Staffordshire County Council

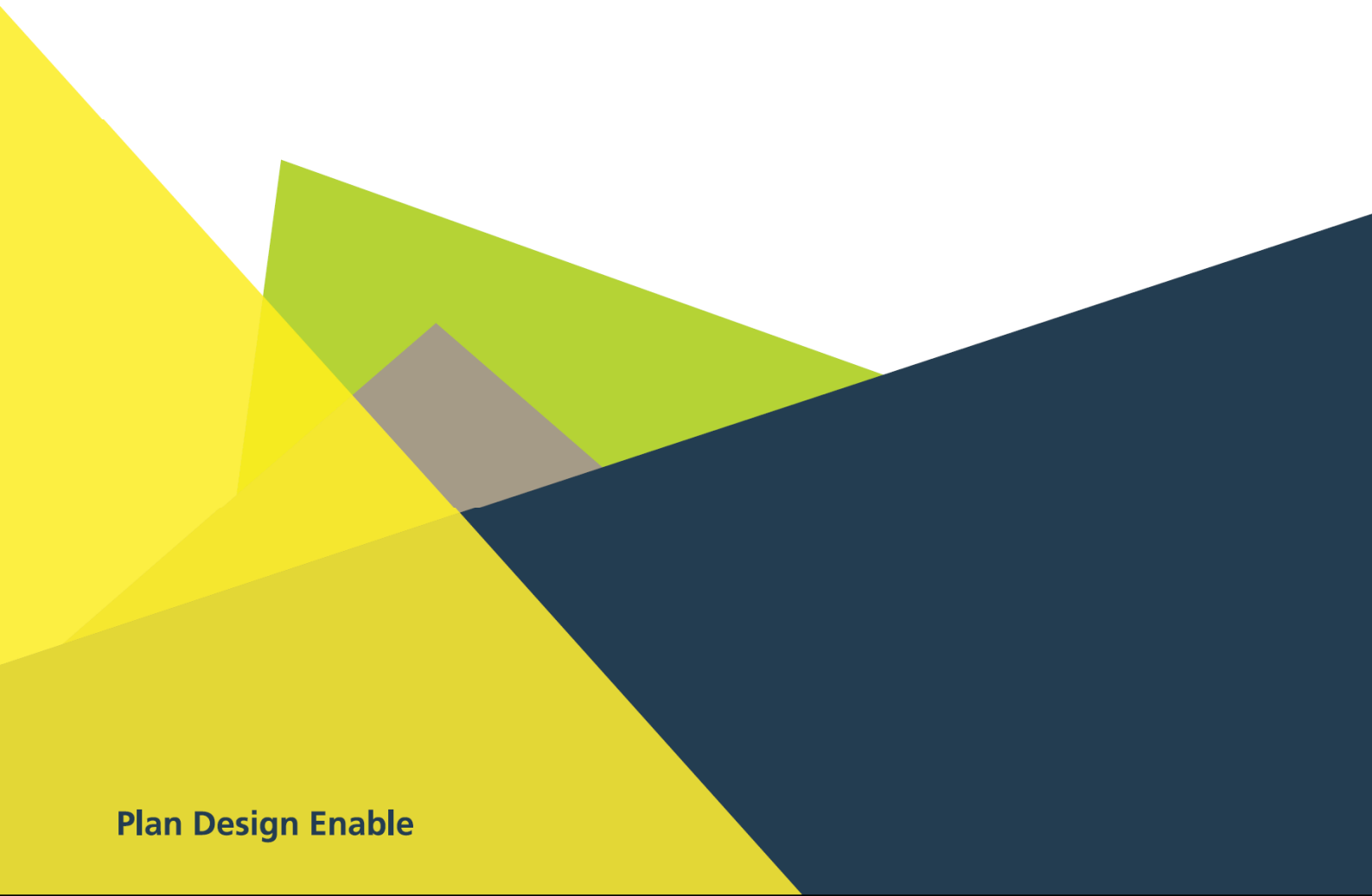
Appendix 3.3

Survey Analysis Note, 2007

ATKINS

Stafford Western Access Improvements

Survey Analysis Note



Plan Design Enable

Note

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Document History

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1. Introduction

1.1 Atkins Transport Planning has been appointed by Staffordshire County Council (SCC) to assess the impact of the proposed Stafford Western Access Improvements scheme.

1.2 This scheme includes a proposed link between the A518 and the A34 utilising stretches of Martin Drive and Doxey Road.

1.3 The purpose of this note is to discuss the analysis undertaken of the data collated as part of the Stafford Model Development.

1.4 Previously a data collection report called 'Survey Completion Report' has been issued.

STRUCTURE OF NOTE

1.5 This note provides a summary of the data analysis undertaken for the study. Details of each chapter are as follows:

- Roadside Interview surveys;
- Car Park Surveys;
- Traffic Counts; and
- Journey Time Surveys.

2. Roadside Interviews

OVERVIEW

2.1 Roadside interview surveys provide invaluable information on driver behaviour including their origin and destination and the purpose of the journey. In total nearly 11,900 drivers were interviewed at eleven of the main roads in Stafford through these surveys. The interview locations were selected to obtain information about the critical movements to and from Stafford.

2.2 Two forms of interviews have been undertaken for these surveys. These are:

- Face-to-face interviews; and
- Reply-paid Postcards.

2.3 The location and method of the interview sites is given in Table 2.1 and locations shown in Figure 2.1. The more traditional form of interview, namely face-to-face, was undertaken at 8 locations. However, in the remaining three locations face-to-face interviews could not be carried out due to high traffic volume and site conditions which would have caused substantial queuing. At these locations a postcard survey has been undertaken. This involves the survey staff passing out postage-paid questionnaire postcards to the drivers at the survey site for them to complete and return at a later time.

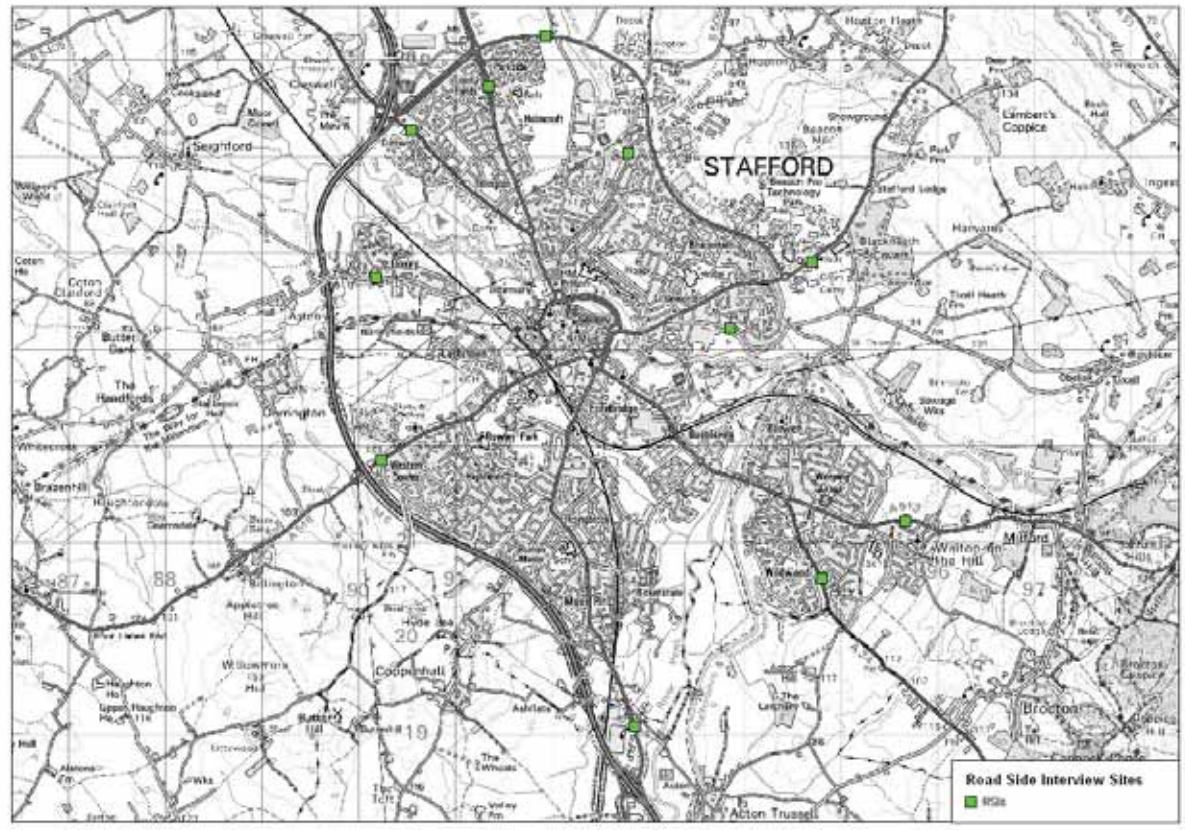
Table 2.1 - Roadside Interviews: Survey Type

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**
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**

2.4 The Roadside Interview (RSI) Sites were designed to ensure that all key traffic movements entering the town were captured. Following discussion with the Steering

Group, eleven locations were identified as priority sites as illustrated on Figure 2.1 – RSI locations below.

Figure 2.1 – RSI locations



2.5 The aim was to interview a minimum of 125 vehicles per hour. However, it should be appreciated that this target could not be reached in all the surveyed hours due to heavy traffic volume and queuing conditions. Also, on limited occasions, adverse weather and light conditions affected sample rates as the Police were concerned about stopping vehicles for safety reasons.

2.6 The surveys were carried during the neutral month of October, before the school holiday period to capture normal traffic conditions. Due to unforeseen circumstances, 3 of the surveys needed to be rerun during the first two weeks of November. However, these were conducted outside of school holidays so considered acceptable for analysis. Table 2.1 lists the locations of the roadside interview sites. A copy of the Roadside Interview form used can be found in Appendix A.

2.7 The roadside interviews covered both light and heavy goods vehicles.

Light vehicles:

- Motorcycles;
- Cars/Taxis; and

- Light Goods Vehicles.

Heavy vehicles:

- OGV1 (2 axles – twin tyres, 3 axle rigid);
- OGV2 (4 axles – rigid); and
- OGV3 (3 or more axles – Articulated).

2.8 Each survey was conducted in the inbound direction (towards Stafford centre) for a period of 12 hours from 07:00 – 19:00 hours. A 12 hour manual classified count was undertaken in both directions at each site on the day of the RSI. Also, Automatic Traffic Count (ATC) data was collected for a three week period at each site.

SAMPLE RATES

2.9 The data collected from the roadside interview surveys represent a sample of vehicles passing through each site. These have been compared with manual classified counts, undertaken in parallel with the interviews, to derive the sample rates as shown in Table 2.2.

2.10 In general a 20-30% all vehicle type sample was considered acceptable as it will enable a realistic distribution of traffic passing through the interview location to be determined. However due to site conditions and various other factors this wasn't always achievable. Out of 11 locations, eight recorded more than 20% of the vehicles interviewed. All sites where traditional face-to-face interviews were conducted achieved a sample rate of at least 20%. For sites 5, 7 and 8 a sample factor of 9%, 15% and 9% respectively were recorded due to difficulties encountered during the surveys.

2.11 At sites 4, 5, 7, 8, 10 and 11 the postcard survey method was either used solely or in conjunction with face-to-face interview. These responses have been generally less than face-to-face interviews. This is expected as the postcard surveys rely on the driver to fill in and return the questionnaire themselves. Consequently, sites 5, 7 and 8 that were using the postcard method demonstrate sample rates of less than 20%.

2.12 From the original 12 hour records, data for the peak periods have been extracted and cleaned for any illogical trips. This is a quality control measure that aims to ensure the resulting model is an accurate reflection of actual behaviour. To maximise the use of valid interview data, the interview records were aggregated for a two hour period in the morning and evening peak periods. For the AM Peak hour (08:00-09:00) records from the two-hour period 07:30-09:30 were used. For the PM peak hour (17:00-18:00) records from the period 16:30-18:30 were used.

2.13 The interviews have been undertaken in a single direction only. For the non-interview direction the trips will be transposed from the other time periods. Further information on this process and about matrix building from the observed trip records is provided in the Local Model Validation Report (LMVR).

Table 2.2 - Proportion of Vehicles Interviewed in 12 hour Period

Site Description	Vehicle Type	No of Interviews	Total Count (LGV+HGV)	Sample Factors
Site 1	Car	1083	5078	21%
	LGV	130	400	33%
	HGV	37	421	9%
	All	**1285**	**5959**	**22%**
Site 2	Car	1324	5432	24%
	LGV	164	625	26%
	HGV	26	196	13%
	All	**1531**	**6344**	**24%**
Site 3	Car	1619	5902	27%
	LGV	118	383	31%
	HGV	6	127	5%
	All	**1776**	**6530**	**27%**
Site 4	Car	672	3189	21%
	LGV	27	205	13%
	HGV	4	80	5%
	All	**717**	**3519**	**20%**
Site 5	Car	639	6261	10%
	LGV	31	758	4%
	HGV	10	269	4%
	All	**689**	**7376**	**9%**
Site 6	Car	1012	2589	39%
	LGV	113	230	49%
	HGV	27	111	24%
	All	**1165**	**2977**	**39%**
Site 7	Car	670	4373	15%
	LGV	33	484	7%
	HGV	6	157	4%
	All	**713**	**5095**	**14%**
Site 8	Car	564	5929	10%
	LGV	45	976	5%
	HGV	26	552	5%
	All	**639**	**7559**	**8%**
Site 9	Car	913	1608	57%
	LGV	42	79	53%
	HGV	5	11	45%
	All	**976**	**1758**	**56%**
Site 10	Car	906	3019	30%
	LGV	118	357	33%
	HGV	14	114	12%
	All	**1049**	**3562**	**29%**
Site 11	Car	969	3262	30%
	LGV	44	206	21%
	HGV	2	68	3%
	All	**1025**	**3650**	**28%**
All Sites	Car	10371	46642	22%
	LGV	865	4703	18%
	HGV	163	2106	8%
	All	11565	54329	**21%**

2.14 Desire lines for key corridors in the area of the Stafford Western Access Improvements have been determined using the RSI data at the following sites:

- A518 Castle Bank;
- A5103 Eccleshall Road; and
- Doxey Road.

2.15 The desire line diagrams and further details of this analysis are provided in Appendix B.

SUMMARY OBSERVATIONS

2.16 In addition to the information on origins and destinations, roadside interviews also provide information on the purpose of the journey.

2.17 This chapter summarises the information collected from the roadside interview surveys in terms of Journey Purpose.

JOURNEY PURPOSE

2.18 Table 2.3 provides a summary of the journey purposes recorded at all of the sites divided into the three interview periods for all interviewed vehicles in the direction of interview.

Table 2.3 - Journey Purpose Proportions

Peak Hour	Business	Commuting	Education	Leisure	Shopping
AM	12%	65%	7%	11%	5%
PM	6%	54%	4%	28%	9%
12 hour	16%	36%	5%	26%	16%

2.19 The table shows that during a 12 hour period the highest proportion of trips were made for commuting purposes. As expected, these proportions are particularly high during the AM and PM peaks where proportions of 65 and 54 percent are recorded respectively.

2.20 Leisure is the next predominant purpose of the trips, accounting for roughly one-quarter of the journeys made in the 12 hour period.

2.21 Note that the table represents movements inbound towards Stafford centre. The outbound PM trips will be the reverse of inbound AM trips to generate two directional data.

2.22 Shopping accounted for 16% of the trips during the 12 hour period. The table also suggests that since the proportion of shopping trips during the peaks is between 5 and 9%, the majority of the shopping trips take place during the inter-peak period.

2.23 16% of trips made in the 12 hour period are for business purposes while very few of the trips are for educational purposes; only 7% in the AM peak.

3. Car Park Surveys

3.1 In addition to RSI surveys, entry, exit and origin-destination surveys have been carried out at the car parks in the town centre and at the car parks in the vicinity of the Tesco, Sainsbury and ASDA stores. The aim of these surveys is to obtain an indication of the internal movements within Stafford which may not be covered through the RSI surveys.

3.2 The survey periods were determined as 08:00-11:00 hours and 15:00-18:00 hours to maximise the number of interviews obtained. Site 11, the railway station car park, was counted from 07:00 AM to 10:00 AM to reflect that rail commuters tend to start their journeys earlier than other commuters.

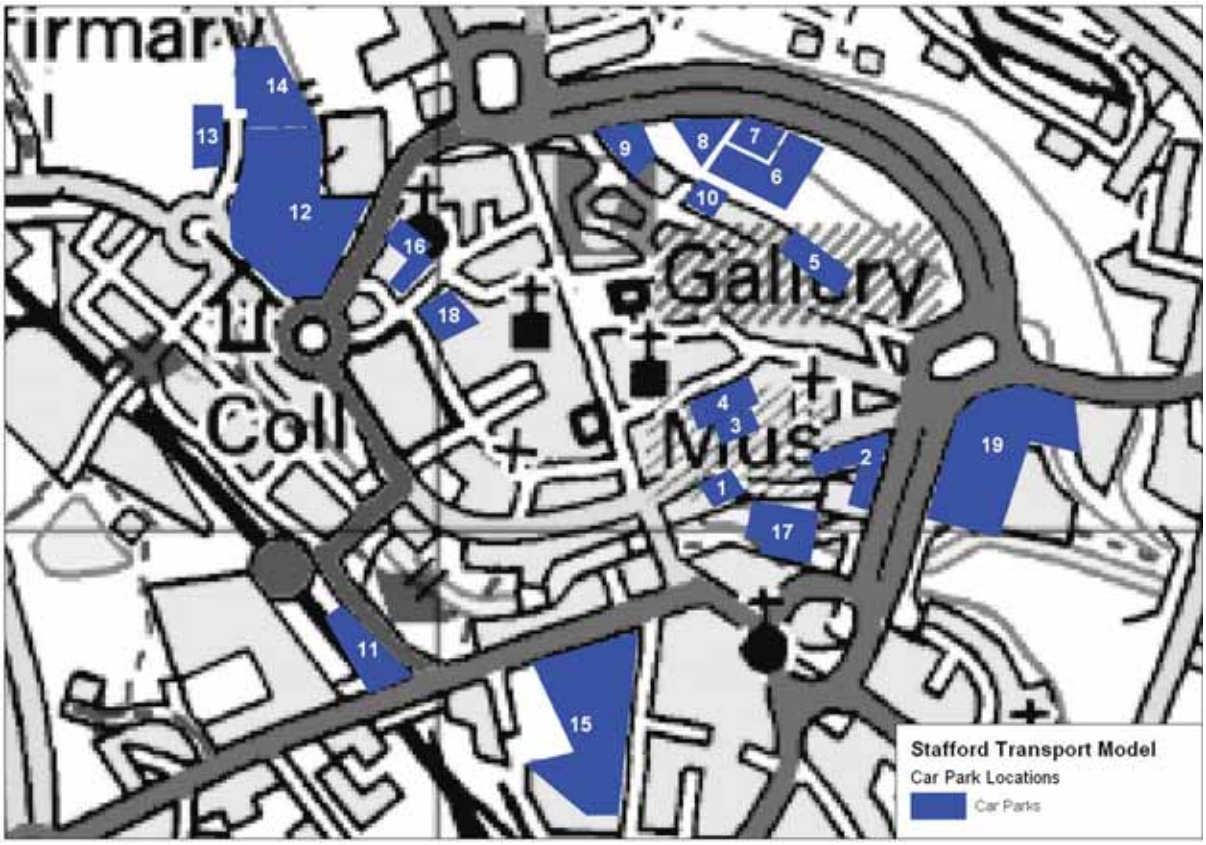
3.3 Smaller public off street car parks were not surveyed on value for money grounds.

3.4 The location of Car Park Surveys are listed in Table 3.1 and shown in Figure 3.1.

Table 3.1 - 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 and long stay for season ticket holders
18	Guildhall Shopping Centre	Private	270	Short
19	Queensway Asda	Asda	n/a	Short

Figure 3.1 - Surveyed Car Park Locations



ENTRY-EXIT COUNTS

3.5 The entry and exit counts during AM peak hour and AM peak periods are given in Table 3.2.

3.6 Generally in the AM peak, car park inflows are higher than the outflows demonstrating the dominant AM peak direction; inbound to the town centre.

Table 3.2 - Summary of Details for Car Park – AM Peak

Car Park No.	AM Peak (8-9)		AM Period (8-11)		Peak hour In-flows as % of Capacity
	IN	OUT	IN	OUT	
1	19	23	63	63	24%
2	46	5	62	19	48%
3	29	6	146	65	58%
4	60	7	106	21	35%
5	71	0	95	22	93%
6/7/8/9/10	333	48	739	201	39%
11	42	25	196 (07:00-10:00)	56 (07:00-10:00)	36%
12	95	40	528	236	13%
13	51	1	84	1	39%
14	202	4	298	19	60%
15	220	138	1025	633	-
16	74	20	349	204	51%
17	115	1	199	15	25%
18	72	3	294	102	27%
19	198	136`	827	593	-

3.7 Sites 6, 7 8, 9 and 10 are aggregated for the purposes of analysis due to the fact that drivers can travel between these two car parks on 'internal roads'.

3.8 In the AM peak hour (08:00 AM – 09:00 AM), 4 of the 14 car park groups recorded high flows accounting for more than half of their holding capacity. All of the car parks receive at least 24% of their capacity during the peak hour.

3.9 The highest level of turnover is observed at the Civic Centre car park where there are as many entries as exits during the AM period. Slightly lower levels of turnover, though still in excess of 50%, are observed at Sainsbury's, Tesco, Asda and Broad Street car parks.

3.10 The capacities of sites 15 and 19 are unknown preventing these from forming part of the analysis of flows and turnover.

3.11 Table 3.3 below provides the car park entry and exit counts during the PM peak hour and PM peak period. Apart from the Riverside car park (car park 2), the outflows from the car park are higher than inflows indicating the direction of evening peak flow is outbound from the town centre.

Table 3.3 - Summary of Details for Car Park – PM Peak

Car Park No.	PM Peak (17-18)		PM Period (15-18)		Peak hour Out-flows as % of Capacity
	IN	OUT	IN	OUT	
1	40	45	147	155	57%
2	44	39	73	98	41%
3	19	53	119	184	106%
4	1	63	28	114	36%
5	3	45	5	74	59%
6/7/8/9/10	34	319	230	771	38%
11	25	62	52	147	18%
12	152	190	450	580	27%
13	1	25	2	75	19%
14	5	134	12	244	40%
15	424	441	1126	1210	-
16	90	115	278	362	79%
17	3	99	16	195	21%
18	3	47	90	243	17%
19	354	368	1004	1078	-

3.12 Table 3.3 also shows that in general the level of activity (entry/exits) at the car parks is higher in the PM period than in the AM period. This is primarily due to people using the car parks for a wider variety or purposes in the PM period than in the AM which is predominantly commuting.

ORIGIN – DESTINATION SURVEYS

3.13 Origin and destination surveys have been carried out at selected car parks within the Town Centre and in the vicinity of the Tesco, Sainsbury and ASDA stores. The information collected will capture regular commuting movements in the AM peak and Commuting and Shopping movements in the PM peak.

3.14 The origin and destination survey format as used at the car parks is given in Appendix C. Questions are posed to the car drivers when they have just parked (entering) or are about to exit the car park (leaving). Whether they are arriving or leaving determines which of two different sets of questions are posed.

3.15 If the drivers were interviewed on arrival at the car park, their time of arrival is recorded. Their destination is assumed to be the car park itself. Then they were

asked about the origin of their trip (i.e. where they started their journey before arriving at the car park). This gives the necessary information for one directional journeys; from an origin outside the car park to the car park under consideration. In addition, the drivers were asked about the time they expect to leave the car park and their destination upon leaving. The origin for these trips is taken as the car park itself.

3.16 If the driver was interviewed on their way out of the car park, their time of departure was recorded. The origin of trips leaving the car park is assumed to be the car park itself and their next destination is also recorded. This gives the necessary information for the exit direction of the journey with origin at the car park. In addition, the drivers were asked about the origin of their original trip to the car park and when they arrived. This provides information about their previous journey to the car park with origin outside the car park.

3.17 This approach provides a comprehensive dataset of movements both to and from the car parks. It is noted that if both the journeys take place during the same peak hour then they will be included in the matrix building process thereby enhancing the representation of observed trips within the model.

3.18 Table 3.4 shows the number of valid interviews collected by following the above methodology. The table also gives the corresponding sample rates calculated using the entry/exit count information from Table 3.2 and Table 3.3. It can be seen from the table that, in general, the interviews covered a high proportion of trips using the car park during the interview periods.

