D3008 CORPORATION STREET	40	66	68%	4	✓	✓
	2007	C376 RIVERWAY	L	A518 LAMMASCOTE ROAD	258	120	-53%	10	×	×
	2007		A	D3008 CORPORATION STREET	208	250	20%	3	✓	✓
	2007		R	A518 WESTON ROAD	99	84	-16%	2	✓	✓
	2007	A518 LAMMASCOTE ROAD	L	D3008 CORPORATION STREET	122	102	-16%	2	✓	✓
	2007		A	A518 WESTON ROAD	756	785	4%	1	✓	✓
	2007		R	C376 RIVERWAY	202	171	-15%	2	✓	✓
TC48	2007	C376 RIVERWAY	L	A34 LICHFIELD ROAD (SE)	345	408	18%	3	✓	✓
	2007		A	N/A UNKNOWN	32	34	6%	0	✓	✓
	2007		R	A34 LICHFIELD ROAD (NW)	51	13	-75%	7	×	✓
	2007	A34 LICHFIELD ROAD (SE)	L	N/A UNKNOWN	5	0	-100%	3	✓	✓
	2007		A	A34 LICHFIELD ROAD (NW)	477	668	40%	8	×	×
	2007	N/A UNKNOWN	L	A34 LICHFIELD ROAD (NW)	53	19	-64%	6	×	✓
	2007		A	C376 RIVERWAY	275	339	23%	4	✓	✓
	2007	A34 LICHFIELD ROAD (NW)	L	C376 RIVERWAY	24	2	-92%	6	×	✓
	2007		A	A34 LICHFIELD ROAD (SE)	554	839	51%	11	×	×
	2007		R	N/A UNKNOWN	25	146	483%	13	×	×
TC49	2007	A34 LICHFIELD ROAD (NW)	L	D3019 ST LEONARDS AVENUE	25	6	-77%	5	✓	✓
	2007		A	A34 LICHFIELD ROAD (SE)	1031	1361	32%	10	×	×
	2007	D3019 ST LEONARDS AVENUE	L	A34 LICHFIELD ROAD (SE)	127	228	80%	8	×	×
	2007		R	A34 LICHFIELD ROAD (NW)	35	7	-79%	6	×	✓
	2007	A34 LICHFIELD ROAD (SE)	A	A34 LICHFIELD ROAD (NW)	801	885	10%	3	✓	✓
	2007		R	D3019 ST LEONARDS AVENUE	142	73	-48%	7	×	✓
TC50	2007	D3019 FAIRWAY	L	D3019 ST LEONARDS AVE (E)	27	28	3%	0	✓	✓
	2007		R	D3019 ST LEONARDS AVE (W)	305	145	-52%	11	×	×
	2007	D3019 ST LEONARDS AVE (E)	A	D3019 ST LEONARDS AVE (W)	84	87	4%	0	✓	✓
	2007		R	D3019 FAIRWAY	105	110	5%	1	✓	✓
	2007	D3019 ST LEONARDS AVE (W)	L	D3019 FAIRWAY	136	38	-72%	10	×	✓
	2007		A	D3019 ST LEONARDS AVE (E)	5	41	811%	8	×	✓
TC52	2007	U/C TESCO SUPERSTORE	L	A518 NEWPORT ROAD (W)	282	205	-27%	5	✓	✓
	2007		R	A518 NEWPORT ROAD (E)	123	215	76%	7	×	✓
	2007	A518 NEWPORT ROAD (W)	A	A518 NEWPORT ROAD (E)	288	278	-3%	1	✓	✓
	2007		R	U/C TESCO SUPERSTORE	186	204	10%	1	✓	✓
	2007	A518 NEWPORT ROAD (E)	L	U/C TESCO SUPERSTORE	233	163	-30%	5	✓	✓
	2007		A	A518 NEWPORT ROAD (W)	759	841	11%	3	✓	✓
TC53	2007	D58 BRIDGE STREET	L	A518 LICHFIELD ROAD	289	330	14%	2	✓	✓
	2007		R	A518 NEWPORT ROAD	196	236	21%	3	✓	✓
	2007	A518 LICHFIELD ROAD	A	A518 NEWPORT ROAD	613	601	-2%	0	✓	✓
	2007		R	D58 BRIDGE STREET	27	39	43%	2	✓	✓
	2007	A518 NEWPORT ROAD	A	A518 LICHFIELD ROAD	358	295	-18%	3	✓	✓
TC54	2007	A5187 STATION ROAD	L	A518 NEWPORT ROAD (E)	266	339	27%	4	✓	✓
	2007		R	A518 NEWPORT ROAD (W)	574	463	-19%	5	✓	×
	2007	A518 NEWPORT ROAD (E)	A	A518 NEWPORT ROAD (W)	657	648	-1%	0	✓	✓
	2007		R	A5187 STATION ROAD	369	398	8%	1	✓	✓
	2007	A518 NEWPORT ROAD (W)	L	A5187 STATION ROAD	433	441	2%	0	✓	✓
	2007		A	A518 NEWPORT ROAD (E)	202	144	-29%	4	✓	✓
TC20SPLIT	2004	CHURCHILL ROAD	L	RISING BROOK (N)	26	0	-100%	7	×	✓
	2004		R	RISING BROOK BETWEEN JUNCTIONS	7	0	-100%	4	✓	✓
	2004	RISING BROOK (N)	A	RISING BROOK BETWEEN JUNCTIONS	928	1015	9%	3	✓	✓
	2004		R	CHURCHILL ROAD	15	61	301%	7	×	✓
	2004	RISING BROOK BETWEEN JUNCTIONS	L	CHURCHILL ROAD	43	12	-72%	6	×	✓
	2004		A	RISING BROOK (N)	941	957	2%	1	✓	✓

Ref	Year	Count Location	Turn	To	2007 PM Peak - PCUs					
					Count	Modelled	% Diff	GEH	GEH criteria	Flow criteria
TC20SPLIT	2004	RICKERSCOTE ROAD	L	RISING BROOK (S)	217	225	4%	1	✓	✓
	2004		R	RISING BROOK BETWEEN JUNCTIONS	323	303	-6%	1	✓	✓
	2004	RISING BROOK (S)	A	RISING BROOK BETWEEN JUNCTIONS	661	678	3%	1	✓	✓
	2004		R	RICKERSCOTE ROAD	264	217	-18%	3	✓	✓
	2004	RISING BROOK BETWEEN JUNCTIONS	L	RICKERSCOTE ROAD	438	353	-19%	4	✓	✓
	2004		A	RISING BROOK (S)	497	661	33%	7	×	×
TC06	2004	SOUTH WALLS (E)	R	COPE STREET	194	180	-7%	1	✓	✓
	2004		A	SOUTH WALLS (W)	359	337	-6%	1	✓	✓
	2004		L	COPE STREET	400	477	19%	4	✓	✓
TC03	2004	CHELL ROAD	L	BROAD STREET	170	122	-29%	4	✓	✓
	2004		A	VICTORIA ROAD	507	432	-15%	3	✓	✓
	2004		R	BROAD EYE HILL	255	331	30%	4	✓	✓
	2004	BROAD STREET	L	VICTORIA ROAD	98	49	-50%	6	×	✓
	2004		A	BROAD EYE HILL	96	63	-34%	4	✓	✓
	2004		R	CHELL ROAD	128	170	32%	3	✓	✓
	2004	VICTORIA ROAD	L	BROAD EYE HILL	244	291	19%	3	✓	✓
	2004		A	CHELL ROAD	552	573	4%	1	✓	✓
	2004		R	BROAD STREET	88	98	11%	1	✓	✓
	2004	BROAD EYE HILL	L	CHELL ROAD	415	351	-15%	3	✓	✓
	2004		A	BROAD STREET	58	55	-6%	0	✓	✓
	2004		R	VICTORIA ROAD	299	291	-3%	0	✓	✓
TC17	2004	A34 QUEENSWAY (N)	L	U/C ASDA	332	65	-80%	19	×	×
	2004	U/C ASDA	L	A34 QUEENSWAY (S)	268	185	-31%	6	×	✓
	2004		R	A34 QUEENSWAY (N)	233	165	-29%	5	✓	✓
	2004		R	U/C ASDA	188	130	-31%	5	✓	✓

Appendix B
Screenlines

Table B.1 – Screenline Comparison - AM Peak

Screenline 1	Direction	Observed Flow	Modelled Flow	% Diff	GEH	GEH Criteria
A5013 ECCLESHALL ROAD	EB	809	850	5%	1	ok
A34 STONE ROAD	SB	854	977	14%	4	ok
B5066 SANDON ROAD	SB	504	332	-34%	8	fail
A5013 ECCLESHALL ROAD	WB	494	574	16%	3	ok
A34 STONE ROAD	NB	486	576	19%	4	ok
B5066 SANDON ROAD	NB	361	275	-24%	5	ok

Screenline 2	Direction	Observed Flow	Modelled Flow	% Diff	GEH	GEH Criteria
A449 MOSS PIT	NB	840	989	18%	5	ok
A34 CANNOCK ROAD	NB	788	803	2%	1	ok
A449 MOSS PIT	SB	955	912	-4%	1	ok
A34 CANNOCK ROAD	SB	716	676	-6%	2	ok

Screenline 3	Direction	Observed Flow	Modelled Flow	% Diff	GEH	GEH Criteria
A518 WESTON ROAD	WB	819	958	17%	5	ok
A513 MILFORD ROAD	WB	327	359	10%	2	ok
TIXALL ROAD	WB	747	903	21%	5	ok
A518 WESTON ROAD	EB	456	617	35%	7	fail
A513 MILFORD ROAD	EB	387	384	-1%	0	ok
TIXALL ROAD	EB	188	231	23%	3	ok

Screenline 4	Direction	Observed Flow	Modelled Flow	% Diff	GEH	GEH Criteria
DOXEY ROAD	EB	279	236	-15%	3	ok
A518 CASTLE BANK	EB	478	529	11%	2	ok
DOXEY ROAD	WB	137	156	13%	2	ok
A518 CASTLE BANK	WB	236	274	16%	2	ok

Screenline 5	Direction	Observed Flow	Modelled Flow	% Diff	GEH	GEH Criteria
A34 FOREGATE ROAD NORTH ENTRY/EXIT TO	SB	1509	1679	11%	4	ok
B5066 GAOL ROAD STAFFORD	SB	532	407	-23%	6	fail
A34 FOREGATE ROAD NORTH ENTRY/EXIT TO	NB	1046	1031	-1%	0	ok
B5066 GAOL ROAD STAFFORD	NB	495	465	-6%	1	ok

Screenline 6	Direction	Observed Flow	Modelled Flow	% Diff	GEH	GEH Criteria
FROM WOLVERHAMPTON ROAD	NB	731	812	11%	3	ok
D37 FRIARS ROAD	NB	191	163	-15%	2	ok
FROM WOLVERHAMPTON ROAD	SB	545	553	1%	0	ok
D37 FRIARS ROAD	SB	187	188	1%	0	ok

Screenline 7	Direction	Observed Flow	Modelled Flow	% Diff	GEH	GEH Criteria
A518 LAMMASCOTE ROAD	WB	928	927	0%	0	ok
A34 LICHFIELD ROAD	SB	825	898	9%	2	ok
A518 LAMMASCOTE ROAD	EB	809	857	6%	2	ok
A34 LICHFIELD ROAD	NB	681	741	9%	2	ok

Screenline 8	Direction	Observed Flow	Modelled Flow	% Diff	GEH	GEH Criteria
A518 NEWPORT ROAD (W)	EB	873	932	7%	2	ok
BROAD EYE HILL	SEB	832	803	-3%	1	ok
A518 NEWPORT ROAD (W)	WB	550	541	-2%	0	ok
BROAD EYE HILL	NWB	557	580	4%	1	ok

Screenline 9	Direction	Observed Flow	Modelled Flow	% Diff	GEH	GEH Criteria
A5013 CRESWELL GROVE	SB	721	775	7%	2	ok
M6 J14-15	SB	4386	4360	-1%	0	ok
A34 STONE ROAD	SB	1477	1657	12%	5	ok
A5013 CRESWELL GROVE	NB	395	462	17%	3	ok
M6 J14-15	NB	4554	4510	-1%	1	ok
A34 STONE ROAD	NB	1070	1066	0%	0	ok

Screenline 10	Direction	Observed Flow	Modelled Flow	% Diff	GEH	GEH Criteria
M6 J12-13	NB	4910	5002	2%	1	ok
A449 DUNSTON	NB	848	830	-2%	1	ok
A34	NB	447	730	64%	12	fail
M6 J12-13	SB	4803	4848	1%	1	ok
A449 DUNSTON	SB	651	604	-7%	2	ok
A34	SB	419	541	29%	6	fail

Table B.2 - Screenline Comparison - PM Peak

Screenline 1	Direction	Observed Flow	Modelled Flow	% Diff	GEH	GEH Criteria
A5013 ECCLESHALL ROAD	EB	554	593	7%	2	ok
A34 STONE ROAD	SB	548	673	23%	5	ok
B5066 SANDON ROAD	SB	400	368	-8%	2	ok
A5013 ECCLESHALL ROAD	WB	701	805	15%	4	ok
A34 STONE ROAD	NB	814	820	1%	0	ok
B5066 SANDON ROAD	NB	504	347	-31%	8	fail

Screenline 2	Direction	Observed Flow	Modelled Flow	% Diff	GEH	GEH Criteria
A449 MOSS PIT	NB	966	850	-12%	4	ok
A34 CANNOCK ROAD	NB	648	722	11%	3	ok
A449 MOSS PIT	SB	679	761	12%	3	ok
A34 CANNOCK ROAD	SB	532	642	21%	5	ok

Screenline 3	Direction	Observed Flow	Modelled Flow	% Diff	GEH	GEH Criteria
A518 WESTON ROAD	WB	666	699	5%	1	ok
A513 MILFORD ROAD	WB	398	361	-9%	2	ok
TIXALL ROAD	WB	224	266	19%	3	ok
A518 WESTON ROAD	EB	991	925	-7%	2	ok
A513 MILFORD ROAD	EB	364	489	34%	6	fail
TIXALL ROAD	EB	598	570	-5%	1	ok

Screenline 4	Direction	Observed Flow	Modelled Flow	% Diff	GEH	GEH Criteria
DOXEY ROAD	EB	118	143	21%	2	ok
A518 CASTLE BANK	EB	203	305	50%	6	fail
DOXEY ROAD	WB	318	374	18%	3	ok
A518 CASTLE BANK	WB	529	441	-17%	4	ok

Screenline 5	Direction	Observed Flow	Modelled Flow	% Diff	GEH	GEH Criteria
A34 FOREGATE ROAD NORTH ENTRY/EXIT TO	SB	1096	1188	8%	3	ok
B5066 GAOL ROAD STAFFORD	SB	564	576	2%	1	ok
A34 FOREGATE ROAD NORTH ENTRY/EXIT TO	NB	1602	1579	-1%	1	ok
B5066 GAOL ROAD STAFFORD	NB	545	622	14%	3	ok

Screenline 6	Direction	Observed Flow	Modelled Flow	% Diff	GEH	GEH Criteria
FROM WOLVERHAMPTON ROAD	NB	598	609	2%	0	ok
D37 FRIARS ROAD	NB	144	174	21%	2	ok
FROM WOLVERHAMPTON ROAD	SB	804	871	8%	2	ok
D37 FRIARS ROAD	SB	163	192	18%	2	ok

Screenline 7	Direction	Observed Flow	Modelled Flow	% Diff	GEH	GEH Criteria
A518 LAMMASCOTE ROAD	WB	1022	930	-9%	3	ok
A34 LICHFIELD ROAD	SB	653	700	7%	2	ok
A518 LAMMASCOTE ROAD	EB	1079	1058	-2%	1	ok
A34 LICHFIELD ROAD	NB	638	979	54%	12	fail

Screenline 8	Direction	Observed Flow	Modelled Flow	% Diff	GEH	GEH Criteria
A518 NEWPORT ROAD (W)	EB	635	585	-8%	2	ok
BROAD EYE HILL	SEB	777	697	-10%	3	ok
A518 NEWPORT ROAD (W)	WB	1231	1101	-11%	4	ok
BROAD EYE HILL	NWB	599	684	14%	3	ok

Screenline 9	Direction	Observed Flow	Modelled Flow	% Diff	GEH	GEH Criteria
A5013 CRESWELL GROVE	SB	460	505	10%	2	ok
M6 J14-15	SB	4652	4507	-3%	2	ok
A34 STONE ROAD	SB	974	1250	28%	8	fail
A5013 CRESWELL GROVE	NB	726	733	1%	0	ok
M6 J14-15	NB	4186	4293	3%	2	ok
A34 STONE ROAD	NB	1379	1451	5%	2	ok

Screenline 10	Direction	Observed Flow	Modelled Flow	% Diff	GEH	GEH Criteria
M6 J12-13	NB	4607	4605	0%	0	ok
A449 DUNSTON	NB	769	831	8%	2	ok
A34	NB	546	582	7%	2	ok
M6 J12-13	SB	4923	4858	-1%	1	ok
A449 DUNSTON	SB	857	703	-18%	6	fail
A34	SB	574	619	8%	2	ok

Appendix C
Observed vs. Modelled Count Validation

Table C.1 – Stafford Link Flow Validation – AM Peak 2007

Ref	Year	Count Location	Direction	2007 AM Peak - PCUs						
				Count	Modelled	Diff	%Diff	GEH	GEH criteria	Flow criteria
PC29	2005	B5026 CHESTER ROAD	SEB	247	245	-2	-1%	0	✓	✓
			NWB	69	89	19	27%	2	✓	✓
PVOL18	2007	B5026 CHESTER ROAD ECCLESHALL	EB	228	245	17	7%	1	✓	✓
			WB	100	89	-11	-11%	1	✓	✓
PC49	2006	B5026 CHESTER ROAD	SEB	237	245	8	3%	0	✓	✓
			NWB	112	89	-23	-21%	2	✓	✓
PC23	2004	A449 WOLVERHAMPTON ROAD	SEB	833	875	42	5%	1	✓	✓
			NWB	799	959	160	20%	5	✓	×
PC37	2005	A449 WOLVERHAMPTON ROAD	SEB	862	874	12	1%	0	✓	✓
			NWB	705	959	254	36%	9	×	×
PC47	2006	A518 UTTOXETER ROAD	NEB	346	302	-44	-13%	2	✓	✓
			SWB	473	405	-68	-14%	3	✓	✓
PC70	2007	D33 WEST WAY	SEB	441	378	-63	-14%	3	✓	✓
			NWB	394	424	30	8%	1	✓	✓
SDR32	2006	A51 STONE ROAD SWYNNERTON	EB	326	323	-3	-1%	0	✓	✓
			WB	256	289	32	13%	2	✓	✓
TC24-1	2005	B5066 SANDON ROAD (N)	SB	551	485	-66	-12%	3	✓	✓
			NB	321	323	2	1%	0	✓	✓
TC47-1	2007	A34 LICHFIELD ROAD (NW)	SEB	801	921	121	15%	4	✓	×
			NWB	1405	1467	62	4%	2	✓	✓
PC50	2006	A51 LICHFIELD ROAD	SEB	577	501	-76	-13%	3	✓	✓
			NWB	530	529	-1	0%	0	✓	✓
ACLS27	2006	A51 LICHFIELD ROAD, SANDON	NB	526	529	3	1%	0	✓	✓
			SB	541	501	-40	-7%	2	✓	✓
LCLS33	2006	A51 LONDON ROAD PASTEURFIELDS	NB	553	578	24	4%	1	✓	✓
			SB	526	518	-8	-2%	0	✓	✓
LCLS36	2007	A34 YARLET BANK YARLET	SB	1560	1657	98	6%	2	✓	✓
			NB	1029	1066	37	4%	1	✓	✓
PVOL17	2007	A449 DUNSTON	NB	858	830	-28	-3%	1	✓	✓
			SB	657	604	-53	-8%	2	✓	✓
LCLS27	2006	A449 DUNSTON	NB	927	830	-97	-10%	3	✓	✓
			SB	688	607	-81	-12%	3	✓	✓
TC32-3	2005	A519 NEWPORT ROAD (S)	NB	350	349	-1	0%	0	✓	✓
			SB	243	340	97	40%	6	×	✓
PVOL27	2007	A519 NEWPORT ROAD, ECCLESHALL	NB	359	349	-10	-3%	1	✓	✓
			SB	297	340	43	15%	2	✓	✓
SDR28	2007	A520 LONGTON ROAD STONE	NB	320	346	25	8%	1	✓	✓
			SB	473	402	-71	-15%	3	✓	✓
TC44-2	2006	A518 LICHFIELD ROAD	NWB	522	404	-117	-22%	5	✓	×
			SEB	756	658	-98	-13%	4	✓	✓
TC07-1	2004	A518 LICHFIELD ROAD	WB	471	404	-67	-14%	3	✓	✓
			EB	763	658	-106	-14%	4	✓	✓
TC44-1	2006	D58 BRIDGE STREET	SB	273	325	52	19%	3	✓	✓
			NB	39	47	8	21%	1	✓	✓
TC09-2	2004	A518 WESTON ROAD	WB	906	972	66	7%	2	✓	✓
			EB	703	767	64	9%	2	✓	✓
TC48-4	2007	A34 LICHFIELD ROAD (NW)	SEB	648	741	93	14%	4	✓	✓
			NWB	835	898	63	8%	2	✓	✓
TC51-2	2004	LICHFIELD ROAD EB	WB	691	898	206	30%	7	×	×
			EB	709	741	33	5%	1	✓	✓
TC09-1	2004	RIVERWAY	NB	619	514	-105	-17%	4	✓	×
			SB	412	375	-38	-9%	2	✓	✓
SDR39	2007	A520 LONGTON ROAD STONE	NB	323	453	130	40%	7	×	×
			SB	483	505	22	5%	1	✓	✓
TC39-2	2006	A51 LONDON ROAD (SE)	NWB	478	508	30	6%	1	✓	✓
			SEB	515	595	81	16%	3	✓	✓
PC05	2004	M6	NB	4171	4510	340	8%	5	✓	✓
			SB	3396	4360	964	28%	15	×	×
SDR18	2006	A519 NEWCASTLE ROAD SWYNNERTON	NB	184	232	48	26%	3	✓	✓
			SB	159	235	76	48%	5	✓	✓
PC59	2006	M6	SEB	3790	4671	881	23%	14	×	×
			NWB	4792	4975	183	4%	3	✓	✓
PC68	2007	A34 STONE ROAD	NEB	1095	1093	-2	0%	0	✓	✓
			SWB	863	902	39	4%	1	✓	✓
SDR13	2006	D3040 SECOND AVENUE STAFFORD	NB	51	12	-39	-76%	7	×	✓
			SB	60	15	-45	-75%	7	×	✓
M6 J14	2004	CRESSWELL ROAD SLIP	EB	736	775	39	5%	1	✓	✓
			WB	505	461	-44	-9%	2	✓	✓

