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**Data Input Table – Do Not Delete**

Item	Location	Bookmark name	X <sup>1,2</sup>	Record of input <sup>3,4</sup>
Report Title – first line	Pages i and ii	T1		Solihull Cordon 2001
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		Solihull Cordon Report 2001
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/BG11
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		December 2001
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# Solihull Cordon 2001

## Issue and Revision Record

<b>Rev</b>	<b>Date</b>	<b>Originator (Print) (Signature)</b>	<b>Checker (Print) (Signature)</b>	<b>Approver (Print) (Signature)</b>	<b>Description</b>
		D. King	J. Bates	B. Storey	
A	December 2001				First Issue

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## Summary

The following is a summary of the information contained in this report. Estimates of persons 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	15,595
estimated pedal cycles	59
estimated bus	393
estimated light vehicles	14,939
estimated goods vehicles	207
estimated persons - Light Vehicles	19,132
estimated persons - Heavy Vehicles	280

### 0730-0930 outbound

total vehicles	10,176
estimated pedal cycles	61
estimated bus	393
estimated light vehicles	9,501
estimated goods vehicles	220
estimated persons - Light Vehicles	12,189
estimated persons - Heavy Vehicles	327

### 1000-1200 inbound

total vehicles	9,476
estimated pedal cycles	40
estimated bus	321
estimated light vehicles	8,877
estimated goods vehicles	238
estimated persons - Light Vehicles	12,250
estimated persons - Heavy Vehicles	347

### 1000-1200 outbound

total vehicles	8,084
estimated pedal cycles	21
estimated bus	279
estimated light vehicles	7,451
estimated goods vehicles	332
estimated persons - Light Vehicles	9,910
estimated persons - Heavy Vehicles	564

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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

Counts of vehicles crossing a cordon around Solihull Town Centre are undertaken every two years using Automatic Traffic Counters (ATC'S) installed on all major and most minor roads crossing the cordon. The counts record vehicles continuously, by direction, for a seven day period. The location of the sites is shown in figure 11.

Three sites are also surveyed manually by Solihull 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 2001 Solihull Cordon Survey are presented on the following pages. Where appropriate, comparisons with 1995, 1997 and 1999 data have been made.

## 3 Background

Collection of the data took place in the week beginning Monday 17<sup>th</sup> September. The 2001 Cordon Survey has been the first opportunity to monitor traffic changes since the new development at Touchwood Court was opened at the beginning of September. The survey was carried out over a neutral week, avoiding school holidays and the pre-Christmas peak. 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 fall in traffic of 4.5% inbound and 7.6% outbound compared with 1999. Traffic levels during the morning peak period are around the same as those seen in 1995.

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

	1995	1997	1999	2001
Inbound Total	15,717	16,606	16,331	15,597
Outbound Total	10,158	10,875	11,009	10,176

Table 2 shows the number of vehicles crossing the cordon line in the traditional off-peak morning period (10.00-12.00). During this period traffic increased by 3.7% inbound and decreased by 6.8% outbound.

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

	1995	1997	1999	2001
Inbound Total	9,118	9,152	9,137	9,476
Outbound Total	8,603	8,563	8,679	8,084

The figures in Table 3 show that in 2001 around 20% 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 19.7%. The off-peak time period considered (1000-1200) shows 12% of the daily traffic travelling into the town centre. Around 83% 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 in 2001 were slightly less (around 2%) than those counted in 1999.

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 – 19.00 (12 hour)	00.00 – 24.00 (24 hour)
<b>1995</b>					
Inbound	15,717	9,118	11,883	66,104	80,108
% of 24 hr	19.6	11.4	14.8	82.5	100
Outbound	10,158	8,603	15,145	64,465	79,567
% of 24 hr	12.8	10.8	19.0	81.0	100
NET	5,559	515	-3,262	1,639	541
<b>1997</b>					
Inbound	16,606	9,152	11,712	66,847	80,404
% of 24 hr	20.6	11.4	14.6	83.1	100
Outbound	10,875	8,563	15,474	65,075	79,256
% of 24 hr	13.7	10.8	19.5	82.1	100
NET	5,731	589	-3,762	1,772	1,148
<b>1999</b>					
Inbound	16,331	9,137	11,511	66,327	79,628
% of 24hr	20.5	11.5	14.4	83.3	100
Outbound	11,009	8,679	15,166	65,824	79,919
% of 24hr	13.8	10.8	19.0	82.3	100
NET	5,322	458	-3,655	503	291
<b>2001</b>					
Inbound	15,597	9,476	11,270	65,186	78,206
% of 24hr	19.9%	12.1%	14.4%	83.3%	100
Outbound	10,173	8,084	15,222	63,543	77,115
% of 24hr	13.2%	10.5%	19.7%	82.4%	100
NET	5,424	1,392	-3,952	1,646	1,093