Table 3.4 - Peak Hour Car Park Interview Sample Rates

	Number of Interviews				Sample Rate			
	(0800-1100)		(1500-1800)					
Car Park	AM In	AM Out	PM In	PM Out	AM In	AM Out	PM In	PM Out
1	31	15	25	21	49%	24%	17%	14%
2	37	0	29	36	60%	0%	40%	37%
3	38	11	27	33	26%	17%	23%	18%
4	66	1	14	56	62%	5%	50%	49%
5	54	1	3	47	57%	5%	60%	64%
6/7/8/9/ 10	448	38	93	387	61%	19%	40%	50%
11	87 (0700-1100)	2 (0700-1100)	4	54	44%	4%	8%	37%
12	153	63	127	143	29%	27%	28%	25%
13	65	0	0	62	77%	0%	0%	83%
14	165	2	4	153	55%	11%	33%	63%
15	141	96	127	112	14%	15%	11%	9%
16	50	17	34	33	14%	8%	12%	9%
17	140	4	16	127	70%	27%	100%	65%
18	65	10	26	63	22%	10%	29%	26%
19	132	106	86	115	16%	18%	9%	11%

4. Traffic Counts

EXISTING COUNTS

4.1 A wide range of historic traffic count data was made available by Staffordshire County Council both within the town itself and also in the surrounding buffer area, details of the existing traffic counts have been provided in the 'Survey Completion Report' issued November 2007.

4.2 For the purpose of the study only counts carried out during the last four years were selected for use in the modelling process. Appropriate growth factors were used to convert the data to a common base year of 2007.

4.3 Figure 4.1 and Figure 4.2 illustrate all the traffic counts carried out in the urban area during the last four year period.

Figure 4.1 - Existing Traffic Counts in Stafford Wider Area

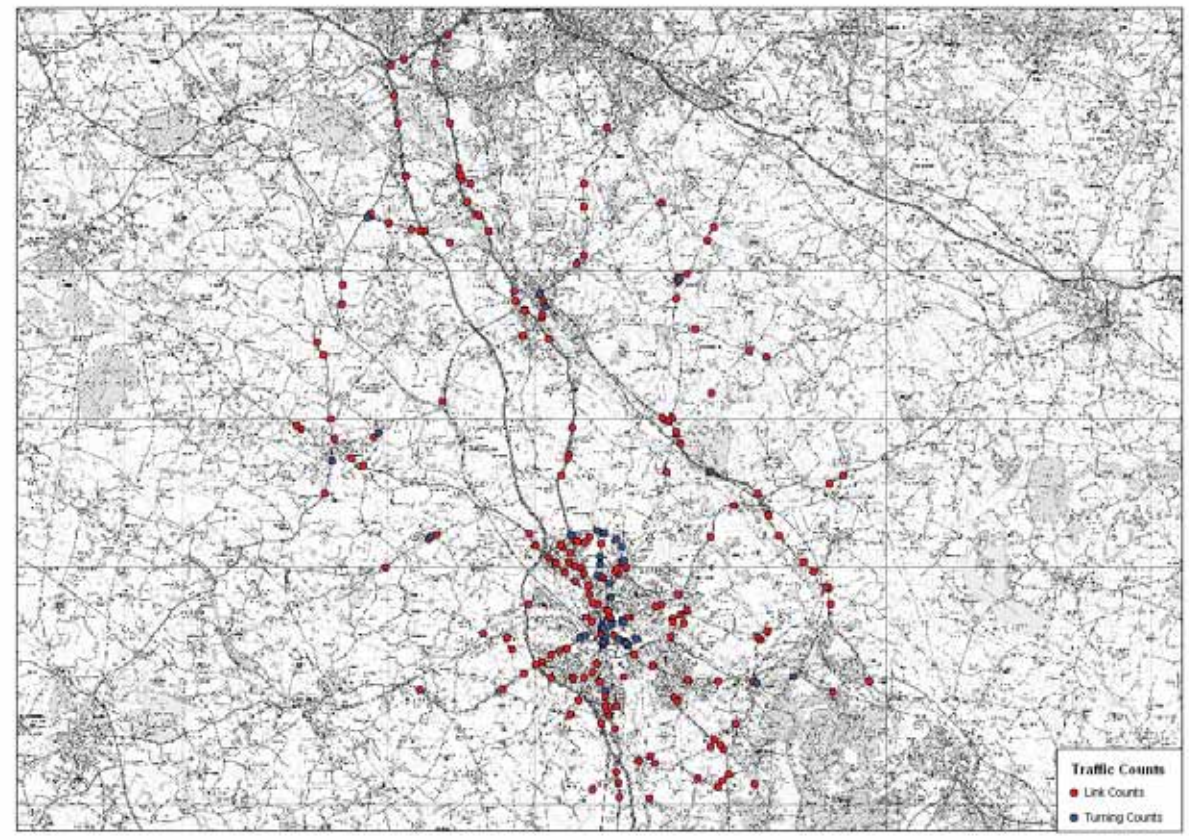
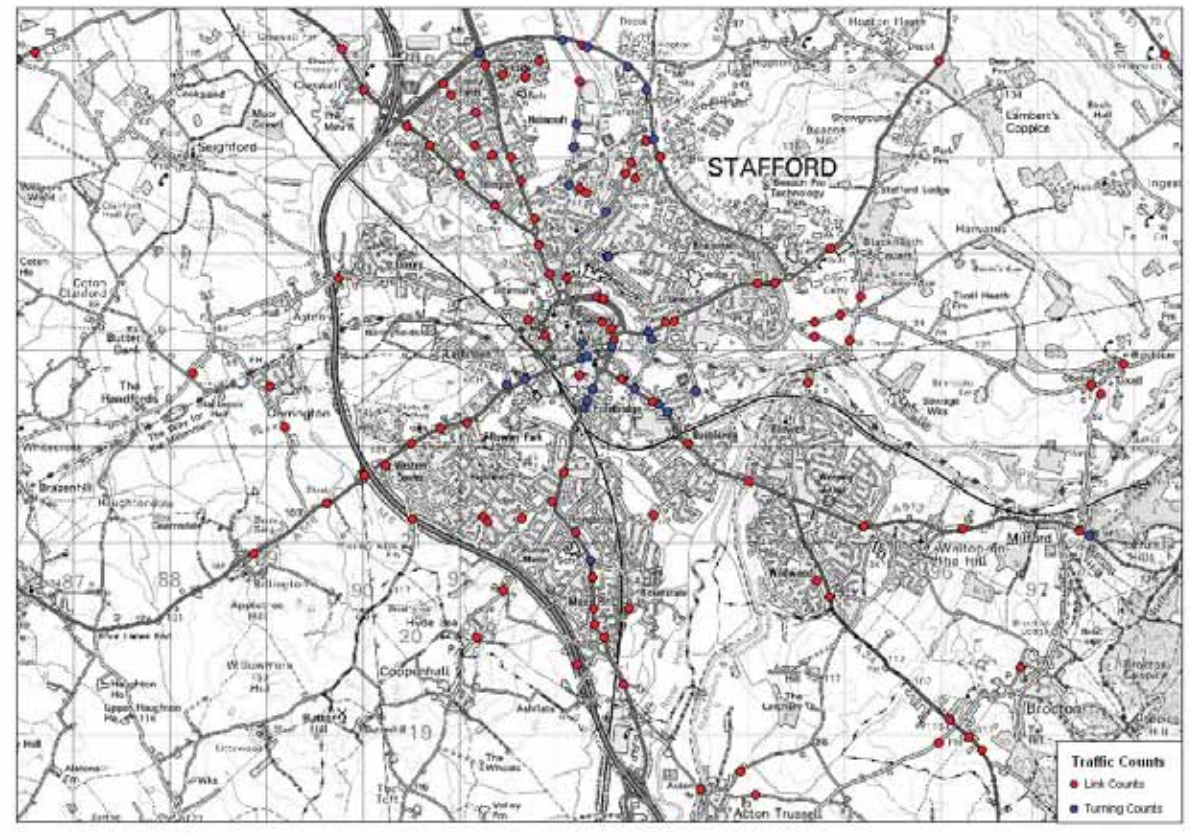


Figure 4.2 - Existing Traffic Counts in Stafford



NEW COUNTS

4.4 In order to improve the traffic model and for use in model calibration and validation, traffic counts were carried out at a number of locations. These include:

- Manual counts at the Roadside interview locations to determine different vehicles types;
- Automatic counts for either two or three consecutive weeks at the Roadside locations to determine hourly and daily variation of flow; and
- Turning counts to assist calibration and validation of the traffic model against existing patterns.

Classified Manual Counts

4.5 Manual classified counts (MCC) were undertaken at the same locations as the RSI surveys, as shown in Figure 2.1. The 12-hour total flows for each of the survey sites are summarised in Table 4.1.

Table 4.1 - Total 12 hour Flows at the Roadside Interview Locations

Site	Interview Dir.	NB/EB	SB/WB	Total
1. A449 Mosspit	NB	5959	6970	12929
2. A34 Stone Road	SB	6249	6344	12593
3. A34 Cannock Road	NB	6530	5690	17910
4. A513 Milford Road	WB	3365	3519	7084
5. A518 Weston Road	WB	6964	7376	14340
6. A518 Castle Bank	EB	2977	3575	6552
7. A5013 Eccleshall Road	EB	5095	5227	10322
8. A513 Beaconside	EB	7559	7729	15288
9. Doxey Road	EB	1758	1683	3441
10. B5066 Sandon Road	SB	3714	3562	7276
11. Tixall Road	WB	3288	3650	6938

4.6 The first 8 sites are 'A' roads capable of carrying a substantial number of vehicles over a 12 hour period. This is illustrated by the fact that they carry between 6,552 and 17,910 vehicles over the 12 hour period. The highest of these flows is observed at Cannock Road, which runs parallel to the M6.

4.7 The only 'B' road covered was Sandon Road (site 10) which offers access to the north of Stafford from Stoke-on-Trent and the surrounding villages.

4.8 Tixall Road (site 11) caters for traffic from the residential areas to the east of Stafford. Also, it is used as an alternative route into and out of the town at peak times to avoid congestion on the A513/A34 route. This explains its high traffic flow of 6,938.

4.9 The lowest flow is on Doxey Road (site 9) and is due to the fact that the road predominantly provides access to Stafford from a number of small villages to the west of Stafford.

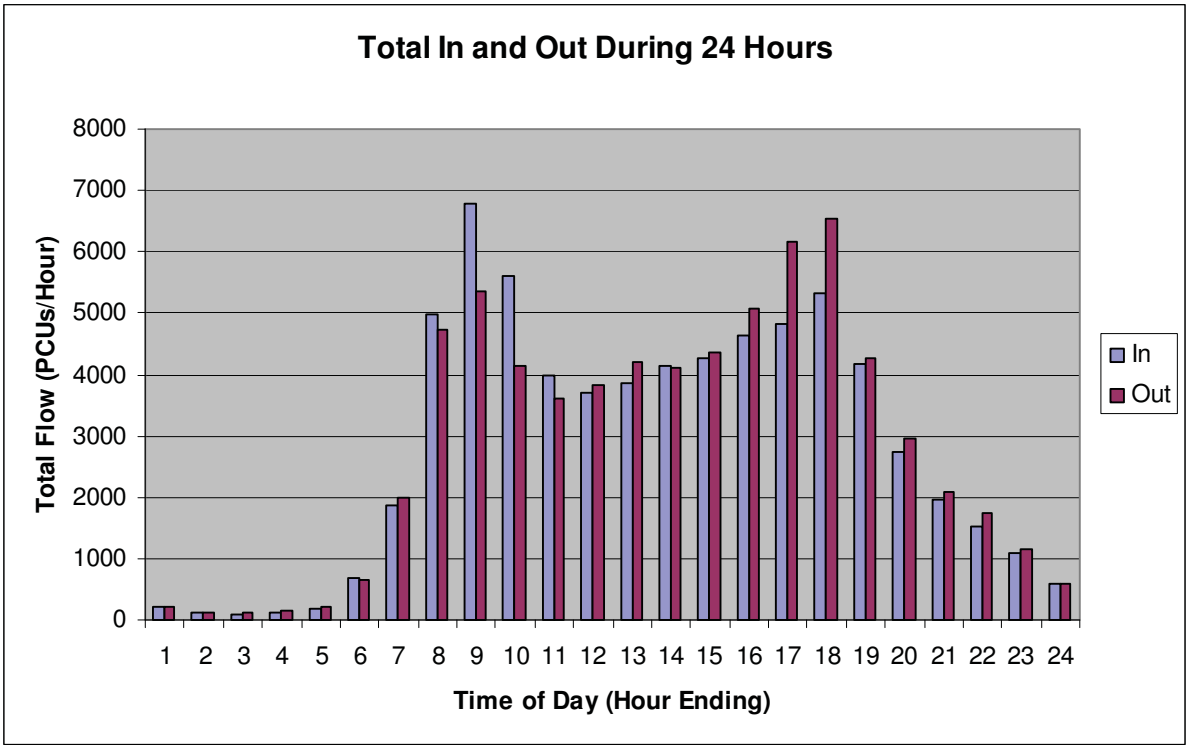
Hourly variation

4.10 Hourly variation of traffic at each of the eleven RSI locations observed from the ATC data is given in Appendix D. The data used to build these charts is an average of two weeks of weekday data from October 2007 (in PCUs). Figure 4.3 shows aggregated hourly variation of traffic at these locations.

4.11 Figure 4.3 shows that the peak hour occurs between 08:00-09:00 hrs in the morning peak and 17:00-18:00 hrs in the evening. Also the figure shows that in the AM peak flows inbound towards Stafford are higher compared to the outbound flows. As

expected, in the PM peak the flow direction gets gradually reversed with higher outbound flows from 15:00 hrs onwards.

Figure 4.3 - Total Hourly Traffic Profile



4.12 Based on this, the time period for modelling the AM and PM peak hours are chosen as:

- AM Peak 08:00 – 09:00; and
- PM Peak 17:00 – 18:00.

Vehicle Type Proportions

4.13 The manual counts have been classified into the following vehicle types:

- Light Vehicles - Car; Taxi;
- LGV;
- Heavy Vehicles – OGV1, OGV2, OGV3, Coach, Public Service Vehicle; and
- Other Vehicles – Motorcycle, Pedal Cycle.

4.14 The vehicle proportions over the 12 hour period are presented in Table 4.2. The table shows that light vehicles (Cars + LGV) account for 95% of total traffic. The proportion of HGVs is higher in the AM peak hour than in the PM peak.

Table 4.2 - Vehicle Type Proportions

Time Period	Car	LGV	HGV	Others
AM	87%	8%	4%	1%
PM	92%	5%	2%	1%
12 hour	86%	9%	5%	1%

4.15 Appendix E shows the vehicle proportions recorded at the individual RSI sites for AM, PM and over a 12 hour period. As observed in Table 4.2 the proportion of HGVs at the individual locations is generally higher in the AM peak than PM peak by a couple of percent.

4.16 All of the RSI locations are open to HGV traffic. Among the sites surveyed Beaconside and Mosspit carry the highest proportion of HGVs as they caters for the heavy goods traffic to and from the north and south of Stafford respectively. Beaconsfield carries the greatest percentage of HGVs making up around 7% of the traffic in the AM and 5% of the traffic in the PM. Roughly 8%, or about 1250 HGVs, use Beaconside over a 12 hour period.

4.17 The HGV proportions on all other roads ranges from 2% to 6% over a 12 hour period.

Turning Counts

4.18 Turning count data has been collected at the following junctions for a period of 12 hours:

1. A518 Newport Road/Tesco Junction;
2. Bridge Street/Lichfield Road/A518 Newport Road; and
3. Station Road/A518 Newport Road.

4.19 Table 4.3 summarises the observed turning flows for the peak periods and for the overall 12 hour period:

Table 4.3 - Total Turning Flows

		Total Entry Flow		
Junction	Type of Junction	AM Peak	PM Peak	12 Hour
1	Signalised Junction	1,214	1,842	8,760
2	Signalised Junction	1,127	1,328	15,951
3	Signalised Junction	1,841	2,474	24,948

4.20 The table illustrates that PM peak flows into the junctions are higher than AM peak flows for all junctions.

Other Counts

4.21 In addition to the above locations, counts data have been collected for the following roads using TRADS data base:

- M6 Junction 12 to 13;
- M6 Junction 13 to 14; and
- M6 Junction 14 to 15.

4.22 As our objective is to build a traffic model for Stafford with a base year 2007, these counts will be factored up to 2007 using NRTF factors before using them in the model calibration and validation. These are available in electronic format and not summarised within this report.

Automatic Traffic Counts

4.23 Automatic Traffic Counts have been undertaken at the same locations as the RSI sites. The data was collected for a period of two or three weeks, which includes a day during when the RSI surveys were carried out.

4.24 The ATC locations are shown in Figure 2.1 (same locations as the RSI sites) and the two-way traffic flows observed at these locations for the following periods are summarised in Table 4.4:

- AM Peak hour (08:00 – 09:00);
- PM Peak hour (17:00 – 18:00);
- 12 hour weekday total (07:00 – 19:00);and
- 24 hour weekday total.

Table 4.4 - Summary of Traffic Flows at ATC Locations

Site Ref.	ATCs at RSI Locations	Direction	AM	PM	12 Hr Flow	24 Hr Flows
1	A449 Mosspit South of Argos Roundabout/Mill Lane	NB	665	909	6489	8129
		SB	813	656	7142	9060
		Total	1478	1565	13631	17189
2	A34 Stone Road South of A513 (Dual Carriageway Section)	NB	484	798	6515	8155
		SB	844	542	6726	8024
		Total	1328	1340	13241	16179
3	A34 Cannock Road Between Overhill Road & Wildwood Drive	NB	779	642	6750	7994
		SB	707	525	6059	7503
		Total	1486	1167	12809	15497
4	A513 Milford Road Adjacent to The Crescent	EB	390	356	3650	4485
		WB	321	395	3626	4359
		Total	711	751	7276	8844
5	A518 Weston Road East of A513 Between Beaconside & Blackheath Lane	EB	453	993	7355	8466
		WB	821	670	7237	8795
		Total	1274	1663	14592	17261
6	A518 Castle Bank Between Sundown Drive & M6	EB	507	219	3492	4337
		WB	251	532	3776	4776
		Total	758	751	7268	9113
7	A5013 Eccleshall Road Between M6 J14 & Crab Lane	EB	477	552	5071	6259
		WB	702	466	5224	6265
		Total	1179	1018	10295	12524
8	A513 Beaconside Between Marston Lane & Parkside Avenue	EB	1014	668	8035	9412
		WB	741	925	7905	9359
		Total	1755	1593	15940	18771
9	Doxey Road West of Greensome Lane	EB	273	124	1834	2243
		WB	145	311	1791	2321
		Total	418	435	3625	4564
10	B5066 Sandon Road Between Tenby Drive & A513 Beaconside	NB	480	397	3707	4295
		SB	360	381	3581	4149
		Total	840	778	7288	8444
11	Tixall Road West of St Thomas Lane	EB	175	588	3238	3643
		WB	729	221	3371	3721
		Total	728	809	6609	7364

4.25 The two week data is also used to determine daily variability and to provide a check on whether the RSI surveys caused any distortion to traffic volumes. Figure 4.4 and Figure 4.5 compare the AM and PM peak flows at the RSI locations respectively.

Figure 4.4 - Weekday Average Traffic Flows at RSI Locations - AM Peak

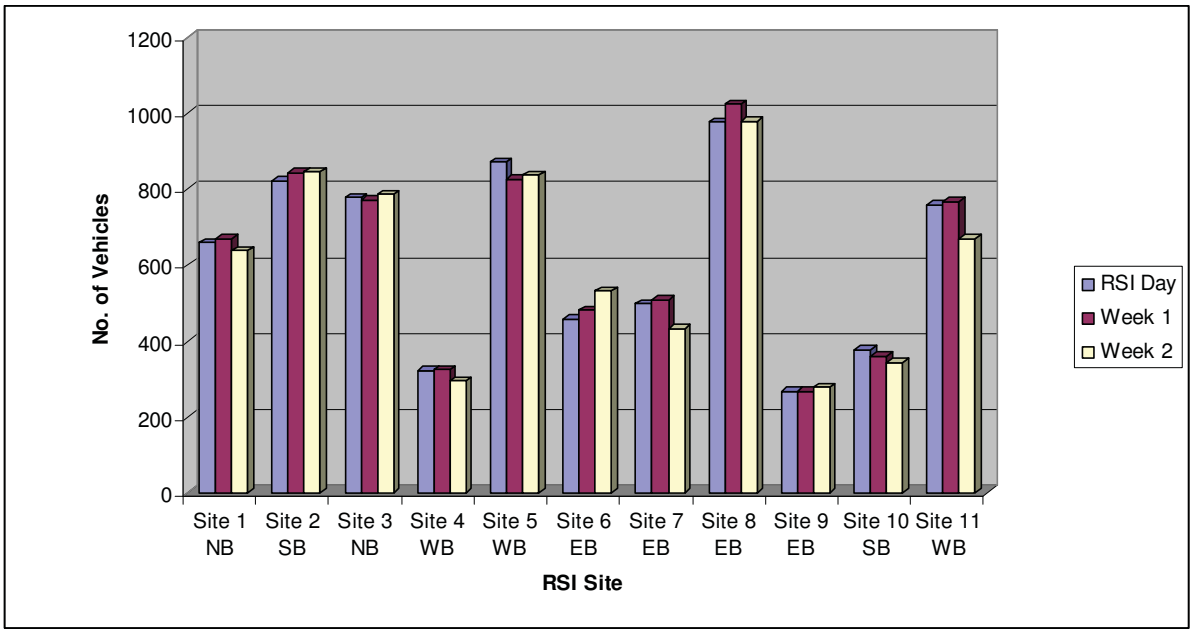
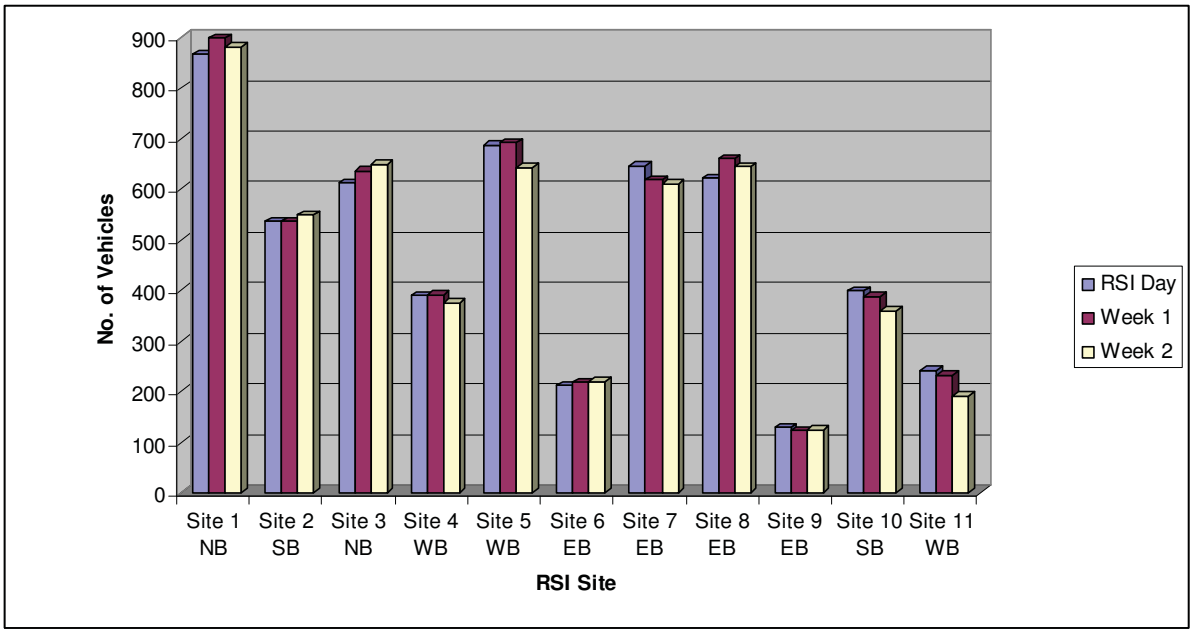


Figure 4.5 - Weekday Average Traffic Flows at RSI Locations - PM Peak



4.26 The main points to note from the above figures are:

AM Peak

- The flows on the RSI day and weekday (5 day) average flows at sites 3, 4 and 9 are quite similar indicating the flows were not affected by the RSI surveys;
- Generally the weekday average flows are slightly higher than the RSI day counts (except sites 5 and 10); and
- At site 5 and 10, where the RSI day flow is higher than the average weekday flows, this could be attributed to the following. RSI surveys may hold traffic up from the pre-peak hours and release it during the peak periods to avoid excessive queue build-up.

