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**Data Input Table – Do Not Delete**

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Report Title – first line	Pages i and ii	T1		Walsall Cordon 1999
Report Title – second line	Pages i and ii	T2		
Report Title – third line	Pages i and ii	T3		
Report Title or Heading – first line	Left aligned in headers	HL1		Walsall Cordon Report 1999
Report Title or Heading – second line	Left aligned in headers	HL2		
Group Name	Right aligned in headers – first line	HR1		jdt
Client/Associate (where applicable)	Right aligned in headers – second line	HR2		
Project Number	Footers	PRJNR		47995/022
Report Number	Footers	RPTNR		01
Revision Letter	Issue and Revision Record on page ii and footers	REV		A
Date of issue or report	Page i, Issue and Revision Record on page ii and footers	DATE		September 1999
Initials of word processor	Footers	INI		DMK

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Walsall Metropolitan Borough Council  
Civic Centre  
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# **Walsall Cordon 1999**

**September 1999**

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# Walsall Cordon 1999

## Issue and Revision Record

Rev	Date	Originator (Print) (Signature)	Checker (Print) (Signature)	Approver (Print) (Signature)	Description
		D. King	B. Storey	B. Storey	
A	September 1999				First Issue

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## List of Contents

<b>Summary</b>	S-1
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### Chapters and Appendices

1	Introduction	1
2	Methodology	1
3	Background	1
4	Results	2
4.1	Daily and Hourly Variations	6
4.2	Patterns of Travel	8
4.3	Mode of travel	8
4.4	Occupancy Levels	11
5	Appendix 1 Position of Cordon Sites	13
6	Appendix 2 Estimates of Vehicle Type from Passage Count Data	1
7	Appendix 3 Estimates of People from Occupancy data	1

### Tables

Table 1	Number of vehicles crossing the cordon in the Morning Peak Period (07.30 - 09.30).....	2
Table 2	Number of vehicles crossing the cordon in the Morning Off-Peak Period (10.00-12.00).....	2
Table 3	Total Vehicles by Time Period on an Average Weekday.....	2
Table 4	Variations in traffic flow, by time of day 1998 .....	6
Table 5	Net loss / gain and accumulation in vehicles crossing the cordon, by hour .....	6
Table 6	Net loss / gain in vehicles on an average weekday, by site .....	8
Table 7	Summary of Inbound mode of transport data from manual surveys .....	9
Table 8	Estimated Inbound mode of transport figures.....	9
Table 9	Summary of Outbound mode of transport data from manual surveys.....	10
Table 10	Estimated Outbound mode of transport figures.....	11
Table 11	Automatic count sites .....	13
Table 12	Manual Count sites .....	13

### Figures

Figure 1	Inbound Morning Peak Period: Vehicle Volumes by Quarter Hour.....	3
Figure 2	Outbound Evening Peak Period: Vehicle Volumes by Quarter Hour.....	3
Figure 3	Inbound levels of vehicles, by hour .....	4

---

Figure 4	Outbound levels of vehicles, by hour .....	4
Figure 5	Net loss / gain in vehicles crossing the cordon, by hour.....	7
Figure 6	Net accumulation of vehicles, by hour .....	7
Figure 7	Estimated Inbound mode of transport figures.....	10
Figure 8	Estimated Outbound mode of transport figures .....	11
Figure 9	Estimates of persons Inbound Morning Peak Period.....	12
Figure 10	Estimates of persons Outbound Morning Peak Period .....	12
Figure 11	Location of Walsall ATC Cordon Sites.....	14

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## Summary

The following is a summary of the information contained in this report. Estimates of people have only been calculated for the inbound and outbound morning peak and off-peak periods. The estimates are calculated using manual surveys. The extent of these surveys defines the extent of information available. For details on methodology and a breakdown of the time periods, see the main report.

### 0730-0930 inbound

total vehicles	13,627
estimated pedal cycles	73
estimated bus	372
estimated light vehicles	12,212
estimated goods vehicles	971
estimated people (all vehicles)	17,804

### 0730-0930 outbound

total vehicles	
estimated pedal cycles	
estimated bus	
estimated light vehicles	
estimated goods vehicles	
estimated people (all vehicles)	

### 1000-1200 inbound

total vehicles	9,227
estimated pedal cycles	10
estimated bus	405
estimated light vehicles	7,787
estimated goods vehicles	1,025
estimated people (all vehicles)	12,733

### 1000-1200 outbound

total vehicles	8,744
estimated pedal cycles	22
estimated bus	408
estimated light vehicles	7,113
estimated goods vehicles	1,201
estimated people (all vehicles)	11,279

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## 1 Introduction

This report is being undertaken as part of the Local Transport Plan monitoring process. The purpose of the report is to give an indication of the level of vehicular activity in the town centre, to indicate existing and future levels of transport demand and to monitor the effects of transport policy. The surveys and analysis have been undertaken by the **jdt**.

## 2 Methodology

The most effective method of obtaining the necessary data to monitor traffic flows is to monitor traffic crossing a cordon around the town centre. Sites are positioned on all the main roads. Sites on some of the minor roads so as to obtain a close 'closed' cordon then supplement this network. The idea is to capture all vehicles entering the town centre. The location of the sites is shown in Figure 1.

The counters used record the vehicles automatically. In this way, data for a full week is collected, enabling 24 hr average weekday data to be presented.

Four sites are also surveyed manually by Walsall M.B.C. staff. This data is used to estimate the modal split of the automatic data and also to estimate the number of people travelling into the town centre by vehicle.

A complimentary bus cordon survey is undertaken by CENTRO, into which this report feeds.

Results of the 1999 Walsall Cordon Survey are presented on the following pages. Where appropriate, comparisons with 1997 data have been made.

## 3 Background

Collection of the data took place in the week beginning Monday 15<sup>th</sup> March. It is important to avoid school holidays and the Christmas shopping season. In future the intention will be to keep to the same week each year.

The exact position of the automatic counts can be seen in Appendix 1. Again, the intention will be to use the same sites for this monitoring purpose each time the cordon survey is carried out.



## 4 Results

In Table 1 the figures for the number of vehicles crossing the cordon line in the morning peak period are presented. Traditionally, the morning peak period has been considered as being 07.30-09.30. The figures show a decrease in the number of vehicles counted inbound during this time period in 1999 when compared with 1997 but a small increase in the outbound figures.

**Table 1 Number of vehicles crossing the cordon in the Morning Peak Period (07.30 - 09.30)**

	1997	1999
Inbound Total	13,865	13,627
Outbound Total	9,090	9,244

Table 2 shows the number of vehicles crossing the cordon line in the traditional off-peak morning period (10.00-12.00). This time period shows a slight increase inbound and a small decrease outbound when compared with the data collected two years ago.

**Table 2 Number of vehicles crossing the cordon in the Morning Off-Peak Period (10.00-12.00)**

	1997	1999
Inbound Total	9,090	9,227
Outbound Total	8,815	8,744

The figures in Table 3 show that in 1999 around 18.5% of traffic flowing into the town centre on a typical weekday is crossing the cordon line between the hours of 7.30a.m. and 9.30a.m. This corresponds to the figure outbound in the evening peak period (4p.m. to 6p.m.), which is 18.4%. The off-peak time period considered (1000-1200) shows 12.5% of the daily traffic travelling into the town centre. A similar percentage is evident in the outbound direction for this time period. Around 80% of an average day's traffic is crossing the cordon during the main 12hr day. The figures in this table show that, in general, the numbers of vehicles counted were higher in 1999 than in 1997.