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

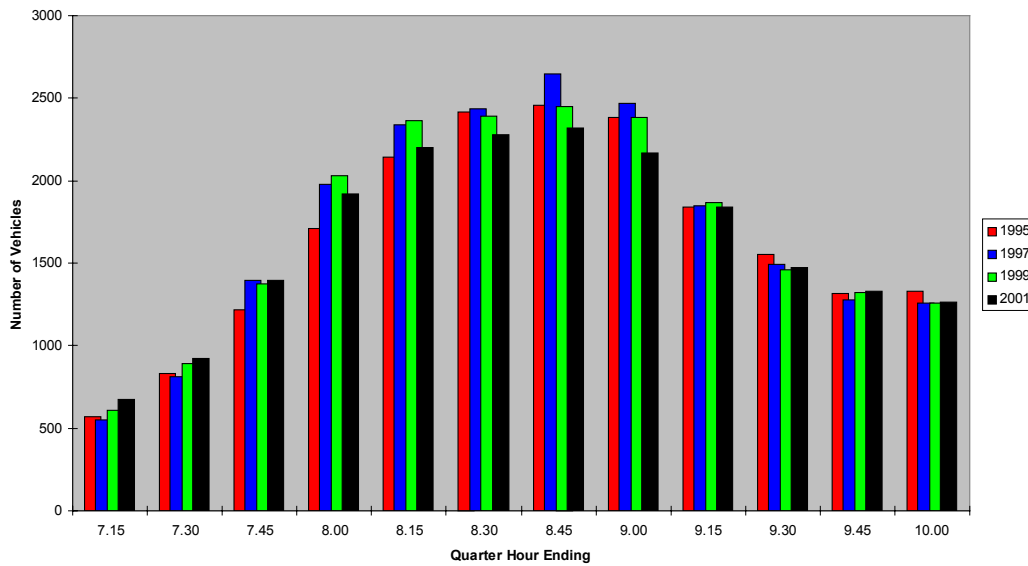