PM Peak

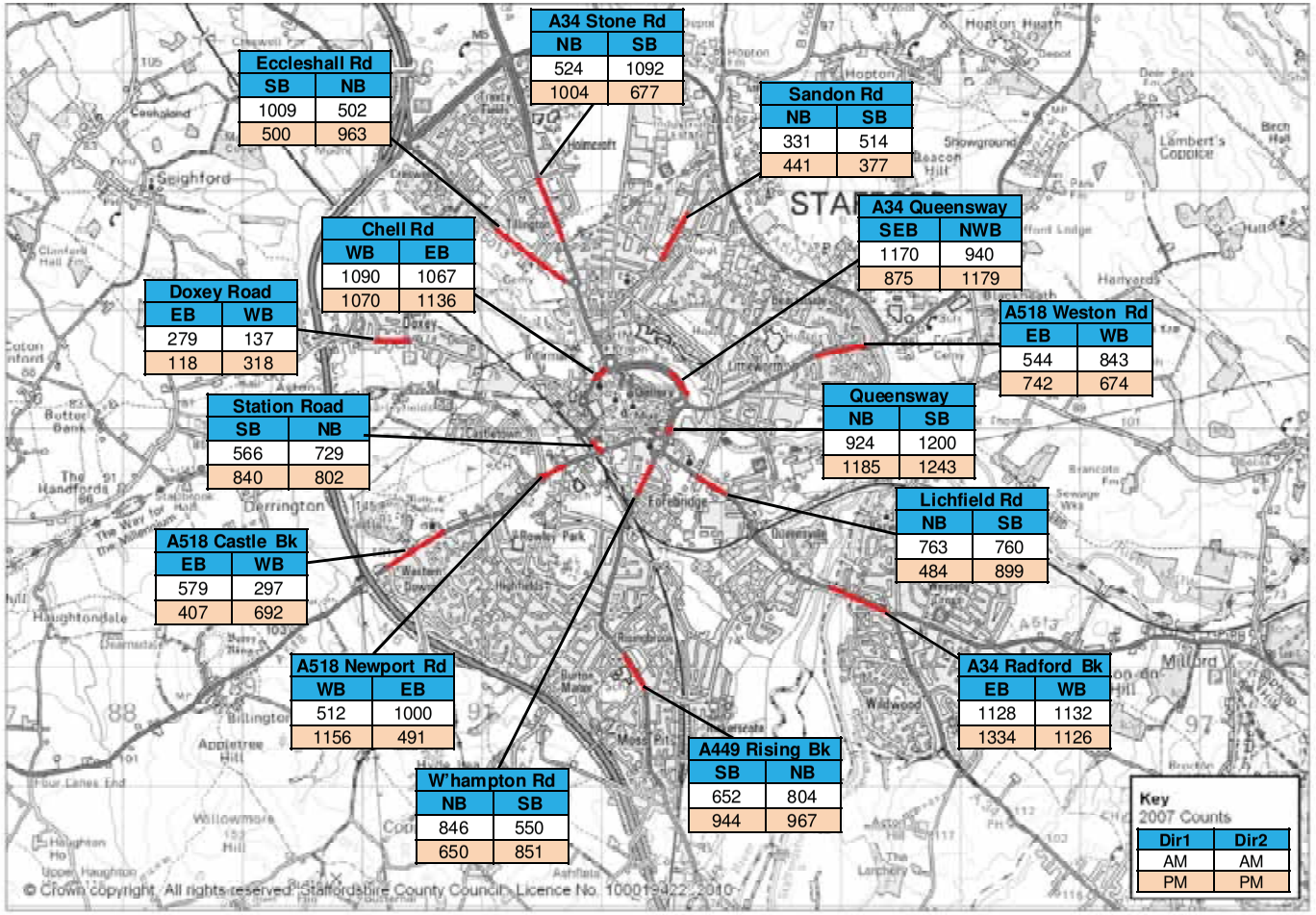
- In general, the figures show that the flows on the RSI days are comparable with the average weekday flows indicating that the RSI sites had little impact on the daily flow; and
- As with the AM peak data, the RSI days tends to have slightly lower flows than the weekday average flows.

4.27 As a preventative measure RSI sites have been scaled appropriately to an average weekday flow calculated by finding the average of the two weeks' flow. This prevents any disturbance caused from conducting the RSI interviews remaining in the model.

Study Area Traffic Flows

4.28 Figure 4.6 shows the observed traffic flows in the key study area for the AM and PM peak hours for a 2007 base year in PCUS (assuming 1 HGV=2PCUS).

Figure 4.6 – 2007 Base Year Observed Traffic Flows (PCUS)



5. Journey Time Surveys

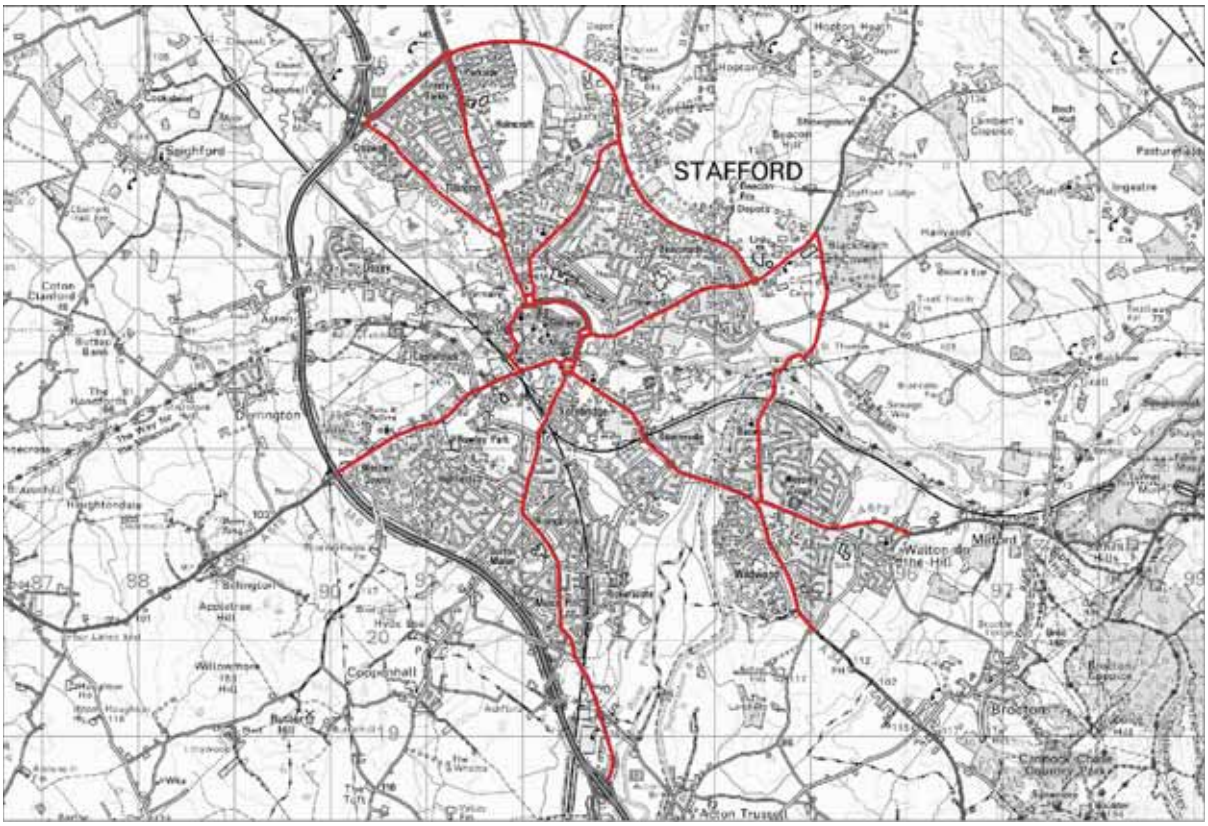
5.1 Journey time surveys have been undertaken along eleven routes in Stafford to capture congestion along the east-west and north-south movements. The following routes have been chosen to obtain a better picture about the movements taking place through the town centre:

- 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: Beaconside roundabout to A500 to M6 junction 15; and
- Route 11 – A34 / A518 / B5066 (Rbt) – A518 / Queensway (Rbt) – A518 Weston Road / A513 Beaconside.

5.2 Information from the journey time surveys will enable us to verify the main areas of congestion and also ensure that the speed/flow and junction flow/delay relationships used in traffic modelling are adequately reflecting local conditions.

5.3 Figure 5.1 shows the Journey time routes on GIS. A sufficient number of runs have been undertaken in both directions during the peak hours to ensure that 'typical' estimates are obtained.

Figure 5.1 - Journey Time Routes



5.4 The results of the journey time surveys are given in Table 5.1 and Table 5.2 showing AM and PM peak respectively. The tables show that:

- Route 6, around the town centre, has a low average speed in both the AM and PM peak, ranging from 27.7 to 31.0 kph;
- The lowest speed recorded is for route 11 in the AM where traffic travelling away from the centre eastbound has an average speed of 22.6 kph; and
- The greatest differences between AM and PM journey times are seen on route 8 westbound (56% increase in PM) and route 11 eastbound (34% decrease in PM).

Table 5.1 - AM Peak Observed Journey Time Summary

Route	Time Period	Length (km)	Average Time.	Std.Dev	Avg.Speed (Km/Hr)
Route 1	WB	2.8	04:56	00:44	33.6
	EB	2.8	06:20	02:55	26.2
Route 2	SEB	6.7	10:07	00:41	39.7
	NWB	6.7	09:52	00:56	40.7
Route 3	EB	5.7	06:15	02:40	54.7
	WB	5.7	06:07	00:21	55.9
Route 4	NB	26.8	15:45	00:46	102.0
	SB	26.8	16:29	01:35	97.4
Route 5	WB	3.4	05:53	00:31	35.0
	EB	3.4	05:15	00:41	39.2
Route 6	AntiClockwise	2.6	05:03	00:22	31.0
	Clockwise	2.6	05:42	00:12	27.4
Route 7	AntiClockwise	5.0	07:21	00:50	40.8
	Clockwise	5.0	07:05	00:24	42.3
Route 8	WB	4.0	05:50	00:47	41.1
	EB	4.0	07:00	01:41	34.2
Route 9	NB	4.5	07:36	03:04	35.9
	SB	4.5	06:53	00:25	39.7
Route 10	NB	20.1	17:45	02:29	68.0
	SB	20.1	17:32	01:24	68.8
Route 11	EB	2.6	06:56	02:43	22.6
	WB	2.6	06:18	01:26	24.9

Table 5.2 - PM Peak Observed Journey Time Summary

Route	Time Period	Length (km)	Average Time.	Std.Dev	Avg.Speed (Km/Hr)
Route 1	WB	2.8	04:54	00:39	33.8
	EB	2.8	05:18	00:57	31.3
Route 2	SEB	6.7	09:36	00:31	41.9
	NWB	6.7	09:16	00:24	43.4
Route 3	EB	5.7	05:59	00:08	57.2
	WB	5.7	05:55	00:44	57.7
Route 4	NB	26.8	17:15	00:27	93.1
	SB	26.8	16:34	00:15	96.9
Route 5	WB	3.4	06:19	02:02	32.6
	EB	3.4	05:04	00:33	40.7
Route 6	AntiClockwise	2.6	05:15	00:44	29.8
	Clockwise	2.6	05:39	01:00	27.7
Route 7	AntiClockwise	5.0	06:20	00:29	47.2
	Clockwise	5.0	07:47	00:25	38.5
Route 8	WB	4.0	09:06	03:12	26.3
	EB	4.0	06:45	00:35	35.5
Route 9	NB	4.5	07:28	00:29	36.6
	SB	4.5	06:32	00:55	41.8
Route 10	NB	20.1	18:57	01:10	63.7
	SB	20.1	18:22	00:53	65.7
Route 11	EB	2.6	04:34	01:20	34.3
	WB	2.6	06:06	02:27	25.7

SUMMARY OBSERVATIONS

5.5 Detailed diagrams of the individual routes and the timing points are illustrated in Appendix G. These show that each survey is of varying length and consists of an appropriate number of timing segments depending upon the number of major junctions or urban areas that the route passes through.

6. CONCLUSIONS

6.1 This report has presented the results of traffic survey data collated for the purpose of building the new traffic model for Stafford.

6.2 The main conclusions to be drawn from this report are detailed below:

Roadside Interview Surveys

- Surveys have been undertaken at eleven locations utilising both face-to-face and postcard methodologies all in the inbound direction towards Stafford. The survey data provides a full picture of existing traffic patterns and conditions;
- Typically more than 20% of passing vehicles have been interviewed at each site and hence the survey sample is considered sufficient to provide a robust representation of driver origins and destinations;
- Assessment of the interview data shows that commuter trips account for 65% of interviewed traffic in the AM peak and 54% in the PM peak; and
- HGV proportions at the interview locations are generally higher in the AM peak than in the PM peak. Beaconside carries 8% HGVs during the 12 hour period and demonstrates the highest proportion from the RSI sites. The proportion of HGVs on other roads is relatively small and ranges from 2% to 6% during the 12 hour period.

Car Park Surveys

- Entry-Exits counts have been undertaken at 19 Car Parks surrounding Stafford Town centre; and
- At each of these car parks, Origin and Destination Surveys have been conducted to identify the distribution of traffic using these car parks.

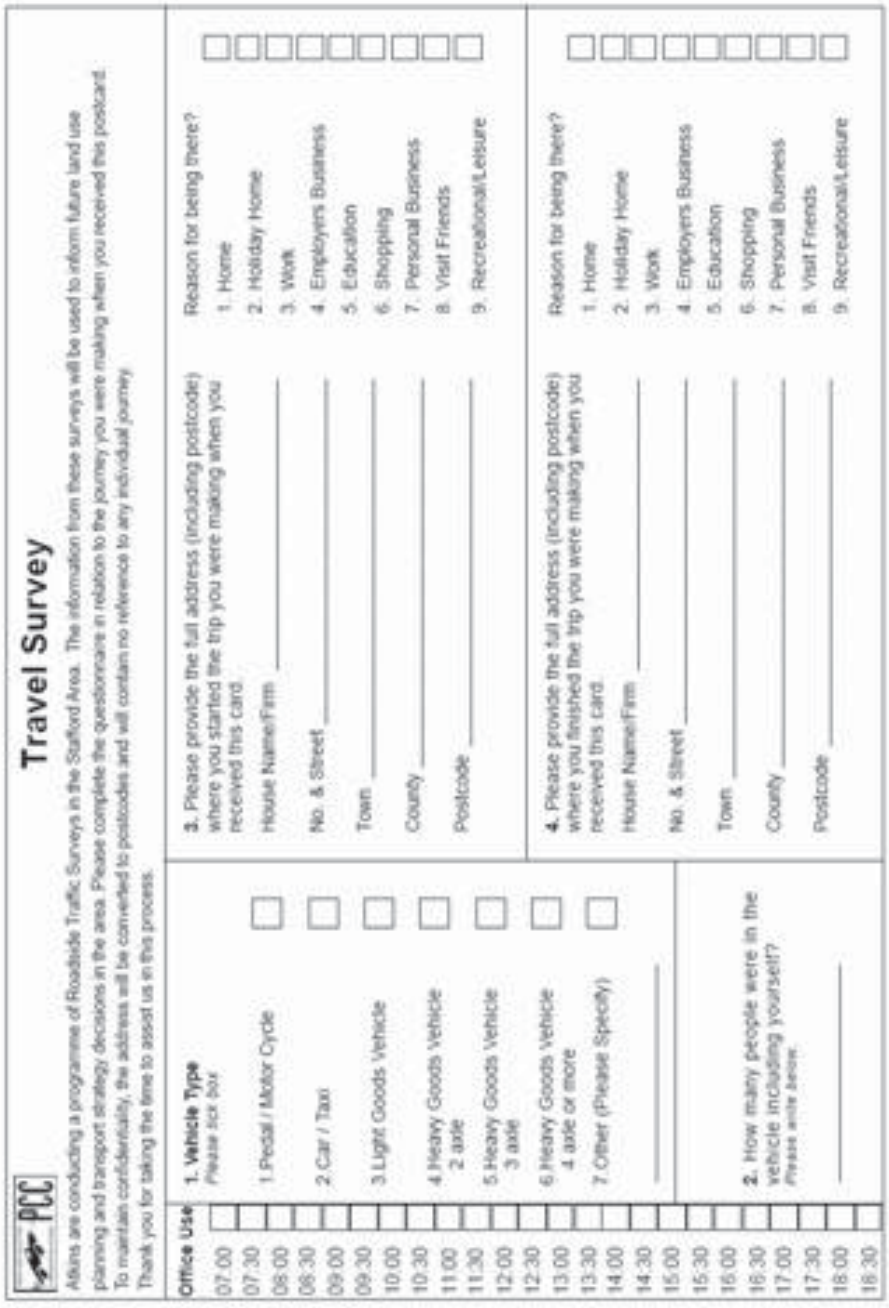
Traffic Counts

- Manual and ATC counts were undertaken at the same locations as the RSIs. This has enabled the interview data to be expanded as well as providing a validation check of the manual counts; and
- Turning count data has also been collated at three strategic junctions within the study area.

Journey Time Surveys

- A total of 11 journey time surveys have been undertaken on strategic routes within the study area;
- Surveys have been undertaken for the AM and PM periods to assess existing travel speeds and delays on main roads;
- The results show that the journey time speeds range from 22.6 to 102 kph. Unsurprisingly, route 4 on the M6, was found to have the highest speeds on the surveyed routes;
- The route leaving the east side of Stafford in the AM on the A518 witnesses the lowest speed of 22.6 kph; and
- The data will be utilised to validate the AM and PM time period traffic models.

Appendix A – RSI survey card



Travel Survey

PCC

Atkins are conducting a programme of Roadside Traffic Surveys in the Stafford Area. The information from these surveys will be used to inform future land use planning and transport strategy decisions in the area. Please complete the questionnaire in relation to the journey you were making when you received this postcard. To maintain confidentiality, the address will be converted to postcodes and will contain no reference to any individual journey.

Thank you for taking the time to assist us in this process.

Office Use

07:00
07:30
08:00
08:30
09:00
09:30
10:00
10:30
11:00
11:30
12:00
12:30
13:00
13:30
14:00
14:30
15:00
15:30
16:00
16:30
17:00
17:30
18:00
18:30

1. Vehicle Type
Please tick box

1.Pedal / Motor Cycle ☐
2.Car / Taxi ☐
3.Light Goods Vehicle ☐
4.Heavy Goods Vehicle 2 axle ☐
5.Heavy Goods Vehicle 3 axle ☐
6.Heavy Goods Vehicle 4 axle or more ☐
7.Other (Please Specify) ☐
_____

2. How many people were in the vehicle including yourself?
Please write below
_____

3. Please provide the full address (including postcode) where you started the trip you were making when you received this card.

House Name/Firm _____
No. & Street _____
Town _____
County _____
Postcode _____

Reason for being there? ☐☐☐☐☐☐☐☐☐
1. Home
2. Holiday Home
3. Work
4. Employers Business
5. Education
6. Shopping
7. Personal Business
8. Visit Friends
9. Recreational/Leisure

4. Please provide the full address (including postcode) where you finished the trip you were making when you received this card.

House Name/Firm _____
No. & Street _____
Town _____
County _____
Postcode _____

Reason for being there? ☐☐☐☐☐☐☐☐☐
1. Home
2. Holiday Home
3. Work
4. Employers Business
5. Education
6. Shopping
7. Personal Business
8. Visit Friends
9. Recreational/Leisure

Appendix B – Desire Lines

DESIRE LINES

Desire Line diagrams have been prepared for the following RSI sites for the AM and PM peaks:

- A518 Castle Bank;
- A5103 Eccleshall Road; and
- Doxey Road.

The diagrams show the origins and destination of trips observed passing through the RSI sites inbound. The sector system in Figure B.1 has been used for the analysis. It should be noted that the desire lines are drawn between the centre of sectors. Trips to the external sectors (41 to 44), therefore, could be to any of the zones within this sector, not necessarily to the location shown (which is only the geographical centre).

Figure B.2 to B.7 show the desire line diagrams for the RSI sites at A518 Castle Bank, A5103 Eccleshall Road and Doxey Road for the AM and PM peaks.

The diagrams demonstrate that the origins and destinations for trips through the RSI sites are sensible.