Ref	Year	Count Location	Direction	2007 AM Peak - PCUs						
				Count	Modelled	Diff	%Diff	GEH	GEH criteria	Flow criteria
M6 J14	2004	M6(N) SLIP	NB	477	443	-34	-7%	2	✓	✓
			SB	499	540	41	8%	2	✓	✓
M6 J14	2004	A34 SLIP	EB	1083	1093	11	1%	0	✓	✓
			WB	960	902	-58	-6%	2	✓	✓
M6 J14	2004	ECCLESHALL ROAD	SEB	736	850	114	15%	4	✓	×
			NWB	532	574	41	8%	2	✓	✓
M6 J14	2004	M6(S) SLIP	SB	794	851	58	7%	2	✓	✓
			NB	867	908	41	5%	1	✓	✓
M6 J14	2004	ROUNDABOUT	CW	1220	1168	-52	-4%	2	✓	✓
			CW	1479	1500	21	1%	1	✓	✓
			CW	896	947	51	6%	2	✓	✓
			CW	1119	998	-121	-11%	4	✓	✓
			CW	858	721	-137	-16%	5	✓	×
TC28-2	2005	B5066 SANDON ROAD	EB	520	423	-97	-19%	4	✓	✓
			WB	181	195	13	7%	1	✓	✓
TC09-3	2004	CORPORATION STREET	SB	364	392	28	8%	1	✓	✓
			NB	399	651	251	63%	11	×	×
TC09-4	2004	A518 LAMMASCOTE ROAD	EB	835	857	22	3%	1	✓	✓
			WB	1209	927	-282	-23%	9	×	×
TC10-3	2004	A34 STONE ROAD (S)	NB	641	576	-65	-10%	3	✓	✓
			SB	926	977	51	6%	2	✓	✓
PC66	2006	A513	SEB	464	462	-2	0%	0	✓	✓
			NWB	590	617	27	5%	1	✓	✓
PC13	2004	A518	NEB	426	435	9	2%	0	✓	✓
			SWB	844	765	-78	-9%	3	✓	✓
PC18	2004	A34 LICHFIELD ROAD	SEB	800	814	14	2%	1	✓	✓
			NWB	1195	1138	-57	-5%	2	✓	✓
SDR40	2006	A518 BILLINGTON BANK HAUGHTON	EB	500	508	7	1%	0	✓	✓
			WB	289	270	-20	-7%	1	✓	✓
VOL03	2004	D34 BARNES ROAD STAFFORD	SB	3	61	58	1793%	10	×	✓
TC10-1	2004	A34 STONE ROAD (N)	SB	1397	1703	306	22%	8	×	×
			NB	959	1063	104	11%	3	✓	✓
TC03-3	2004	VICTORIA ROAD	NEB	961	993	31	3%	1	✓	✓
			SWB	761	735	-25	-3%	1	✓	✓
TC06-1	2004	SOUTH WALLS (E)	WB	944	1028	84	9%	3	✓	✓
TC07-3	2004	A518 NEWPORT ROAD	EB	571	452	-118	-21%	5	✓	×
			WB	540	478	-62	-11%	3	✓	✓
SDR33	2006	A519 NEWCASTLE ROAD MILL MEECE	NB	192	234	41	22%	3	✓	✓
			SB	164	209	45	27%	3	✓	✓
SDR34	2006	A51 FARLEY CORNER GREAT HAYWOOD	NB	769	784	16	2%	1	✓	✓
			SB	729	671	-58	-8%	2	✓	✓
SDR36	2006	A449 RISING BROOK STAFFORD	NB	714	1175	461	65%	15	×	×
			SB	688	788	100	15%	4	✓	✓
SDR29	2007	A34 CANNOCK ROAD BROCTON	NB	743	880	137	18%	5	✓	×
			SB	615	685	69	11%	3	✓	✓
PVOL21	2007	A520 STAFFORD ROAD STONE	EB	788	760	-29	-4%	1	✓	✓
			WB	825	965	139	17%	5	✓	×
PVOL22	2007	A5013 ECCLESHALL ROAD STAFFORD	SB	866	850	-15	-2%	1	✓	✓
			NB	522	574	52	10%	2	✓	✓
SF2	2005	A34 QUEENSWAY SOUTH ENTRY/EXIT TO GYRATORY	NB	1276	1428	152	12%	4	✓	✓
			SB	983	954	-28	-3%	1	✓	✓
PVOL23	2007	C252 TIXALL ROAD STAFFORD	EB	137	93	-44	-32%	4	✓	✓
			WB	378	393	15	4%	1	✓	✓
PVOL25	2007	A34 CANNOCK ROAD BROCTON	SB	759	644	-115	-15%	4	✓	×
			NB	726	803	77	11%	3	✓	✓
SDR03	2007	A51 LONDON ROAD WESTON	NB	727	722	-5	-1%	0	✓	✓
			SB	678	745	67	10%	3	✓	✓
ACLS28	2004	A519 SLINDON NR. ECCLESHALL	SB	205	209	3	2%	0	✓	✓
			NB	216	234	17	8%	1	✓	✓
ACLS29	2004	SCHOOL LANE	NB	64	10	-54	-85%	9	×	✓
			SB	137	15	-122	-89%	14	×	×
LCLS20	2007	A34 STONE ROAD TITTENSOR #CA006	NB	1132	1217	86	8%	3	✓	✓
LCLS23	2006	A449 MOSS PIT STAFFORD	NB	683	964	281	41%	10	×	×
			SB	818	860	42	5%	1	✓	✓
LCLS24	2007	A34 STONE ROAD MEAFORD	SB	1011	1060	49	5%	2	✓	✓

Ref	Year	Count Location	Direction	2007 AM Peak - PCUs						
				Count	Modelled	Diff	%Diff	GEH	GEH criteria	Flow criteria
TC51-3	2004	WOLVERHAMPTON ROAD SB	NB	846	812	-33	-4%	1	✓	✓
			SB	550	553	3	0%	0	✓	✓
SDR08	2007	B5066 GAOL ROAD STAFFORD	SB	532	407	-125	-23%	6	×	×
			NB	495	465	-30	-6%	1	✓	✓
SF8	2005	A34 QUEENSWAY NORTH ENTRY/EXIT TO GYRATORY	NB	1024	835	-190	-19%	6	×	×
			SB	1181	1183	2	0%	0	✓	✓
ACLS21	2004	B5066 HILDERSTONE ROAD HILDERSTONE	NB	199	202	3	2%	0	✓	✓
			SB	491	475	-16	-3%	1	✓	✓
ACLS22	2004	D37 FRIARS TERRACE, STAFFORD	NB	190	163	-27	-14%	2	✓	✓
			SB	132	188	56	43%	4	✓	✓
PC25	2005	M6	NB	4742	4975	232	5%	3	✓	✓
			SB	4498	4671	173	4%	3	✓	✓
TC37-3	2006	B5026 STONE ROAD (SW)	NEB	244	234	-10	-4%	1	✓	✓
			SWB	179	191	11	6%	1	✓	✓
TC51-1	2004	QUEENSWAY	SB	924	939	15	2%	0	✓	✓
			NB	1200	1412	213	18%	6	×	×
ACLS26	2005	C278 COMMON LANE BEDNALL	EB	44	102	58	131%	7	×	✓
			WB	37	92	55	151%	7	×	✓
PC41	2005	D385 SCHOOL LANE	NEB	16	10	-6	-39%	2	✓	✓
			SWB	15	15	0	-2%	0	✓	✓
TC54-2	2007	A518 NEWPORT ROAD (E)	WB	464	544	81	17%	4	✓	✓
			EB	624	631	7	1%	0	✓	✓
TC20-3	2004	A449 RISING BROOK (S)	NB	728	1083	356	49%	12	×	×
			SB	676	814	138	20%	5	✓	×
TC24-4	2005	D44 ASTONFIELDS ROAD	EB	305	290	-15	-5%	1	✓	✓
			WB	377	291	-86	-23%	5	✓	✓
TC29-2	2005	A513 BEACONSIDE (S)	NB	747	685	-62	-8%	2	✓	✓
			SB	916	881	-35	-4%	1	✓	✓
TC16-2	2004	B5066 SOUTH WALLS	WB	268	500	233	87%	12	×	×
			EB	239	210	-29	-12%	2	✓	✓
PC44	2005	A519 NEWCASTLE ROAD	NB	252	234	-18	-7%	1	✓	✓
			SB	218	209	-9	-4%	1	✓	✓
PC33	2005	A51	SEB	511	518	7	1%	0	✓	✓
			NWB	522	581	59	11%	3	✓	✓

Table C.2 – Stafford Link Flow Validation – PM Peak 2007

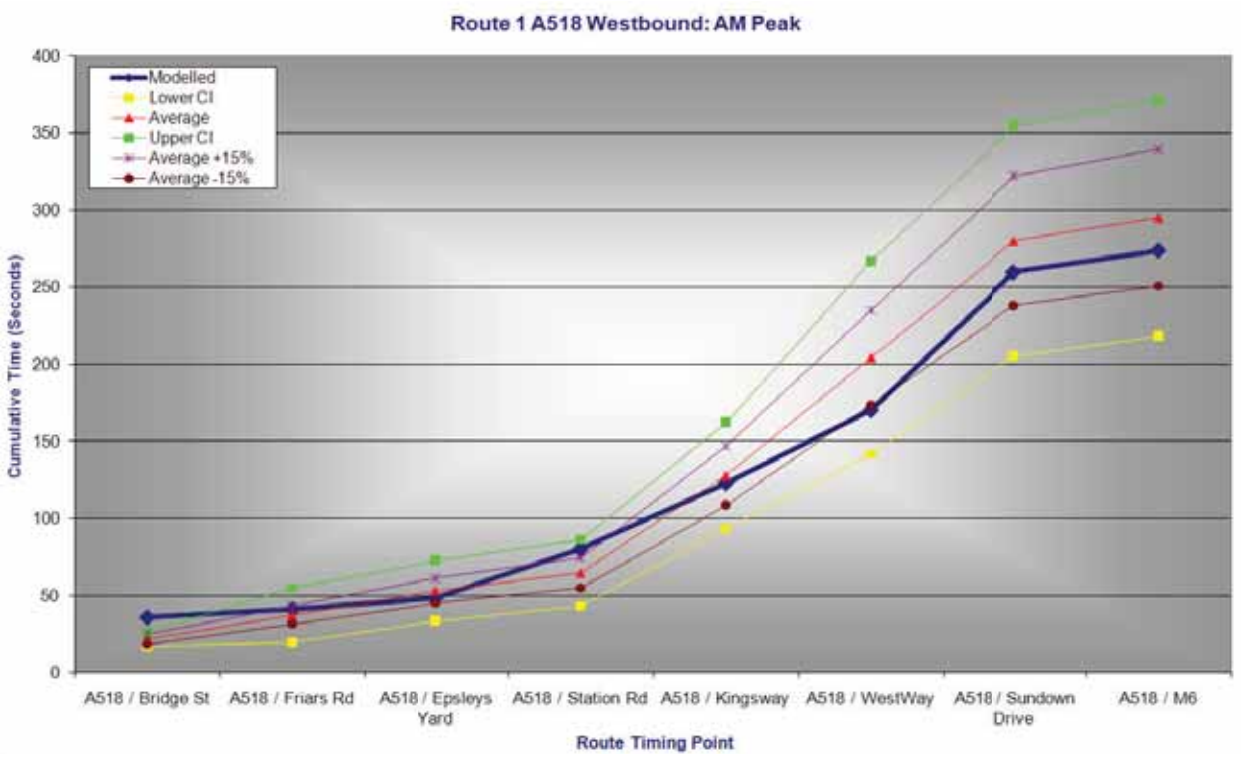
Ref	Year	Count Location	Direction	2007 PM Peak - PCUs						
				Count	Modelled	Diff	%Diff	GEH	GEH criteria	Flow criteria
PC29	2005	B5026 CHESTER ROAD	SEB	77	122	45	59%	5	✓	✓
			NWB	230	235	5	2%	0	✓	✓
PVOL18	2007	B5026 CHESTER ROAD ECCLESHALL	EB	108	122	14	13%	1	✓	✓
			WB	210	235	26	12%	2	✓	✓
PC49	2006	B5026 CHESTER ROAD	SEB	107	122	15	14%	1	✓	✓
			NWB	220	235	15	7%	1	✓	✓
PC23	2004	A449 WOLVERHAMPTON ROAD	SEB	677	767	89	13%	3	✓	✓
			NWB	911	847	-65	-7%	2	✓	✓
PC37	2005	A449 WOLVERHAMPTON ROAD	SEB	646	767	121	19%	5	✓	×
			NWB	954	847	-108	-11%	4	✓	✓
PC47	2006	A518 UTTOXETER ROAD	NEB	378	347	-32	-8%	2	✓	✓
			SWB	401	412	12	3%	1	✓	✓
PC70	2007	D33 WEST WAY	SEB	419	326	-93	-22%	5	✓	✓
			NWB	608	474	-134	-22%	6	×	×
SDR32	2006	A51 STONE ROAD SWYNNERTON	EB	292	313	21	7%	1	✓	✓
			WB	275	326	51	18%	3	✓	✓
TC24-1	2005	B5066 SANDON ROAD (N)	SB	476	435	-41	-9%	2	✓	✓
			NB	826	729	-97	-12%	3	✓	✓
TC47-1	2007	A34 LICHFIELD ROAD (NW)	SEB	1315	1576	261	20%	7	×	×
			NWB	944	956	12	1%	0	✓	✓
PC50	2006	A51 LICHFIELD ROAD	SEB	474	496	22	5%	1	✓	✓
			NWB	534	511	-23	-4%	1	✓	✓
ACLS27	2006	A51 LICHFIELD ROAD, SANDON	NB	543	511	-32	-6%	1	✓	✓
			SB	503	496	-7	-1%	0	✓	✓
LCLS33	2006	A51 LONDON ROAD PASTEURFIELDS	NB	527	519	-9	-2%	0	✓	✓
			SB	586	593	7	1%	0	✓	✓
LCLS36	2007	A34 YARLET BANK YARLET	SB	988	1250	262	27%	8	×	×
			NB	1491	1451	-41	-3%	1	✓	✓
PVOL17	2007	A449 DUNSTON	NB	764	831	67	9%	2	✓	✓
			SB	859	703	-157	-18%	6	×	×
LCLS27	2006	A449 DUNSTON	NB	797	831	34	4%	1	✓	✓
			SB	923	711	-212	-23%	7	×	×
TC32-3	2005	A519 NEWPORT ROAD (S)	NB	318	300	-17	-5%	1	✓	✓
			SB	324	355	31	10%	2	✓	✓
PVOL27	2007	A519 NEWPORT ROAD, ECCLESHALL	NB	306	300	-5	-2%	0	✓	✓
			SB	366	355	-11	-3%	1	✓	✓
SDR28	2007	A520 LONGTON ROAD STONE	NB	541	537	-4	-1%	0	✓	✓
			SB	331	344	13	4%	1	✓	✓
TC44-2	2006	A518 LICHFIELD ROAD	NWB	596	640	44	7%	2	✓	✓
			SEB	745	625	-120	-16%	5	✓	×
TC07-1	2004	A518 LICHFIELD ROAD	WB	591	640	49	8%	2	✓	✓
			EB	840	625	-215	-26%	8	×	×
TC44-1	2006	D58 BRIDGE STREET	SB	511	565	54	11%	2	✓	✓
			NB	32	51	18	57%	3	✓	✓
TC09-2	2004	A518 WESTON ROAD	WB	732	743	10	1%	0	✓	✓
			EB	937	902	-35	-4%	1	✓	✓
TC48-4	2007	A34 LICHFIELD ROAD (NW)	SEB	603	979	377	63%	13	×	×
			NWB	580	700	120	21%	5	✓	×
TC51-2	2004	LICHFIELD ROAD EB	WB	702	700	-2	0%	0	✓	✓
			EB	766	979	213	28%	7	×	×
TC09-1	2004	RIVERWAY	NB	561	454	-107	-19%	5	✓	×
			SB	541	529	-12	-2%	1	✓	✓
SDR39	2007	A520 LONGTON ROAD STONE	NB	541	519	-22	-4%	1	✓	✓
			SB	338	393	55	16%	3	✓	✓
TC39-2	2006	A51 LONDON ROAD (SE)	NWB	575	648	72	13%	3	✓	✓
			SEB	562	577	16	3%	1	✓	✓
PC05	2004	M6	NB	4173	4293	121	3%	2	✓	✓
			SB	4318	4507	189	4%	3	✓	✓
SDR18	2006	A519 NEWCASTLE ROAD SWYNNERTON	NB	177	246	70	39%	5	✓	✓
			SB	206	296	90	43%	6	×	✓
PC59	2006	M6	SEB	4982	4822	-160	-3%	2	✓	✓
			NWB	4755	4673	-82	-2%	1	✓	✓
PC68	2007	A34 STONE ROAD	NEB	843	945	103	12%	3	✓	✓
			SWB	774	891	117	15%	4	✓	✓
SDR13	2006	D3040 SECOND AVENUE STAFFORD	NB	65	12	-53	-81%	9	×	✓
			SB	43	12	-31	-72%	6	×	✓
M6 J14	2004	CRESSWELL ROAD SLIP	EB	455	505	50	11%	2	✓	✓
			WB	866	729	-137	-16%	5	✓	×

Ref	Year	Count Location	Direction	2007 PM Peak - PCUs						
				Count	Modelled	Diff	%Diff	GEH	GEH criteria	Flow criteria
M6 J14	2004	M6(N) SLIP	NB	363	467	103	28%	5	✓	×
			SB	409	460	50	12%	2	✓	✓
M6 J14	2004	A34 SLIP	EB	907	945	39	4%	1	✓	✓
			WB	984	891	-93	-9%	3	✓	✓
M6 J14	2004	ECCLESHALL ROAD	SEB	524	593	69	13%	3	✓	✓
			NWB	712	805	93	13%	3	✓	✓
M6 J14	2004	M6(S) SLIP	SB	732	775	42	6%	2	✓	✓
			NB	832	848	16	2%	1	✓	✓
M6 J14	2004	ROUNDABOUT	CW	1051	1179	128	12%	4	✓	✓
			CW	1132	1217	85	8%	2	✓	✓
			CW	645	731	86	13%	3	✓	✓
			CW	1105	1029	-77	-7%	2	✓	✓
			CW	1084	1059	-25	-2%	1	✓	✓
TC28-2	2005	B5066 SANDON ROAD	EB	181	189	8	4%	1	✓	✓
			WB	441	413	-28	-6%	1	✓	✓
TC09-3	2004	CORPORATION STREET	SB	425	524	98	23%	5	✓	✓
			NB	411	419	8	2%	0	✓	✓
TC09-4	2004	A518 LAMMASCOTE ROAD	EB	1116	1058	-58	-5%	2	✓	✓
			WB	946	930	-16	-2%	1	✓	✓
TC10-3	2004	A34 STONE ROAD (S)	NB	940	820	-120	-13%	4	✓	✓
			SB	664	673	10	2%	0	✓	✓
TC18-1	2004	C76 RIVERWAY	SB	399	455	55	14%	3	✓	✓
			NB	408	341	-66	-16%	3	✓	✓
PC66	2006	A513	SEB	570	686	117	20%	5	✓	×
			NWB	381	477	96	25%	5	✓	✓
PC13	2004	A518	NEB	527	560	34	6%	1	✓	✓
			SWB	476	481	5	1%	0	✓	✓
PC18	2004	A34 LICHFIELD ROAD	SEB	1083	1367	283	26%	8	×	×
			NWB	880	892	12	1%	0	✓	✓
SDR40	2006	A518 BILLINGTON BANK HAUGHTON	EB	346	322	-24	-7%	1	✓	✓
			WB	562	445	-116	-21%	5	✓	×
VOL03	2004	D34 BARNES ROAD STAFFORD	SB	2	18	16	736%	5	✓	✓
TC10-1	2004	A34 STONE ROAD (N)	SB	899	1266	367	41%	11	×	×
			NB	1356	1475	119	9%	3	✓	✓
TC03-3	2004	VICTORIA ROAD	NEB	891	961	70	8%	2	✓	✓
			SWB	910	772	-138	-15%	5	✓	✓
TC06-1	2004	SOUTH WALLS (E)	WB	553	517	-36	-7%	2	✓	✓
TC07-3	2004	A518 NEWPORT ROAD	EB	454	307	-147	-32%	8	×	×
			WB	732	836	104	14%	4	✓	✓
SDR33	2006	A519 NEWCASTLE ROAD MILL MEECE	NB	167	209	42	25%	3	✓	✓
			SB	178	228	50	28%	4	✓	✓
SDR34	2006	A51 FARLEY CORNER GREAT HAYWOOD	NB	708	654	-54	-8%	2	✓	✓
			SB	807	777	-30	-4%	1	✓	✓
SDR36	2006	A449 RISING BROOK STAFFORD	NB	857	942	85	10%	3	✓	✓
			SB	845	1077	232	27%	7	×	×
SDR29	2007	A34 CANNOCK ROAD BROCTON	NB	643	706	63	10%	2	✓	✓
			SB	704	720	16	2%	1	✓	✓
PVOL21	2007	A520 STAFFORD ROAD STONE	EB	887	959	72	8%	2	✓	✓
			WB	806	849	42	5%	1	✓	✓
PVOL22	2007	A5013 ECCLESHALL ROAD STAFFORD	SB	557	593	36	7%	2	✓	✓
			NB	733	805	72	10%	3	✓	✓
SF2	2005	A34 QUEENSWAY SOUTH ENTRY/EXIT TO GYRATORY	NB	1154	1071	-83	-7%	2	✓	✓
			SB	1135	1292	157	14%	4	✓	✓
PVOL23	2007	C252 TIXALL ROAD STAFFORD	EB	255	217	-38	-15%	2	✓	✓
			WB	121	102	-19	-16%	2	✓	✓
PVOL25	2007	A34 CANNOCK ROAD BROCTON	SB	745	652	-92	-12%	3	✓	✓
			NB	769	656	-112	-15%	4	✓	✓
SDR03	2007	A51 LONDON ROAD WESTON	NB	667	674	8	1%	0	✓	✓
			SB	627	638	11	2%	0	✓	✓
ACLS28	2004	A519 SLINDON NR. ECCLESHALL	SB	215	228	14	6%	1	✓	✓
			NB	224	209	-14	-6%	1	✓	✓
ACLS29	2004	SCHOOL LANE	NB	132	82	-50	-38%	5	✓	✓
			SB	79	18	-61	-77%	9	×	✓
LCLS20	2007	A34 STONE ROAD TITTENSOR #CA006	NB	1117	1107	-11	-1%	0	✓	✓
LCLS23	2006	A449 MOSS PIT STAFFORD	NB	909	777	-132	-15%	5	✓	✓
			SB	673	684	11	2%	0	✓	✓
LCLS24	2007	A34 STONE ROAD MEAFORD	SB	1047	996	-51	-5%	2	✓	✓