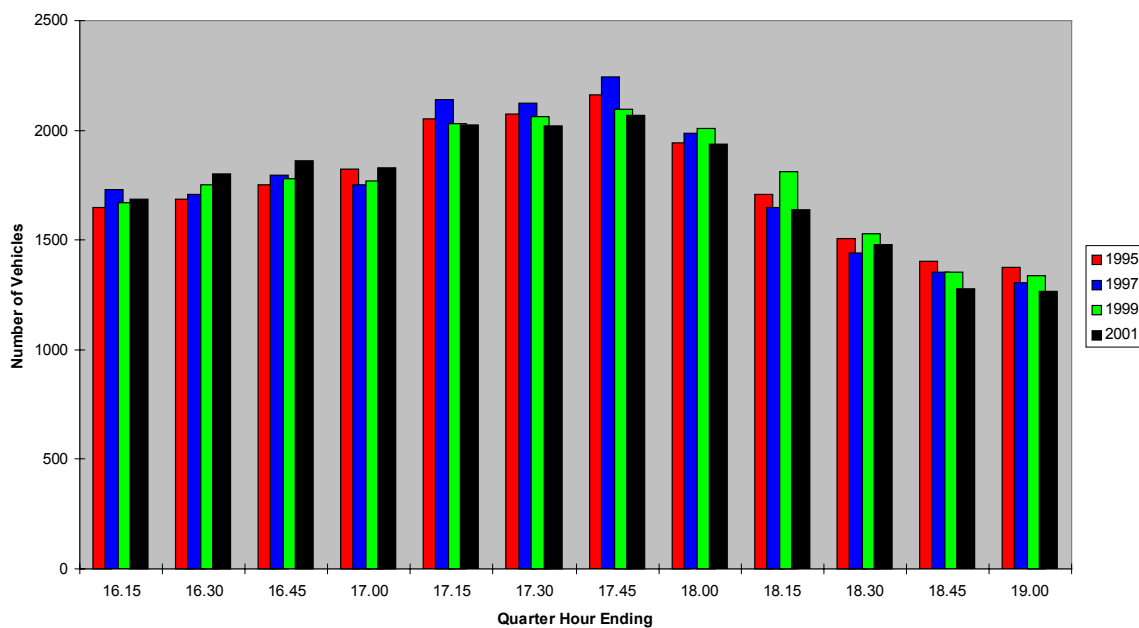
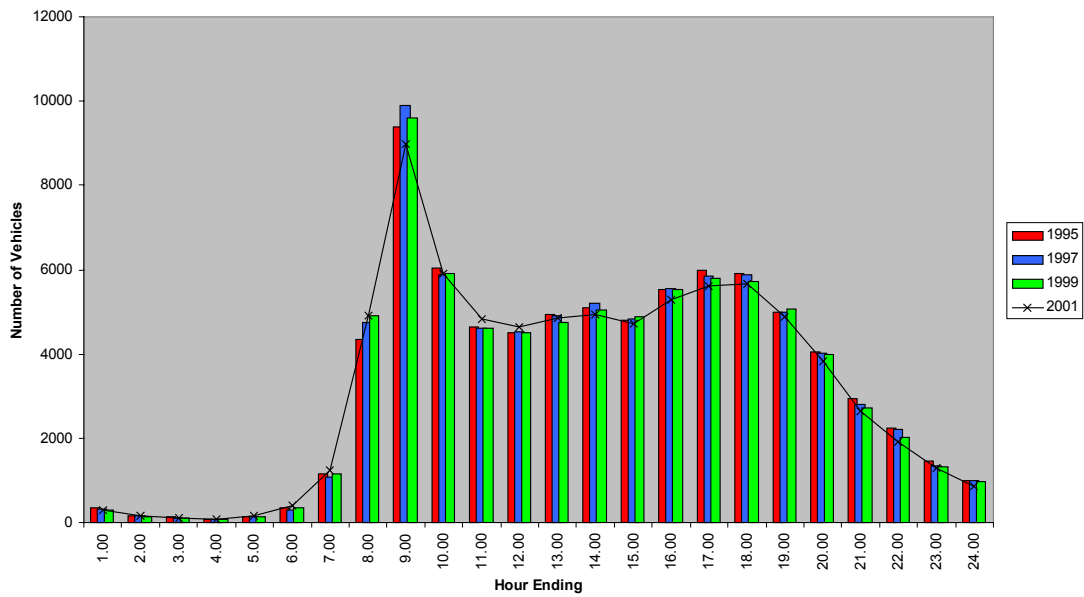