Whilst the net figure over 24 hours might be expected to be zero, the figures are an average of the flow characteristics over five weekdays and the net figure is within the expected level of accuracy of automatic counts.

**Table 3 Total Vehicles by Time Period on an Average Weekday**

	07.30 - 09.30	10.00 - 12.00	16.00 - 18.00	07.00 – 1900 (12 hour)	00.00 – 24.00 (24 hour)
<b>1997</b>					
Inbound	13,865	9,090	9,863	59,938	72,918
% of 24 hr	19.0%	12.5%	13.5%	82.2%	100%
Outbound	9,090	8,815	13,610	60,054	73,706
% of 24 hr	12.3%	12.0%	18.5%	81.5%	100%
<b>NET</b>	4,775	275	-3,747	-116	-788
<b>1999</b>					
Inbound	13,627	9,227	9,940	60,363	73,819
% of 24hr	18.5%	12.5%	13.5%	81.8%	100%
Outbound	9,244	8,744	13,649	60,124	74,137
% of 24hr	12.5%	11.8%	18.4%	81.1%	100%
<b>NET</b>	4,383	483	-3,709	116	-318

**Figure 1 Inbound Morning Peak Period: Vehicle Volumes by Quarter Hour**

ACTUAL FIGURES FROM MANUAL COUNTS - TOTAL OF COUNTS 2050 and 491

**INBOUND**

Time Start	TOTAL PEDL VEH	MOT CYC	CARS & LTVAN	GOODS <3.0T	GOODS >3.0T	BUS & COACH	Light	Heavy	Actual autos	*****estimated figures*****										
										%cyc	%car	%bus	%light	%heavy	cycles	cars	bus	light	heavy	
7.00	367	1	3	327	8	22	6	330	30	756	0.0027	0.8910	0.0163	0.8992	0.0817	2	674	12	680	62
7.15	440	4	7	382	14	18	15	389	32	998	0.0091	0.8682	0.0341	0.8841	0.0727	9	866	34	882	73
7.30	523	4	5	461	17	24	12	466	41	1307	0.0076	0.8815	0.0229	0.8910	0.0784	10	1152	30	1165	102
7.45	590	5	2	546	5	23	9	548	28	1613	0.0085	0.9254	0.0153	0.9288	0.0475	14	1493	25	1498	77
8.00	496	6	2	445	16	15	12	447	31	1639	0.0121	0.8972	0.0242	0.9012	0.0625	20	1470	40	1477	102
8.15	594	2	5	533	18	21	15	538	39	1839	0.0034	0.8973	0.0253	0.9057	0.0657	6	1650	46	1666	121
8.30	571	2	2	525	10	19	13	527	29	2025	0.0035	0.9194	0.0228	0.9229	0.0508	7	1862	46	1869	103
8.45	553	2	1	497	12	26	15	498	38	2004	0.0036	0.8987	0.0271	0.9005	0.0687	7	1801	54	1805	138
9.00	510	1	4	430	13	43	19	434	56	1681	0.0020	0.8431	0.0373	0.8510	0.1098	3	1417	63	1430	185
9.15	469	2	1	401	10	34	21	402	44	1519	0.0043	0.8550	0.0448	0.8571	0.0938	6	1299	68	1302	143
9.30	446	1	0	383	18	28	16	383	46	1405	0.0022	0.8587	0.0359	0.8587	0.1031	3	1207	50	1207	145
9.45	476	0	2	406	16	30	22	408	46	1315	0.0000	0.8529	0.0462	0.8571	0.0966	0	1122	61	1127	127
10.00	486	1	2	406	14	36	27	408	50	18101						88	16013	529	16107	1376
10.15	460	2	1	388	20	32	17	389	52							74	12144		12212	970
10.30	443	0	1	373	19	32	18	374	51											
10.45	410	0	1	334	23	30	22	335	53											
11.00	425	1	1	357	14	31	21	358	45											
11.15	409	0	1	339	27	27	15	340	54											
11.30	460	0	0	392	21	26	21	392	47											
11.45	437	0	0	383	11	29	14	383	40											
0730-0930	4306	24	22	3838	101	205	116	3860	306	13627	0.0056	0.8913	0.0269	0.8964	0.0711	76	12146	367	12216	968
10-12	3530	4	7	2972	149	243	155	2979	392	9227	0.00113	0.84193	0.0439	0.844	0.11105	10	7768	405	7787	1025
12.00	380	1	0	319	11	30	19	319	41											
12.15	396	0	1	326	20	30	19	327	50											

**OUTBOUND**

Time Start	TOTAL PEDL VEH	MOT CYC	CARS & LTVAN	GOODS <3.0T	GOODS >3.0T	BUS & COACH	Light	Heavy	Actual autos	*****Estimated figures*****										
										%cyc	%bus	%light	%heavy	cycles	bus	light	heavy			
7.00	217	1	1	175	10	22	8	176	32	623	0.0046	0.0369	0.8111	0.1475	3	23	505	92		
7.15	310	4	6	253	11	25	11	259	36	747	0.0129	0.0355	0.8355	0.1161	10	27	624	87		
7.30	365	1	2	312	13	25	12	314	38	993	0.0027	0.0329	0.8603	0.1041	3	33	854	103		
7.45	371	1	0	317	13	24	16	317	37	1141	0.0027	0.0431	0.8544	0.0997	3	49	975	114		
8.00	383	1	2	329	11	30	10	331	41	1216	0.0026	0.0261	0.8642	0.1070	3	32	1051	130		
8.15	359	1	1	303	7	33	14	304	40	1242	0.0028	0.0390	0.8468	0.1114	3	48	1052	138		
8.30	336	0	0	274	17	26	19	274	43	1319	0.0000	0.0565	0.8155	0.1280	0	75	1076	169		
8.45	311	3	1	255	18	26	8	256	44	1285	0.0096	0.0257	0.8232	0.1415	12	33	1058	182		
9.00	315	1	0	260	9	29	16	260	38	1087	0.0032	0.0508	0.8254	0.1206	3	55	897	131		
9.15	302	0	2	236	23	25	16	238	48	961	0.0000	0.0530	0.7881	0.1589	0	51	757	153		
9.30	318	2	1	248	15	32	20	249	47	961	0.0063	0.0629	0.7830	0.1478	6	60	752	142		
9.45	334	1	1	260	17	37	18	261	54	1006	0.0030	0.0539	0.7814	0.1617	3	54	786	163		
10.00	300	0	1	239	17	28	15	240	45	12581					50	540	10388	1604		
10.15	349	0	1	283	17	27	21	284	44											
10.30	339	1	2	280	21	21	14	282	42											
10.45	345	1	1	268	21	40	14	269	61											
11.00	368	0	1	294	12	41	20	295	53											
11.15	389	3	2	325	10	30	19	327	40											
11.30	368	1	1	304	16	33	13	305	49											
11.45	368	1	0	297	25	29	16	297	54											
10-12	2826	7	9	2290	139	249	132	2299	388	8744	0.00248	0.0467	0.814	0.1373	22	408	7113	1201		
12.00	394	1	1	321	22	30	19	322	52											
12.15	421	0	1	339	23	42	16	340	65											

Figure 1 and Figure 2 show the two main peak periods by quarter hour. The morning figures are given from 7a.m. until 10a.m. and the evening from 4p.m. to 7p.m. These time periods are wider than those presented in previous tables. This allows a check on the traditional time periods as peak spreading may be seen on these graphs. Figure 1 shows fluctuating changes in traffic between 1997 and 1999. Similarly, in the outbound direction, (Figure 2) some time periods show increases compared with 1997 while others show decreases.