Figure B.1 – Sector System

Figure B.2 – Desire Lines – A518 Castle Bank – AM Peak

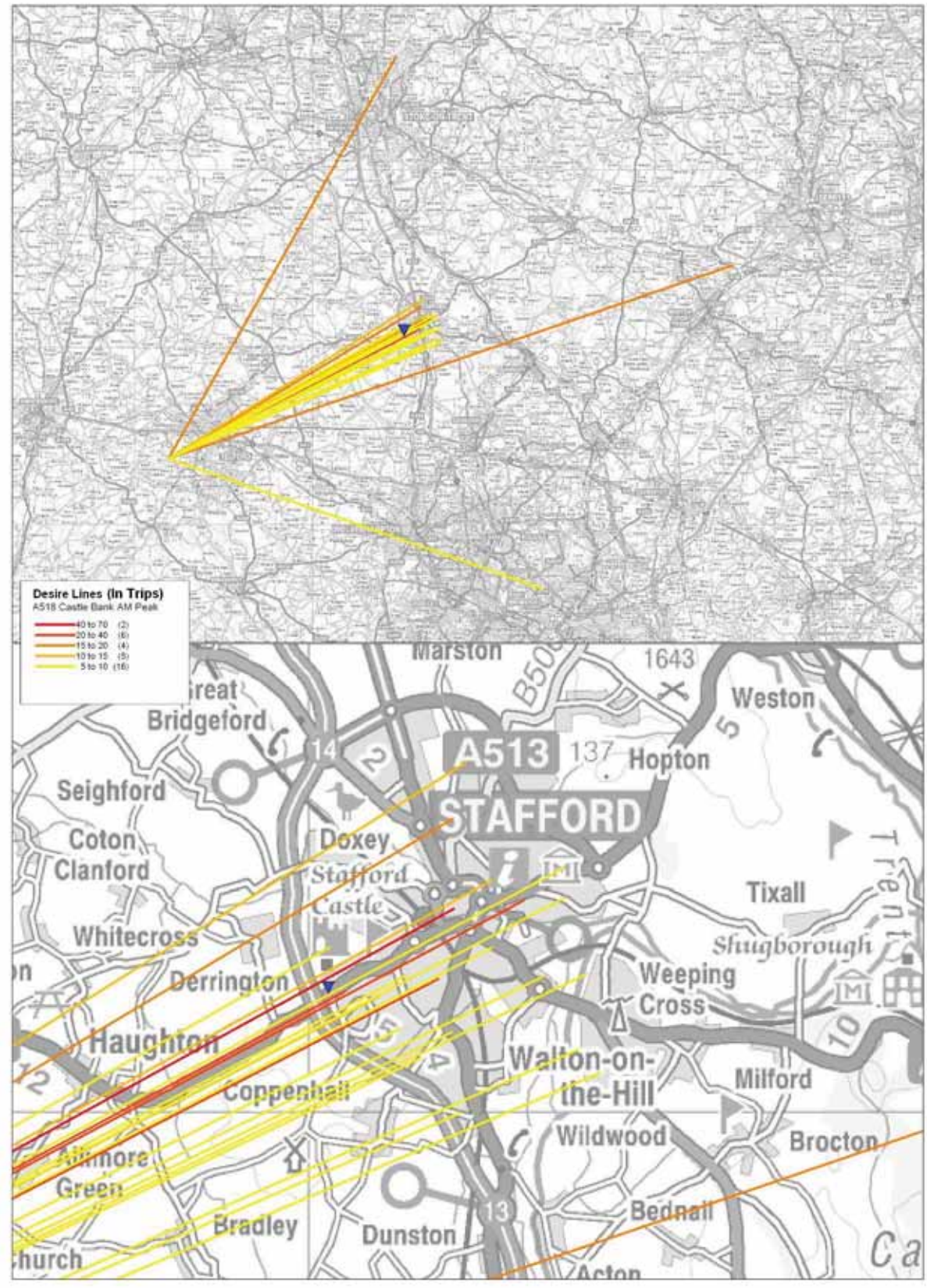


Figure B.3 – Desire Lines – A518 Castle Bank – PM Peak

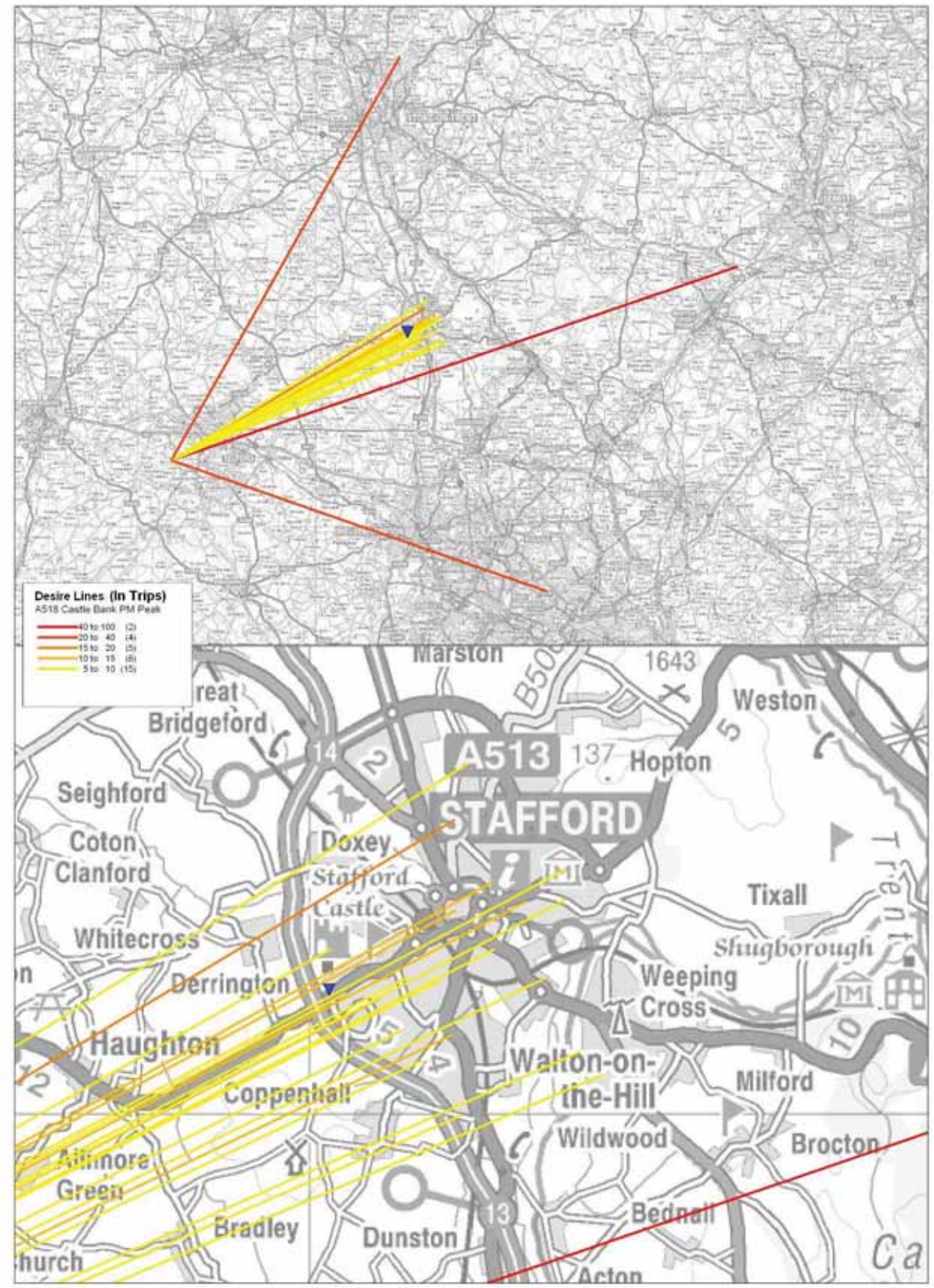


Figure B.4 – Desire Lines – A5103 Eccleshall Road – AM Peak

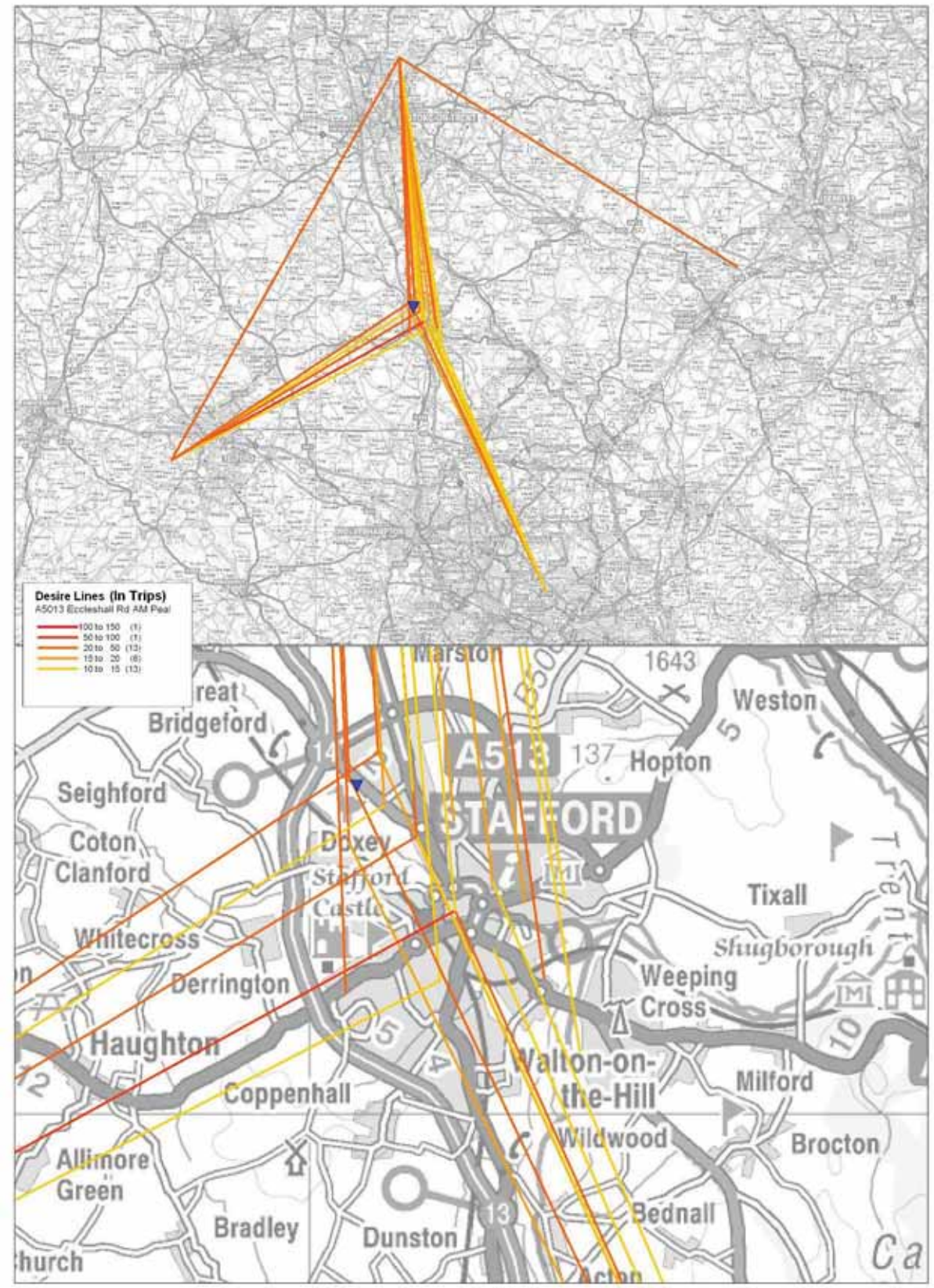


Figure B.5 – Desire Lines – A5103 Eccleshall Road – PM Peak

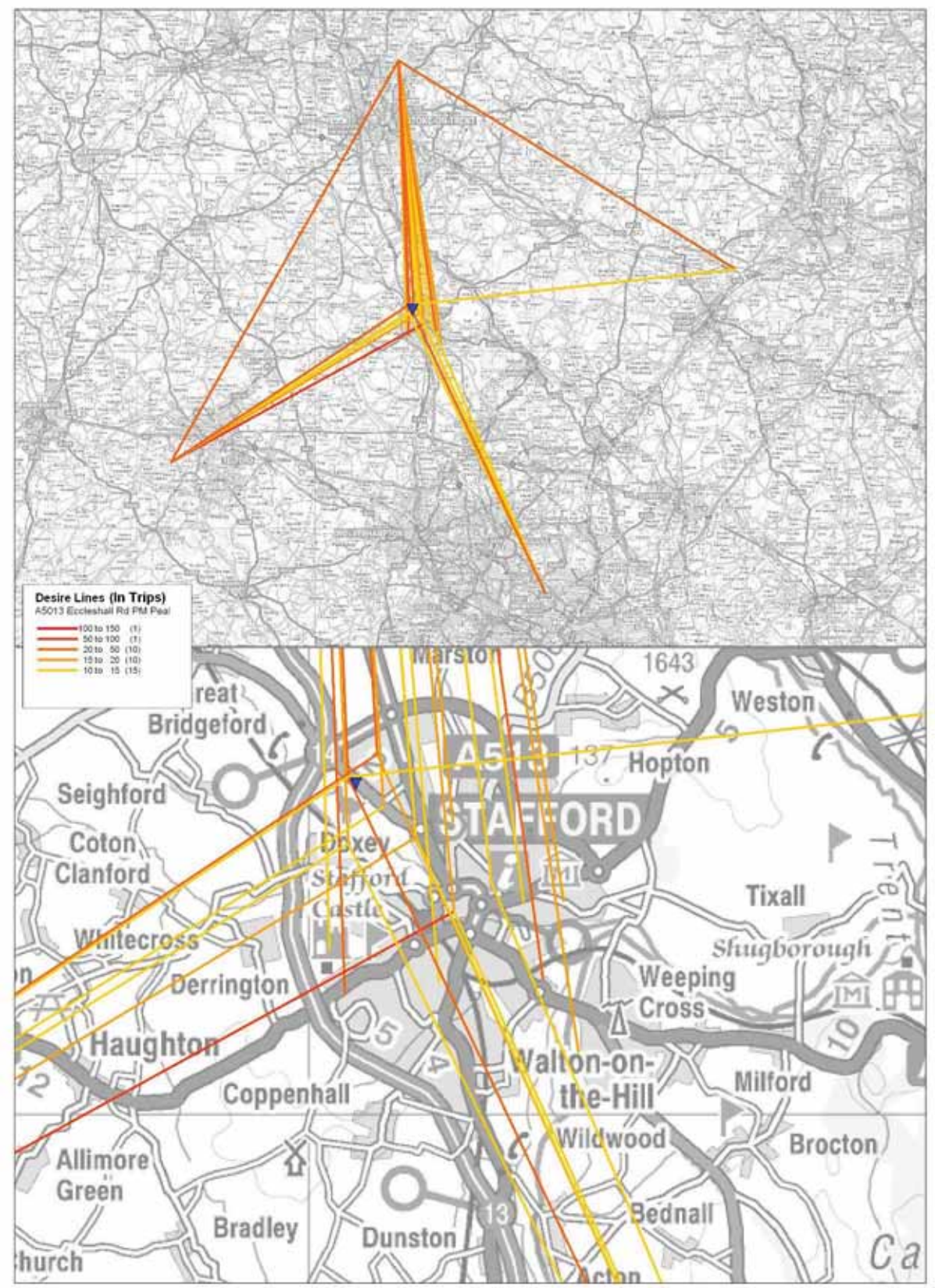


Figure B.6 – Desire Lines – Doxey Road – AM Peak

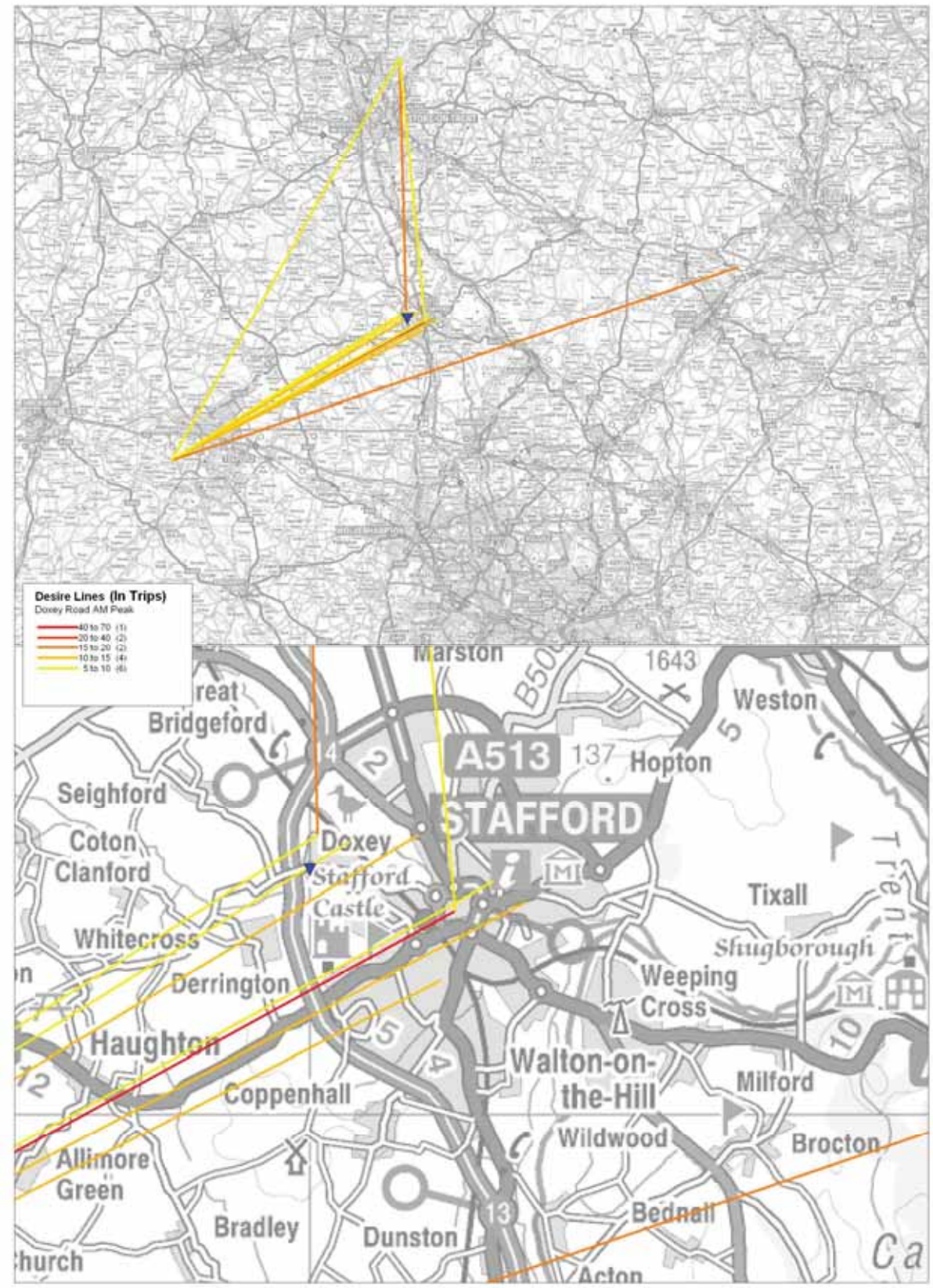
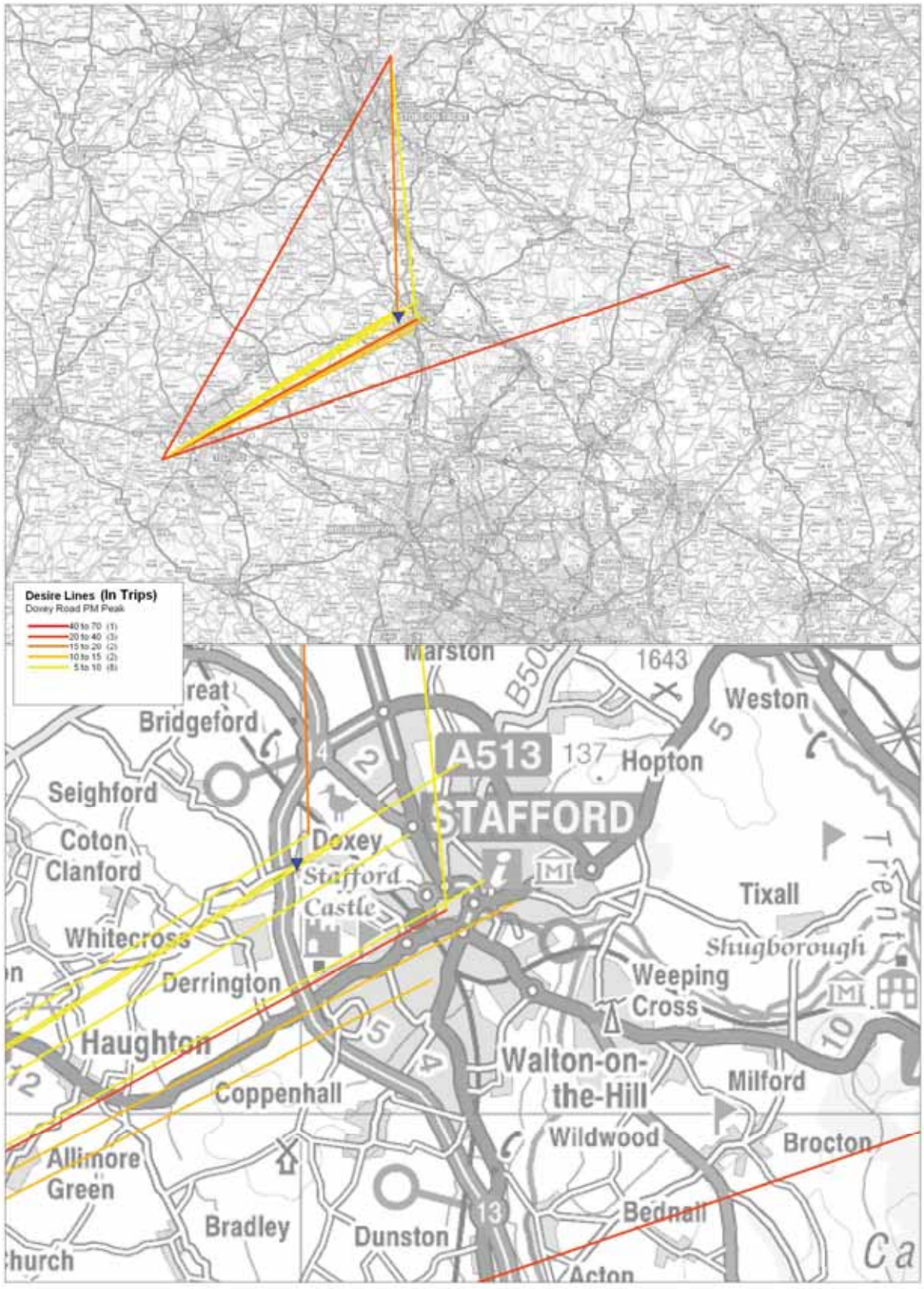
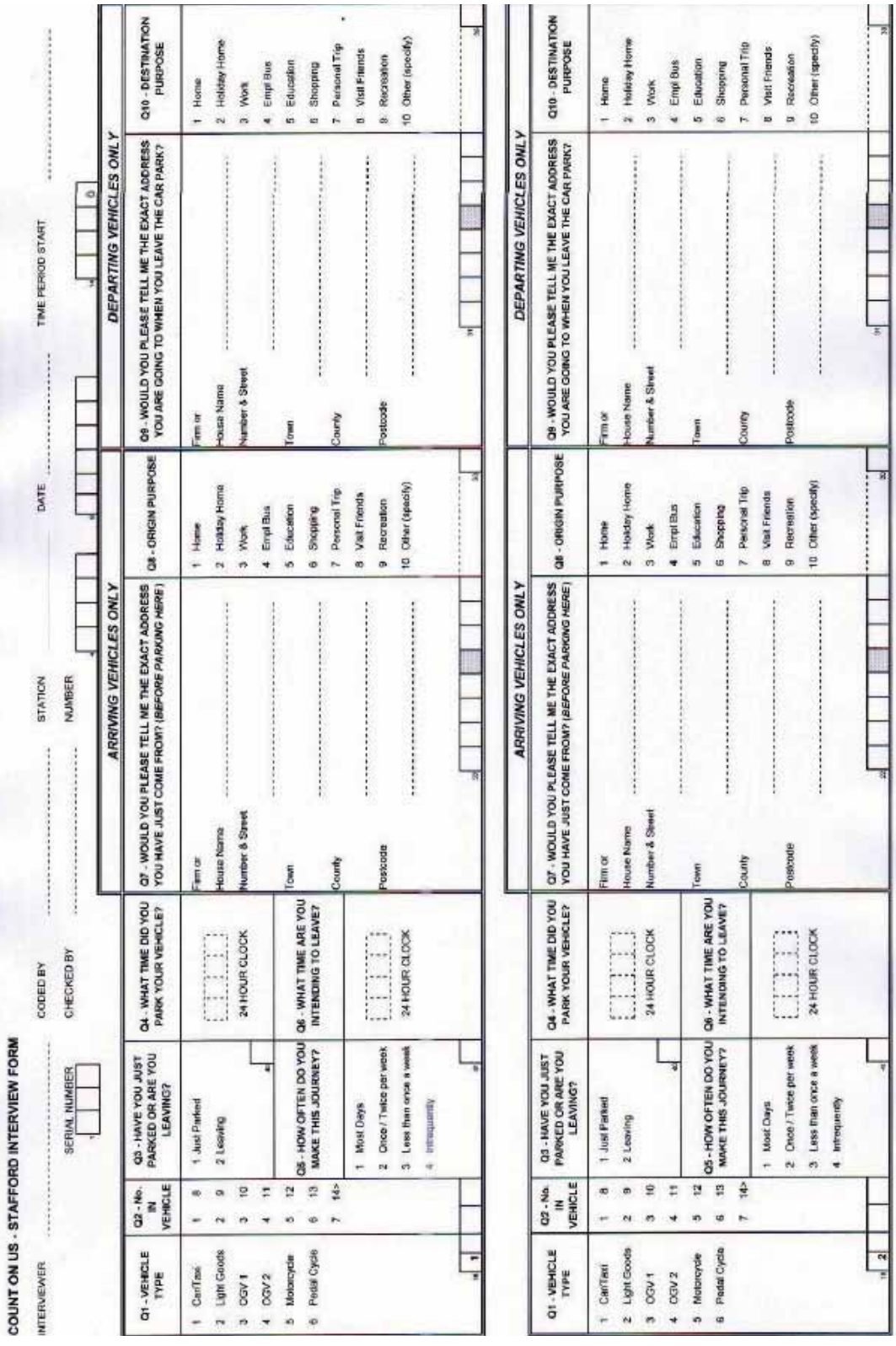


Figure B.7 – Desire Lines –Doxey Road– PM Peak



Appendix C – Car Parks survey card



COUNT ON US - STAFFORD INTERVIEW FORM

INTERVIEWER ..... CODED BY ..... STATION ..... DATE ..... TIME PERIOD START .....