Ref	Year	Count Location	Direction	2007 PM Peak - PCUs						
				Count	Modelled	Diff	%Diff	GEH	GEH criteria	Flow criteria
TC51-3	2004	WOLVERHAMPTON ROAD SB	NB	650	609	-41	-6%	2	✓	✓
			SB	851	871	20	2%	1	✓	✓
SDR08	2007	B5066 GAOL ROAD STAFFORD	SB	564	576	13	2%	1	✓	✓
			NB	545	622	76	14%	3	✓	✓
SF8	2005	A34 QUEENSWAY NORTH ENTRY/EXIT TO GYRATORY	NB	914	774	-140	-15%	5	✓	✓
			SB	982	998	16	2%	1	✓	✓
ACLS21	2004	B5066 HILDERSTONE ROAD HILDERSTONE	NB	437	419	-18	-4%	1	✓	✓
			SB	208	194	-14	-7%	1	✓	✓
ACLS22	2004	D37 FRIARS TERRACE, STAFFORD	NB	138	174	36	26%	3	✓	✓
			SB	177	192	16	9%	1	✓	✓
PC25	2005	M6	NB	4110	4673	563	14%	8	×	×
			SB	3974	4822	848	21%	13	×	×
TC37-3	2006	B5026 STONE ROAD (SW)	NEB	183	169	-13	-7%	1	✓	✓
			SWB	204	191	-13	-6%	1	✓	✓
TC51-1	2004	QUEENSWAY	SB	1185	1411	226	19%	6	×	×
			NB	1243	1036	-207	-17%	6	×	×
ACLS26	2005	C278 COMMON LANE BEDNALL	EB	41	112	71	174%	8	×	✓
			WB	25	105	80	322%	10	×	✓
PC41	2005	D385 SCHOOL LANE	NEB	8	82	74	912%	11	×	✓
			SWB	17	18	1	4%	0	✓	✓
TC54-2	2007	A518 NEWPORT ROAD (E)	WB	1026	1046	20	2%	1	✓	✓
			EB	468	483	15	3%	1	✓	✓
TC20-3	2004	A449 RISING BROOK (S)	NB	925	896	-30	-3%	1	✓	✓
			SB	714	866	152	21%	5	✓	×
TC24-4	2005	D44 ASTONFIELDS ROAD	EB	477	334	-143	-30%	7	×	×
			WB	274	229	-45	-16%	3	✓	✓
TC29-2	2005	A513 BEACONSIDE (S)	NB	747	728	-19	-3%	1	✓	✓
			SB	775	730	-45	-6%	2	✓	✓
TC16-2	2004	B5066 SOUTH WALLS	WB	319	287	-32	-10%	2	✓	✓
			EB	224	346	122	55%	7	×	×
PC44	2005	A519 NEWCASTLE ROAD	NB	310	209	-101	-33%	6	×	×
			SB	223	228	5	2%	0	✓	✓
PC33	2005	A51	SEB	515	593	78	15%	3	✓	✓
			NWB	461	516	54	12%	2	✓	✓

Appendix D
Journey Time Routes

Figure D.1 - Journey Time Route 1 – A518: 2007 AM Peak



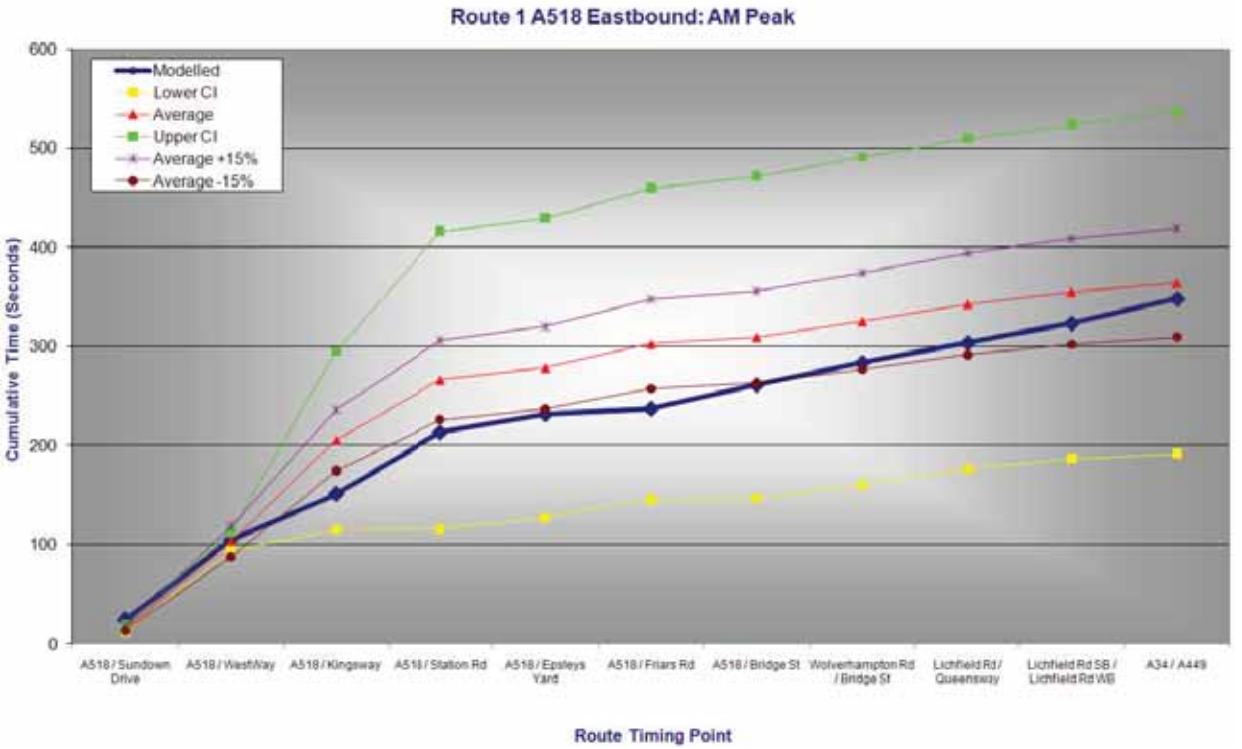
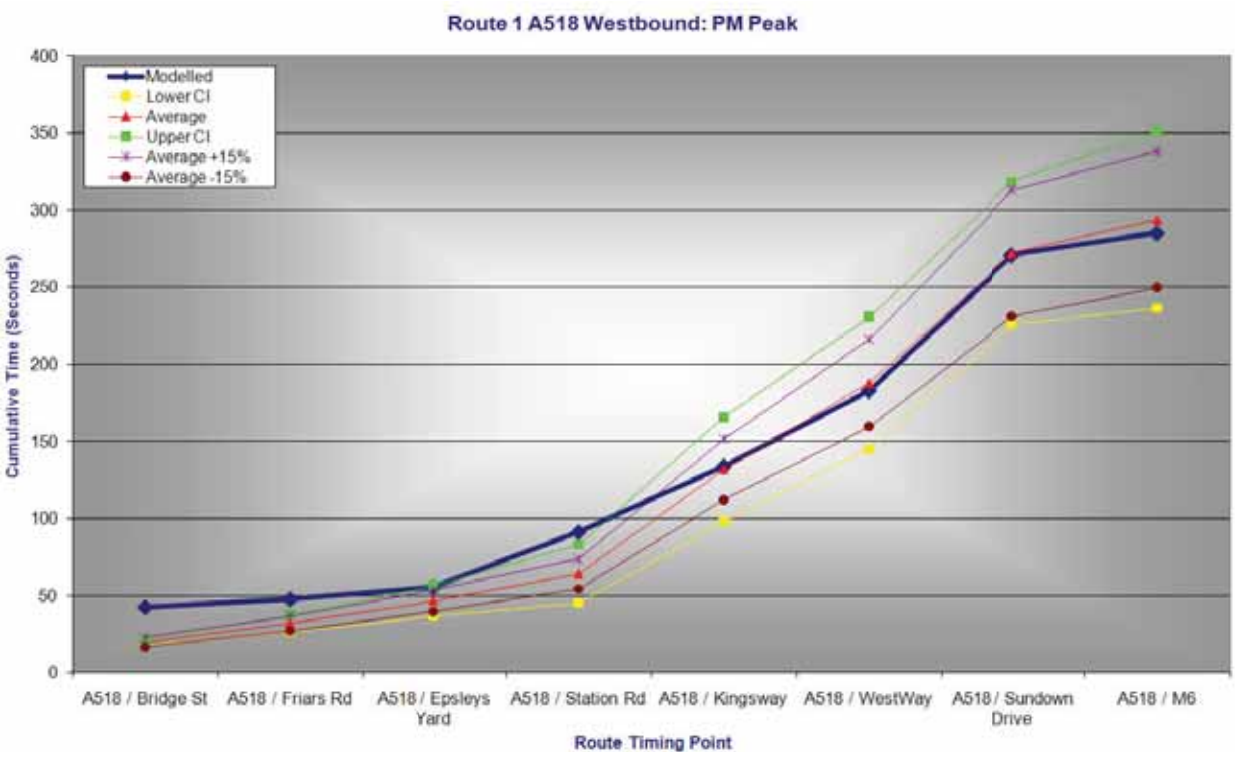


Figure D.2 - Journey Time Route 1 – A518: 2007 PM Peak



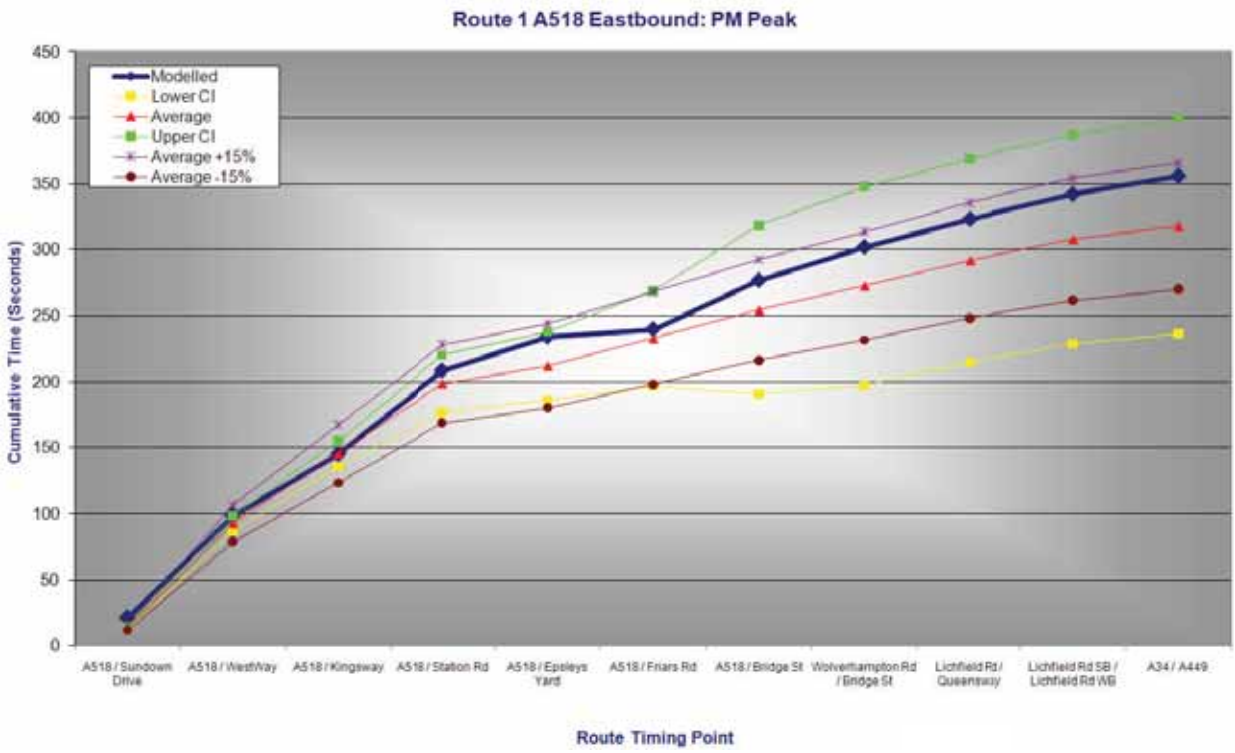
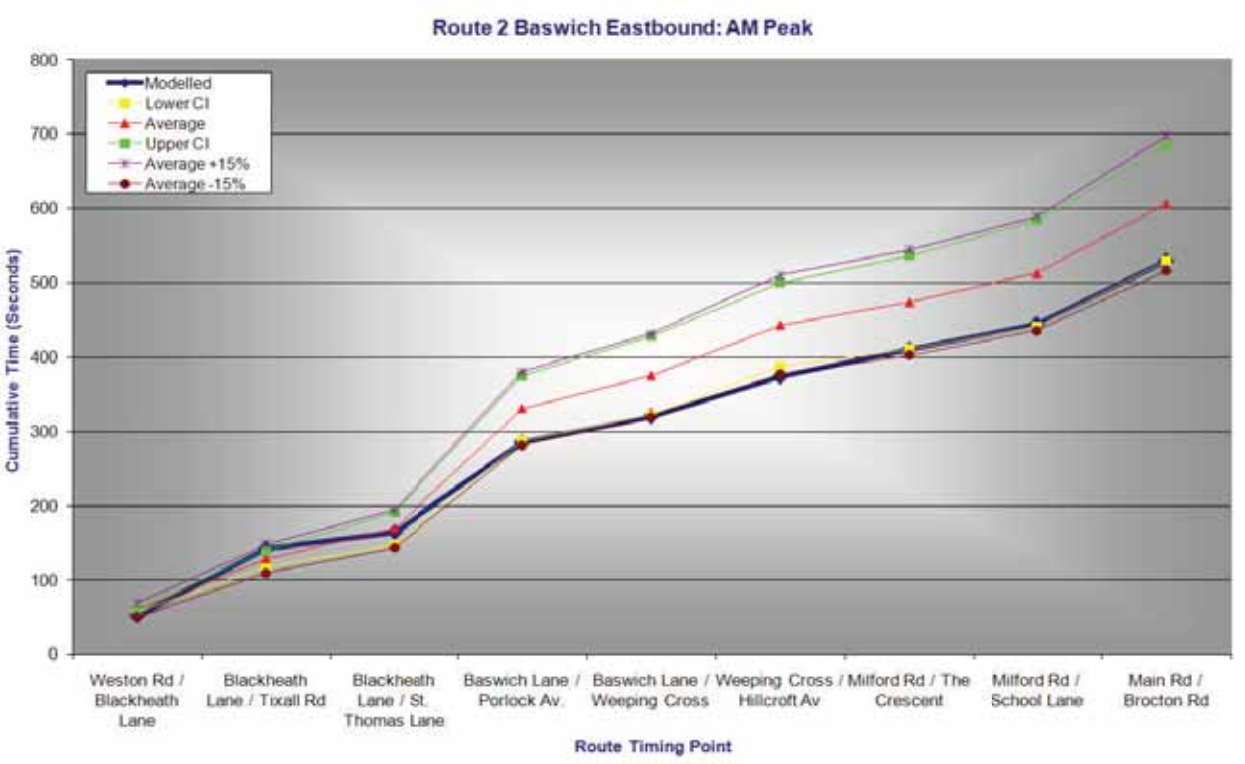


Figure D.3 - Journey Time Route 2 – Baswich: 2007 AM peak



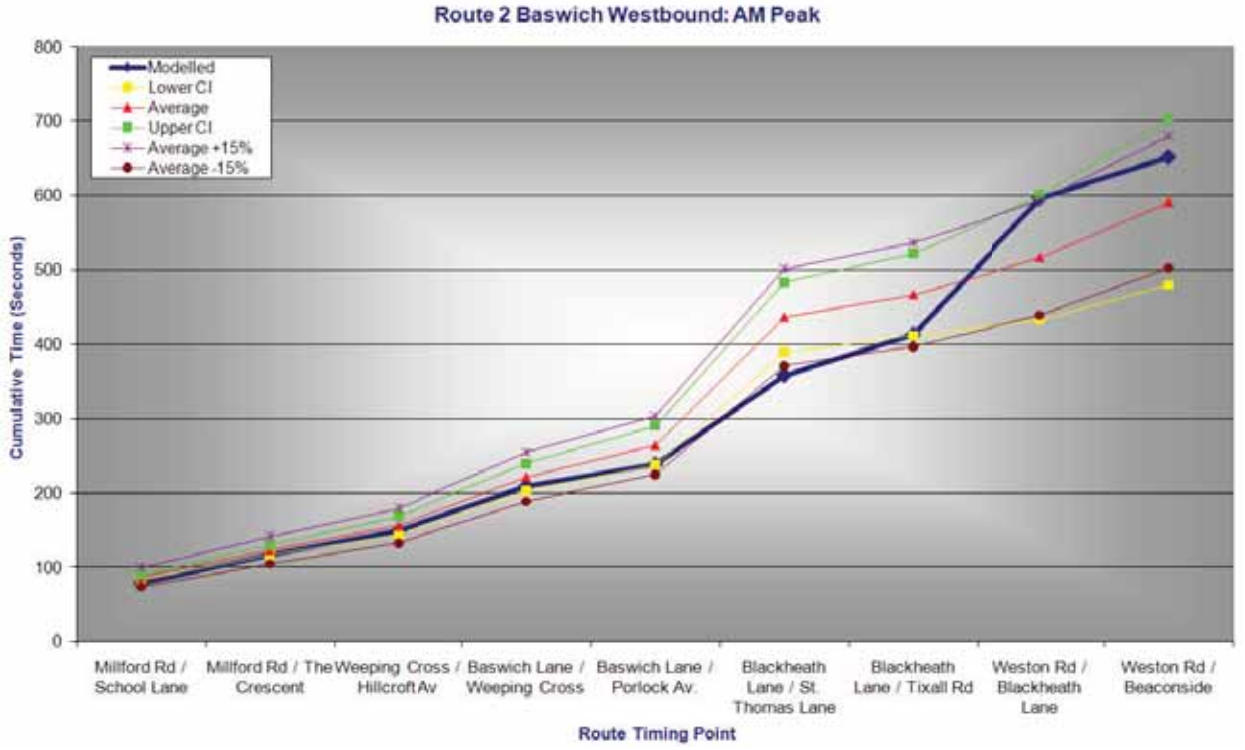
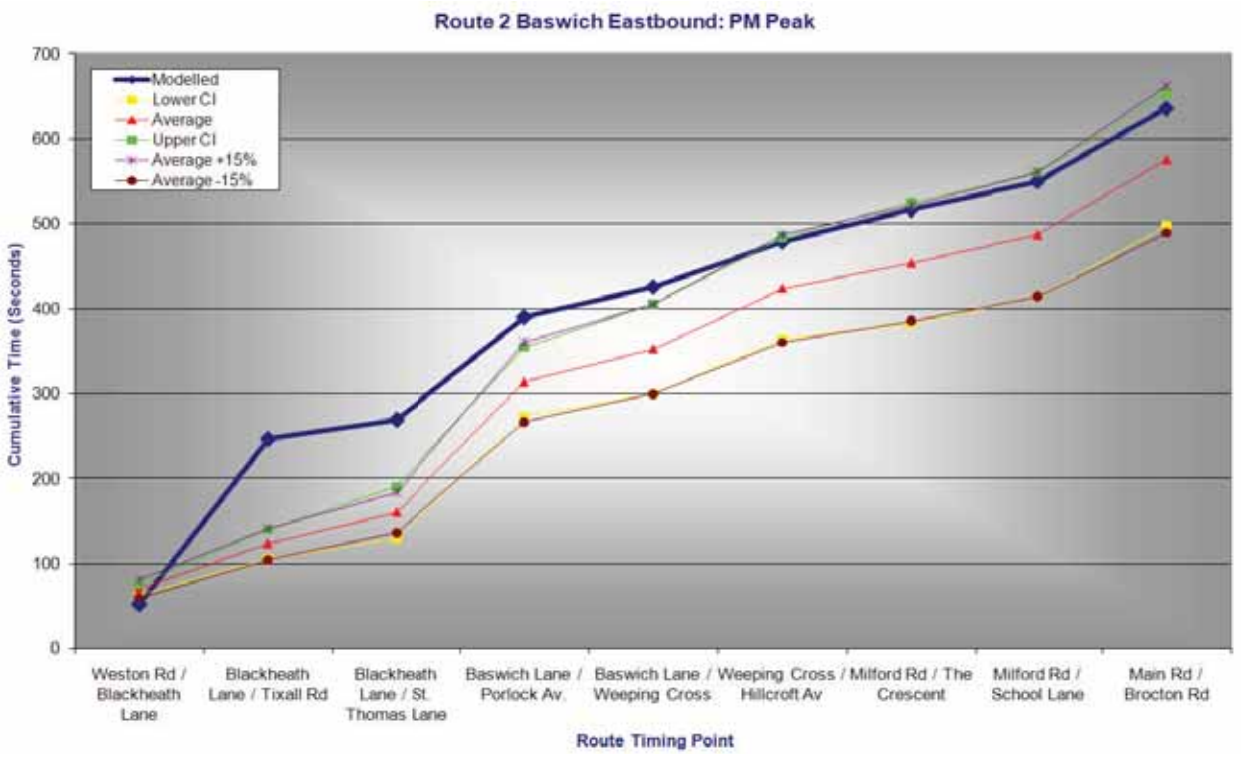