**Figure 2 Outbound Evening Peak Period: Vehicle Volumes by Quarter Hour**

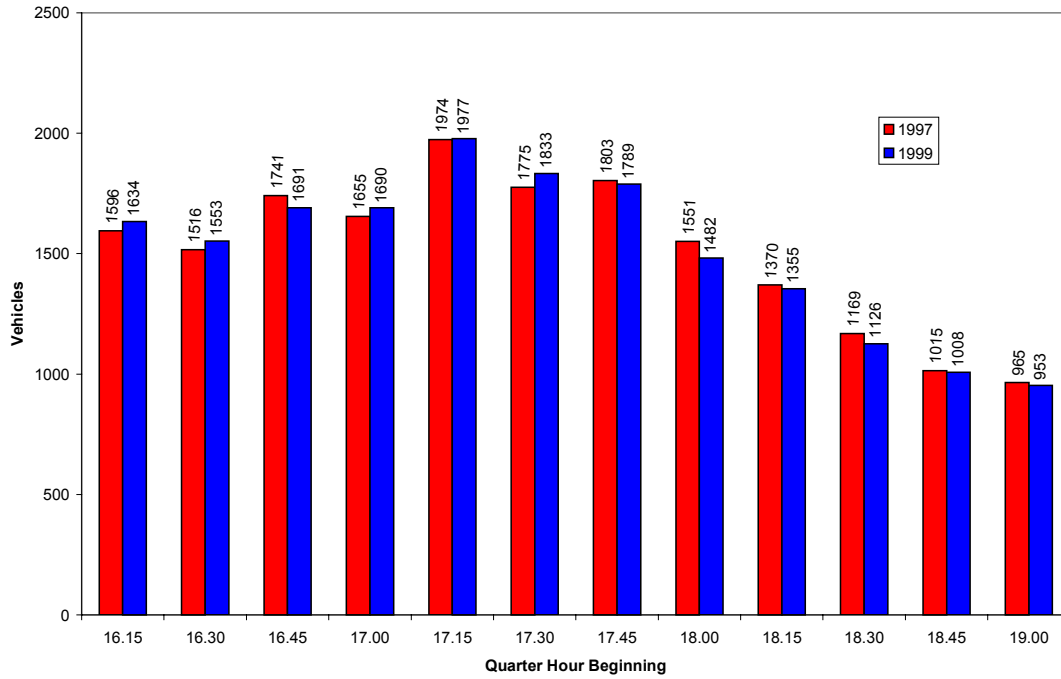


Figure 3 Inbound levels of vehicles, by hour

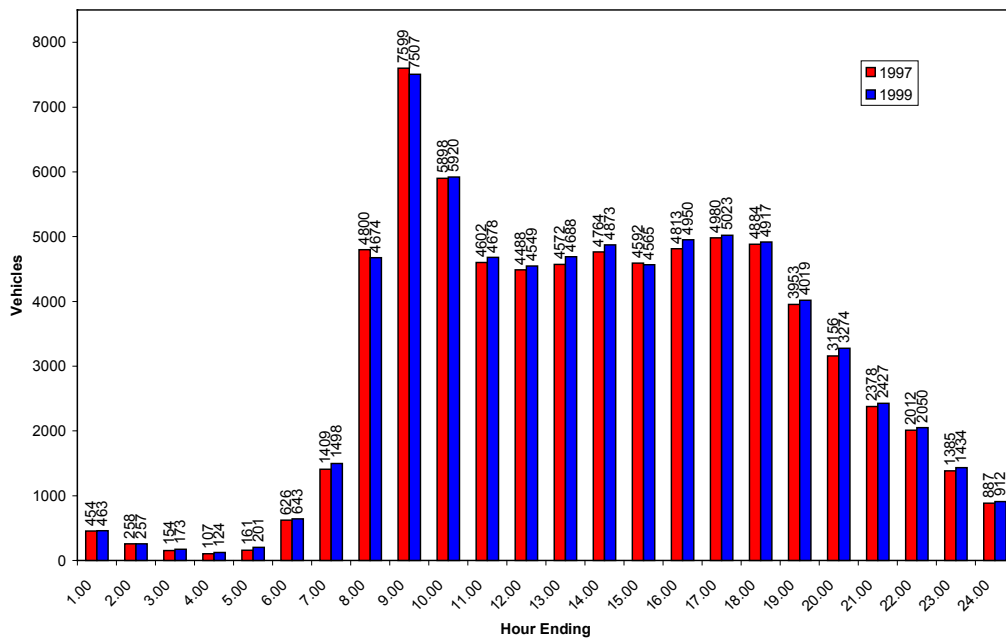
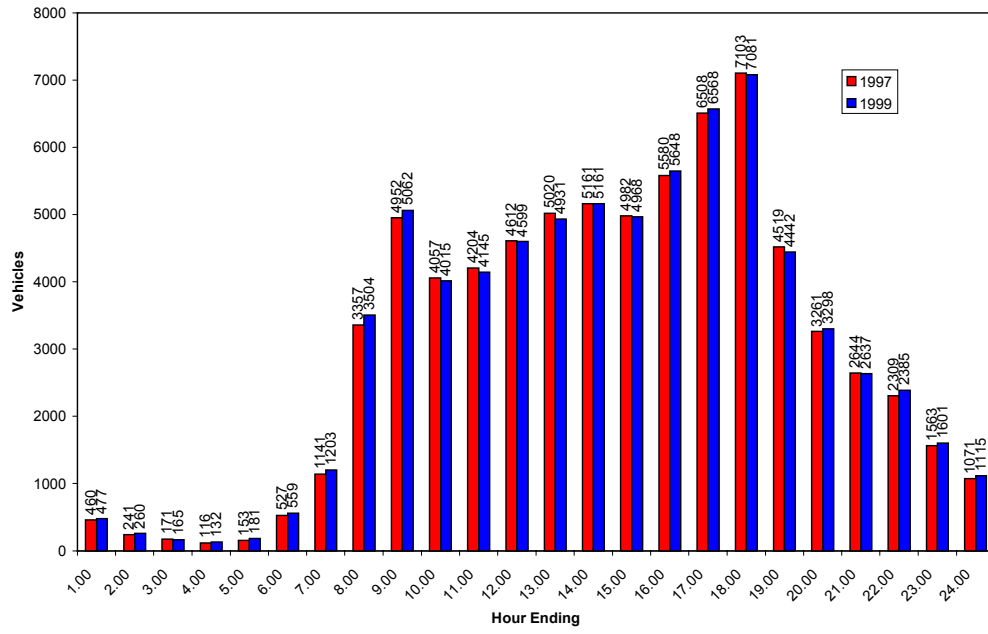


Figure 4 Outbound levels of vehicles, by hour



#### 4.1 Daily and Hourly Variations

The figures in Table 4 give the proportions that each day contributes to an average weekday (Mon-Fri) for each of the traditional time periods. These figures can be used to factor a count taken on any particular day to an average weekday. The figures also show which days have the heaviest flows during each time period.