SERIAL NUMBER CHECKED BY ..... NUMBER

ARRIVING VEHICLES ONLY

Q1 - VEHICLE TYPE	Q2 - No. IN VEHICLE	Q3 - HAVE YOU JUST PARKED OR ARE YOU LEAVING?	Q4 - WHAT TIME DID YOU PARK YOUR VEHICLE?	Q5 - HOW OFTEN DO YOU MAKE THIS JOURNEY?	Q6 - WHAT TIME ARE YOU INTENDING TO LEAVE?	Q7 - WOULD YOU PLEASE TELL ME THE EXACT ADDRESS YOU HAVE JUST COME FROM? (BEFORE PARKING HERE)	Q8 - ORIGIN PURPOSE
1 Car/Taxi	1 8	1 Just Parked		1 Most Days		Firm or	1 Home
2 Light Goods	2 9	2 Leaving		2 Once / Twice per week		House Name	2 Holiday Home
3 OGV 1	3 10		24 HOUR CLOCK	3 Less than once a week	24 HOUR CLOCK	Number & Street	3 Work
4 OGV 2	4 11			4 Infrequently		Town	4 Empl Bus
5 Motorcycle	5 12					County	5 Education
6 Pedal Cycle	6 13					Postcode	6 Shopping
	7 14>						7 Personal Trip
							8 Visit Friends
							9 Recreation
							10 Other (specify)

DEPARTING VEHICLES ONLY

Q9 - WOULD YOU PLEASE TELL ME THE EXACT ADDRESS YOU ARE GOING TO WHEN YOU LEAVE THE CAR PARK?	Q10 - DESTINATION PURPOSE
Firm or	1 Home
House Name	2 Holiday Home
Number & Street	3 Work
Town	4 Empl Bus
County	5 Education
Postcode	6 Shopping
	7 Personal Trip
	8 Visit Friends
	9 Recreation
	10 Other (specify)

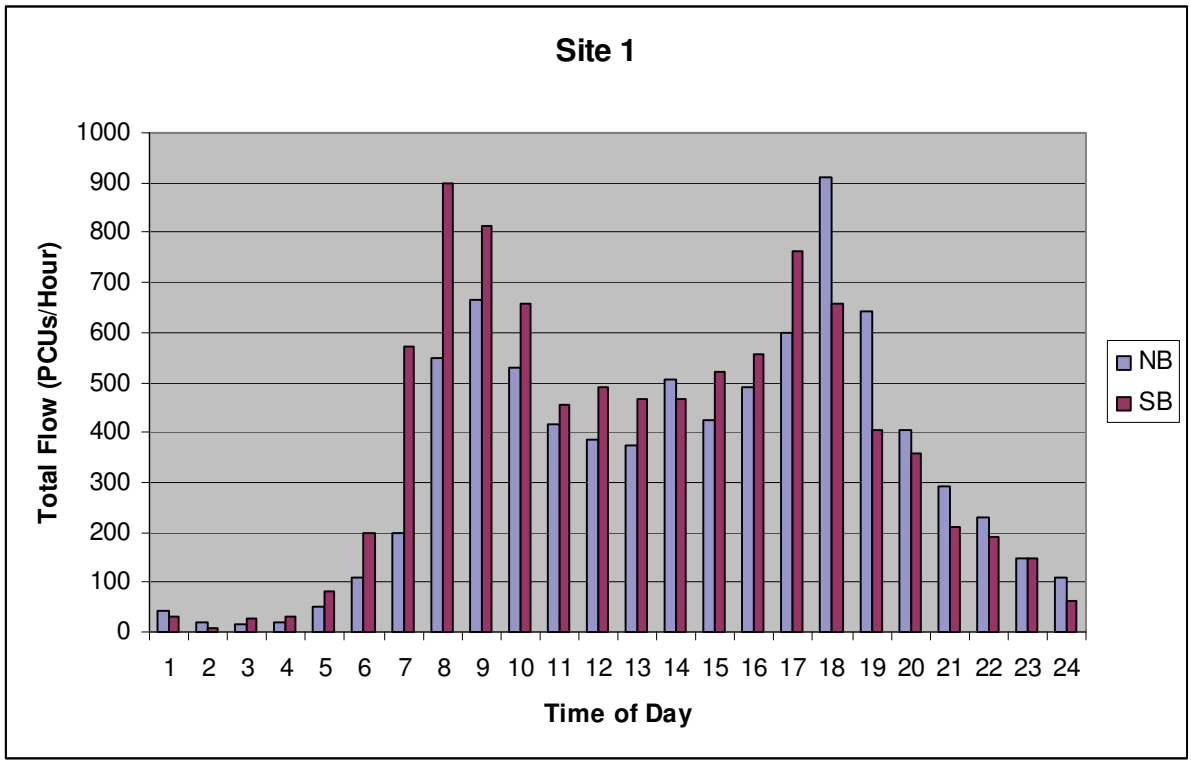
ARRIVING VEHICLES ONLY

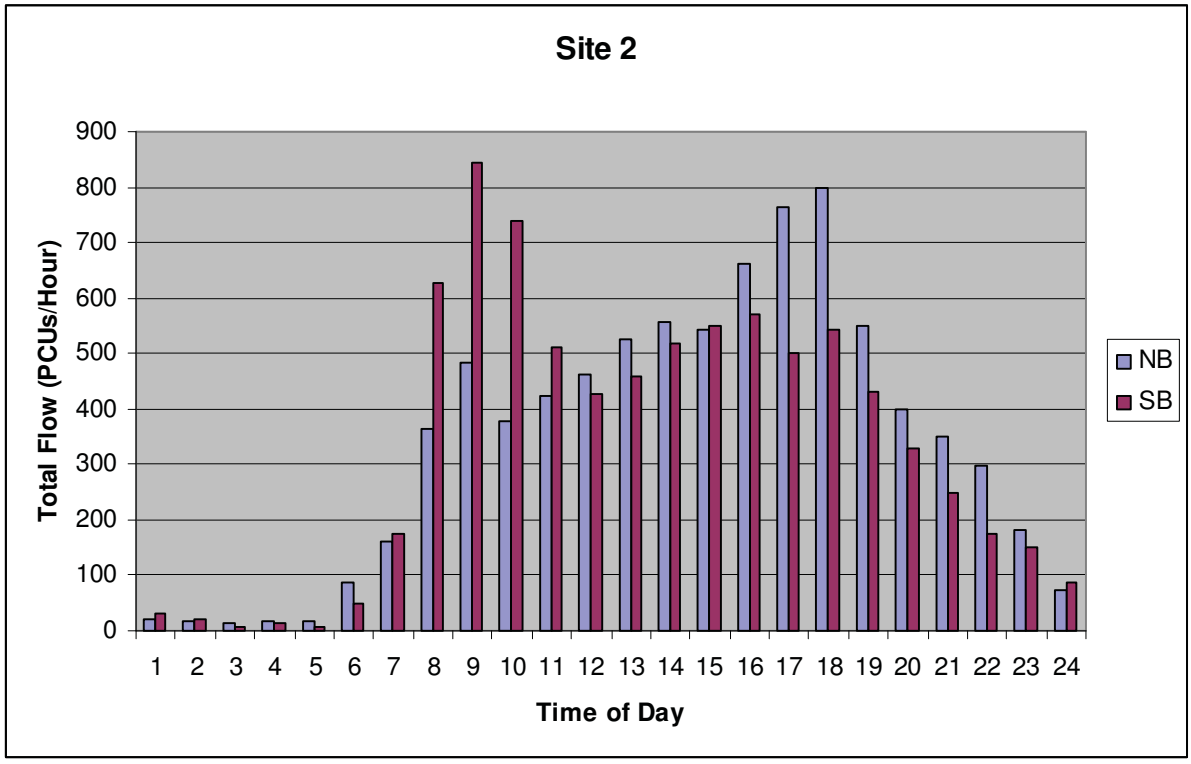
Q1 - VEHICLE TYPE	Q2 - No. IN VEHICLE	Q3 - HAVE YOU JUST PARKED OR ARE YOU LEAVING?	Q4 - WHAT TIME DID YOU PARK YOUR VEHICLE?	Q5 - HOW OFTEN DO YOU MAKE THIS JOURNEY?	Q6 - WHAT TIME ARE YOU INTENDING TO LEAVE?	Q7 - WOULD YOU PLEASE TELL ME THE EXACT ADDRESS YOU HAVE JUST COME FROM? (BEFORE PARKING HERE)	Q8 - ORIGIN PURPOSE
1 Car/Taxi	1 8	1 Just Parked		1 Most Days		Firm or	1 Home
2 Light Goods	2 9	2 Leaving		2 Once / Twice per week		House Name	2 Holiday Home
3 OGV 1	3 10		24 HOUR CLOCK	3 Less than once a week	24 HOUR CLOCK	Number & Street	3 Work
4 OGV 2	4 11			4 Infrequently		Town	4 Empl Bus
5 Motorcycle	5 12					County	5 Education
6 Pedal Cycle	6 13					Postcode	6 Shopping
	7 14>						7 Personal Trip
							8 Visit Friends
							9 Recreation
							10 Other (specify)

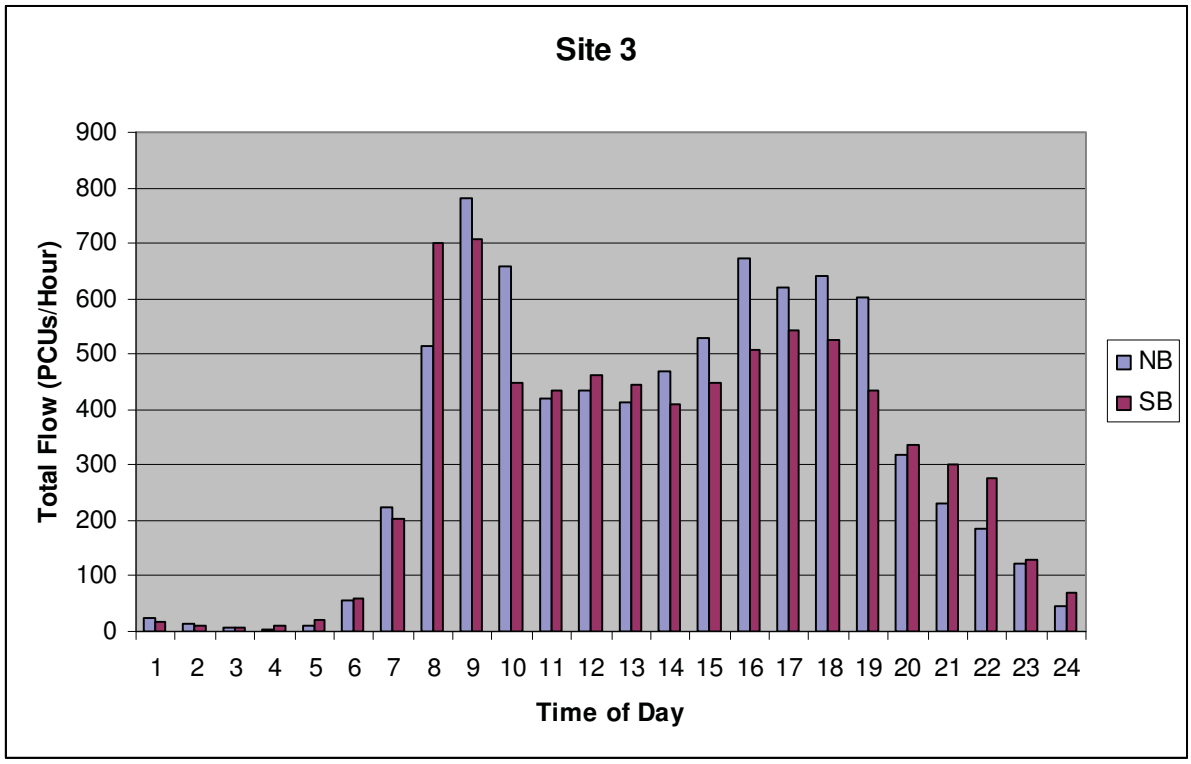
DEPARTING VEHICLES ONLY

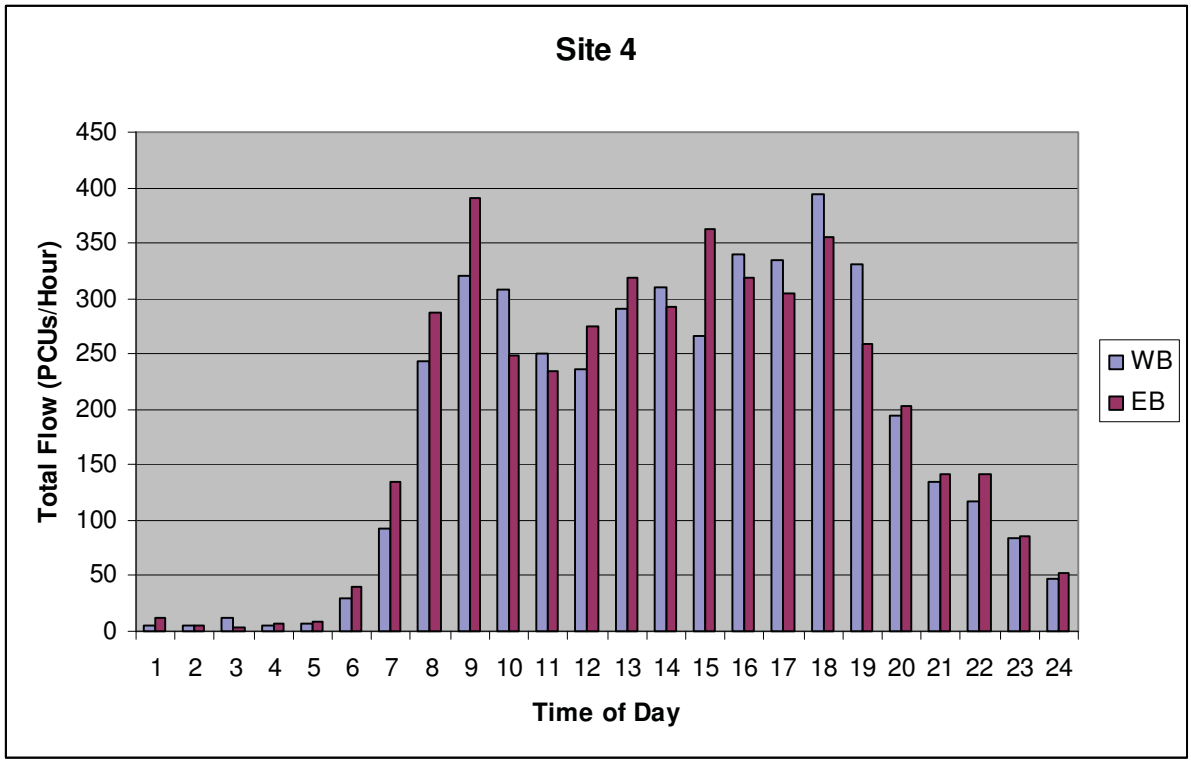
Q9 - WOULD YOU PLEASE TELL ME THE EXACT ADDRESS YOU ARE GOING TO WHEN YOU LEAVE THE CAR PARK?	Q10 - DESTINATION PURPOSE
Firm or	1 Home
House Name	2 Holiday Home
Number & Street	3 Work
Town	4 Empl Bus
County	5 Education
Postcode	6 Shopping
	7 Personal Trip
	8 Visit Friends
	9 Recreation
	10 Other (specify)

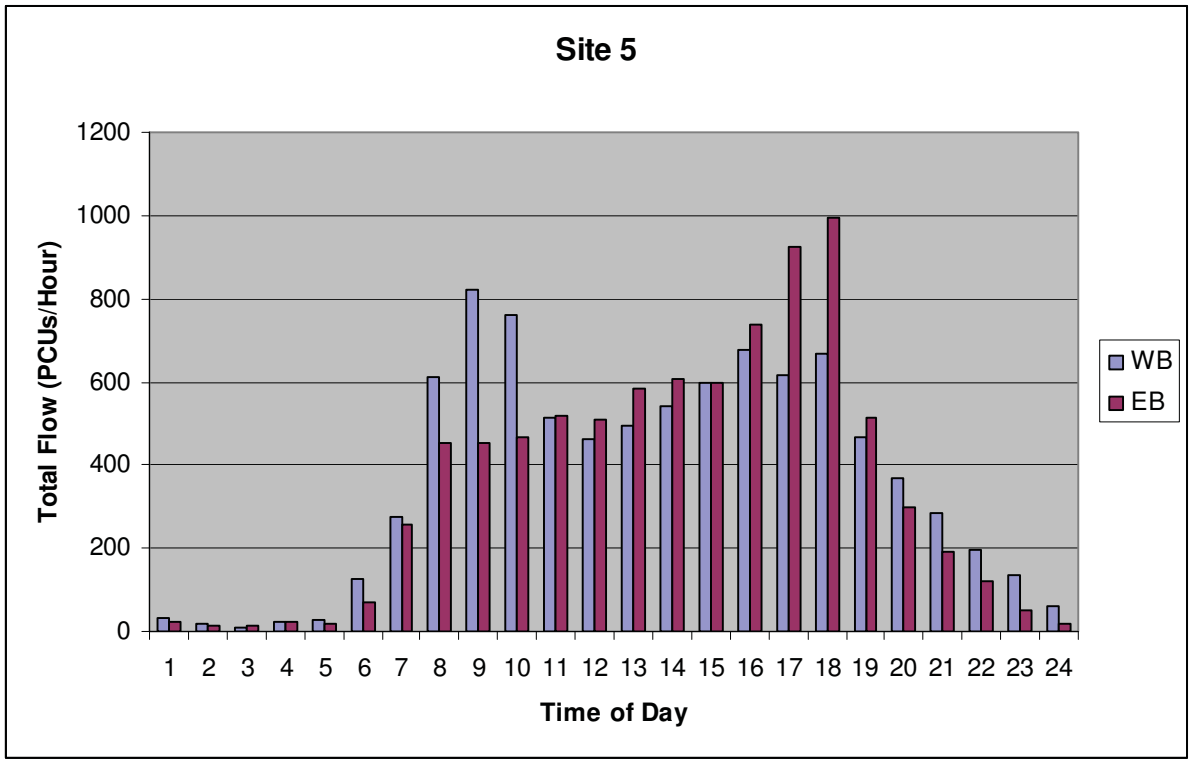
Appendix D – Hourly Variation of Traffic at RSI Locations

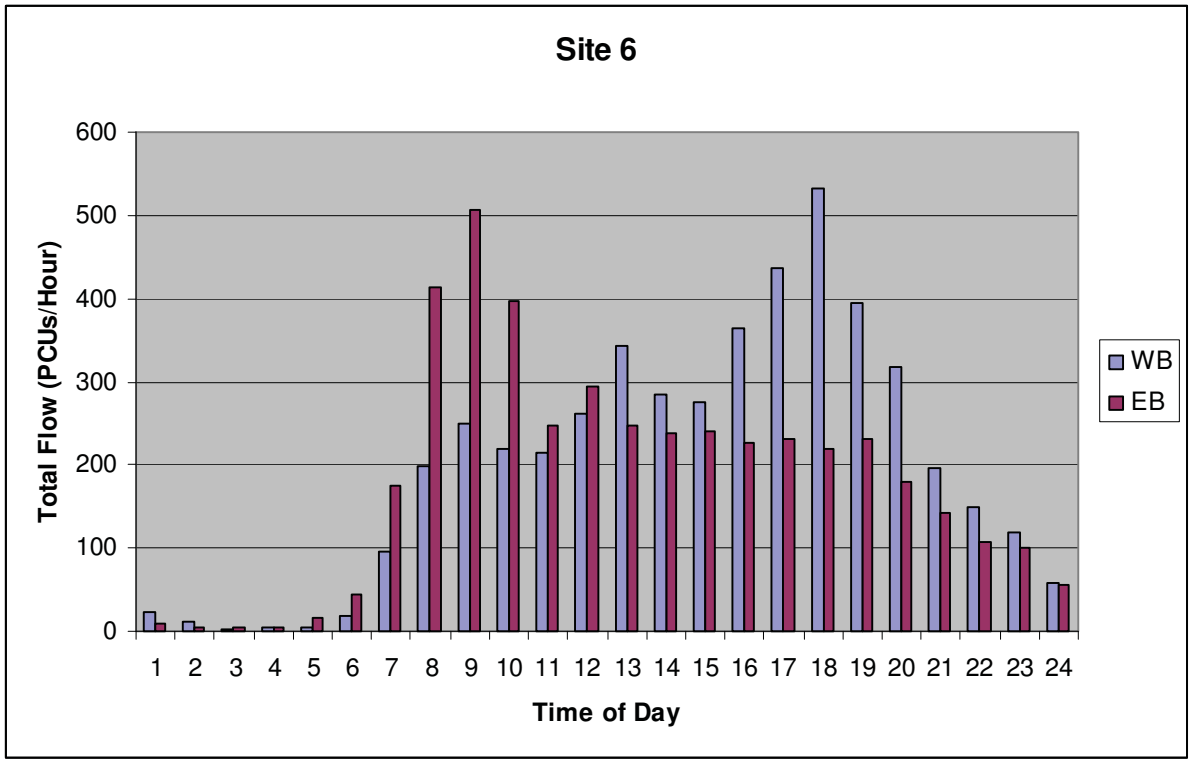

Site 1
Total Flow (PCUs/Hour)
1000
900
800
700
600
500
400
300
200
100
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Time of Day
NB
SB

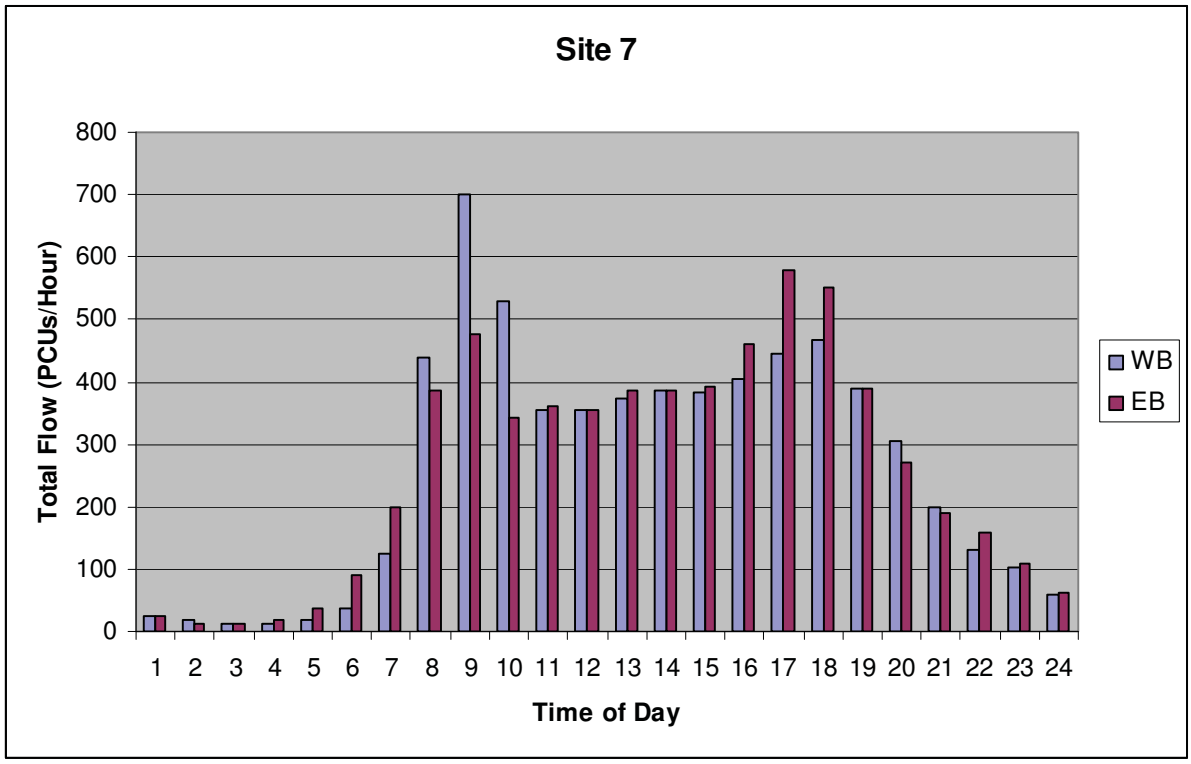

Site 2
Total Flow (PCUs/Hour)
900
800
700
600
500
400
300
200
100
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Time of Day
NB
SB

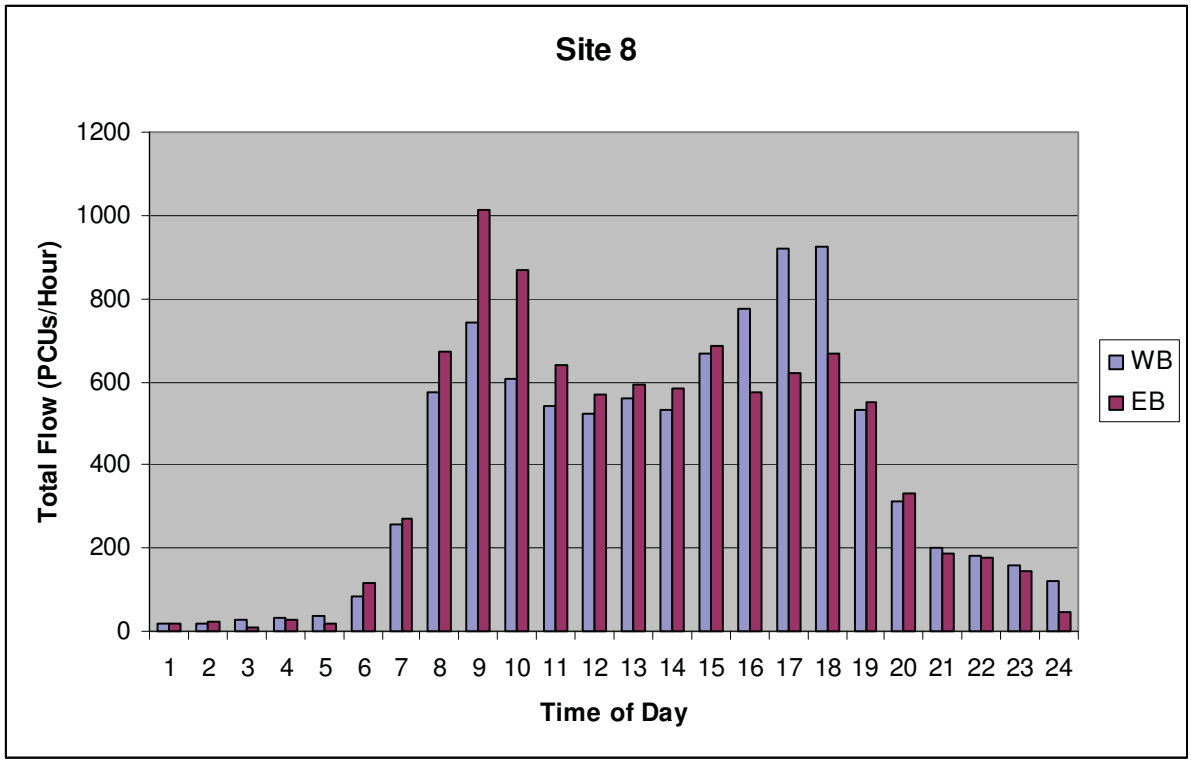

Site 3
Total Flow (PCUs/Hour)
900
800
700
600
500
400
300
200
100
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Time of Day
NB
SB