Figure D.4 - Journey Time Route 2 – Baswich: 2007 PM Peak



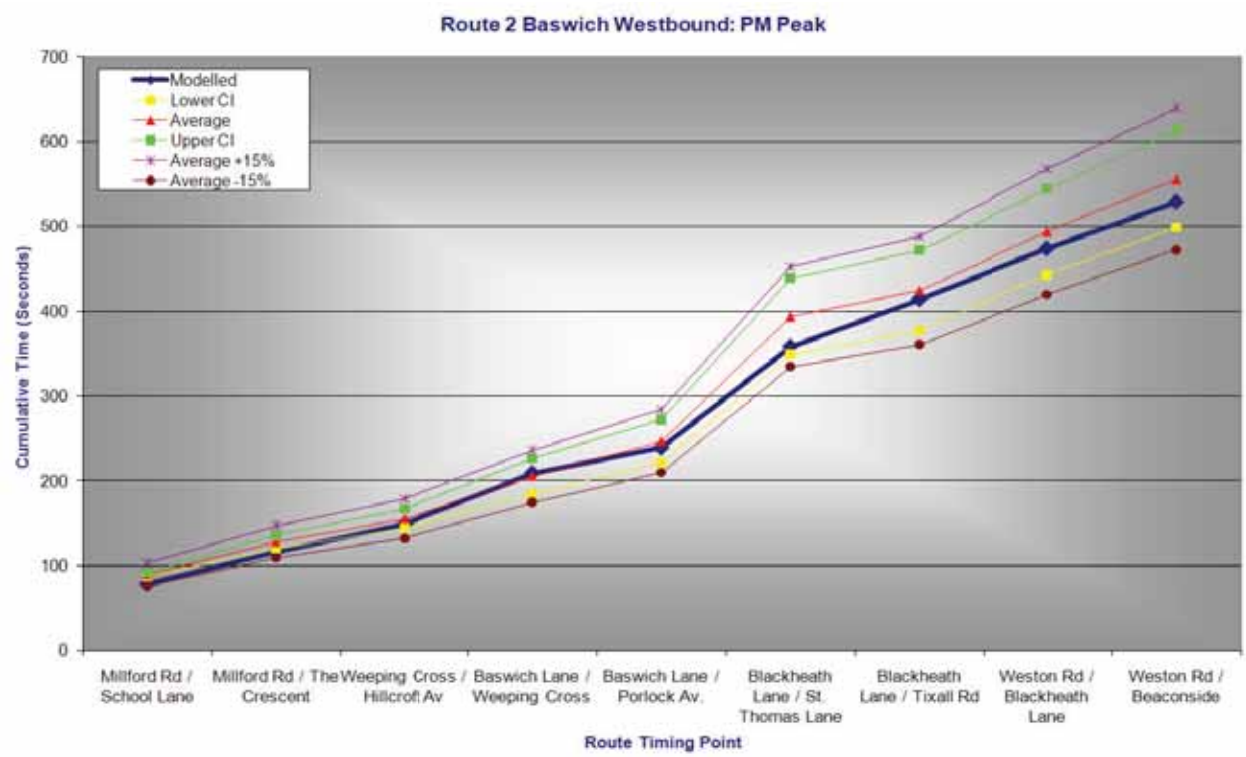
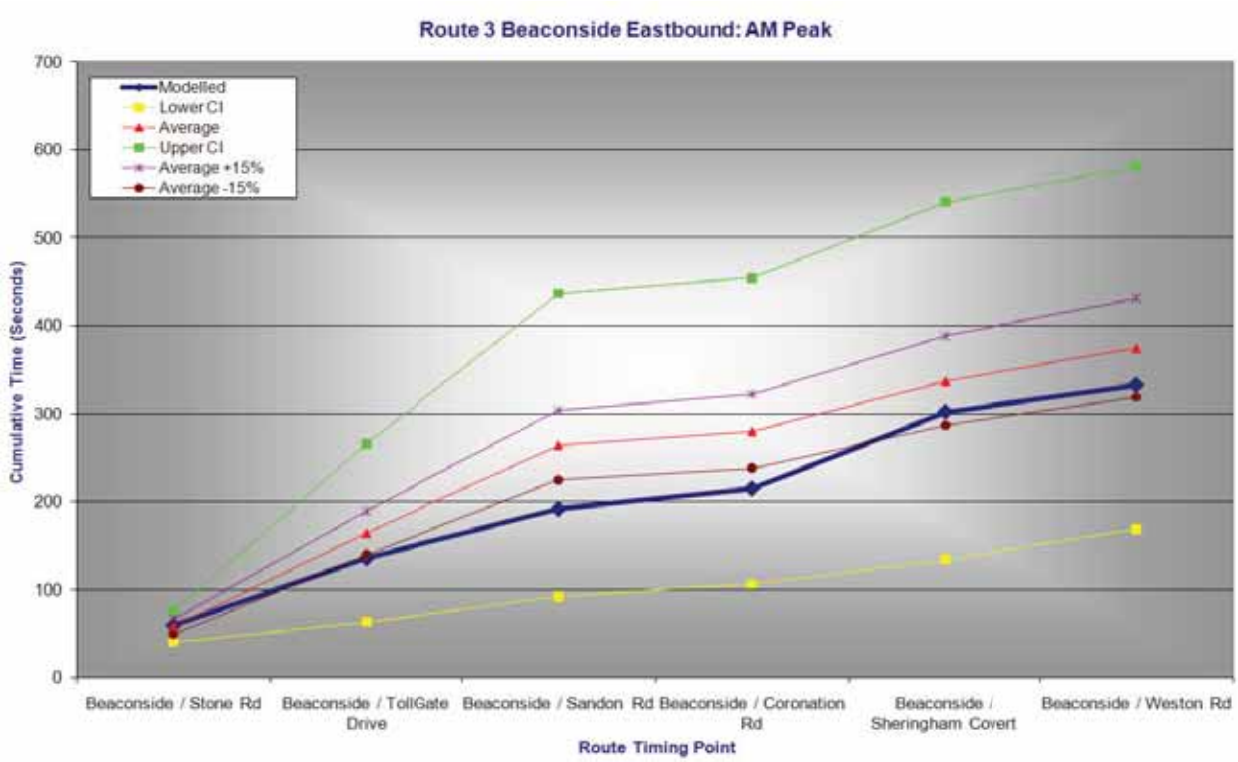


Figure D.5 - Journey Time Route 3 – Beaconside: 2007 AM Peak



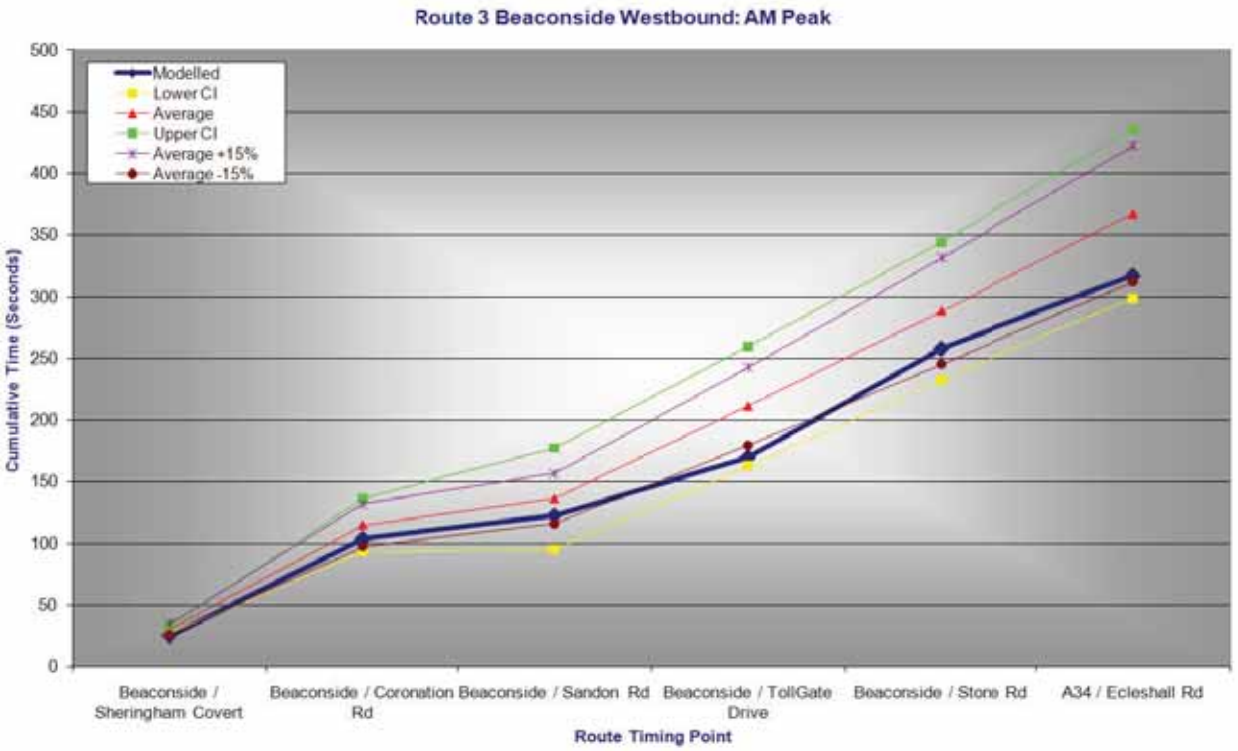
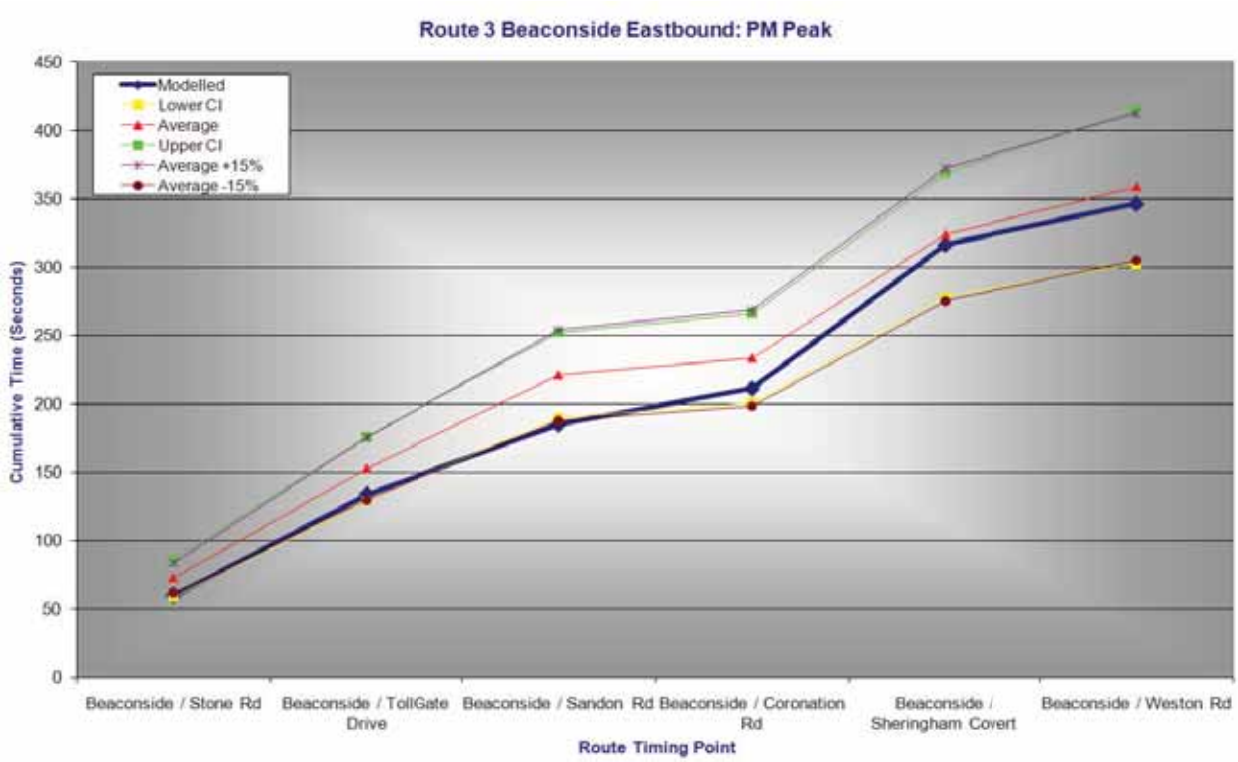


Figure D.6 - Journey Time Route 3 – Beaconside: 2007 PM Peak



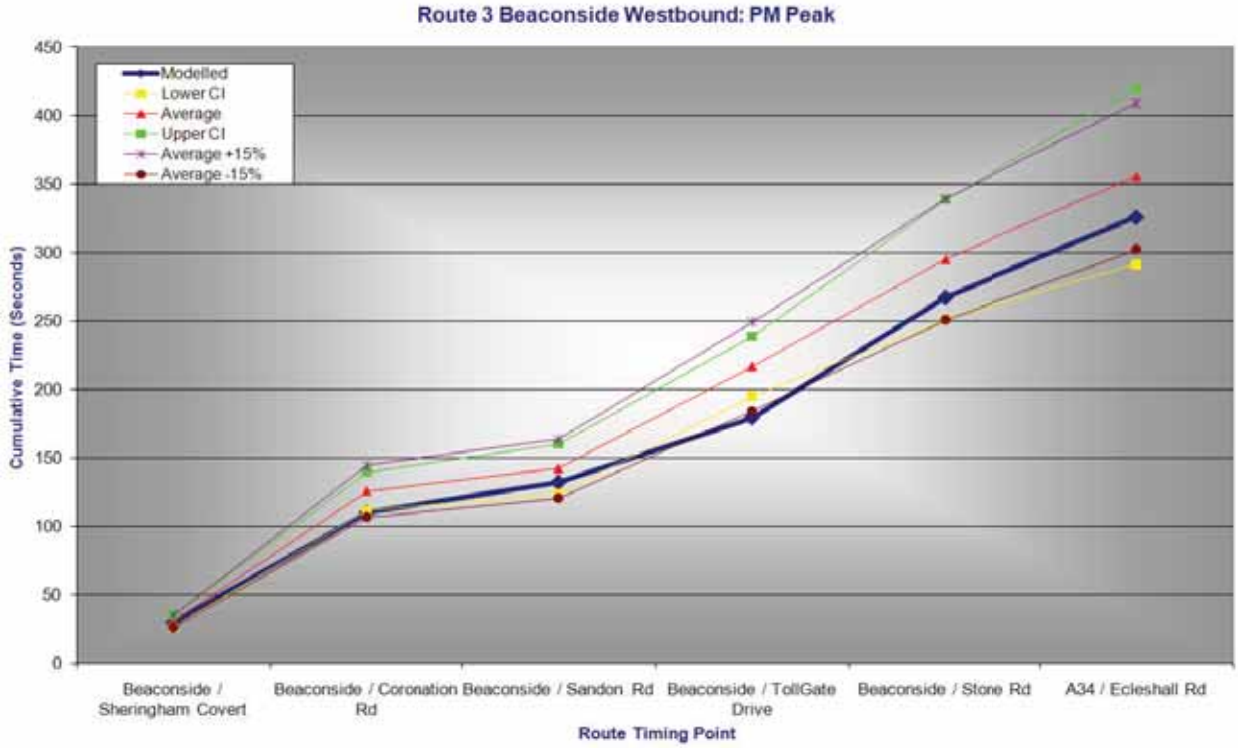
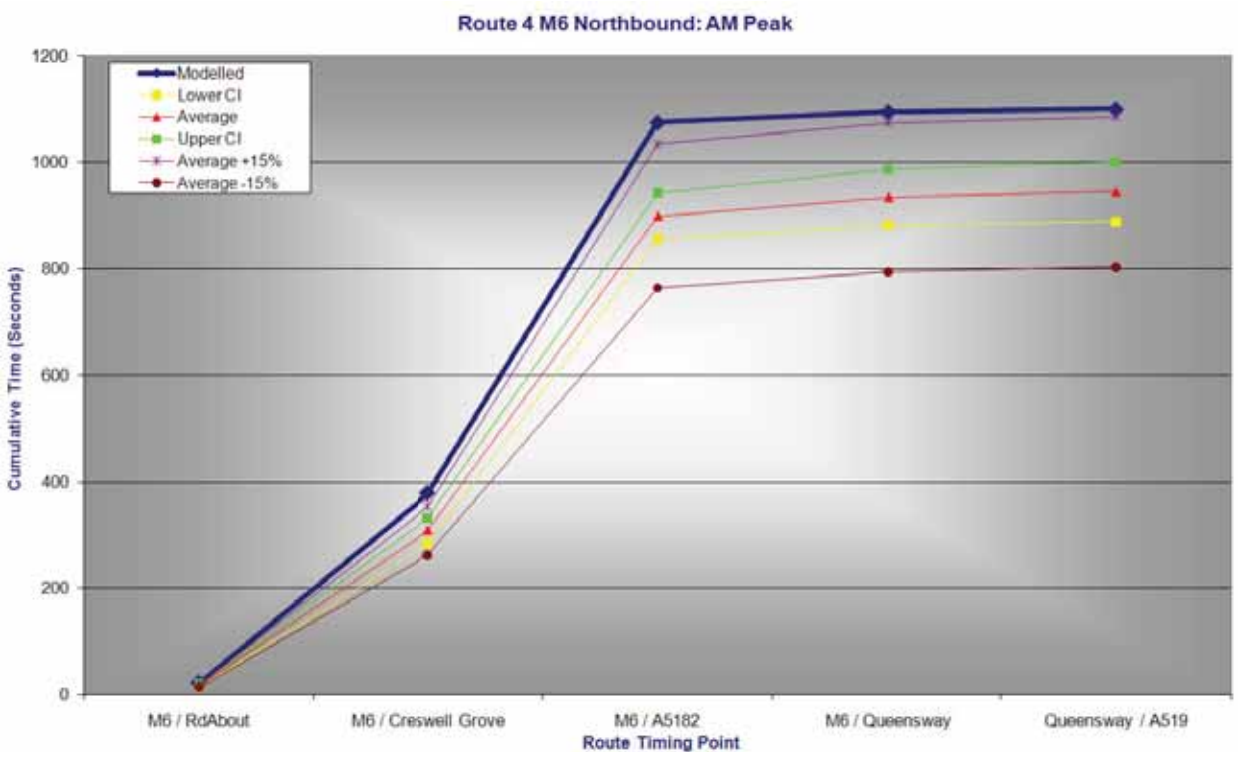