**Table 4 Variations in traffic flow, by time of day 1998**

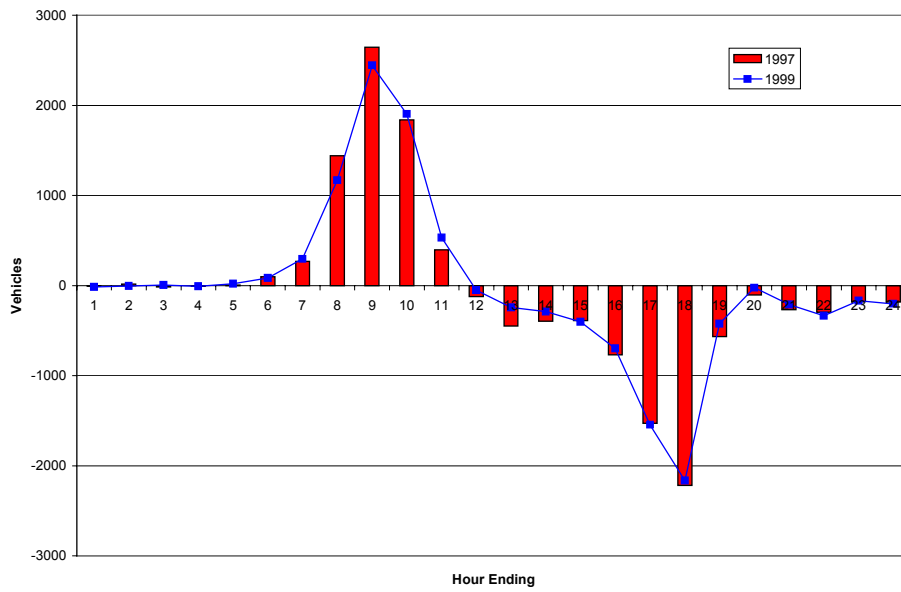
	Mon.	Tues.	Wed.	Thur.	Fri.	Sat.	Sun.
<b>Inbound</b>							
07.30 - 09.30	1.004	1.013	0.990	0.982	1.011	0.498	0.120
10.00 - 12.00	1.013	1.026	0.961	0.950	1.049	1.179	0.670
16.00 - 18.00	0.998	1.008	0.963	1.015	1.012	0.677	0.506
07.00 - 19.00	0.995	1.014	0.969	0.985	1.037	0.848	0.490
00.00 - 24.00	0.978	1.013	0.967	0.991	1.052	0.878	0.550
<b>Outbound</b>							
07.30 - 09.30	0.993	0.999	0.987	1.007	1.016	0.464	0.159
10.00 - 12.00	1.006	1.001	0.979	0.957	1.058	1.099	0.698
16.00 - 18.00	1.007	1.013	0.990	0.984	1.007	0.714	0.376
07.00 - 19.00	0.993	1.002	0.977	0.980	1.048	0.850	0.504
00.00 - 24.00	0.976	1.009	0.971	0.992	1.053	0.873	0.561

Figure 5 and Figure 6 show the gain in vehicles to the cordon by hour and the total accumulation of vehicles to the cordon. The figures used in these graphs are given in Table 5.

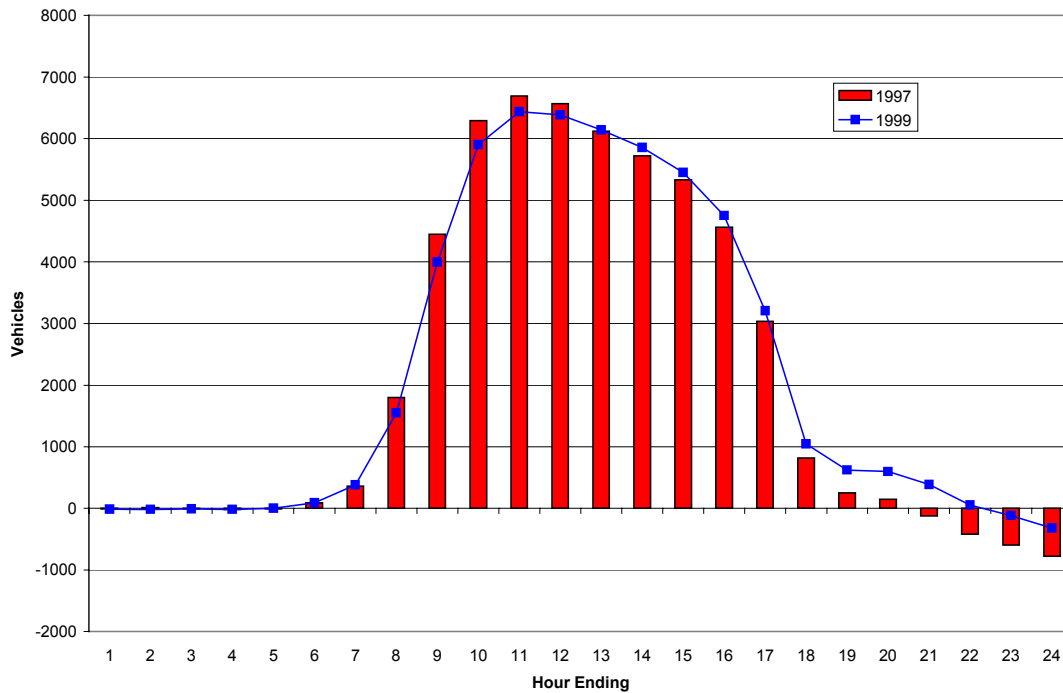
**Table 5 Net loss / gain and accumulation in vehicles crossing the cordon, by hour**

Hour ending	Inbound	Outbound	Net	Cum
1 00	463	477	-14	-14
2 00	257	260	-3	-17
3 00	173	165	8	-9
4 00	124	132	-8	-17
5 00	201	181	20	3
6 00	643	559	84	87
7 00	1498	1203	295	382
8 00	4674	3504	1170	1552
9 00	7507	5062	2445	3997
10 00	5920	4015	1905	5902
11 00	4678	4145	533	6435
12 00	4549	4599	-50	6385
13 00	4688	4931	-243	6142
14 00	4873	5161	-288	5854
15 00	4565	4968	-403	5451
16 00	4950	5648	-698	4753
17 00	5023	6568	-1545	3208
18 00	4917	7081	-2164	1044
19 00	4019	4442	-423	621
20 00	3274	3298	-24	597
21 00	2427	2637	-210	387
22 00	2050	2385	-335	52
23 00	1434	1601	-167	-115
24 00	912	1115	-203	-318

**Figure 5 Net loss / gain in vehicles crossing the cordon, by hour**



**Figure 6 Net accumulation of vehicles, by hour**



## 4.2 Patterns of Travel

The figures in Table 6 show the number of vehicles travelling into and out of the town centre by each individual site on an average weekday. By examining these figures, some patterns of travel may be evident. For example, people may prefer to use a particular road inbound in the morning, but choose a different route for their outward evening journey.