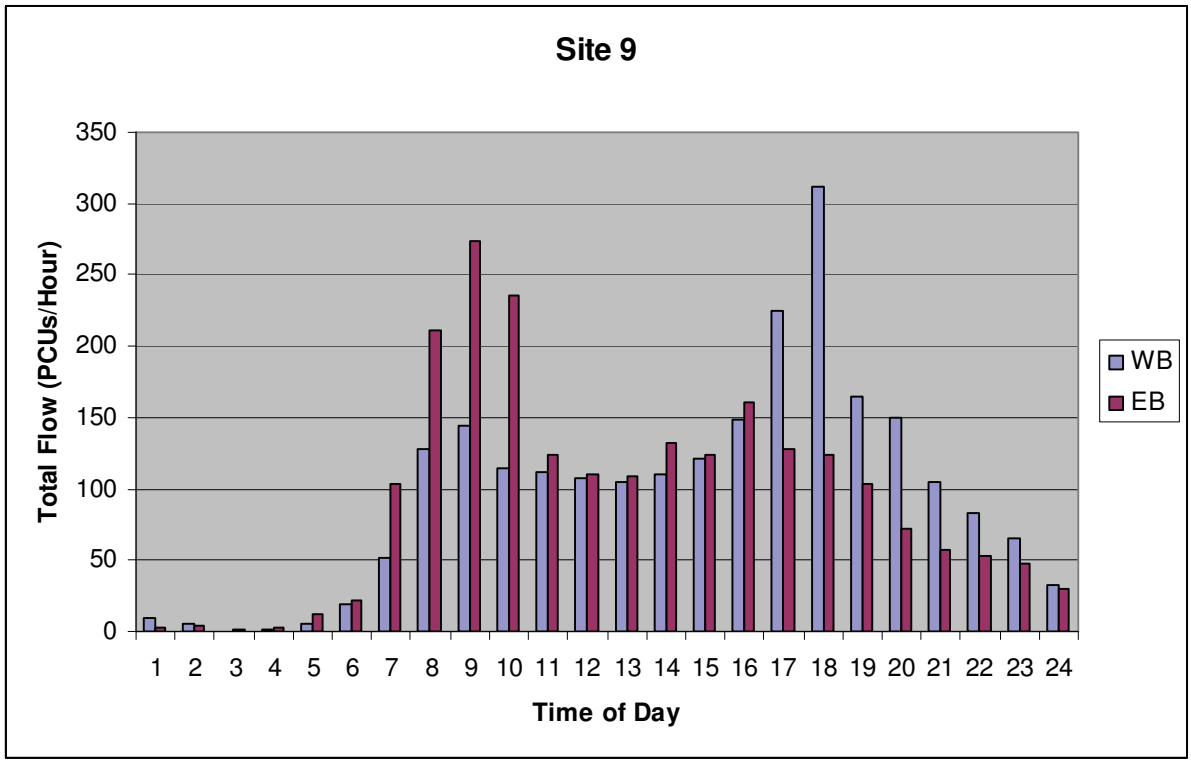

Site 4
Total Flow (PCUs/Hour)
450
400
350
300
250
200
150
100
50
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Time of Day
WB
EB

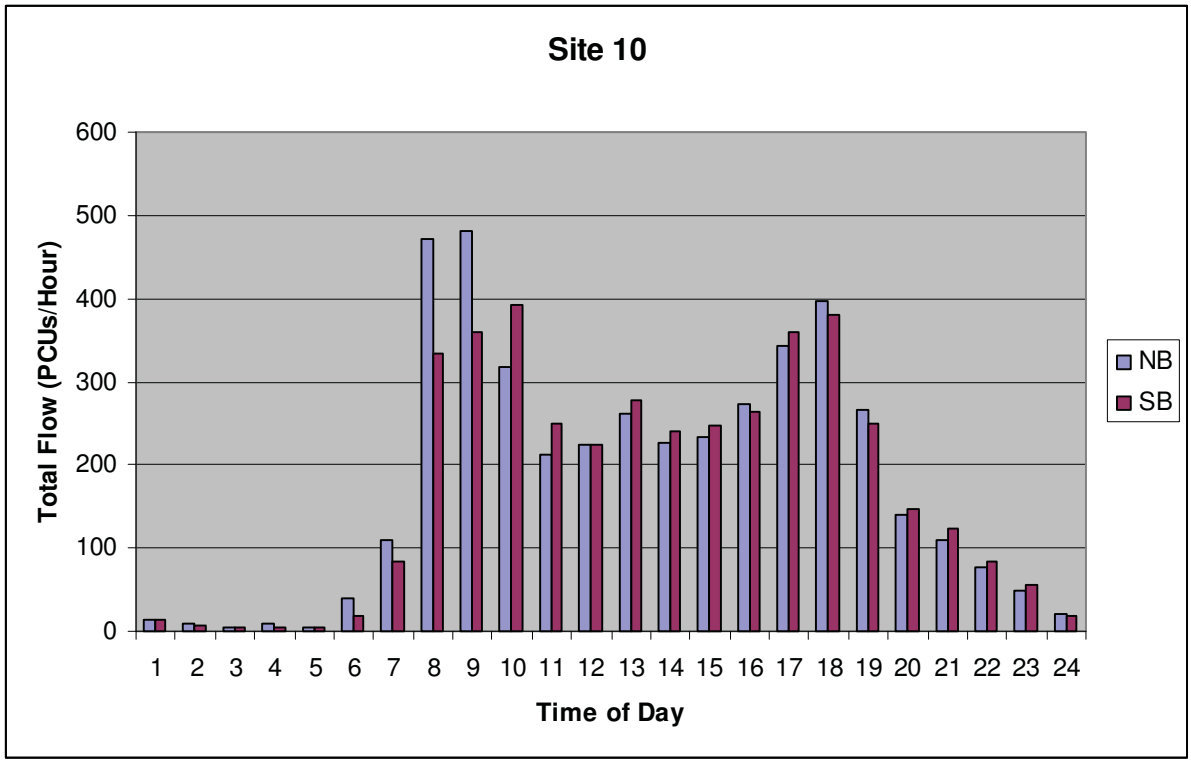

Site 5
Total Flow (PCUs/Hour)
1200
1000
800
600
400
200
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Time of Day
WB
EB

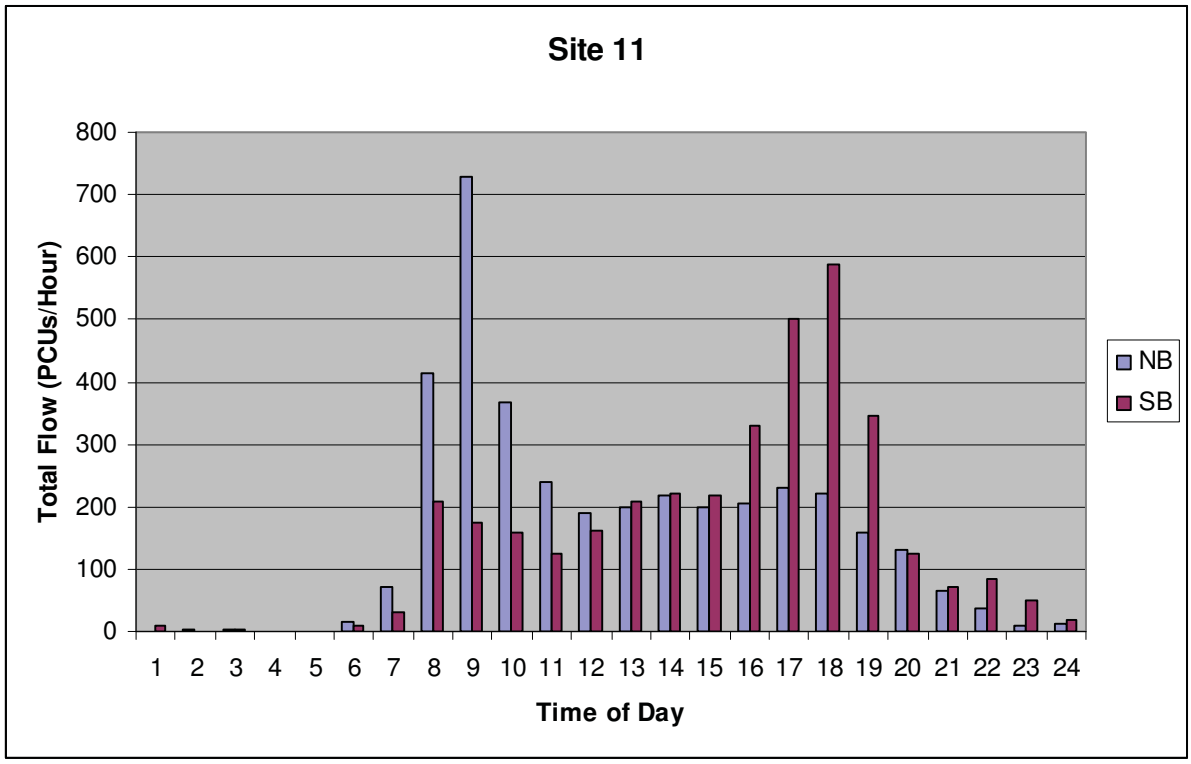

Site 6
Total Flow (PCUs/Hour)
600
500
400
300
200
100
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Time of Day
WB
EB


Site 7
Total Flow (PCUs/Hour)
800
700
600
500
400
300
200
100
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Time of Day
WB
EB


Site 8
Total Flow (PCUs/Hour)
1200
1000
800
600
400
200
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Time of Day
WB
EB

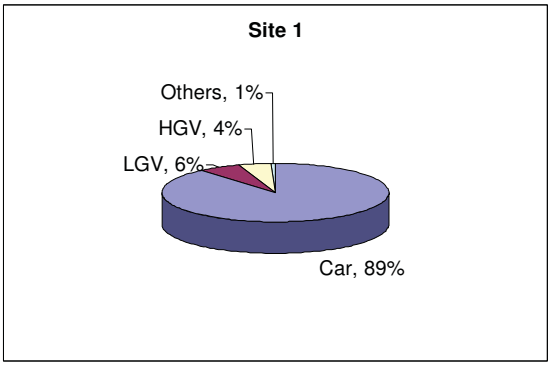

Site 9
Total Flow (PCUs/Hour)
350
300
250
200
150
100
50
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Time of Day
WB
EB

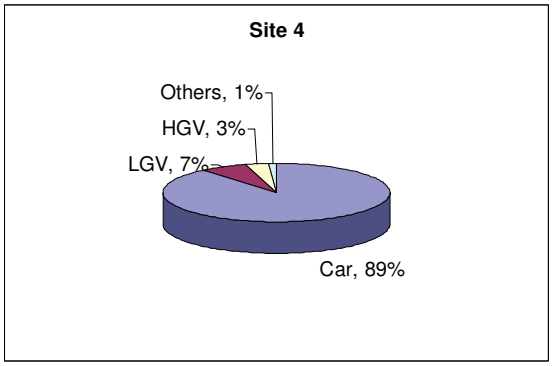

Site 10
Total Flow (PCUs/Hour)
600
500
400
300
200
100
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Time of Day
NB
SB

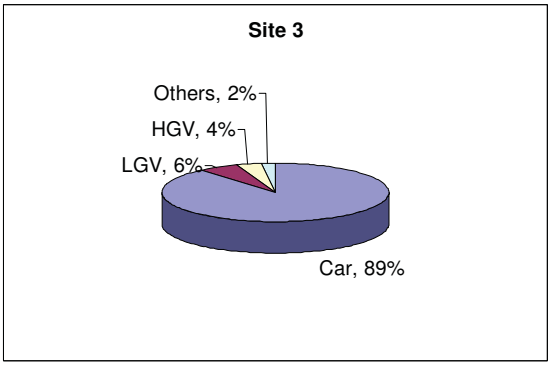

Site 11
Total Flow (PCUs/Hour)
800
700
600
500
400
300
200
100
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Time of Day
NB
SB

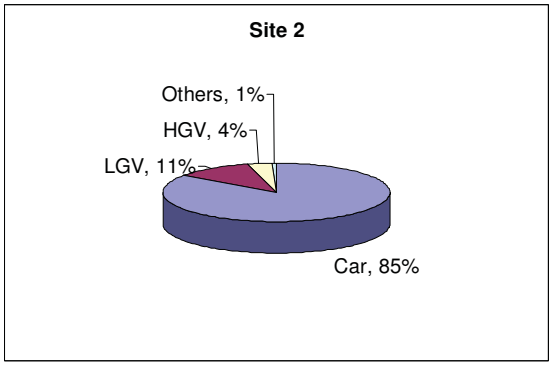
Appendix E – RSI Site Vehicle Proportions