Figure D.7 - Journey Time Route 4 – M6: 2007 AM Peak



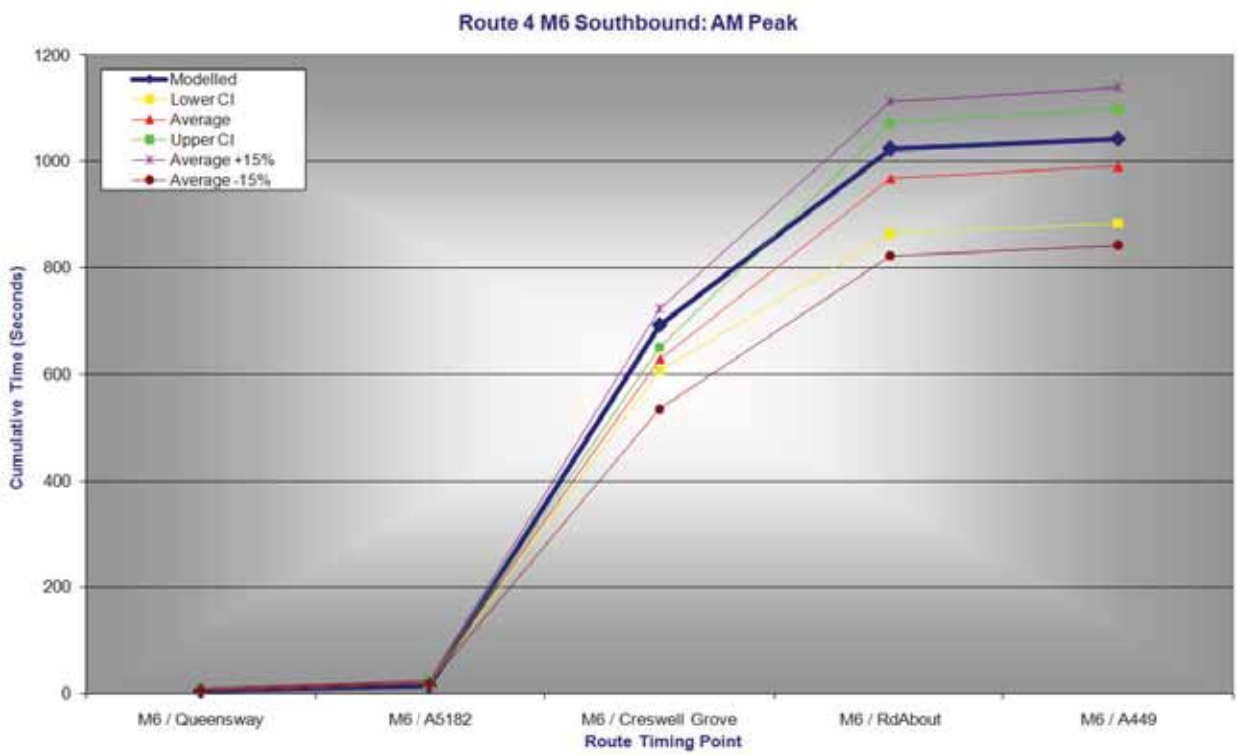
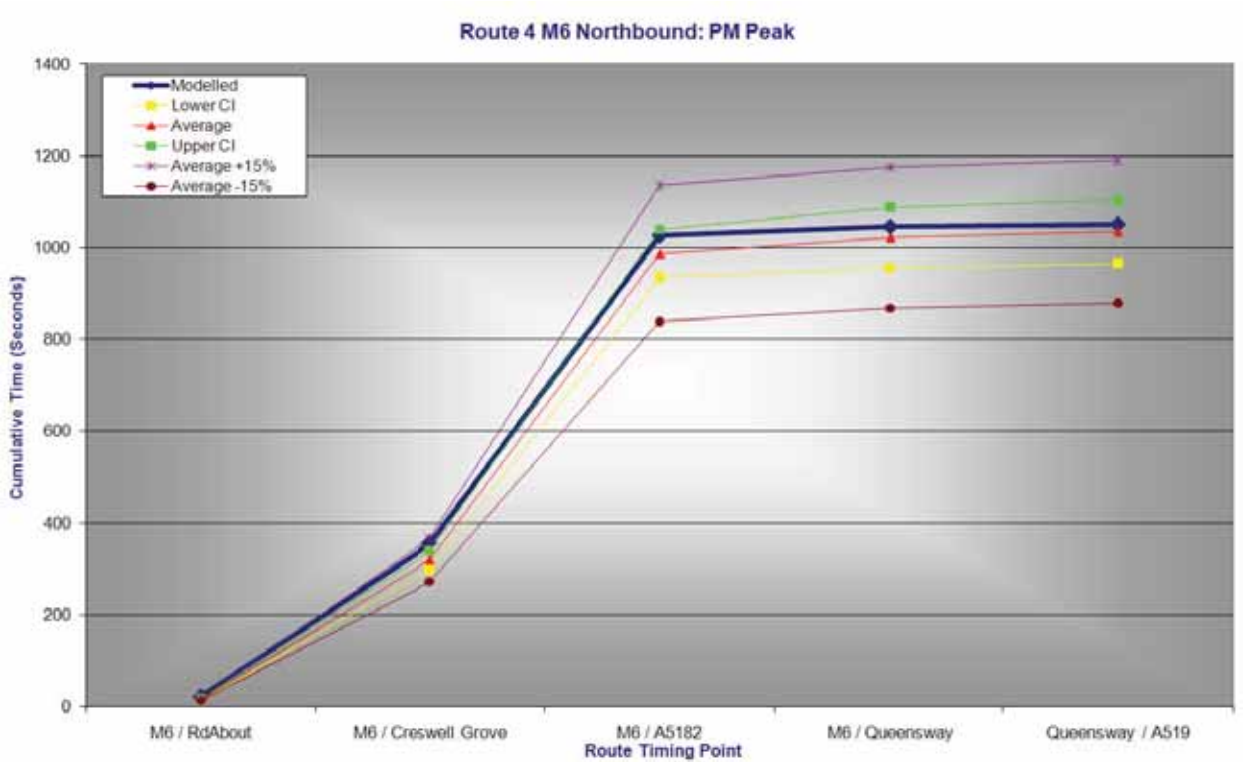


Figure D.8 - Journey Time Route 4 – M6: 2007 PM Peak



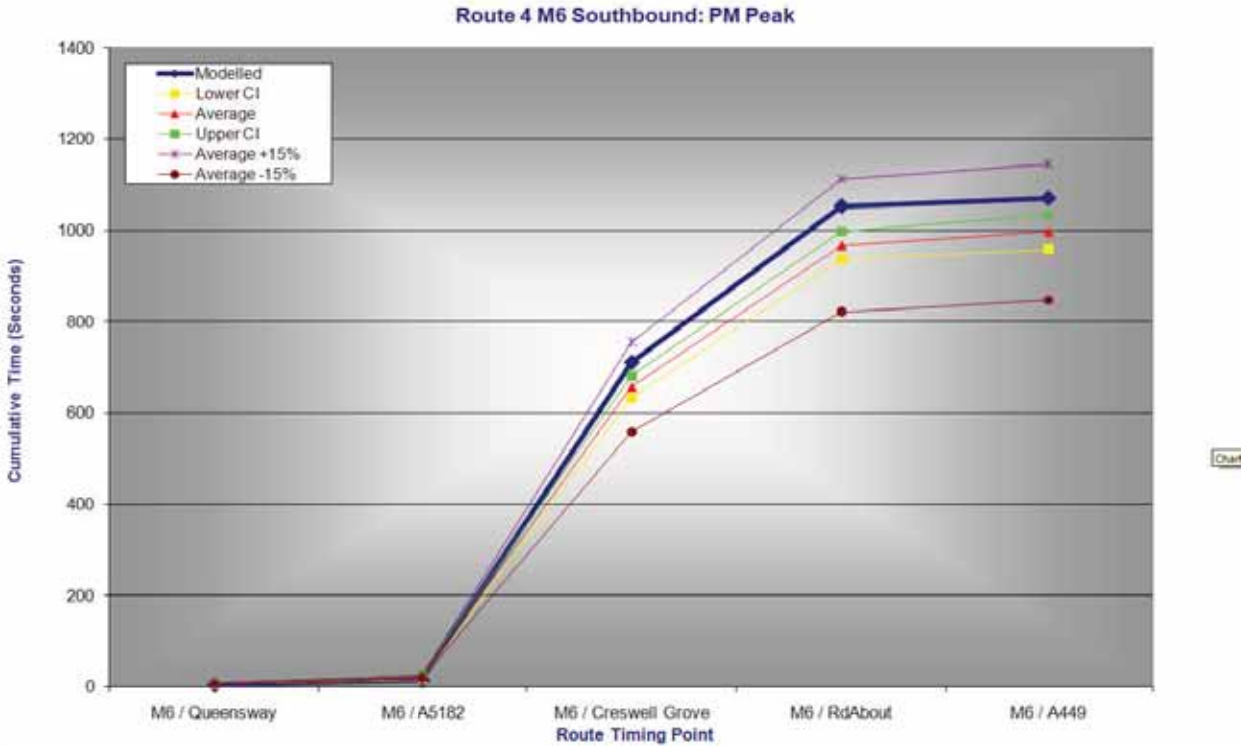
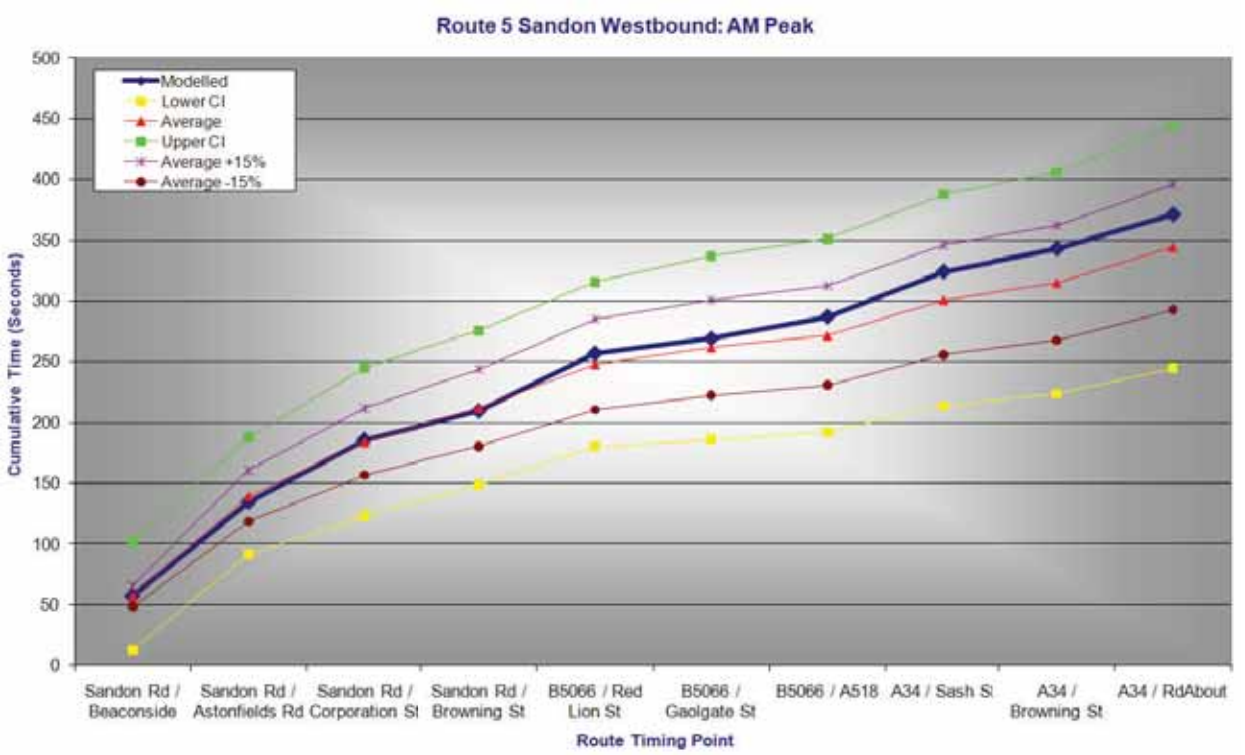


Figure D.9 - Journey Time Route 5 – Sandon Road: 2007 AM Peak



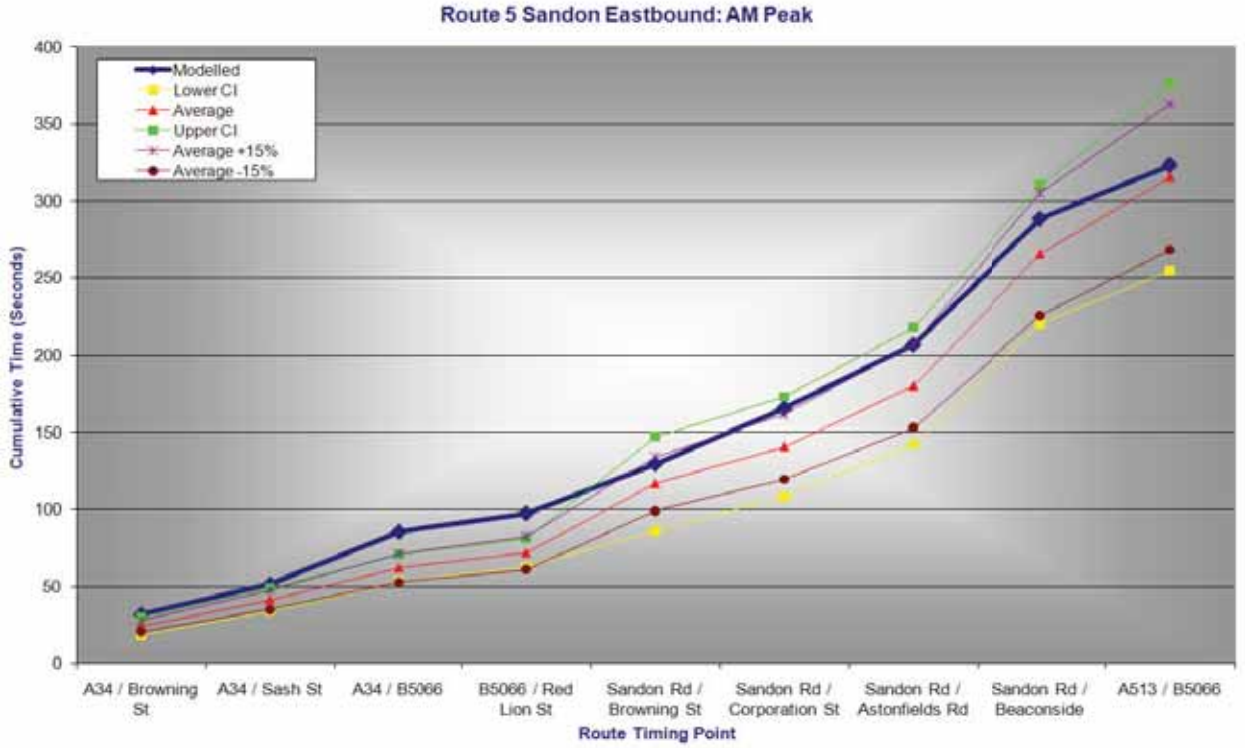
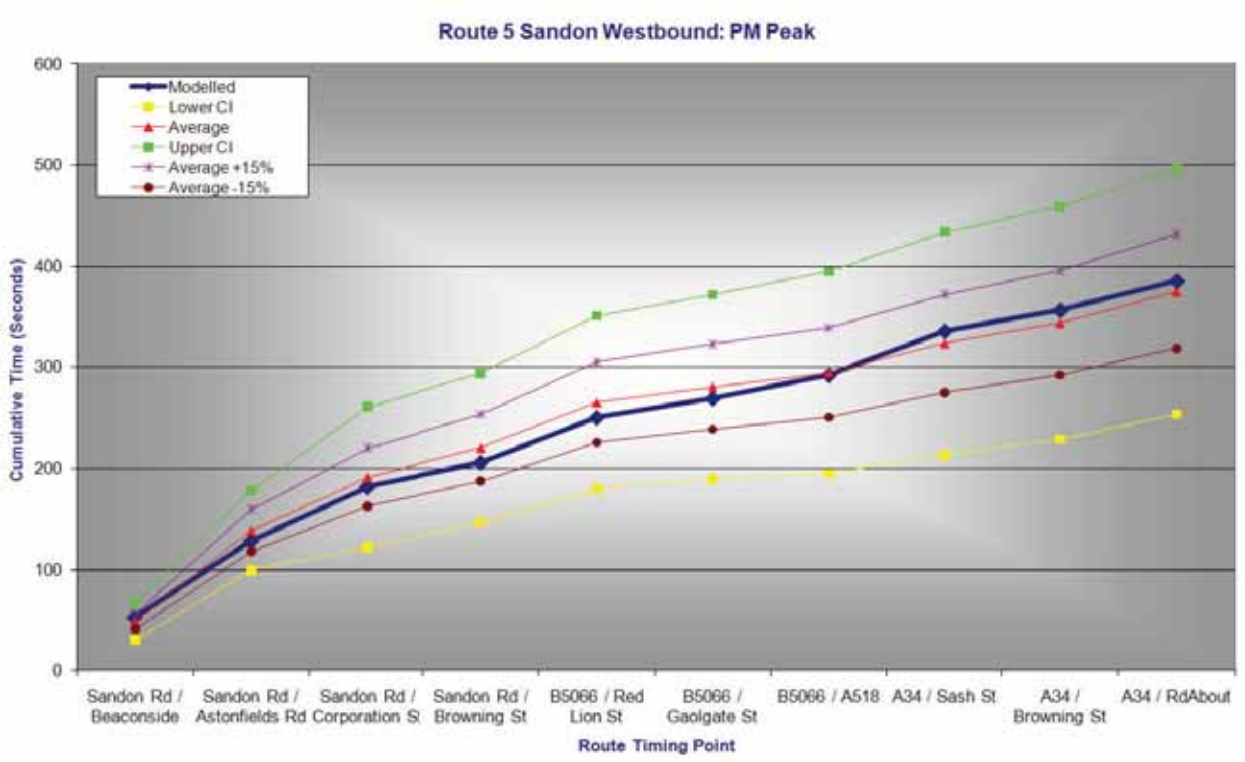


Figure D.10 - Journey Time Route 5 – Sandon Road: 2007 PM Peak



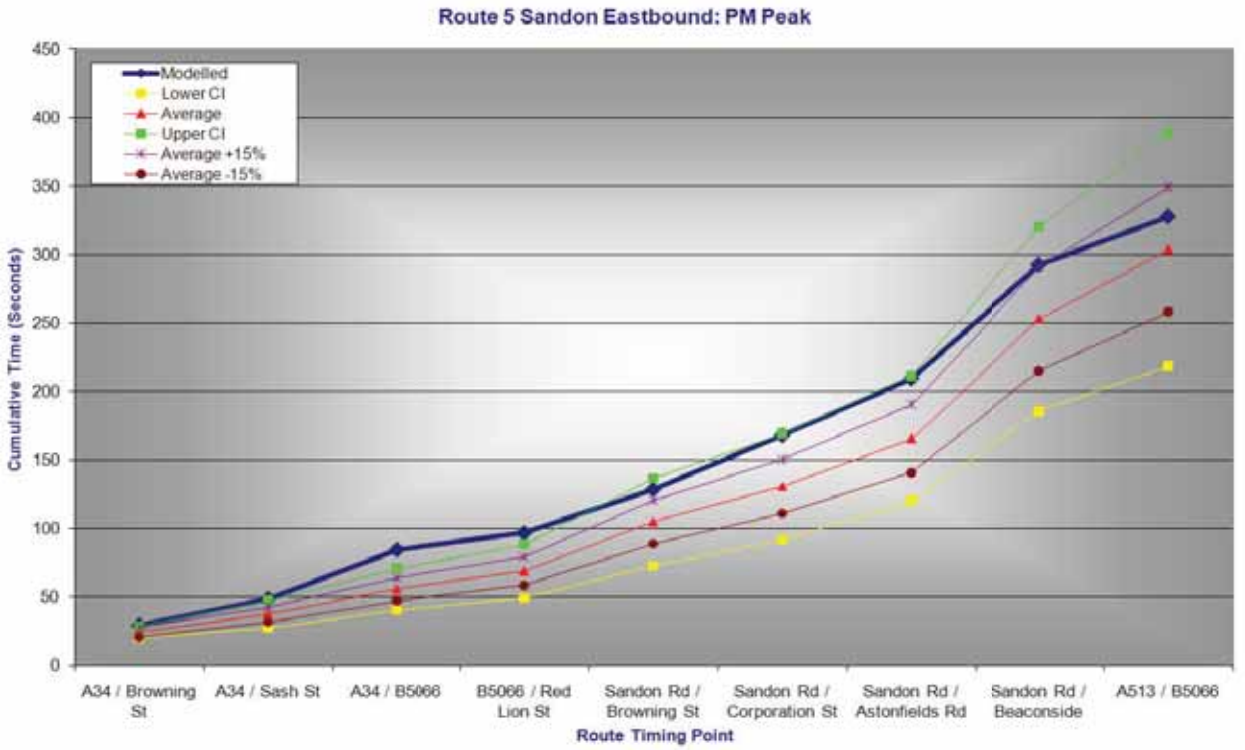
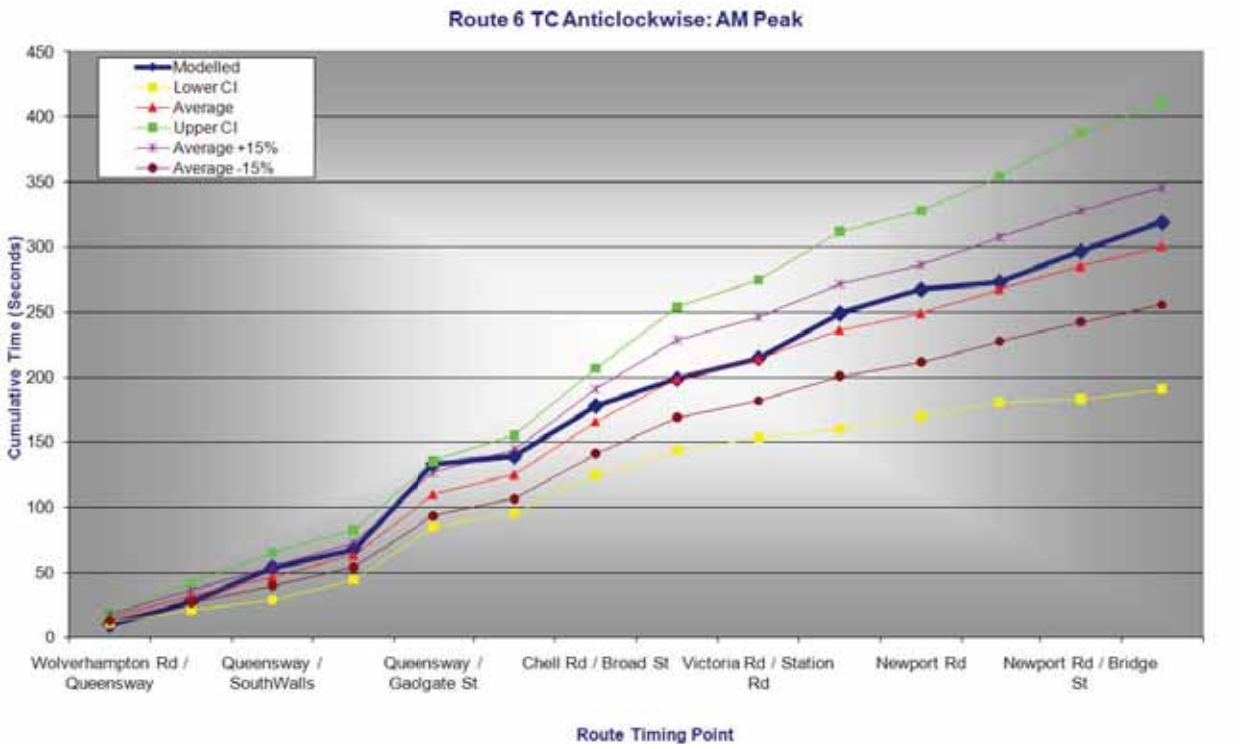