**Table 6 Net loss / gain in vehicles on an average weekday, by site**

Site	Location	Inbound 1999	Outbound 1999	Net loss / gain 1999
WL01	Lichfield Street	3,241	4,141	-900
WL02	Lower Rushall Street	11,038	12,813	-1,775
WL03	Lincoln Road	513	298	215
WL04	The Crescent	1,425	1,872	-447
WL05	Sutton Road	3,322	4,762	-1,440
WL06	Birmingham Road	7,353	7,285	68
WL07	Delves Road	2,042	2,024	18
WL08	West Bromwich St.	688		688
WL09	West Street	4,705	6,109	-1,404
WL10	Bescot Crescent	3,778	4,420	-642
WL12	Wednesbury Road	9,239	10,077	-838
WL13	Rollingmill Street	4,134	5,771	-1,637
WL14	Bridgeman Street	7,034	5,280	1,754
WL15	Wolverhampton St.	6,262	2,673	3,589
WL16	Green Lane	2,964	1,638	1,326
WL17	Stafford Street	4,458	1,983	2,475
WL18	Hatherton Street	1,627	2,988	-1,361

## 4.3 Mode of travel

The two manual surveys give us an indication of mode of travel data.

Table 7 summarises the data recorded at the two manual sites. For the purpose of this table, 'light vehicles' includes motorcycles, cars, taxis and light vans less than 1.5T. The Heavy goods category includes all vehicles over 1.5T. These are the usual categories for light and heavy vehicles.

In Table 7 the percentage each vehicle category contributes to the total vehicles in that ¼ hour is given in brackets. In Table 8 these percentages are multiplied by the number of vehicles counted by the automatic counters, giving an estimate of the number of vehicles of that type crossing the cordon line in that ¼ hour.

**Table 7 Summary of Inbound mode of transport data from manual surveys**

TIME STARTING	TOTAL VEH	PEDAL CYC	BUS & COACH	Light Vehs	Heavy Vehs	% pedal cycle	% bus	% light	% goods
07.00	367	1	6	330	30	0.3	1.6	89.9	8.2
07.15	440	4	15	389	32	0.9	3.4	88.4	7.3
07.30	523	4	12	466	41	0.7	2.3	89.1	7.8
07.45	590	5	9	548	28	0.8	1.5	92.9	4.7
08.00	496	6	12	447	31	1.2	2.4	90.1	6.2
08.15	594	2	15	538	39	0.3	2.5	90.6	6.6
08.30	571	2	13	527	29	0.3	2.3	92.3	5.1
08.45	553	2	15	498	38	0.4	2.7	90.0	6.9
09.00	510	1	19	434	56	0.2	3.7	85.1	11.0
09.15	469	2	21	402	44	0.4	4.5	85.7	9.4
09.30	446	1	16	383	46	0.2	3.6	85.9	10.3
09.45	476	0	22	408	46	0.0	4.6	85.7	9.7
Total	6035	30	175	5370	460	0.5	2.9	89.0	7.6

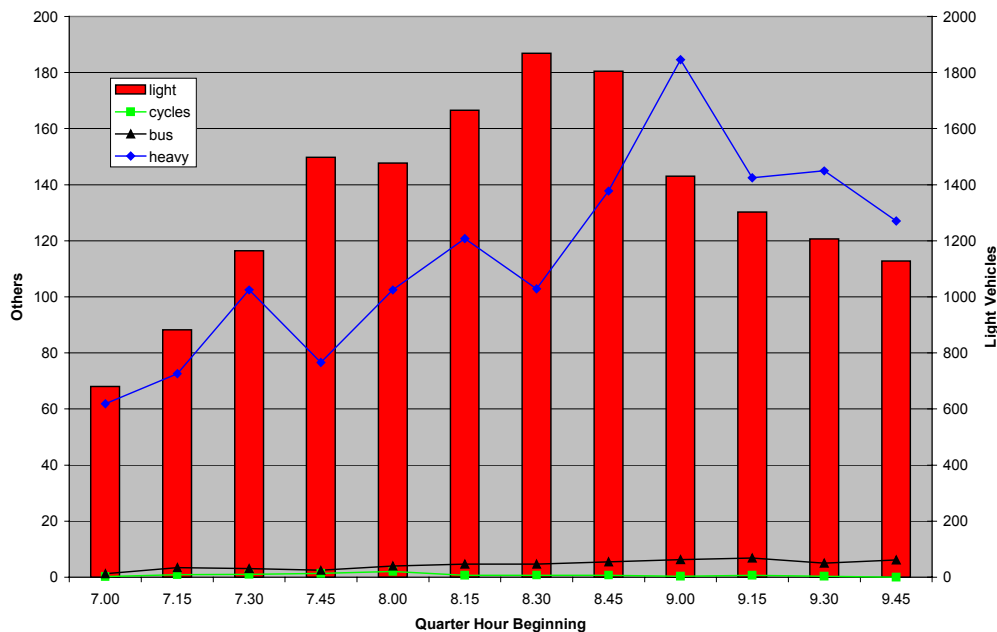
**Table 8 Estimated Inbound mode of transport figures**

TIME STARTING	number of automatic vehs	estimated ped cyc	estimated bus	estimated light	estimated heavy
07.00	756	2	12	680	62
07.15	998	9	34	882	73
07.30	1307	10	30	1165	102
07.45	1613	14	25	1498	77
08.00	1639	20	40	1477	102
08.15	1839	6	46	1666	121
08.30	2025	7	46	1869	103
08.45	2004	7	54	1805	138
09.00	1681	3	63	1430	185
09.15	1519	6	68	1302	143
09.30	1405	3	50	1207	145
09.45	1315	0	61	1127	127
Total	18101	88	529	16107	1376

The figures in Table 7 and Table 8 are represented in Figure 7. As the numbers for Light Vehicles are so much higher than the other categories, the light vehicles are read from the right hand axis and all the other categories form the left-hand axis.



**Figure 7 Estimated Inbound mode of transport figures**



The summary for outbound modes from the manual data can be found in Table 9 with the estimated outbound in Table 10 and the graph representing these figures in Figure 8. The figures collected in the manual surveys can be found in Appendix 2.

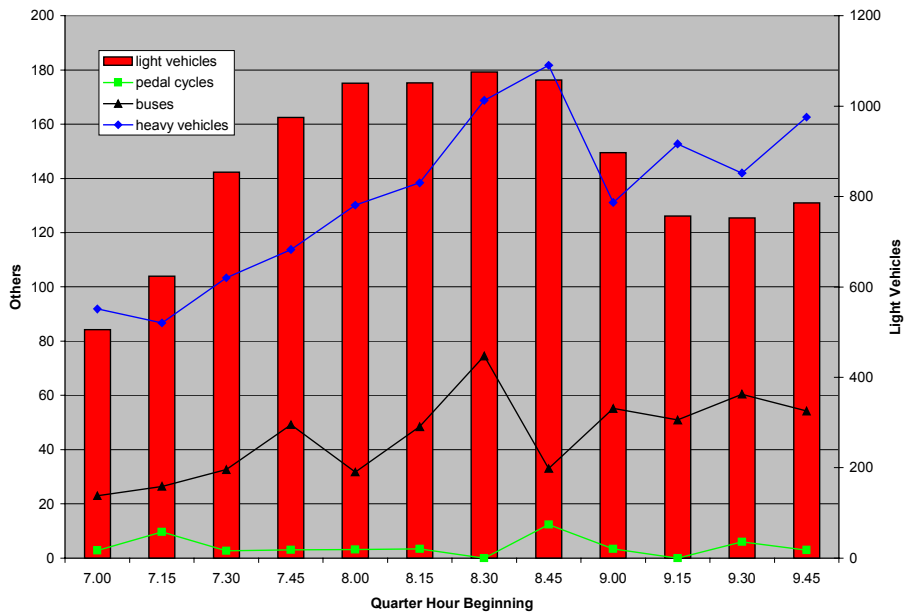
**Table 9 Summary of Outbound mode of transport data from manual surveys**