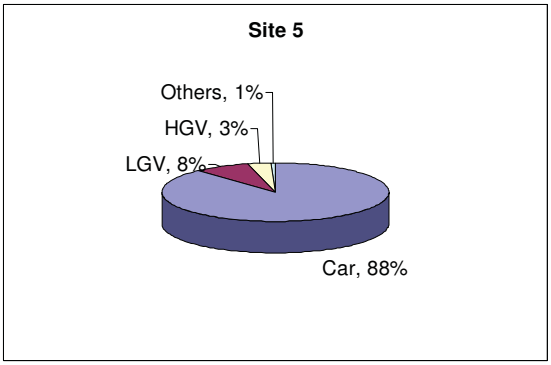
AM Peak

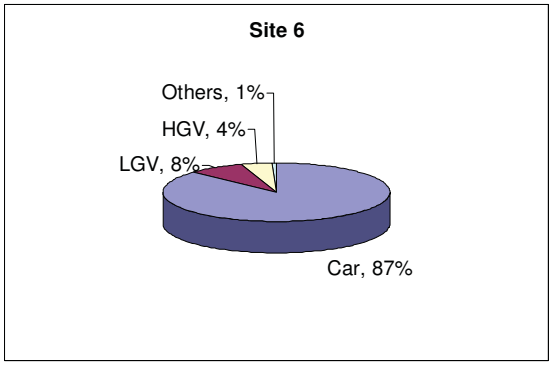

Site 1
Others, 1%
HGV, 4%
LGV, 6%
Car, 89%


Site 4
Others, 1%
HGV, 3%
LGV, 7%
Car, 89%

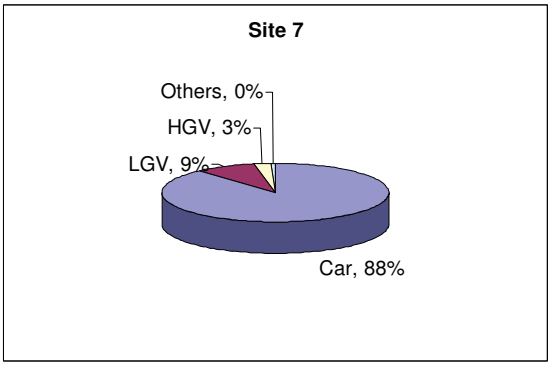

Site 3
Others, 2%
HGV, 4%
LGV, 6%
Car, 89%

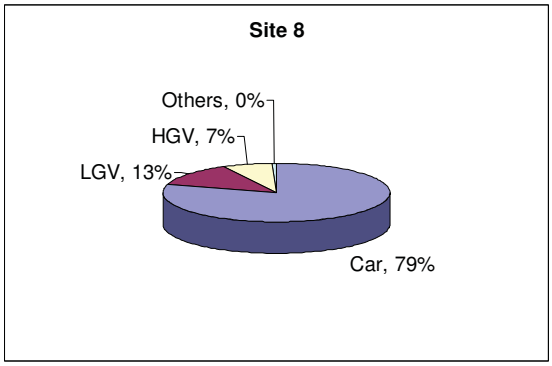

Site 2
Others, 1%
HGV, 4%
LGV, 11%
Car, 85%

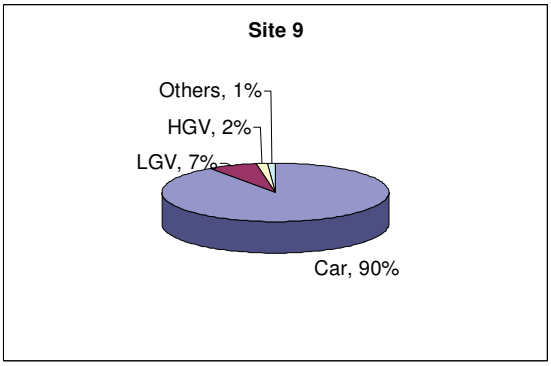

Site 5
Others, 1%
HGV, 3%
LGV, 8%
Car, 88%

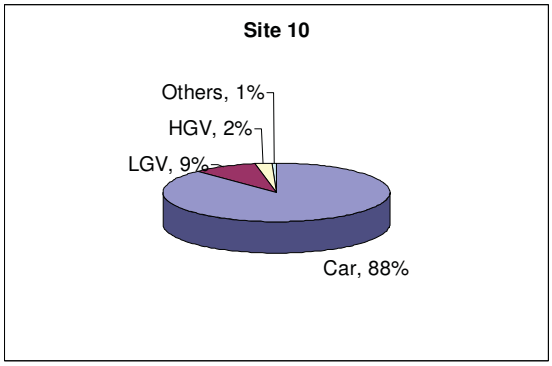

Site 6
Others, 1%
HGV, 4%
LGV, 8%
Car, 87%

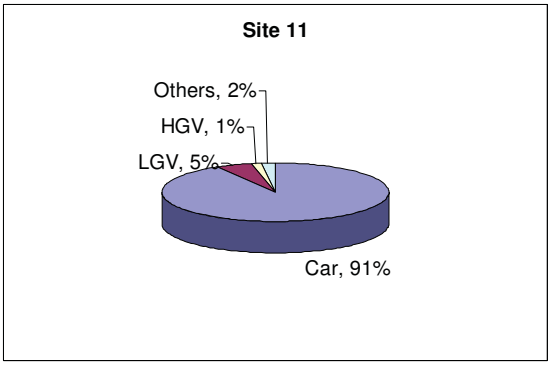
AM Peak


Site 7
Others, 0%
HGV, 3%
LGV, 9%
Car, 88%

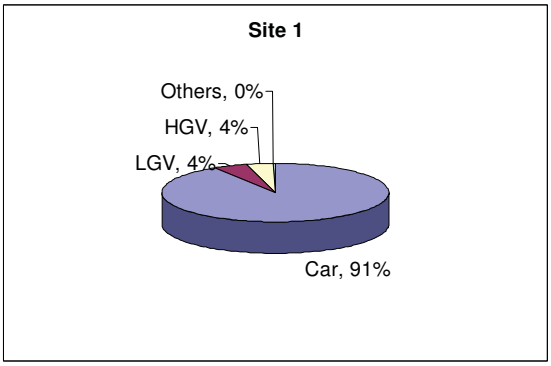

Site 8
Others, 0%
HGV, 7%
LGV, 13%
Car, 79%

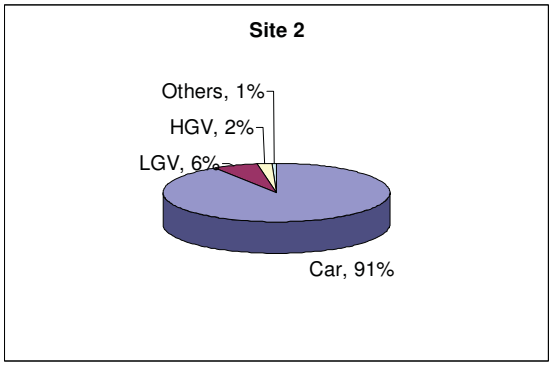

Site 9
Others, 1%
HGV, 2%
LGV, 7%
Car, 90%

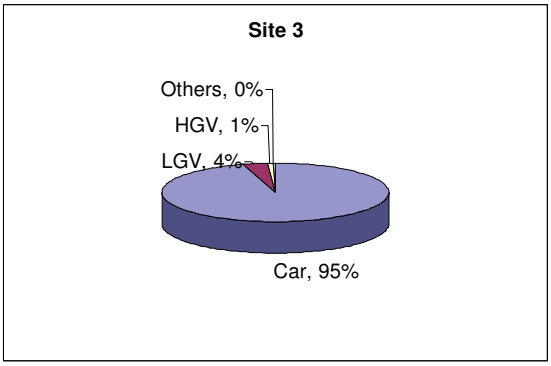

Site 10
Others, 1%
HGV, 2%
LGV, 9%
Car, 88%

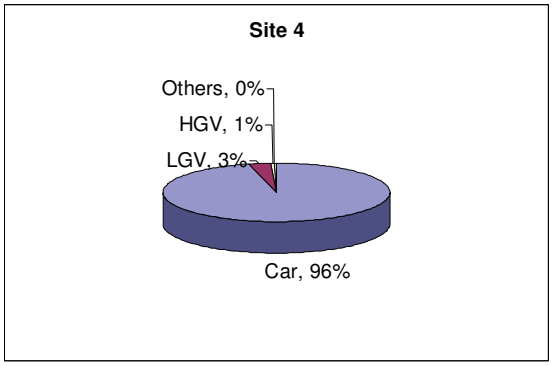

Site 11
Others, 2%
HGV, 1%
LGV, 5%
Car, 91%

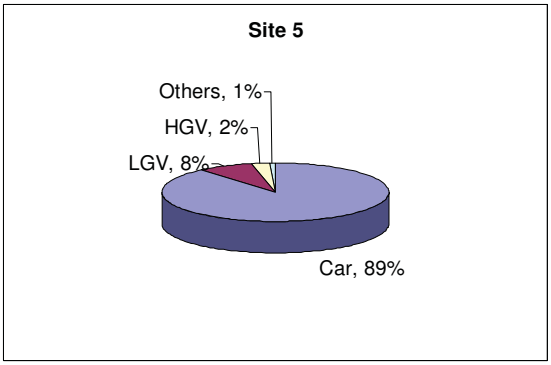
PM Peak

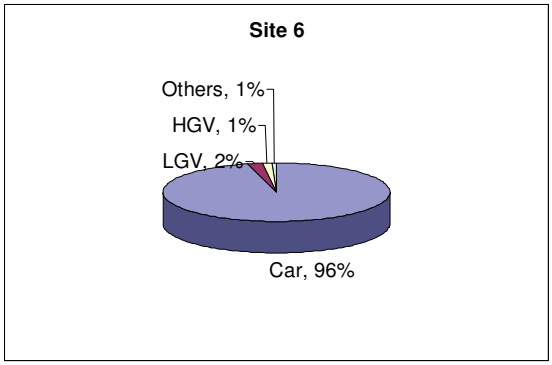

Site 1
Others, 0%
HGV, 4%
LGV, 4%
Car, 91%


Site 2
Others, 1%
HGV, 2%
LGV, 6%
Car, 91%

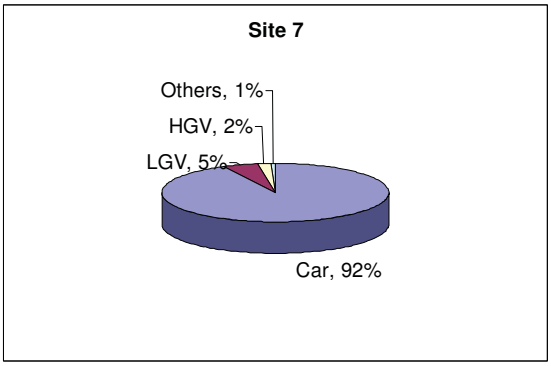

Site 3
Others, 0%
HGV, 1%
LGV, 4%
Car, 95%

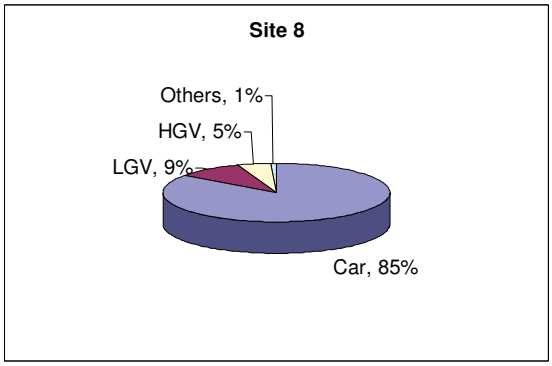

Site 4
Others, 0%
HGV, 1%
LGV, 3%
Car, 96%

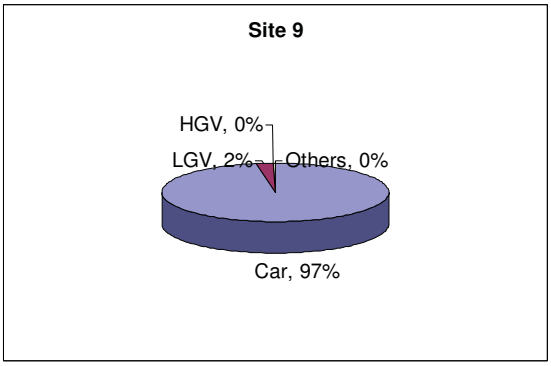

Site 5
Others, 1%
HGV, 2%
LGV, 8%
Car, 89%

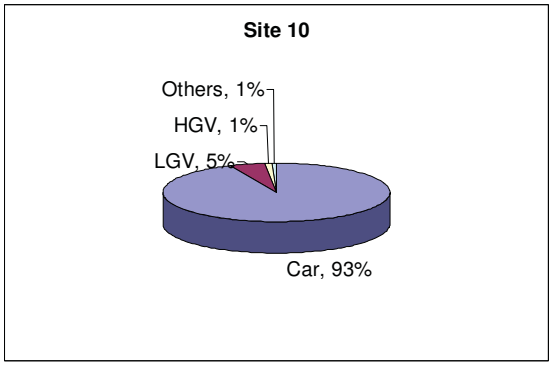

Site 6
Others, 1%
HGV, 1%
LGV, 2%
Car, 96%

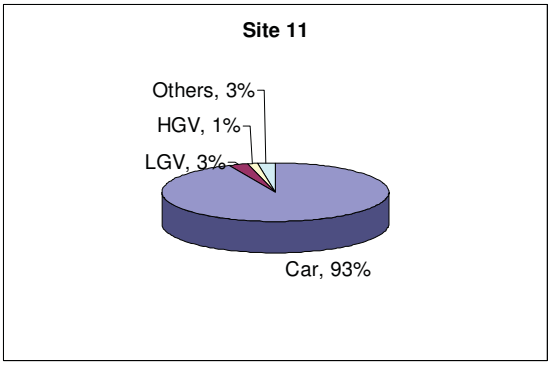
PM Peak


Site 7
Others, 1%
HGV, 2%
LGV, 5%
Car, 92%

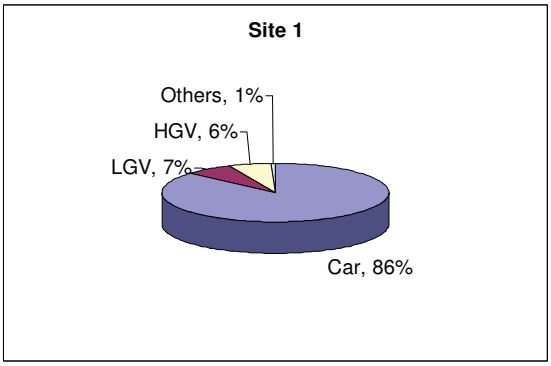

Site 8
Others, 1%
HGV, 5%
LGV, 9%
Car, 85%

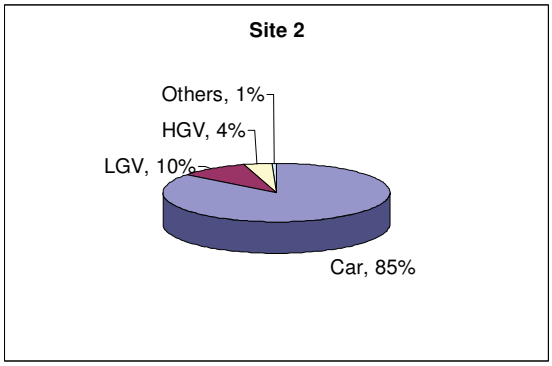

Site 9
HGV, 0%
LGV, 2%
Others, 0%
Car, 97%

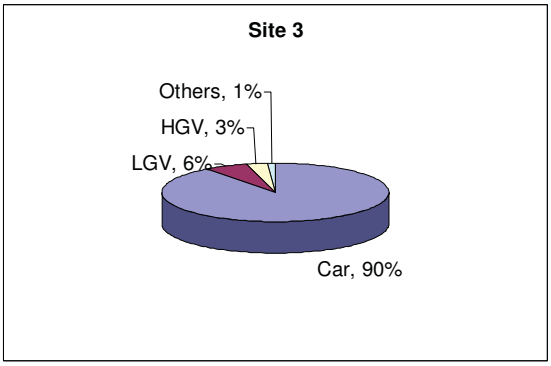

Site 10
Others, 1%
HGV, 1%
LGV, 5%
Car, 93%

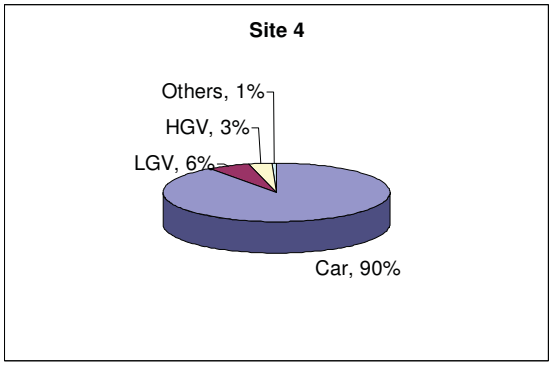

Site 11
Others, 3%
HGV, 1%
LGV, 3%
Car, 93%

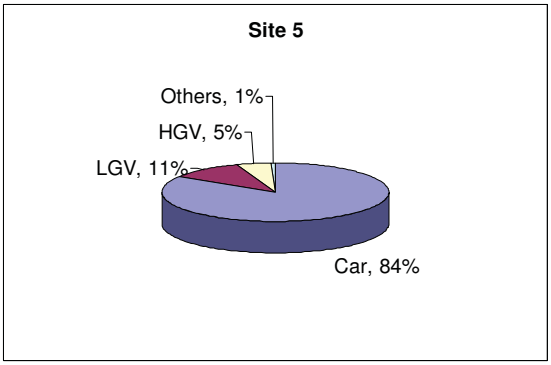
12 hour period

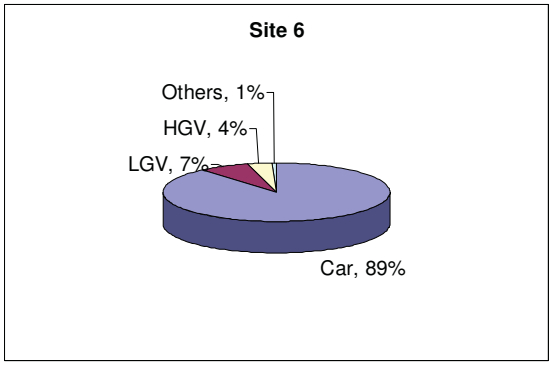




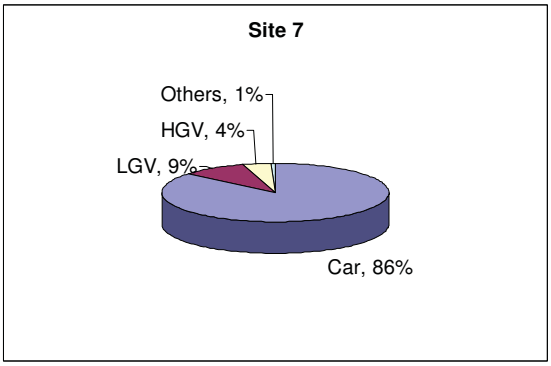


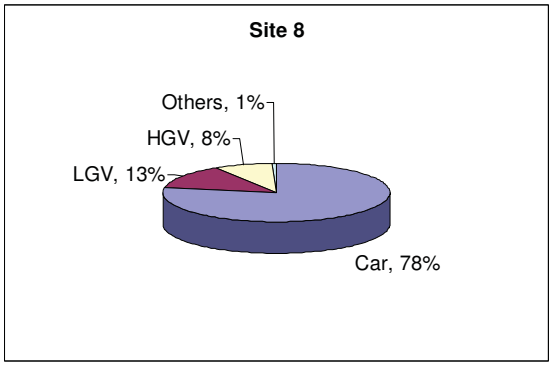


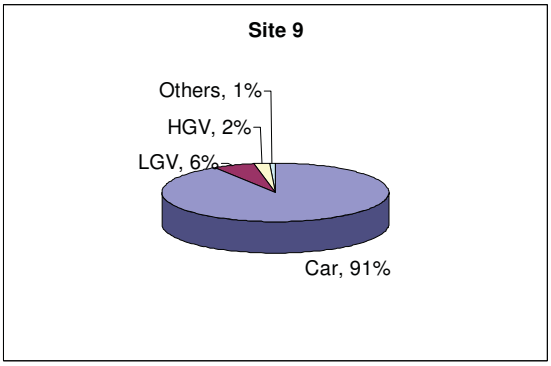


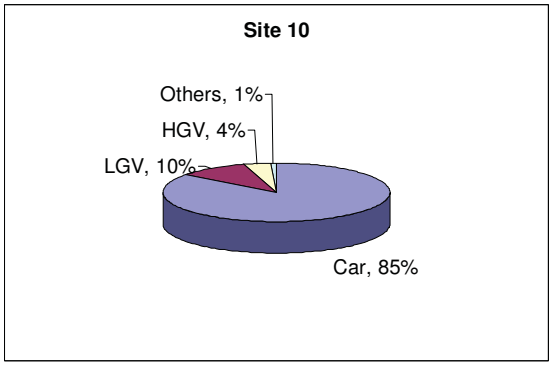


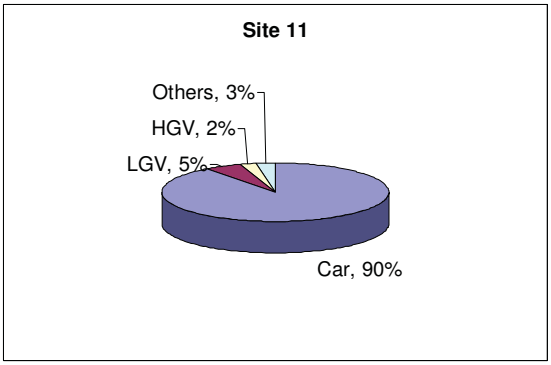
12 hour period





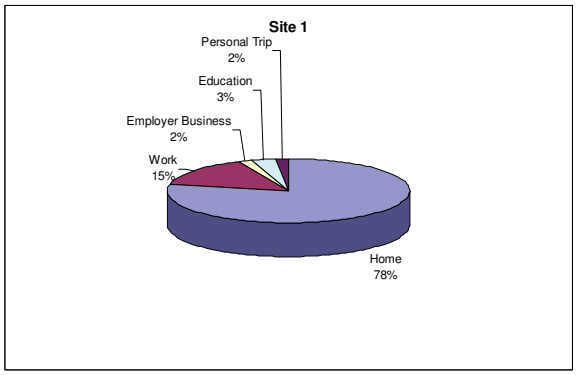


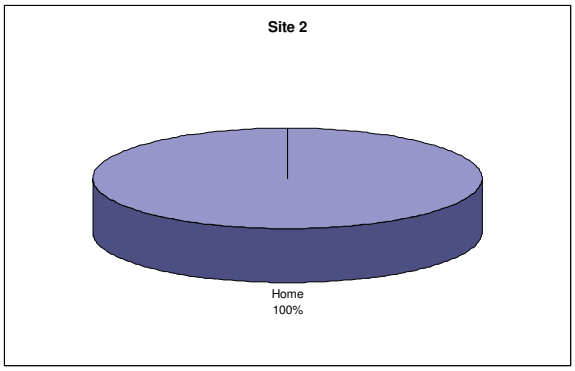


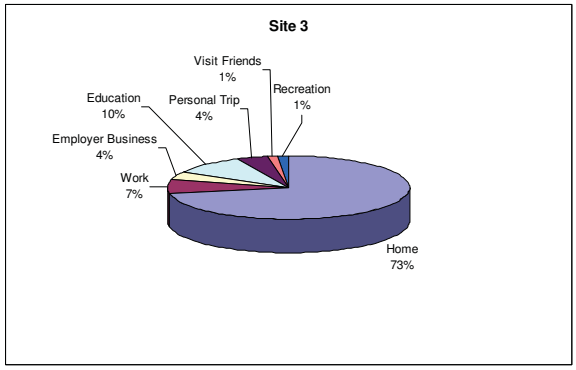


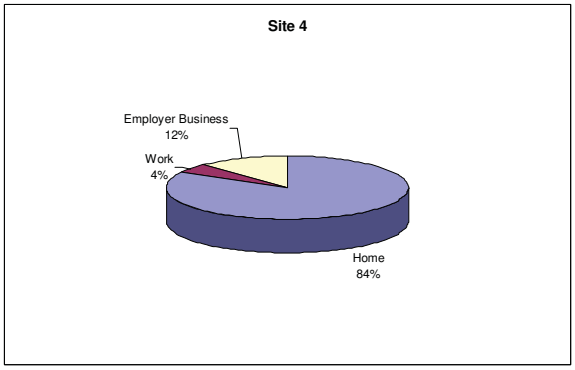
Appendix F – Distribution of Journey Purposes

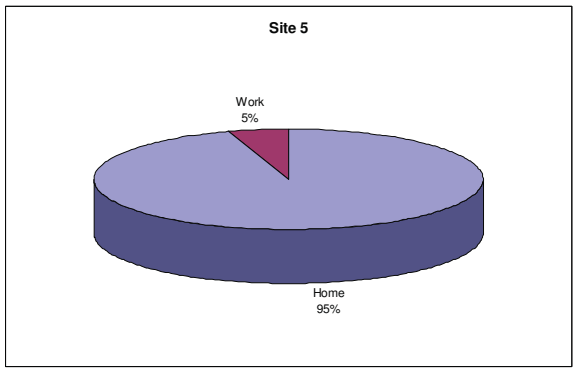
Car Park Survey Origin Purpose by Site

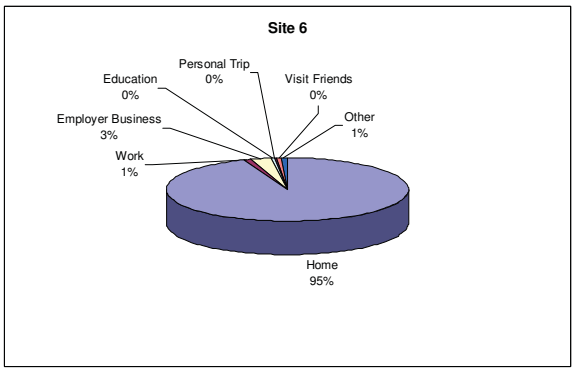


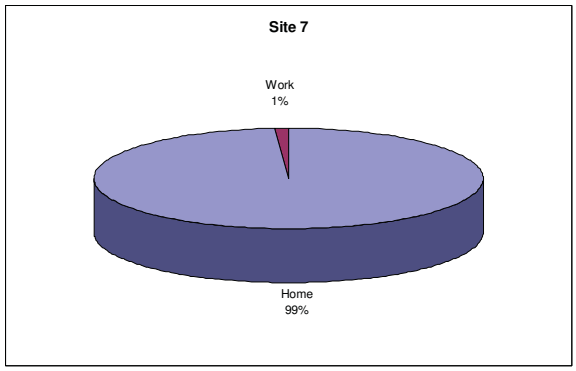


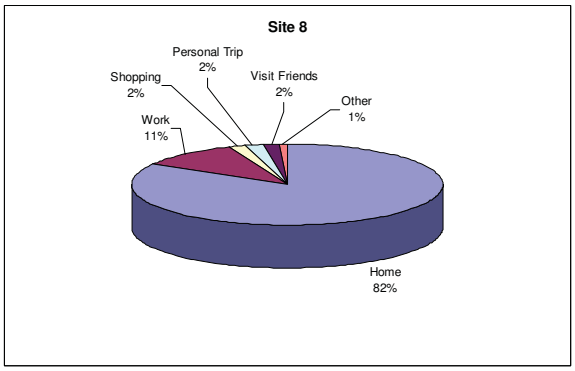




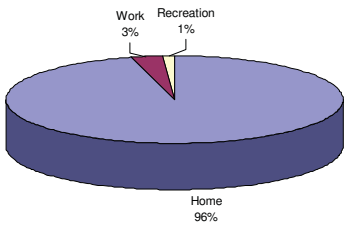




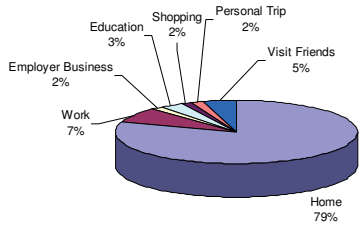




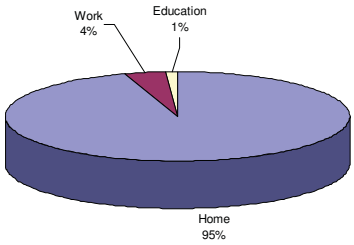
Site 9



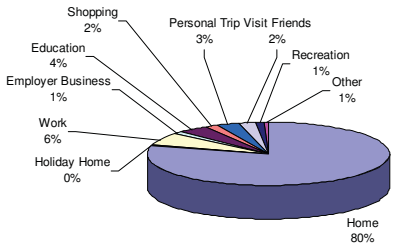
Site 10



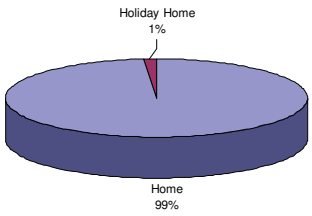
Site 11



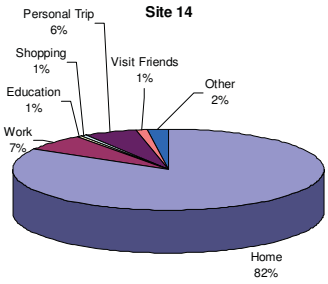
Site 12



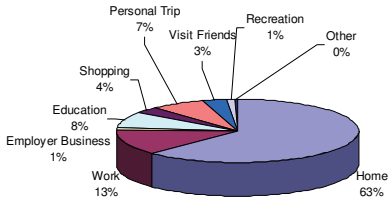
Site 13



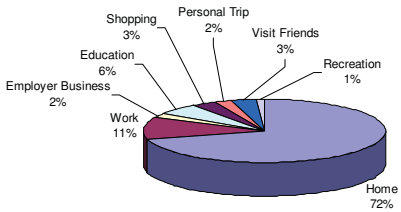
Site 14



Site 15



Site 16



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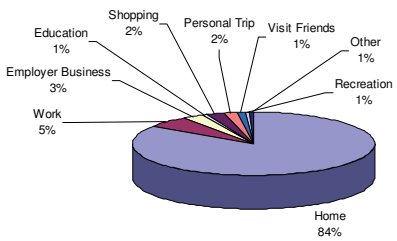

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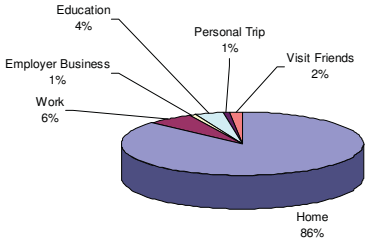
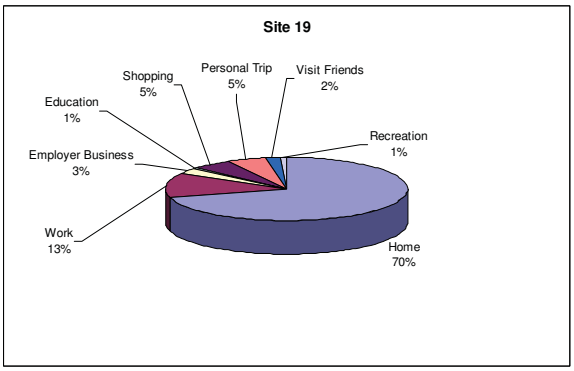
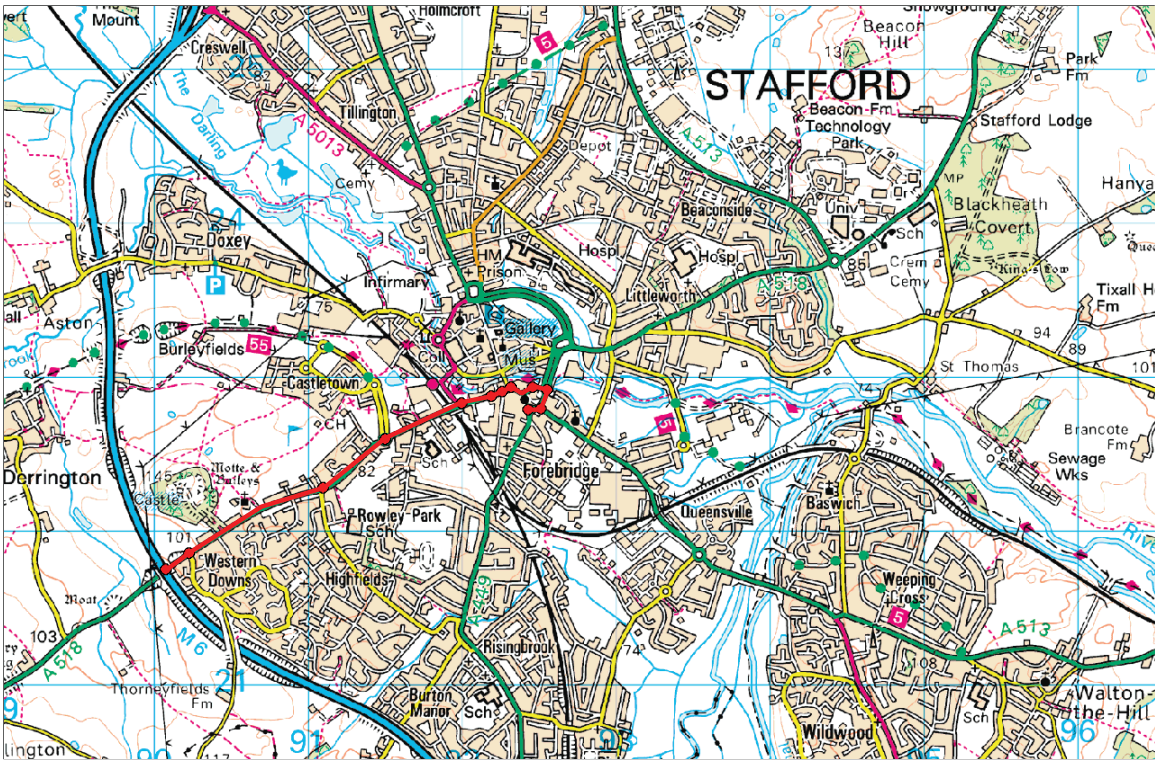


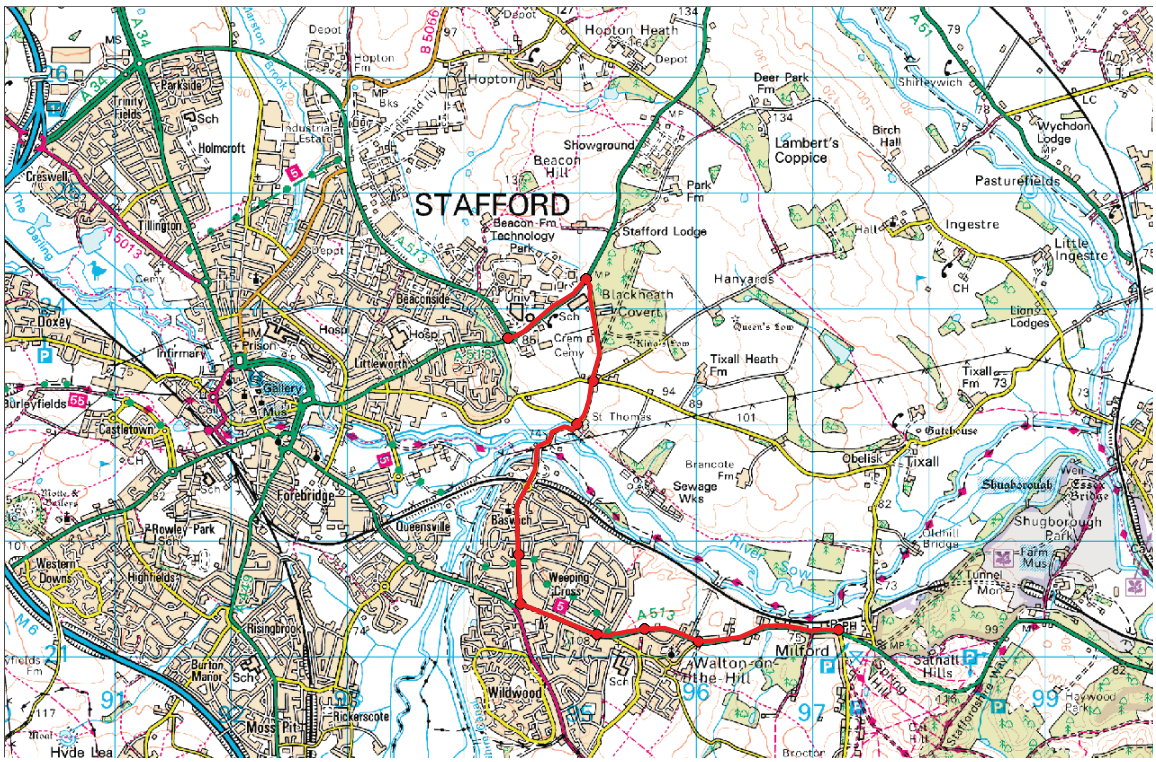

Site 19
Shopping 5%
Personal Trip 5%
Visit Friends 2%
Education 1%
Recreation 1%
Employer Business 3%
Work 13%
Home 70%