Figure D.11 - Journey Time Route 6 Town Centre Ring: 2007 AM Peak



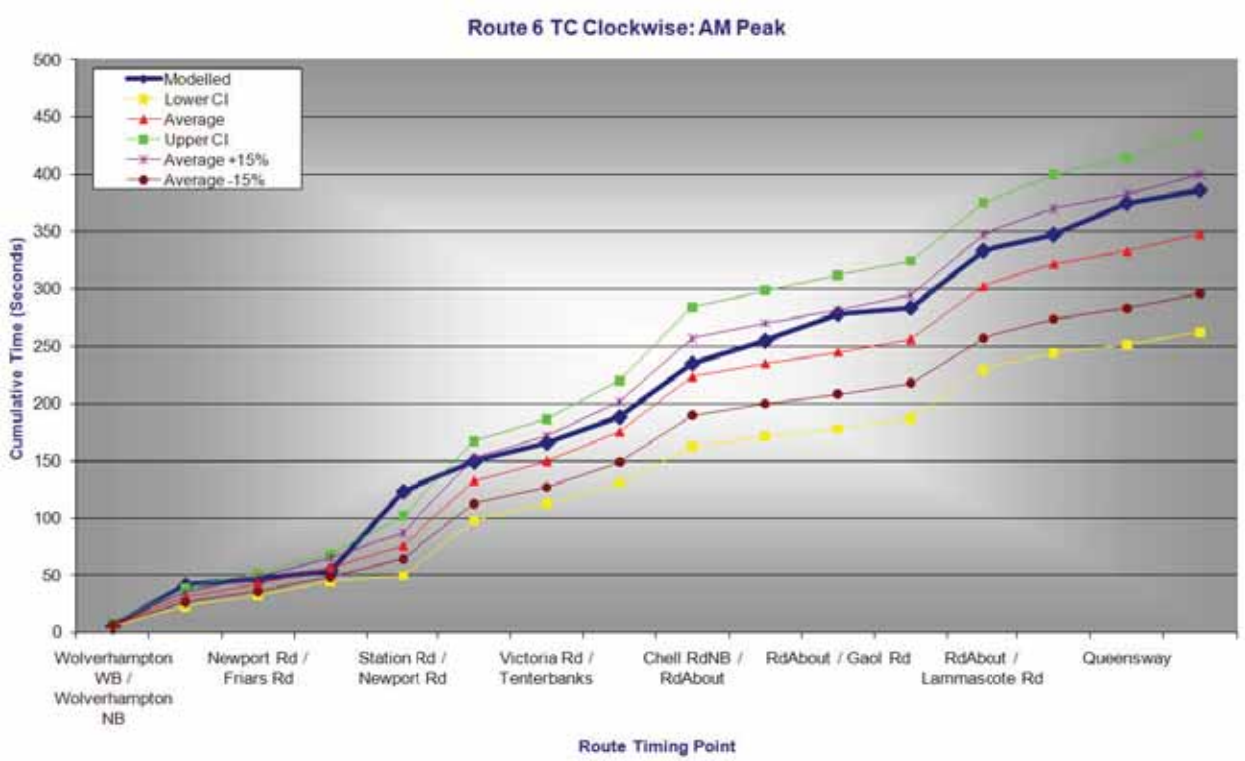
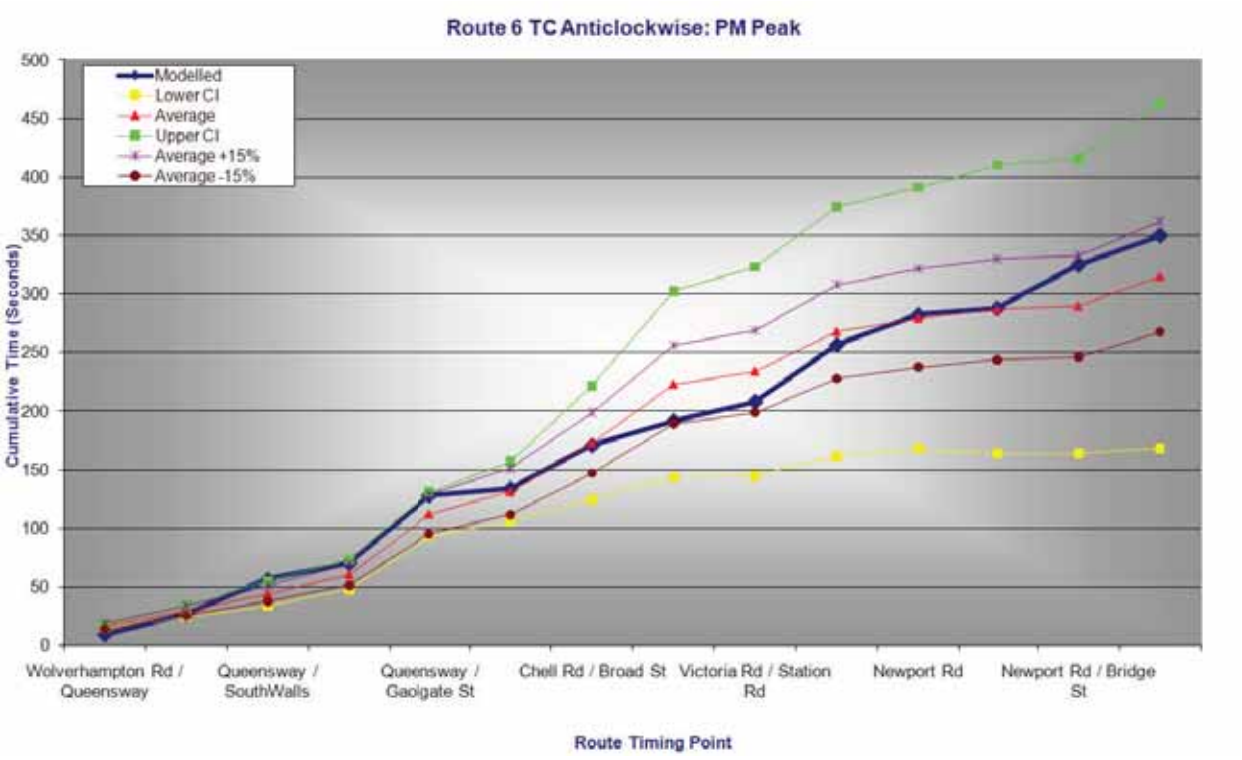


Figure D.12 - Journey Time Route 6 – Town Centre Ring: 2007 PM Peak



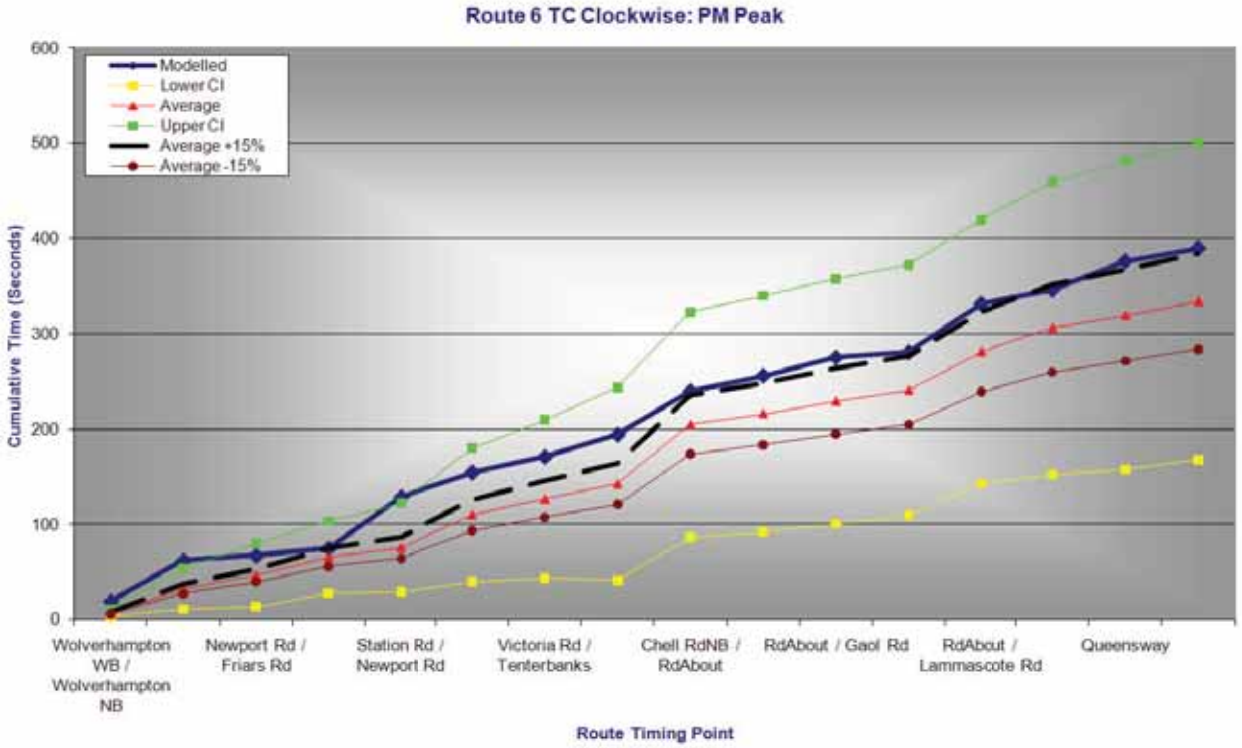
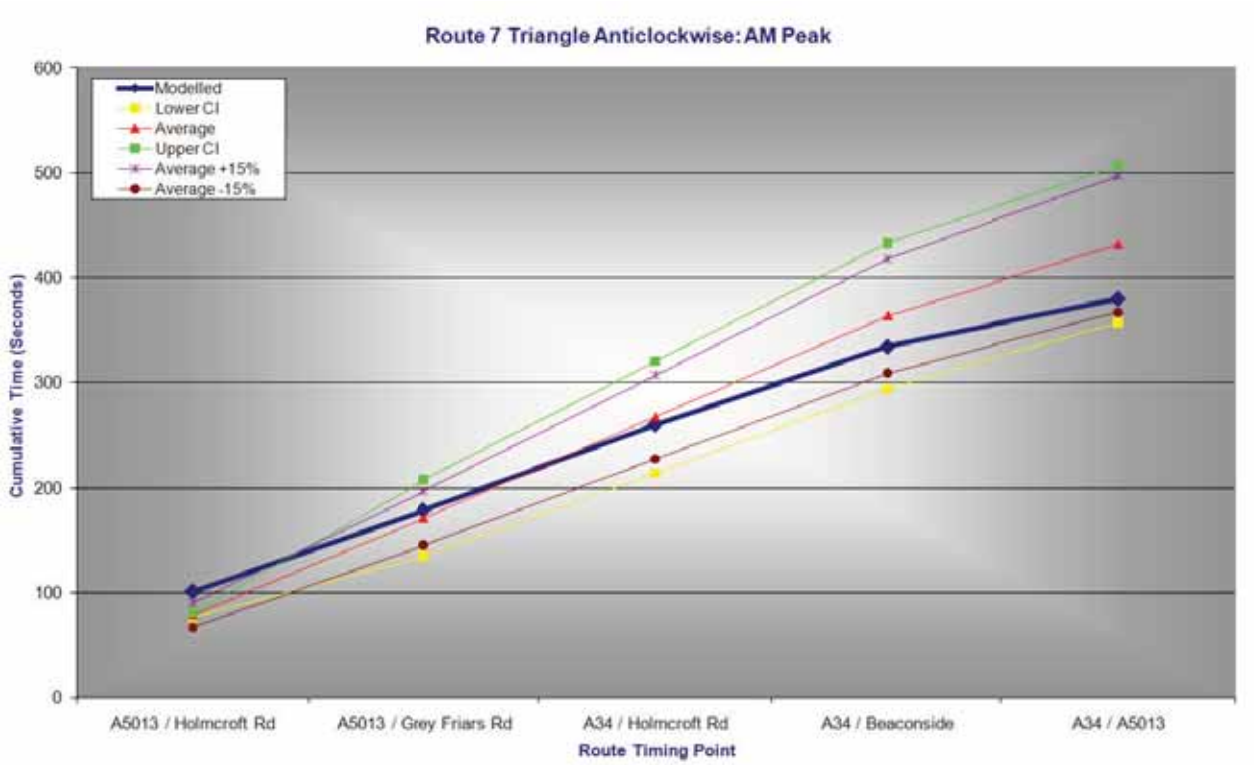


Figure D.13 - Journey Time Route 7 – Triangle: 2007 AM Peak



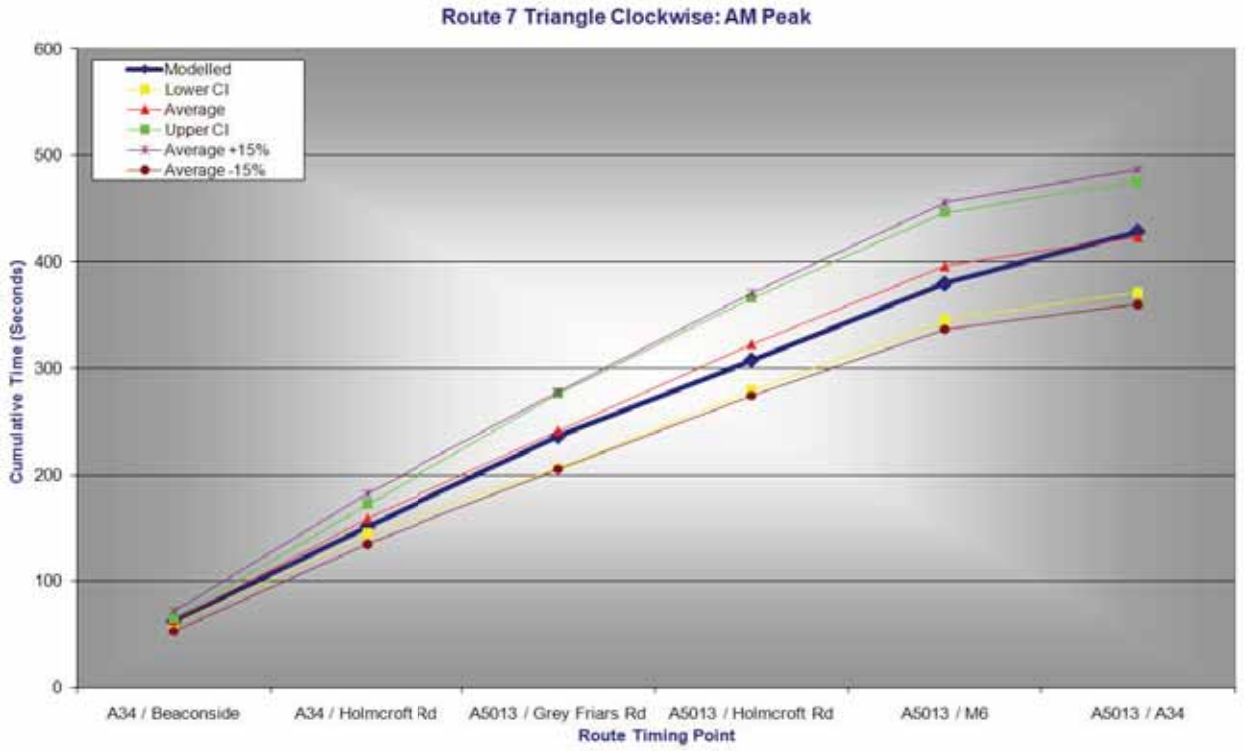
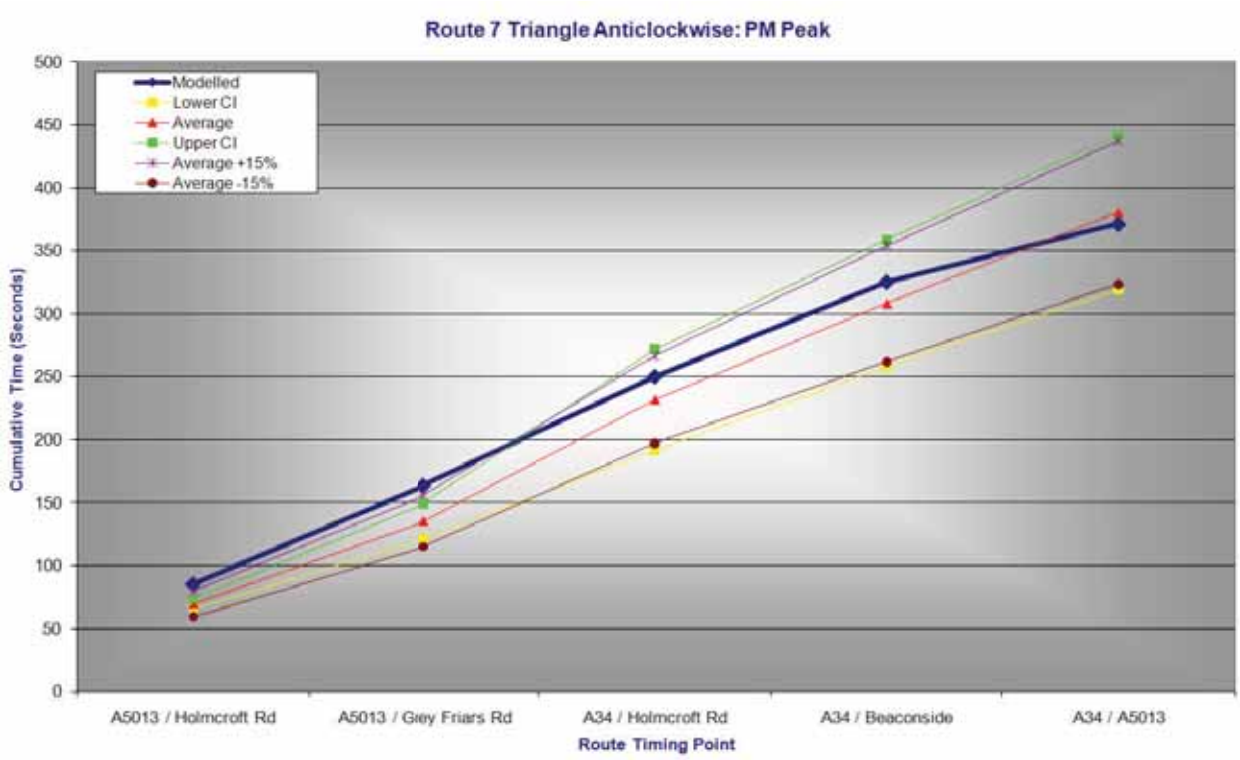