TIME STARTING	TOTAL VEH	PEDAL CYC	BUS & COACH	Light Vehs	Heavy Vehs	% pedal cycle	% bus	% light	% goods
07.00	217	1	8	176	32	0.5	3.7	81.1	14.7
07.15	310	4	11	259	36	1.3	3.5	83.5	11.6
07.30	365	1	12	314	38	0.3	3.3	86.0	10.4
07.45	371	1	16	317	37	0.3	4.3	85.4	10.0
08.00	383	1	10	331	41	0.3	2.6	86.4	10.7
08.15	359	1	14	304	40	0.3	3.9	84.7	11.1
08.30	336	0	19	274	43	0.0	5.6	81.5	12.8
08.45	311	3	8	256	44	1.0	2.6	82.3	14.1
09.00	315	1	16	260	38	0.3	5.1	82.5	12.1
09.15	302	0	16	238	48	0.0	5.3	78.8	15.9
09.30	318	2	20	249	47	0.6	6.3	78.3	14.8
09.45	334	1	18	261	54	0.3	5.4	78.1	16.2
Total	3921	16	168	3239	498	0.4	4.3	82.6	12.7

**Table 10 Estimated Outbound mode of transport figures**

TIME STARTING	No. auto vehs.	estimated ped cyc	estimated bus	estimated light	estimated goods
07.00	623	3	23	505	92
07.15	747	10	27	624	87
07.30	993	3	33	854	103
07.45	1141	3	49	975	114
08.00	1216	3	32	1051	130
08.15	1242	3	48	1052	138
08.30	1319	0	75	1076	169
08.45	1285	12	33	1058	182
09.00	1087	3	55	897	131
09.15	961	0	51	757	153
09.30	961	6	60	752	142
09.45	1006	3	54	786	163
Total	12581	50	540	10388	1604

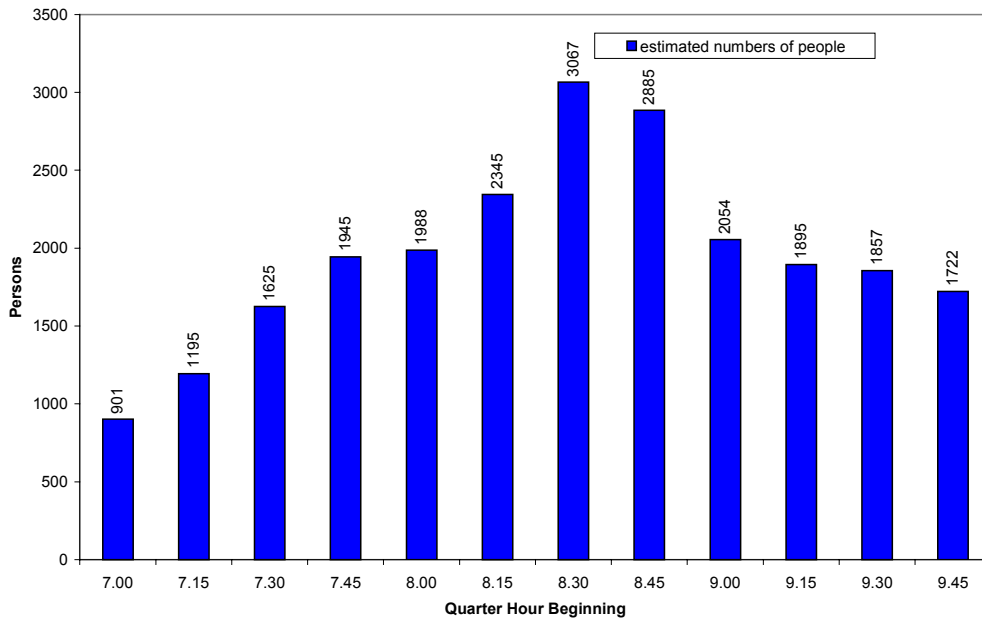
**Figure 8 Estimated Outbound mode of transport figures**



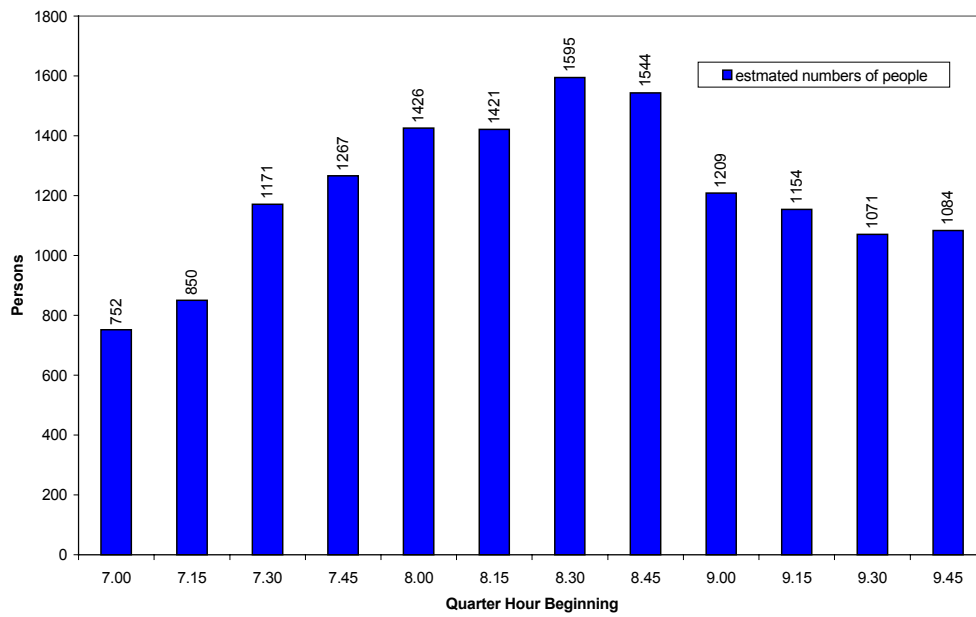
#### 4.4 Occupancy Levels

Figures 9 and 10 show the estimated numbers of persons crossing the cordon calculated from the occupancy counts at the two manual sites and the number of vehicles counted automatically per time period