Appendix G – Details of Journey Time Survey Routes

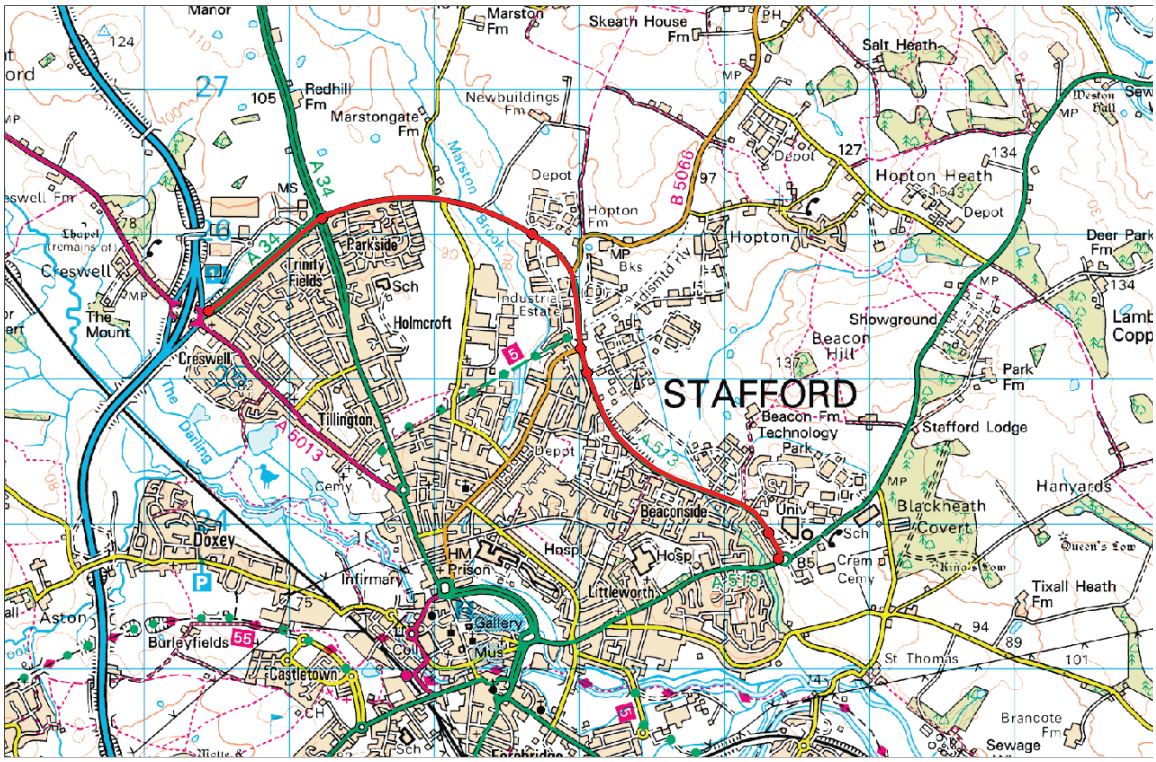
Route 1



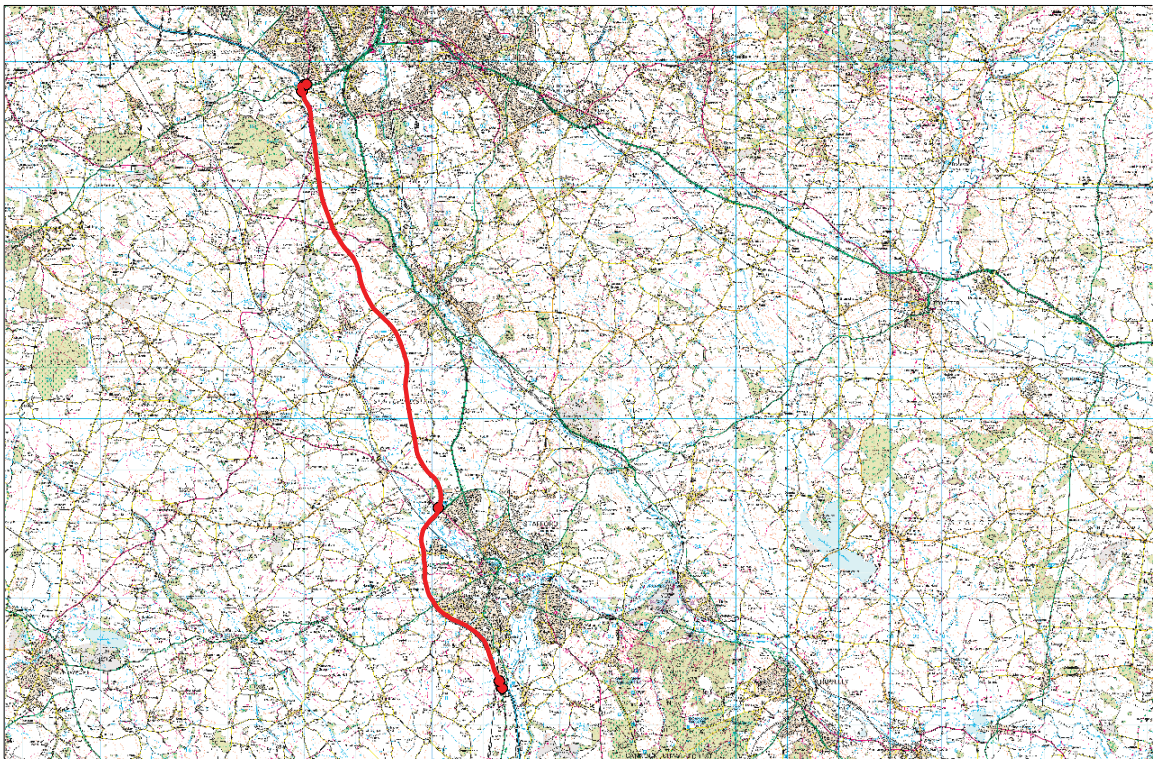
Route 2



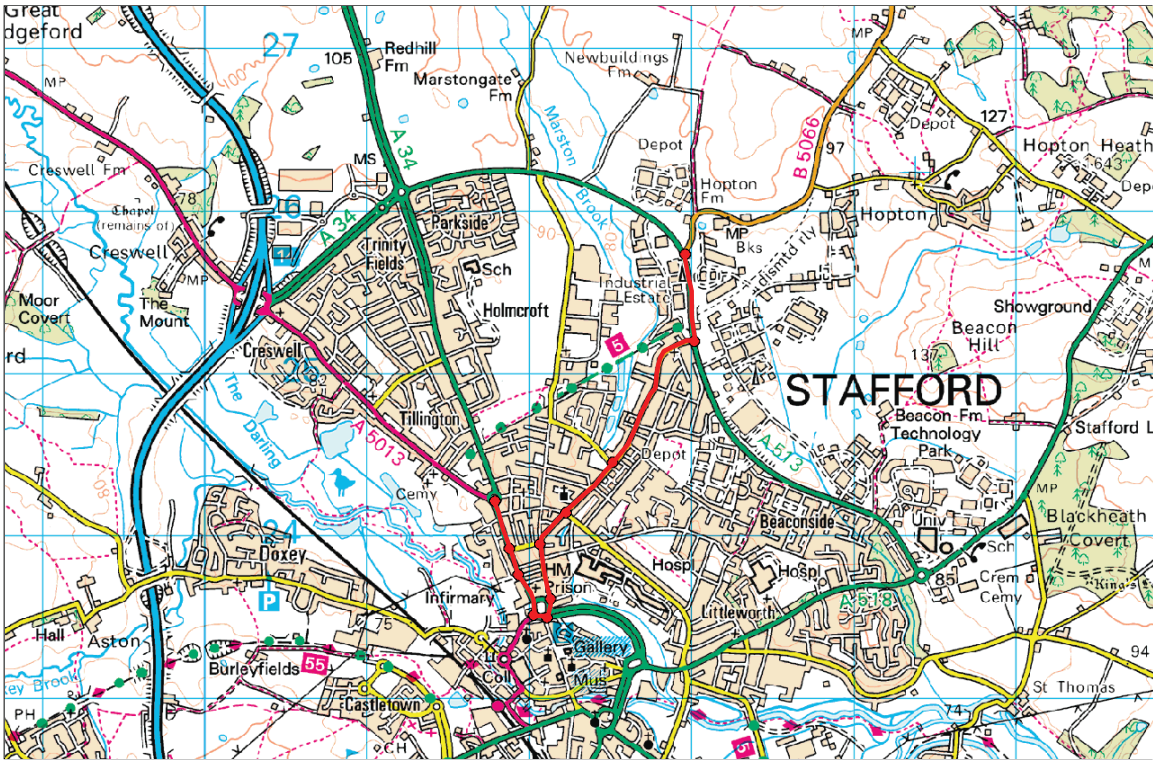
Route 3



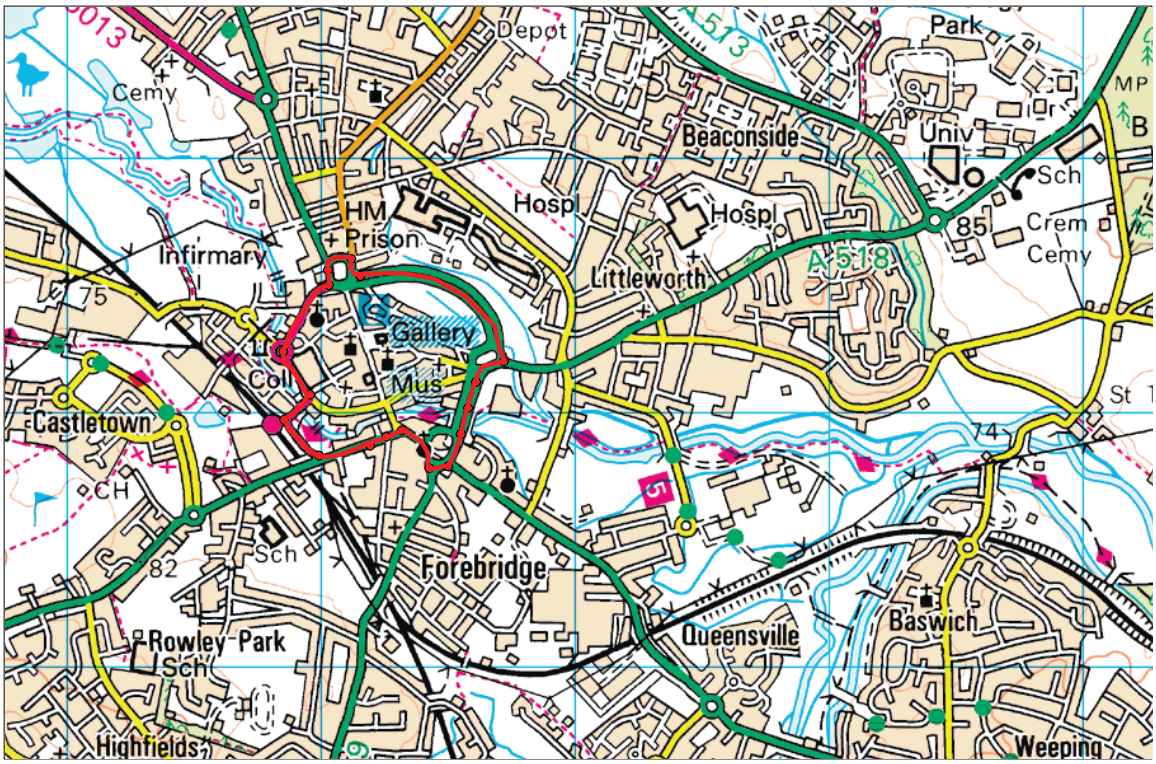
Route 4



Route 5



Route 6



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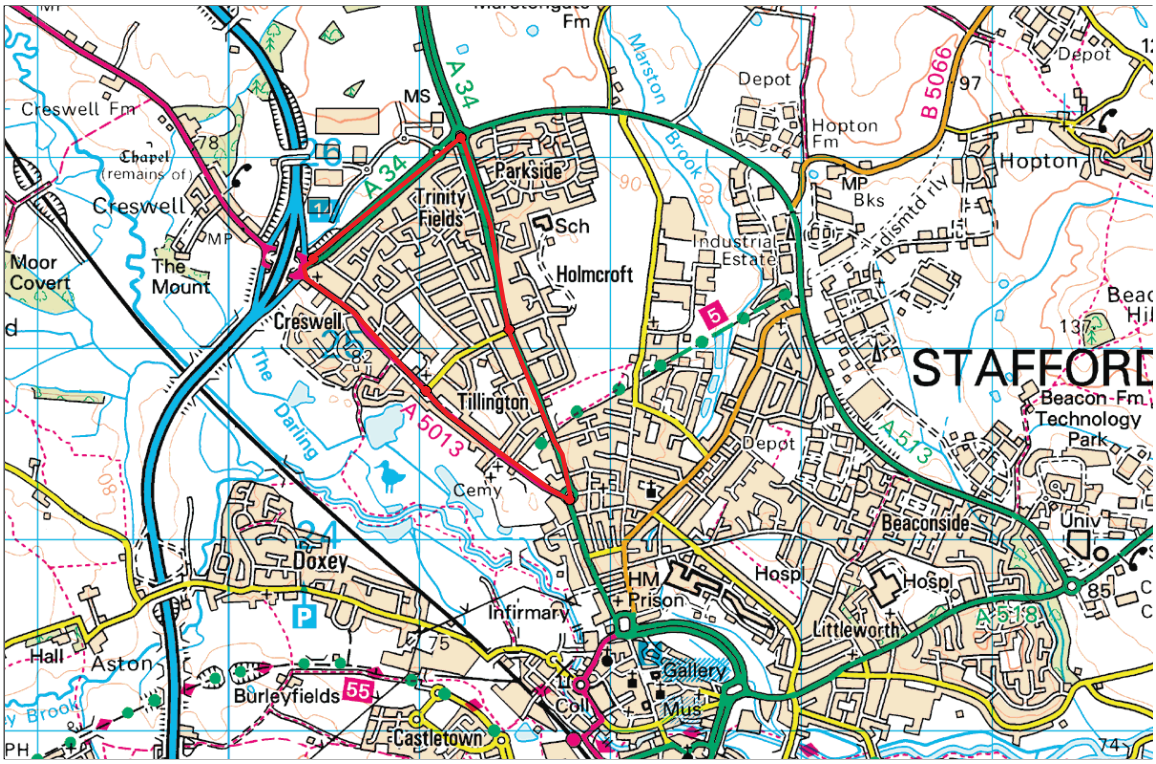
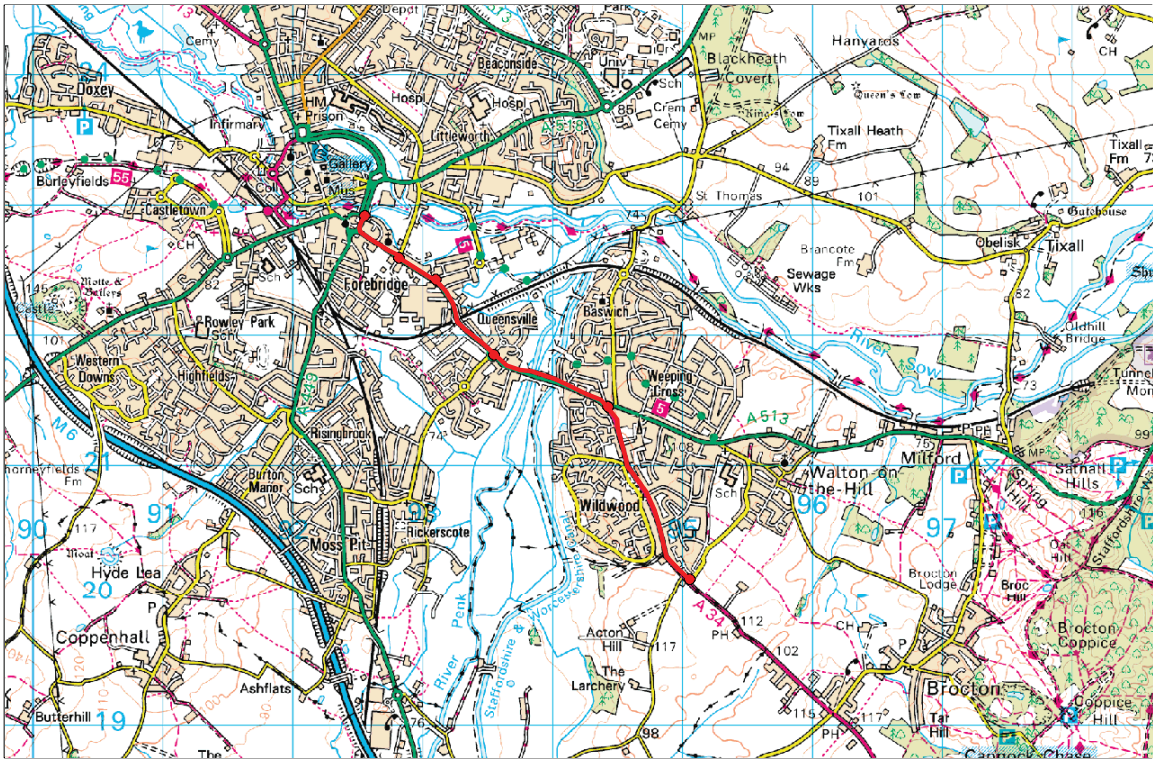
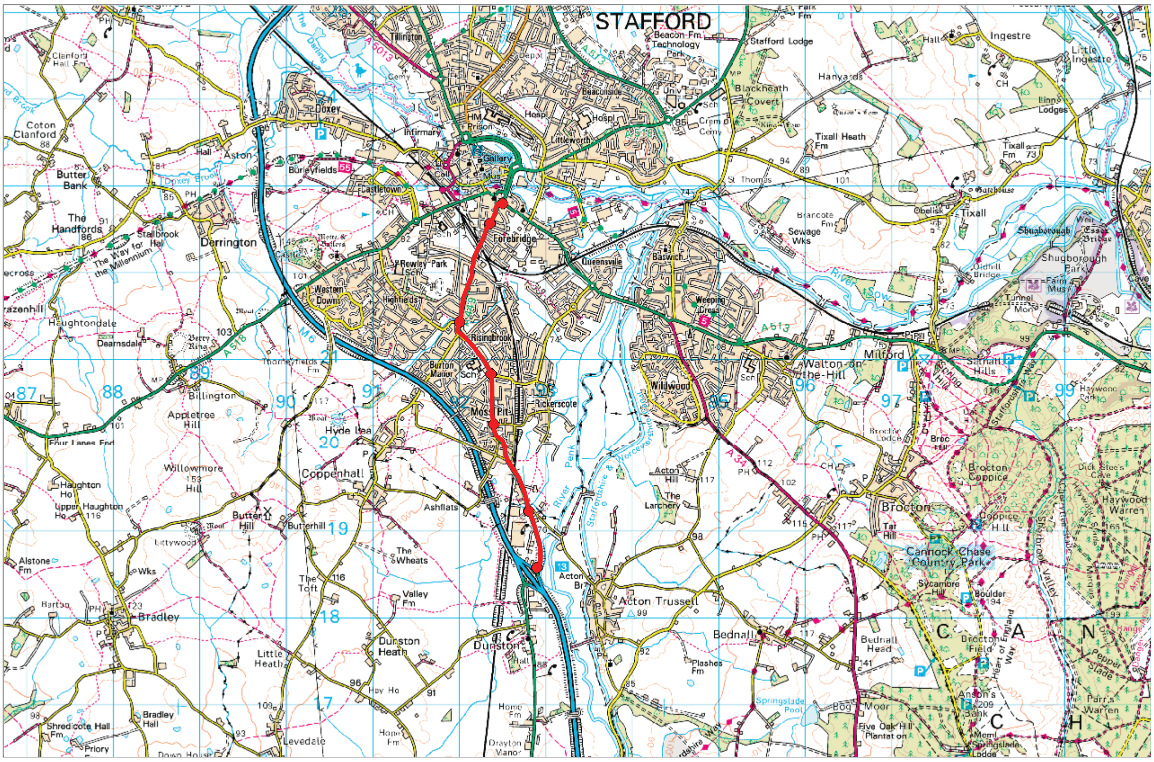


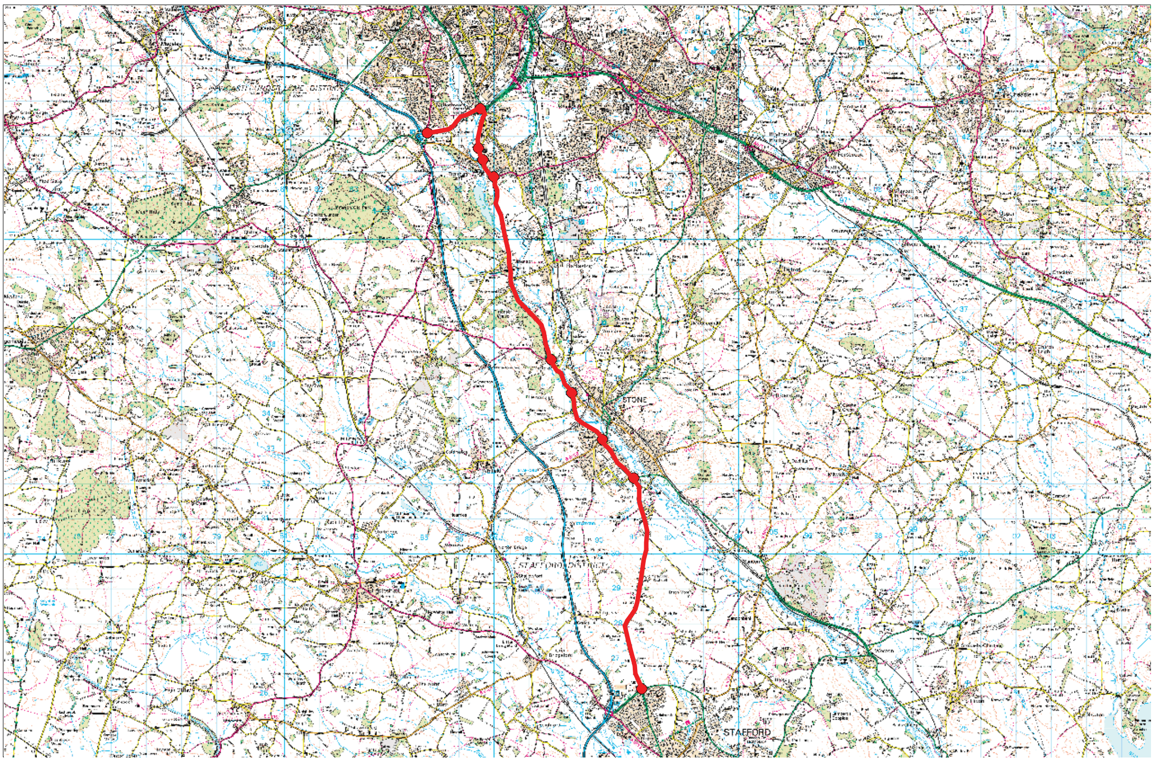
Route 8



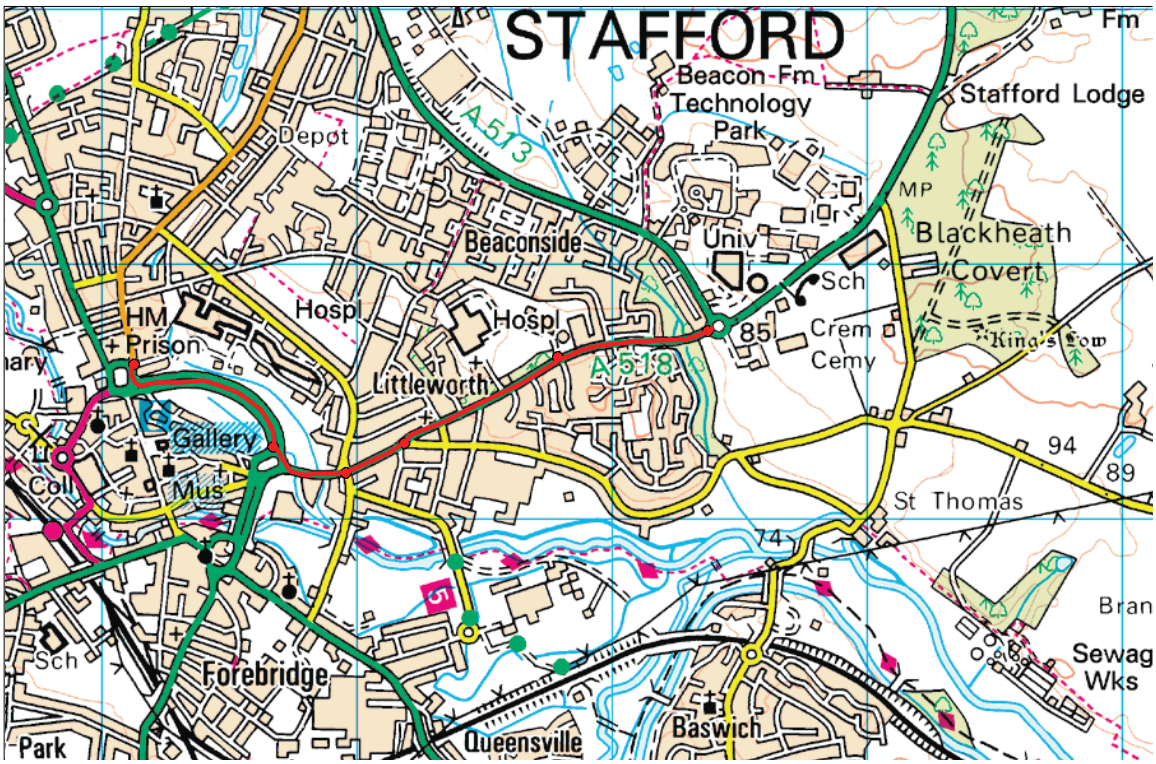
Route 9



Route 10



Route 11


STAFFORD
Beacon Fm
Technology
Park
Stafford Lodge
Fm
Depot
A513
MP
Blackheath
Covert
Beaconside
Univ
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Prison
Hosp
Hospl
85
Crem
Cemy
A518
Littleworth
Gallery
Coll
Mus
94
89
St Thomas
74
Bran
Sewag
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