Figure D.14 - Journey Time Route 7 – Triangle: 2007 PM Peak



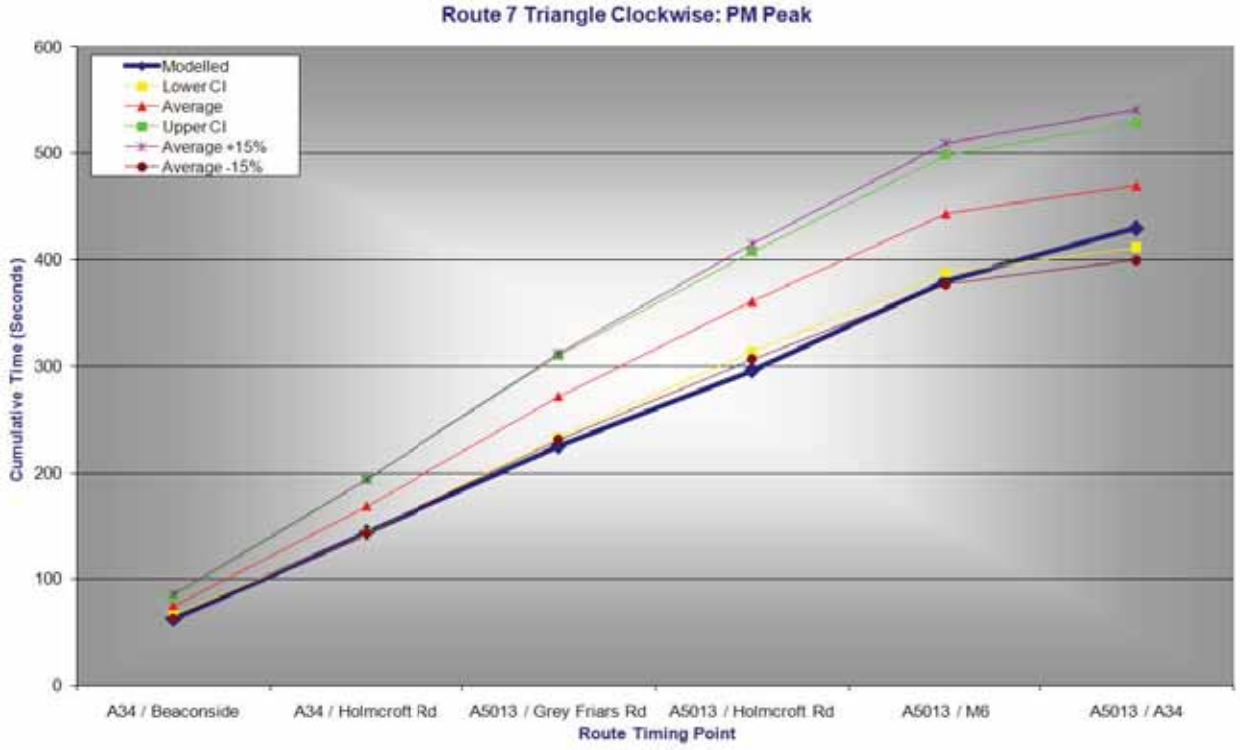
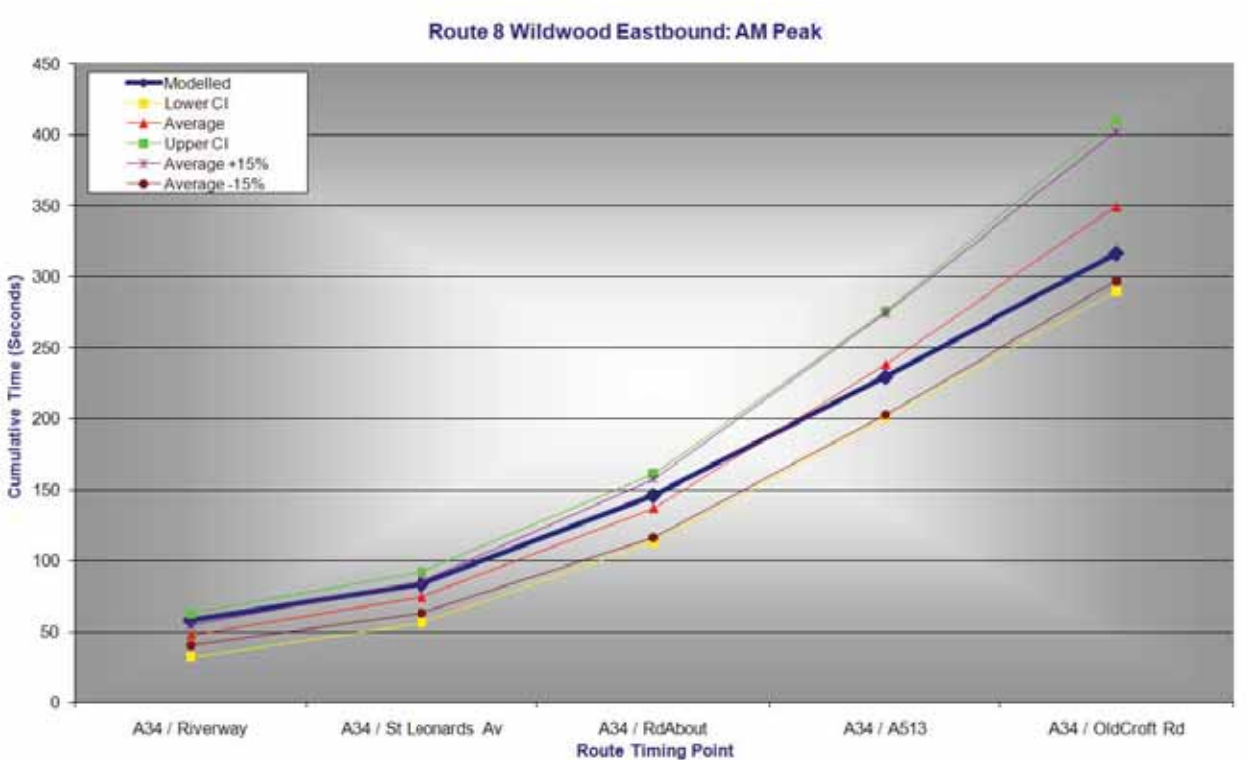


Figure D.15 - Journey Time 8 – Wildwood: 2007 AM Peak



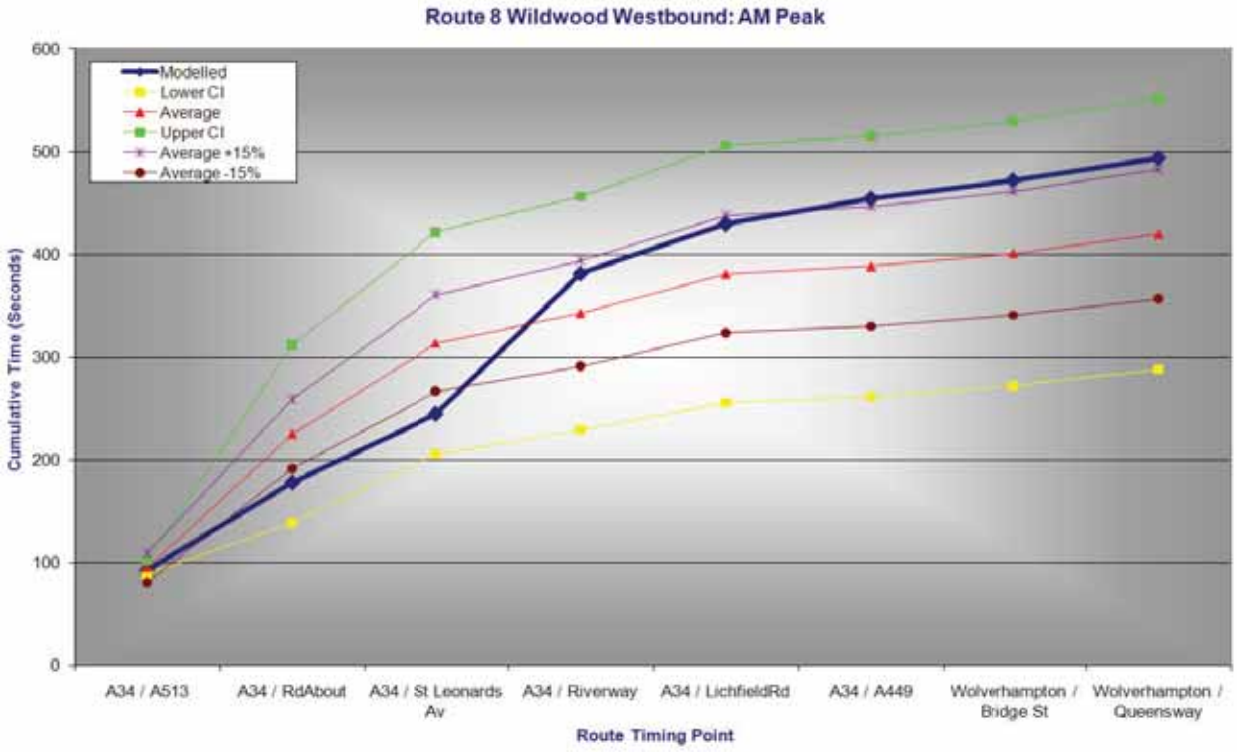
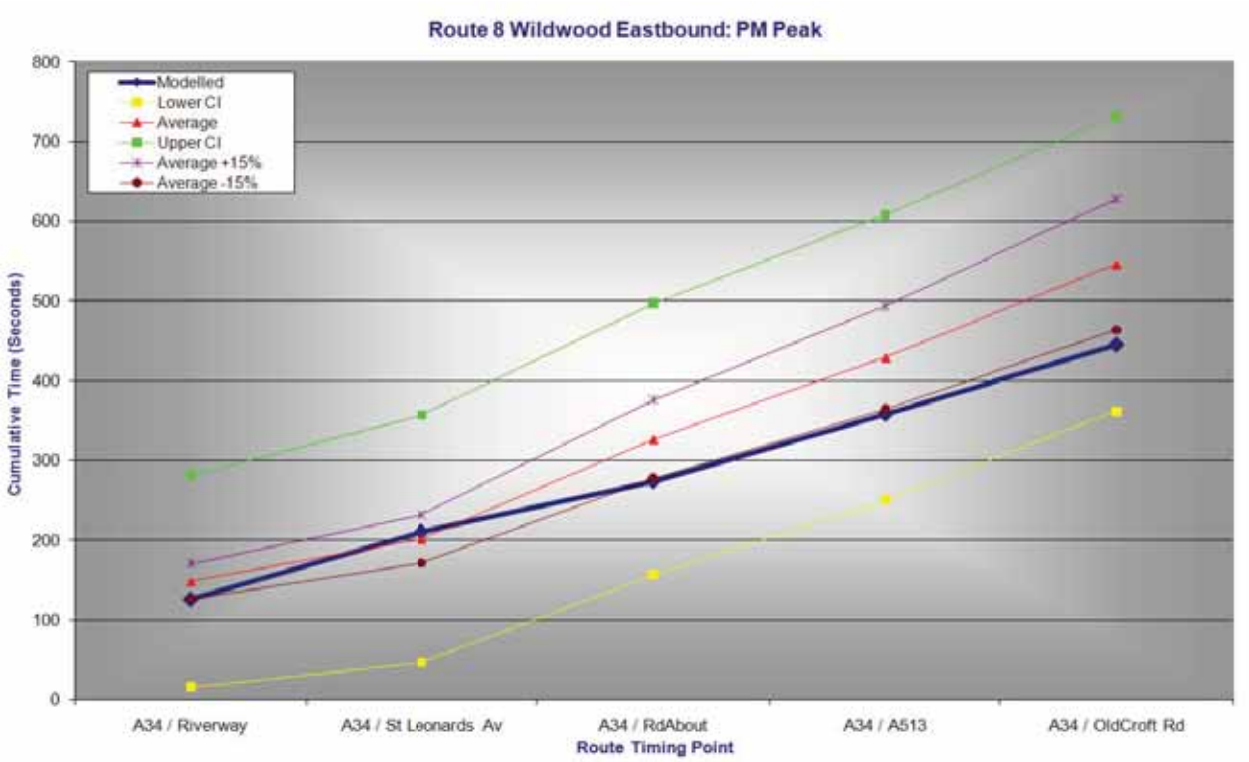


Figure D.16 - Journey Time Route 8 – Wildwood: 2007 PM Peak



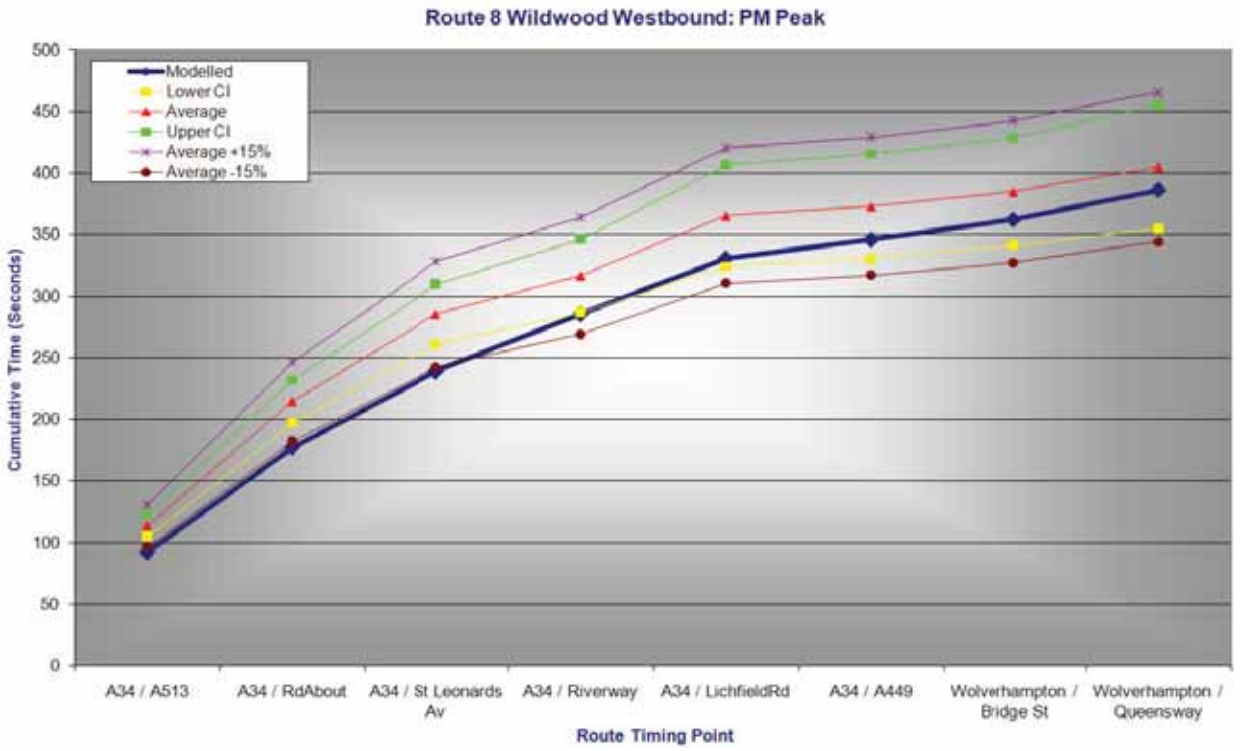
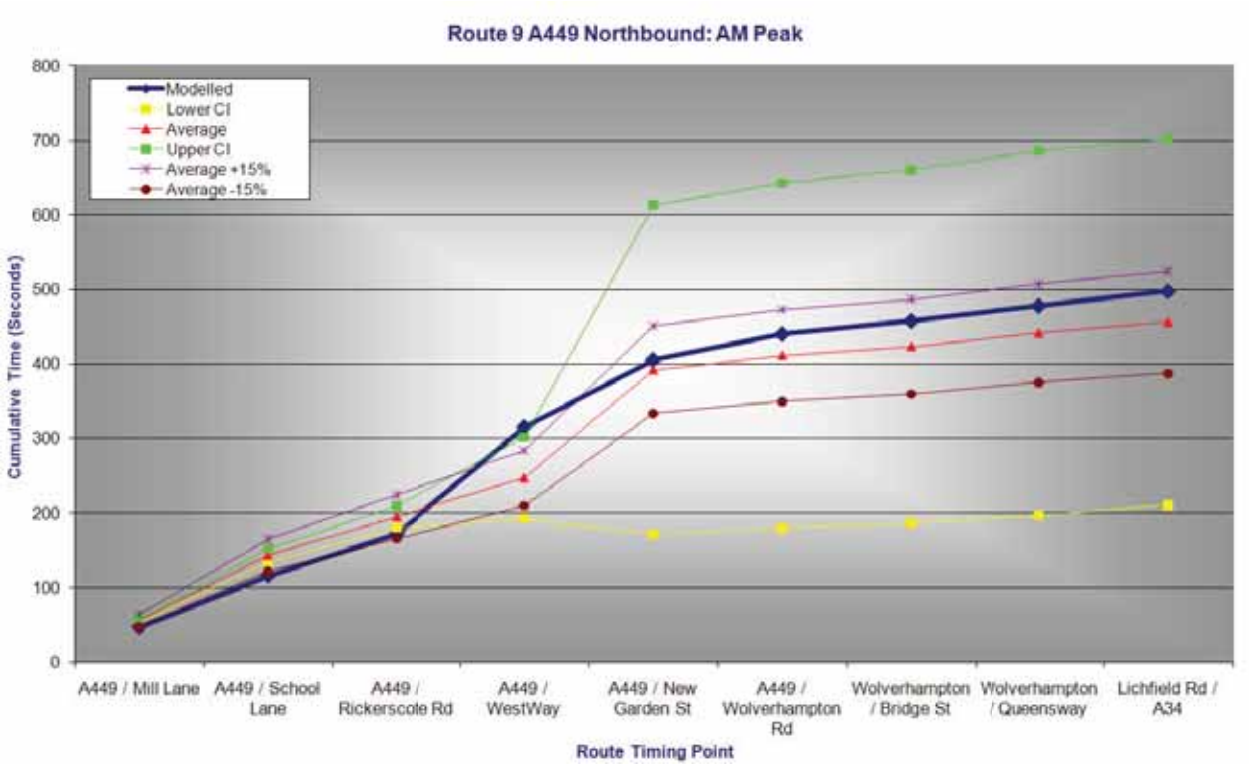


Figure D.17 - Journey Time Route 9 – A449: 2007 AM Peak



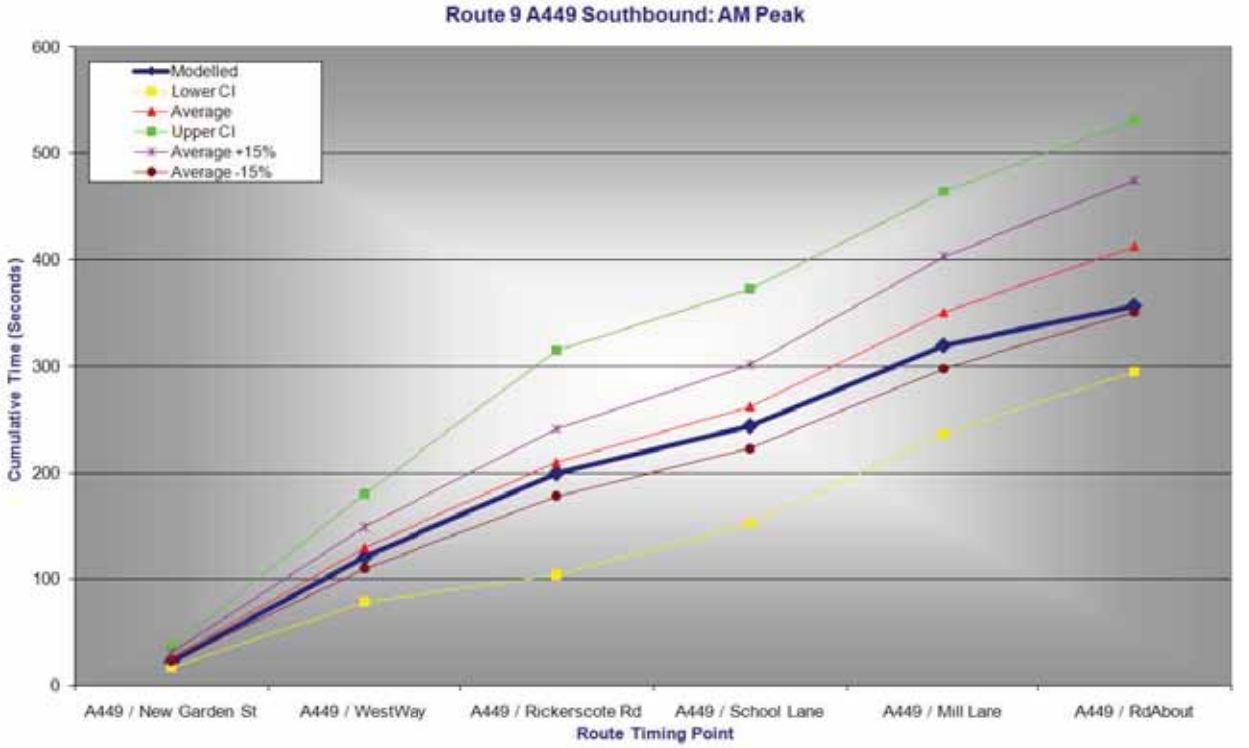
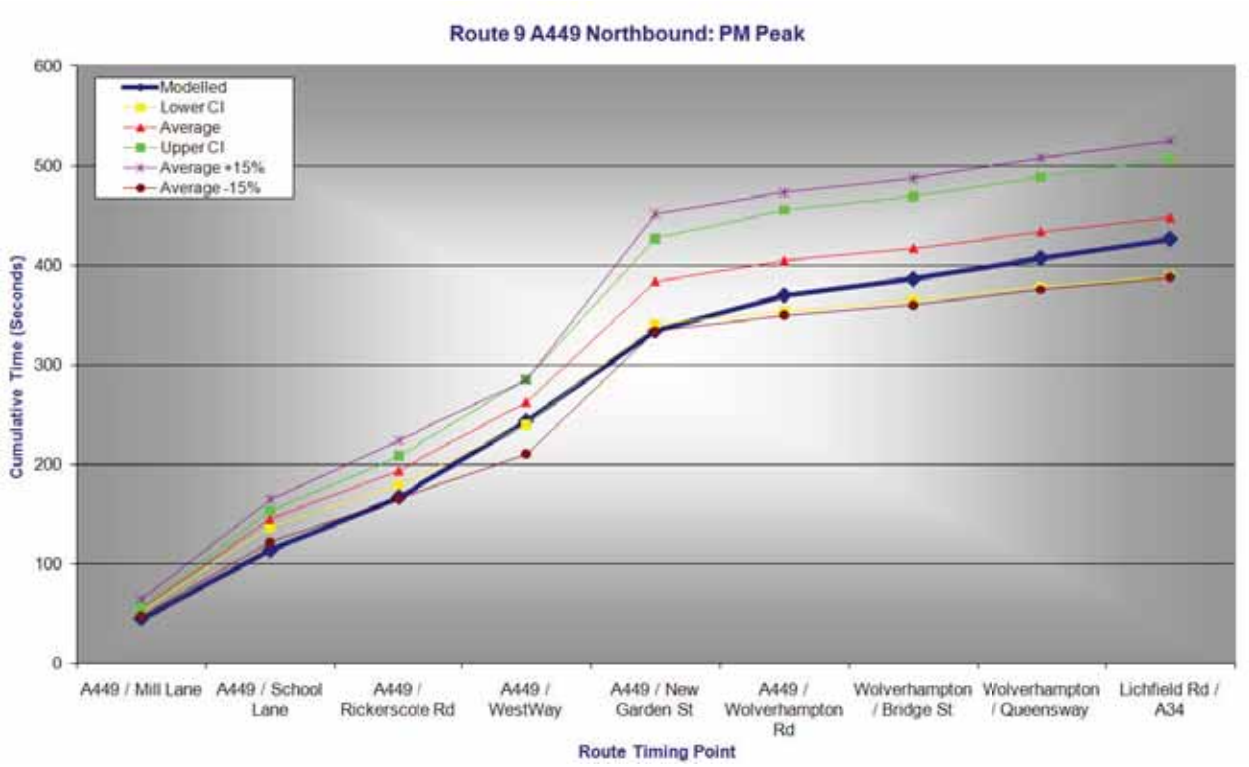