**Figure 9** Estimates of persons Inbound Morning Peak Period



**Figure 10** Estimates of persons Outbound Morning Peak Period



## 5 Appendix 1 Position of Cordon Sites

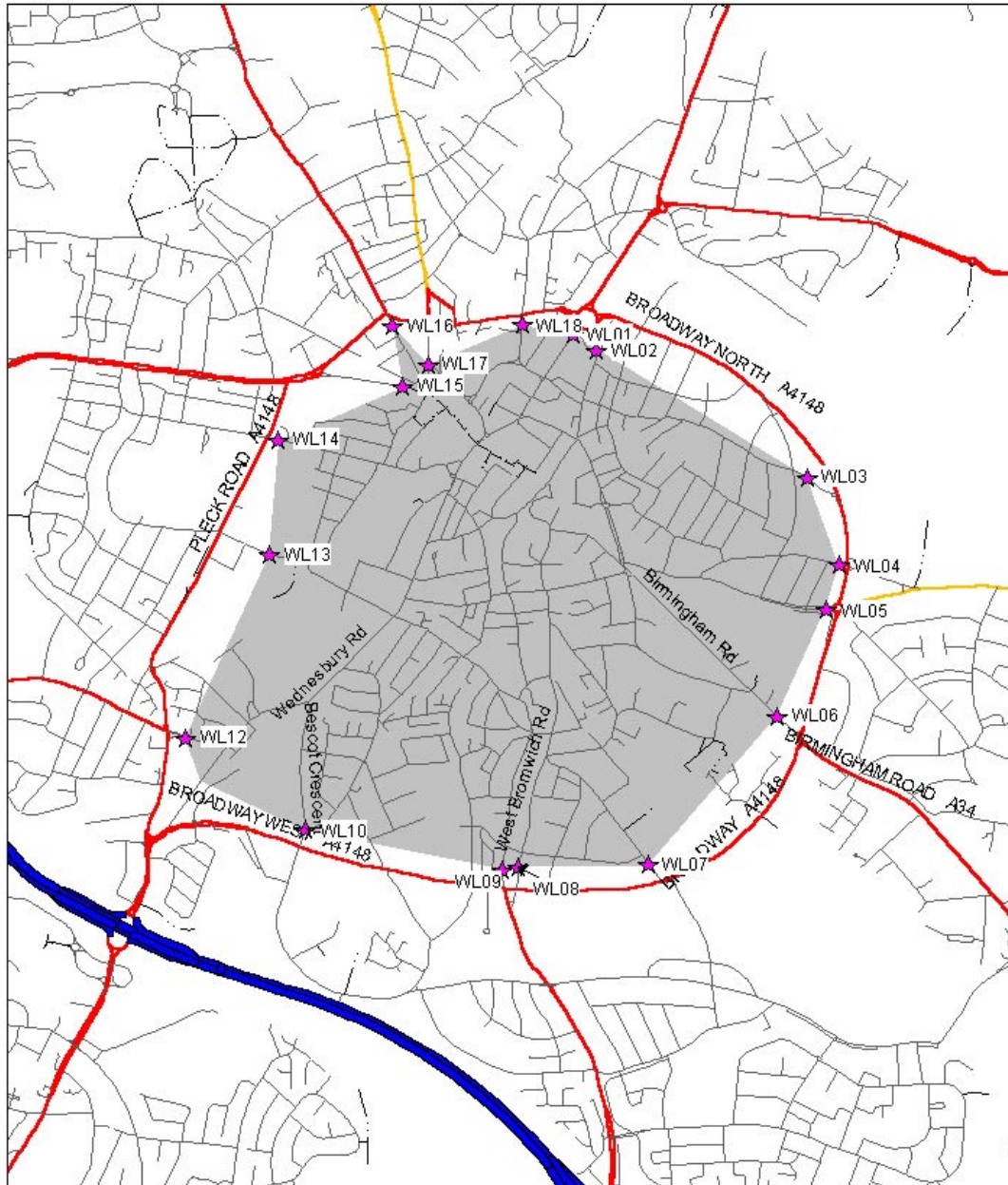
**Table 11 Automatic count sites**

Site	Location	Exact Position
WL01	Lichfield Street	Between Littleton Street and Hatherton St.
WL02	Lower Rushall Street	Between Broadway and Walhouse Road
WL03	Lincoln Road	Between Broadway and Princes Avenue
WL04	The Crescent	Between Broadway and Boscobel Road
WL05	Sutton Road	Between Broadway and Boscobel Road
WL06	Birmingham Road	Between Broadway and Jesson Close
WL07	Delves Road	Between Broadway and Tame Street East
WL08	West Bromwich Road	Between Broadway and Tame Street East
WL09	Weston Street	Between Broadway and Tame Street
WL10	Bescot Crescent	Between Broadway and Milton Street
WL12	Wednesbury Road	Between Bescot Rd and Caledon Street
WL13	Rollingmill Street	Between Brineton Street and Queen Street
WL14	Bridgeman Street	Between Pleck Road and Charles Street
WL15	Wolverhampton Street	Between Blue Lane and Townend
WL16	Green Lane	Between Court Way and Margaret Street
WL17	Stafford Street	Between Littleton Street and Townend
WL18	Hatherton Street	Between Littleton Street and Hatherton Road

**Table 12 Manual Count sites**

WL01(R491)	Lichfield Street	Near Butts Street
WL12(N2050)	Wednesbury Road	Near Caledon Street

**Figure 11 Location of Walsall ATC Cordon Sites**



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 Vpdc01\projects\47995\monitoring\Walsall\sites.wor

<b>Title</b>					<b>Mott MacDonald</b>	
<b>Location of Walsall ATC Cordon sites</b>					<b>Mott MacDonald Limited</b>	
					<b>Canterbury House</b>	
					<b>85 Newhall Street, Birmingham, B3 1LZ</b>	
Date	Drawn	Checked	Approved	Status	Drawing no.	Rev.
07/10/99	JTB	BWS	BWS	Final	47995/BA13/01	A
					Telephone 0121-237-4002	
					Fax 0121-237-4003	

## Appendix 2 Estimates of Vehicle Type from Passage Count Data

### INBOUND

Time Start	TOTAL VEH	PEDL CYC	MOT CYC	CARS<3.0T	CARS<3.0T	GOODS >3.0T	GOODS >3.0T	BUS & COACH	Light	Heavy	Actual autos	%cyc	%car	%bus	%light	%heavy	cycles	cars	bus	light	heavy	
7.00	367	1	3	327	8	22	6	6	330	30	756	0.3%	89.1%	1.6%	89.9%	8.2%	2	674	12	680	62	
7.15	440	4	7	382	14	18	15	15	389	32	998	0.9%	86.8%	3.4%	88.4%	7.3%	9	866	34	882	73	
7.30	523	4	5	461	17	24	12	12	466	41	1307	0.8%	88.1%	2.3%	89.1%	7.8%	10	1152	30	1165	102	
7.45	590	5	2	546	5	23	9	9	548	28	1613	0.8%	92.5%	1.5%	92.9%	4.7%	14	1493	25	1498	77	
8.00	496	6	2	445	16	15	12	12	447	31	1639	1.2%	89.7%	2.4%	90.1%	6.3%	20	1470	40	1477	102	
8.15	594	2	5	533	18	21	15	15	538	39	1839	0.3%	89.7%	2.5%	90.6%	6.6%	6	1650	46	1666	121	
8.30	571	2	2	525	10	19	13	13	527	29	2025	0.4%	91.9%	2.3%	92.3%	5.1%	7	1862	46	1869	103	
8.45	553	2	1	497	12	26	15	15	498	38	2004	0.4%	89.9%	2.7%	90.1%	6.9%	7	1801	54	1805	138	
9.00	510	1	4	430	13	43	19	19	434	56	1681	0.2%	84.3%	3.7%	85.1%	11.0%	3	1417	63	1430	185	
9.15	469	2	1	401	10	34	21	21	402	44	1519	0.4%	85.5%	4.5%	85.7%	9.4%	6	1299	68	1302	143	
9.30	446	1	0	383	18	28	16	16	383	46	1405	0.2%	85.9%	3.6%	85.9%	10.3%	3	1207	50	1207	145	
9.45	476	0	2	406	16	30	22	22	408	46	1315	0.0%	85.3%	4.6%	85.7%	9.7%	0	1122	61	1127	127	
10.00	486	1	2	406	14	36	27	27	408	50	18101						88	16013	529	16107	1376	
10.15	460	2	1	388	20	32	17	17	389	52							74	12144		12212	970	
10.30	443	0	1	373	19	32	18	18	374	51												
10.45	410	0	1	334	23	30	22	22	335	53												
11.00	425	1	1	357	14	31	21	21	358	45												
11.15	409	0	1	339	27	27	15	15	340	54												
11.30	460	0	0	392	21	26	21	21	392	47												
11.45	437	0	0	383	11	29	14	14	383	40												
0730-0930	4306	24	22	3838	101	205	116	116	3860	306	13627	0.6%	89.1%	2.7%	89.6%	7.1%	76	12146	367	12216	968	
10-12	3530	4	7	2972	149	243	155	155	2979	392	9227	0.1%	84.2%	4.4%	84.4%	11.1%	10	7768	405	7787	1025	