Figure 1 and Figure 2 show the two main peak periods by quarter hour. The morning figures are given from 7a.m. until 10a.m. and the evening from 4p.m. to 7p.m. These time periods are wider than those presented in previous tables. This allows a check on the traditional time periods as peak spreading may be seen on these graphs. Figure 1 shows fluctuating changes in traffic between 1995 and 2001. Similarly, in the outbound direction, (Figure 2) some time periods show increases compared with previous years while others show decreases.

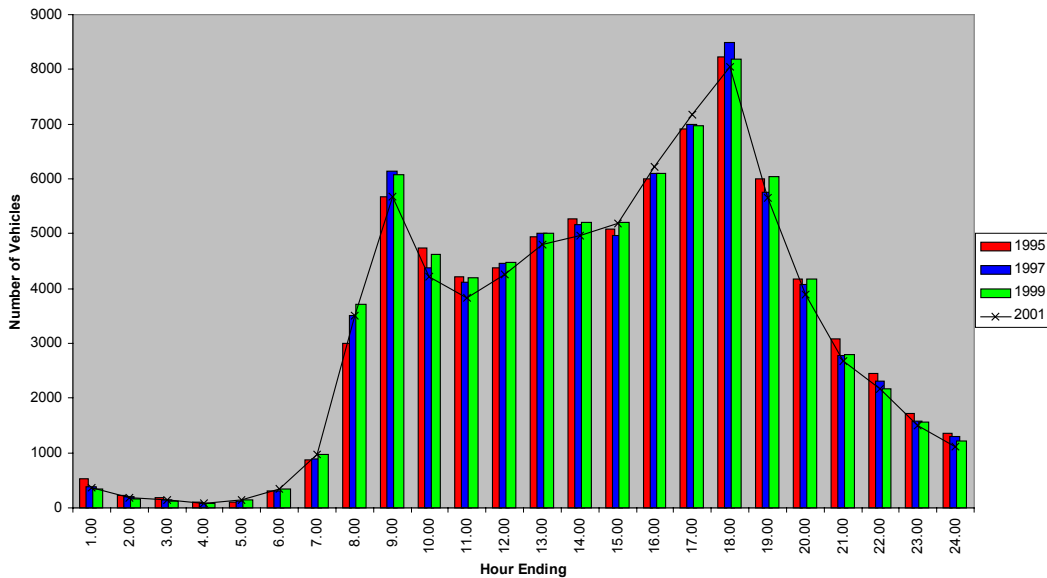
**Figure 2 Outbound Evening Peak Period: Vehicle Volumes by Quarter Hour – Average Weekday**



**Figure 3 Inbound levels of vehicles, by hour – Average Weekday**



**Figure 4 Outbound levels of vehicles, by hour – Average Weekday**



#### 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. For Saturday and Sunday, proportions for 1999 have been included to assess changes in weekend traffic since the Touchwood development was opened.

**Table 4 Variations in traffic flow, by time of day 2001**

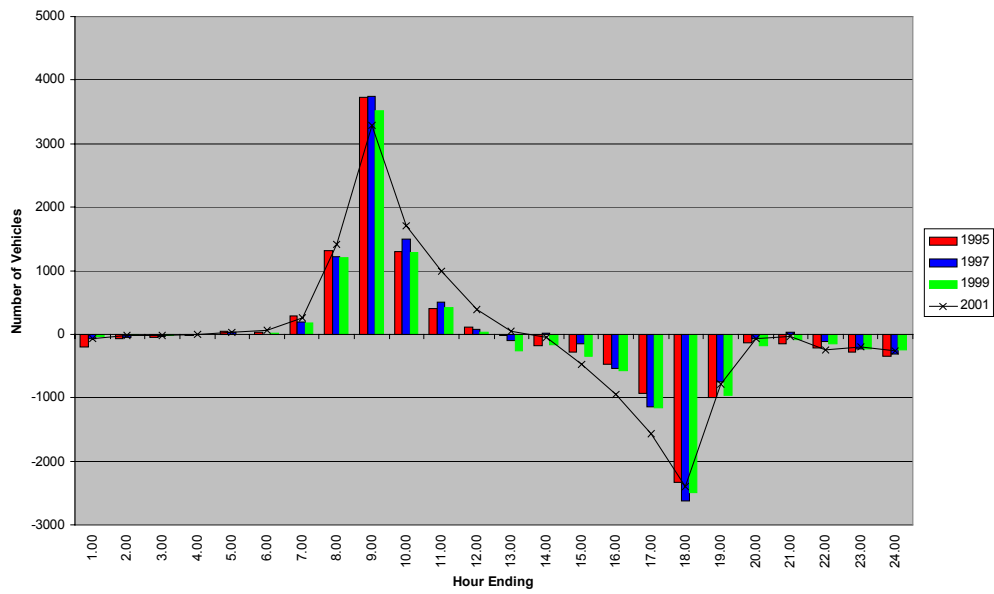
	Mon.	Tues.	Wed.	Thur.	Fri.	Sat. 1999	Sat. 2001	Sun. 1999	Sun. 2001
<b>Inbound</b>									
07.30 - 09.30	0.987	1.022	1.029	0.986	0.978	0.403	0.447	0.157	0.163
10.00 - 12.00	0.950	0.994	1.008	1.014	1.035	1.290	1.321	0.783	1.019
16.00 - 18.00	0.942	1.007	0.992	1.039	1.022	0.732	0.772	0.508	0.572
07.00 - 19.00	0.959	1.000	1.006	1.008	1.027	0.838	0.914	0.517	0.636
00.00 - 24.00	0.948	0.992	0.996	1.015	1.050	0.855	0.928	0.554	0.661
<b>Outbound</b>									
07.30 - 09.30	0.989	1.008	1.029	0.983	0.992	0.452	0.443	0.208	0.206
10.00 - 12.00	0.960	0.973	0.992	1.015	1.060	1.204	1.119	0.837	0.897
16.00 - 18.00	0.936	1.012	0.999	1.015	1.039	0.705	0.778	0.394	0.565
07.00 - 19.00	0.951	0.992	1.005	1.009	1.043	0.840	0.858	0.528	0.645
00.00 - 24.00	0.937	0.984	0.995	1.026	1.059	0.854	0.867	0.566	0.669