Figure D.18 - Journey Time Route 9 – A449: 2007 PM Peak



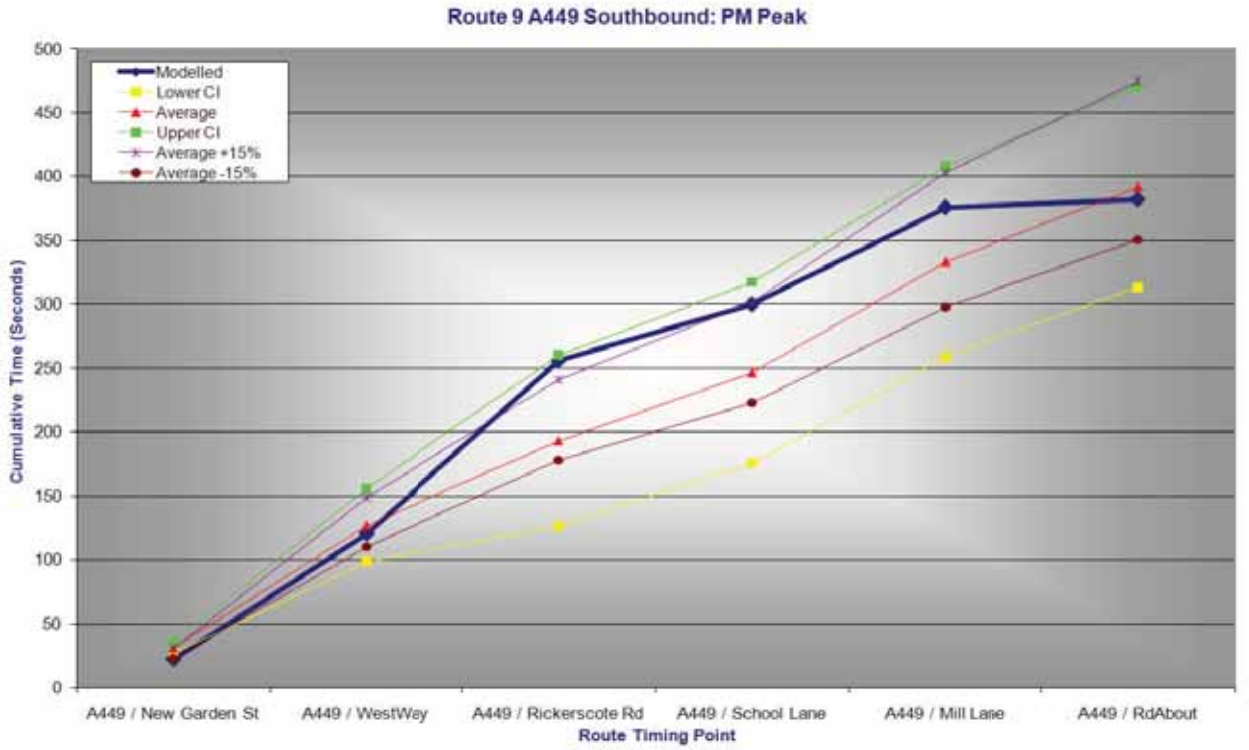
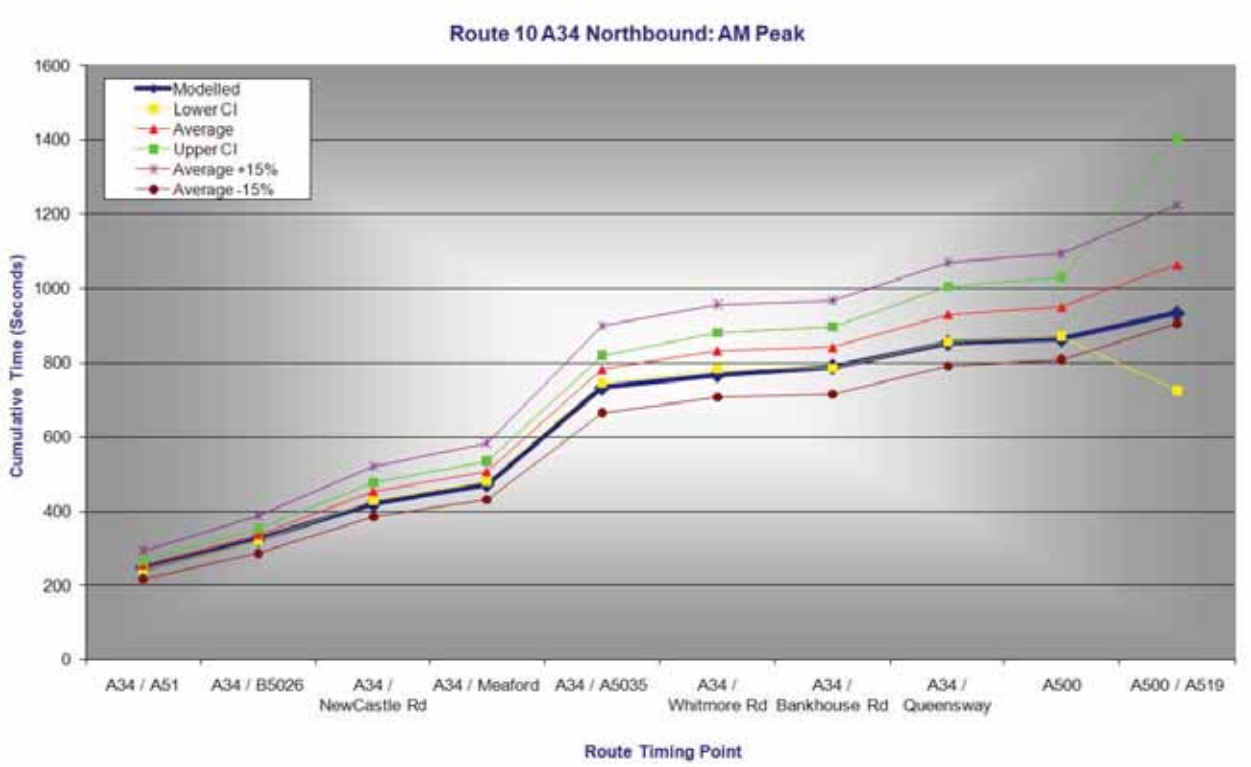


Figure D.19 - Journey Time Route 10 – A34: 2007 AM Peak



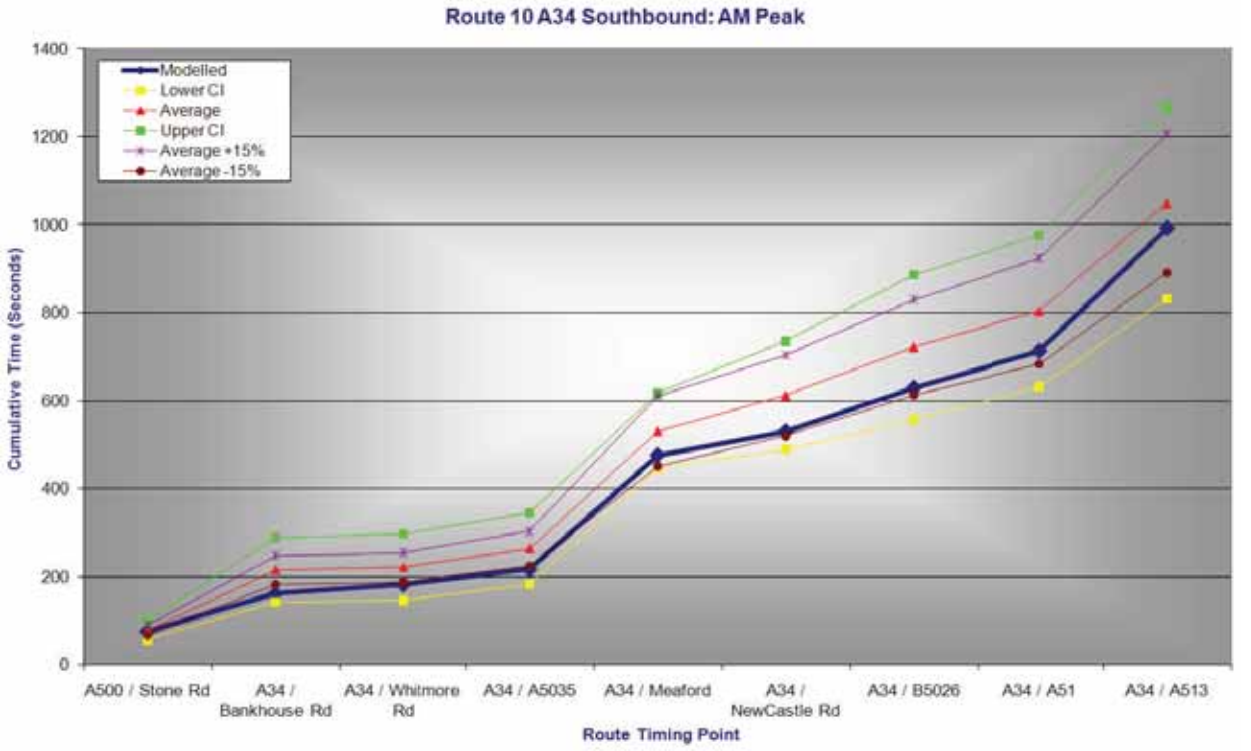
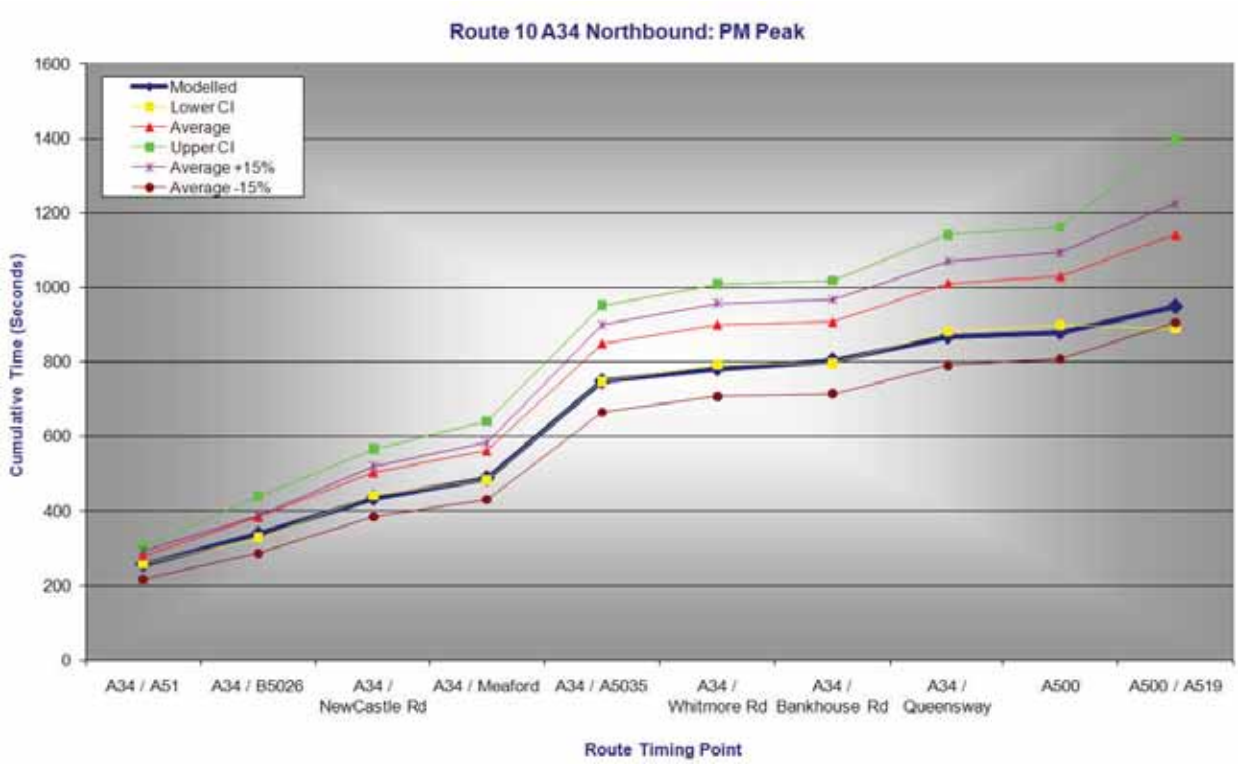


Figure D.20 - Journey Time Route 10 – A34: 2007 PM Peak



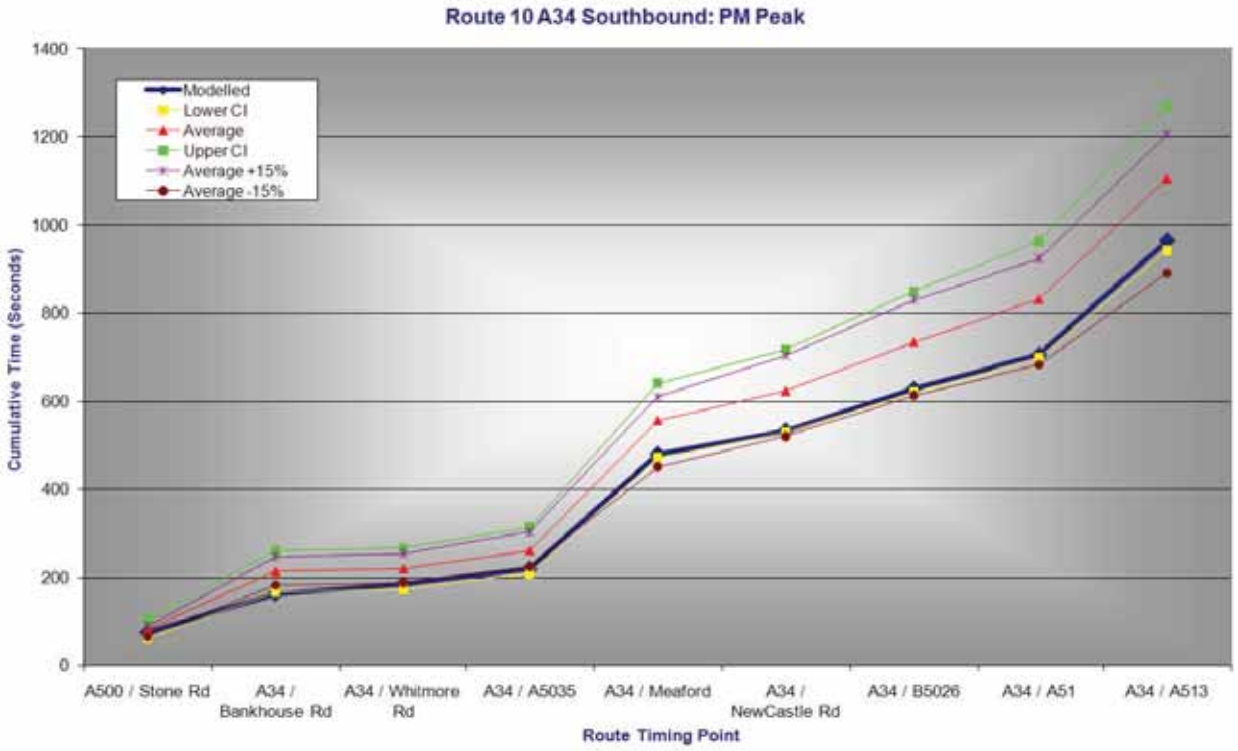
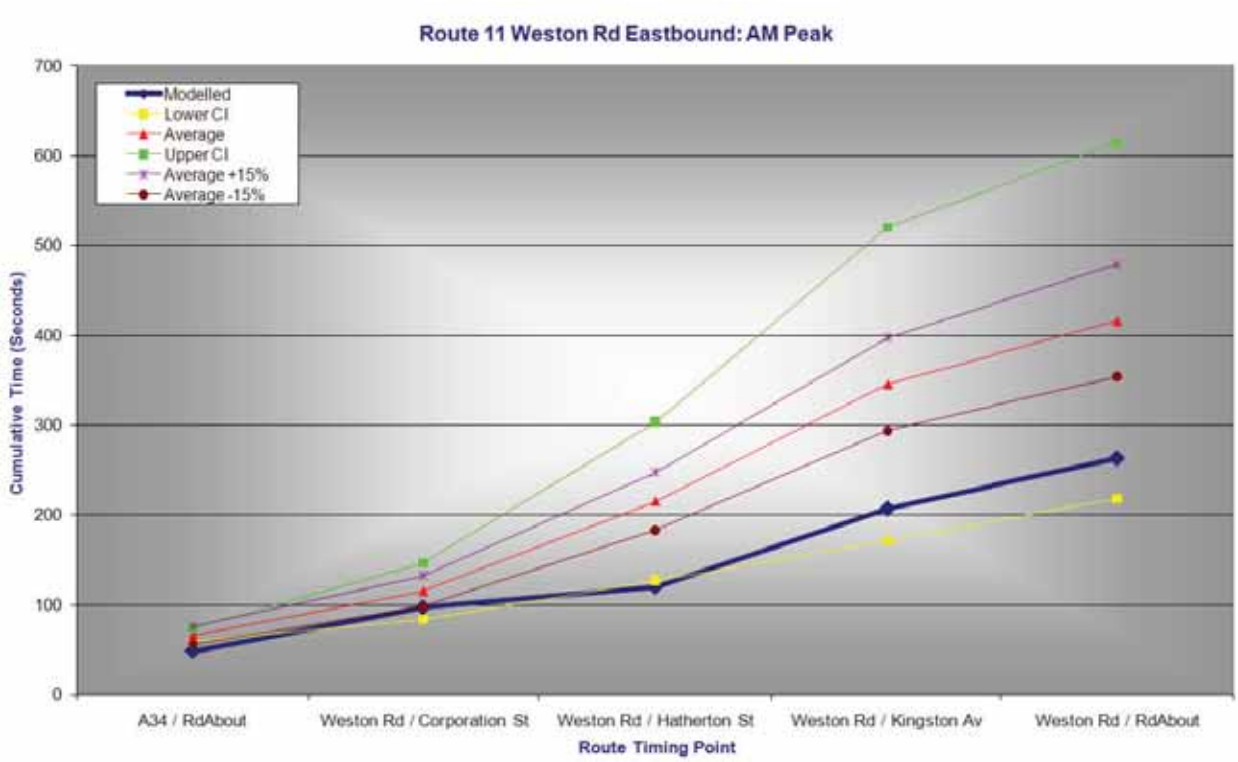


Figure D.21 - Journey Time Route 11 – Weston Road: 2007 AM Peak



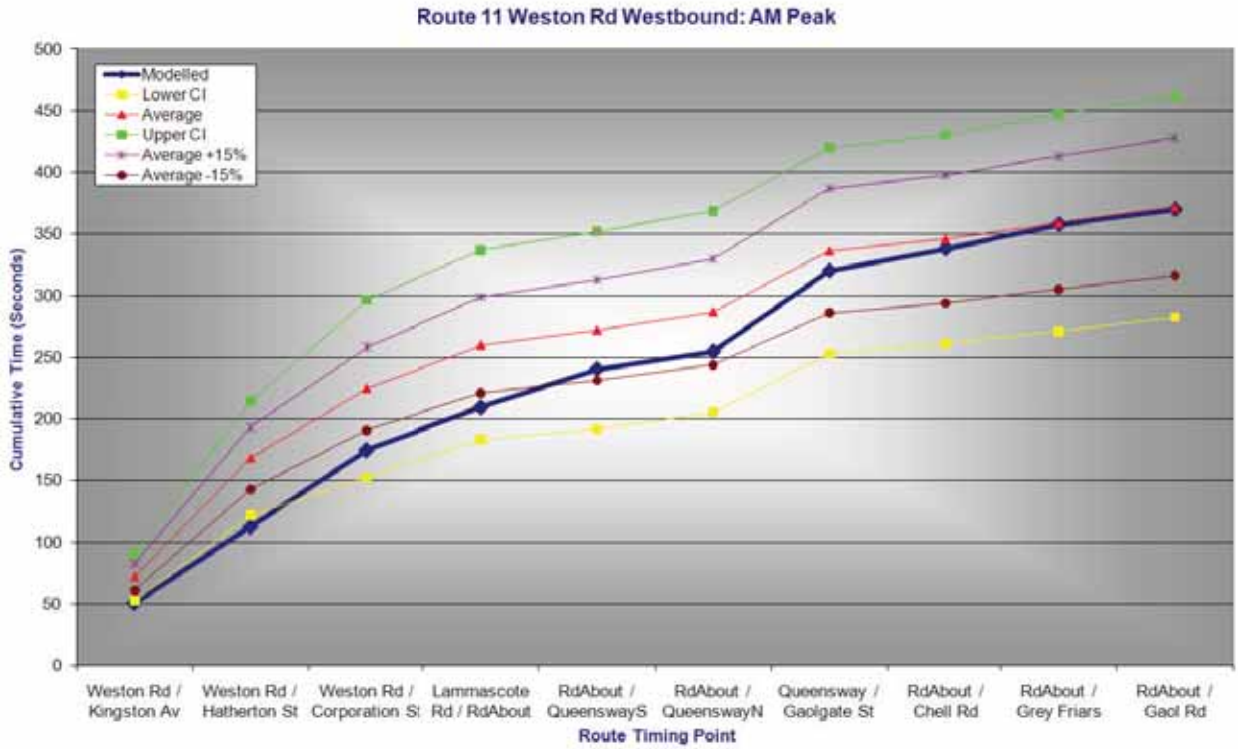


Figure D.22 - Journey Time Route 11 – Weston Rd: 2007 PM Peak