\*\*\*\*\*estimated figures\*\*\*\*\*

**OUTBOUND**

Time Start	TOTAL VEH	PEDL CYC	MOT CYC	CARS& LTVAN	GOODS <3.0T	GOODS >3.0T	BUS & COACH	Light	Heavy	Actual autos	%cyc	%bus	%light	%heavy	cycles	bus	light	heavy
7.00	217	1	1	175	10	22	8	176	32	623	0.5%	3.7%	81.1%	14.7%	3	23	505	92
7.15	310	4	6	253	11	25	11	259	36	747	1.3%	3.5%	83.5%	11.6%	10	27	624	87
7.30	365	1	2	312	13	25	12	314	38	993	0.3%	3.3%	86.0%	10.4%	3	33	854	103
7.45	371	1	0	317	13	24	16	317	37	1141	0.3%	4.3%	85.4%	10.0%	3	49	975	114
8.00	383	1	2	329	11	30	10	331	41	1216	0.3%	2.6%	86.4%	10.7%	3	32	1051	130
8.15	359	1	1	303	7	33	14	304	40	1242	0.3%	3.9%	84.7%	11.1%	3	48	1052	138
8.30	336	0	0	274	17	26	19	274	43	1319	0.0%	5.7%	81.5%	12.8%	0	75	1076	169
8.45	311	3	1	255	18	26	8	256	44	1285	1.0%	2.6%	82.3%	14.1%	12	33	1058	182
9.00	315	1	0	260	9	29	16	260	38	1087	0.3%	5.1%	82.5%	12.1%	3	55	897	131
9.15	302	0	2	236	23	25	16	238	48	961	0.0%	5.3%	78.8%	15.9%	0	51	757	153
9.30	318	2	1	248	15	32	20	249	47	961	0.6%	6.3%	78.3%	14.8%	6	60	752	142
9.45	334	1	1	260	17	37	18	261	54	1006	0.3%	5.4%	78.1%	16.2%	3	54	786	163
10.00	300	0	1	239	17	28	15	240	45	12581					50	540	10388	1604
10.15	349	0	1	283	17	27	21	284	44									
10.30	339	1	2	280	21	21	14	282	42									
10.45	345	1	1	268	21	40	14	269	61									
11.00	368	0	1	294	12	41	20	295	53									
11.15	389	3	2	325	10	30	19	327	40									
11.30	368	1	1	304	16	33	13	305	49									
11.45	368	1	0	297	25	29	16	297	54									
<b>10-12</b>	<b>2826</b>	<b>7</b>	<b>9</b>	<b>2290</b>	<b>139</b>	<b>249</b>	<b>132</b>	<b>2299</b>	<b>388</b>	<b>8744</b>	<b>0.2%</b>	<b>4.7%</b>	<b>81.4%</b>	<b>13.7%</b>	<b>22</b>	<b>408</b>	<b>7113</b>	<b>1201</b>

### Appendix 3 Estimates of Persons from Occupancy data

Total of both occupancy counts - all categories

Inbound	Number of vehicles with shown number of occupants										TOTAL 5 VEH	TOTAL OCC	AVERAGE OCC	A	B	C	D
	1	2	3	4	5	6	7	8	9	10							
7.00	299	69	5	0	0	0	373	452	1.21	692	11	681	825				
7.15	349	90	7	1	0	0	447	554	1.24	1062	36	1026	1271				
7.30	365	96	14	2	0	0	477	607	1.27	1330	31	1299	1654				
7.45	441	102	8	2	0	0	553	677	1.22	1716	26	1690	2069				
8.00	386	80	12	3	1	1	482	599	1.24	1676	41	1635	2032				
8.15	403	84	21	10	1	1	519	679	1.31	1927	49	1878	2457				
8.30	318	130	41	12	8	8	509	789	1.55	1977	45	1932	2995				
8.45	368	123	42	11	6	6	550	814	1.48	2019	55	1964	2907				
9.00	373	83	13	5	1	1	475	603	1.27	1720	64	1656	2102				
9.15	350	89	22	3	0	0	464	606	1.31	1505	67	1438	1878				
9.30	317	108	16	2	5	5	448	614	1.37	1343	48	1295	1775				
9.45	299	92	19	6	2	2	418	574	1.37	1330	61	1269	1742				
10.00	302	109	23	3	0	0	437	601	1.38								
10.15	269	95	20	3	0	0	387	531	1.37								
10.30	284	100	19	5	2	2	410	571	1.39								
10.45	275	70	21	7	1	1	374	511	1.37								
11.00	272	87	20	7	3	3	389	549	1.41								
11.15	277	74	18	3	4	4	376	511	1.36								
11.30	300	81	21	2	0	0	404	533	1.32								
11.45	265	80	26	5	2	2	378	533	1.41								
12.00	268	61	11	10	2	2	352	473	1.34								
12.15	298	58	10	4	1	1	371	465	1.25								



**Outbound**

	Number of vehicles with shown number of occupants										TOTAL OCC	TOTAL VEH	TOTAL OCC	AVERAGE OCC	A	B	C	D
	1	2	3	4	5	6	7	8	9	10								
7.00	158	35	3	0	2	198	247	1.25	550	20	530	661						
7.15	234	41	3	1	0	279	329	1.18	735	26	709	836						
7.30	296	60	8	1	0	365	444	1.22	923	30	893	1086						
7.45	325	40	7	2	0	374	434	1.16	1149	50	1099	1276						
8.00	309	49	8	2	1	369	444	1.20	1188	31	1157	1392						
8.15	282	41	4	2	2	331	394	1.19	1233	48	1185	1410						
8.30	281	53	9	5	3	351	449	1.28	1280	72	1208	1545						
8.45	238	47	5	1	2	293	361	1.23	1251	32	1219	1502						
9.00	289	45	5	1	0	340	398	1.17	1069	54	1015	1188						
9.15	224	44	5	6	1	280	356	1.27	1000	53	947	1204						
9.30	254	52	2	1	0	309	368	1.19	984	62	922	1098						
9.45	257	37	2	0	0	296	337	1.14	1004	54	950	1081						
10.00	236	38	4	2	0	280	332	1.19										
10.15	227	58	5	0	0	290	358	1.23										
10.30	245	67	13	1	0	326	422	1.29										
10.45	254	83	9	0	0	346	447	1.29										
11.00	244	80	4	1	1	330	425	1.29										
11.15	243	75	11	3	2	334	448	1.34										
11.30	295	89	14	4	1	403	536	1.33										
11.45	273	78	6	4	0	361	463	1.28										
12.00	265	78	19	4	1	367	499	1.36										
12.15	318	63	9	1	0	391	475	1.21										