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.

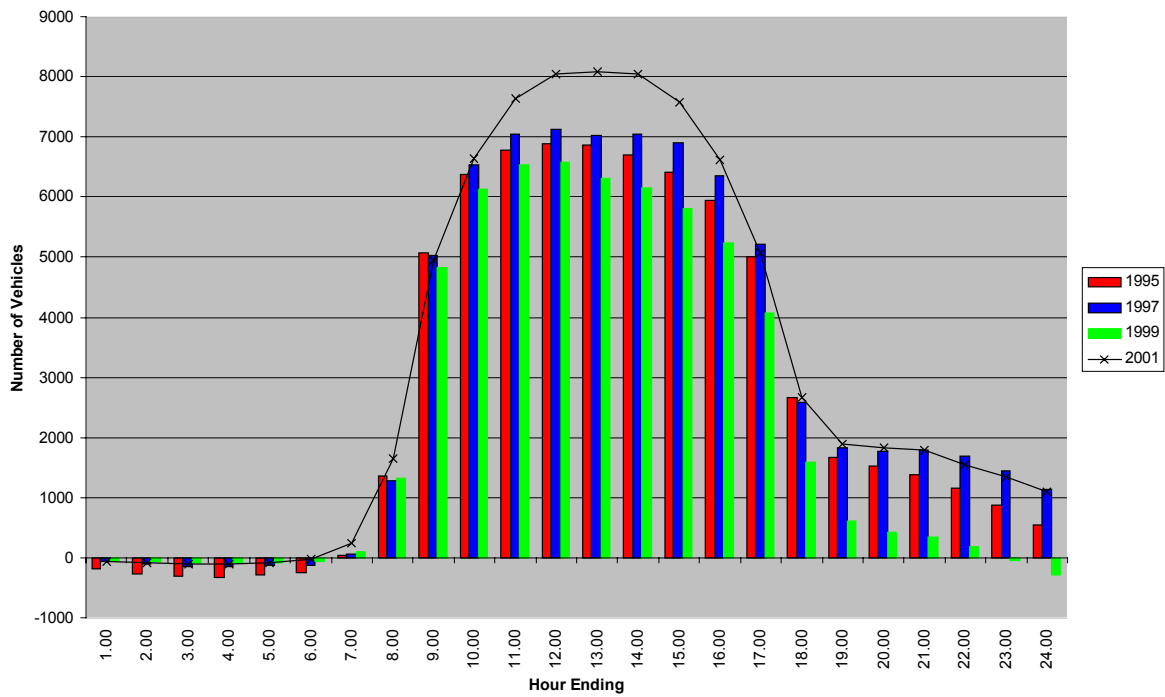
**Table 5 Net loss / gain and accumulation in vehicles crossing the cordon, by hour – Average Weekday**

Hour ending	Inbound	Outbound	Net	Cum
1 00	294	355	-61	-61
2 00	163	184	-21	-82
3 00	121	136	-15	-97
4 00	82	91	-9	-106
5 00	164	141	23	-83
6 00	400	336	64	-19
7 00	1243	982	261	242
8 00	4912	3501	1411	1653
9 00	8971	5681	3290	4943
10 00	5908	4207	1701	6644
11 00	4829	3834	995	7639
12 00	4647	4250	397	8036
13 00	4849	4803	46	8082
14 00	4928	4975	-47	8035
15 00	4714	5183	-469	7566
16 00	5281	6228	-947	6619
17 00	5617	7176	-1559	5060
18 00	5653	8046	-2393	2667
19 00	4877	5659	-782	1885
20 00	3835	3897	-62	1823
21 00	2637	2679	-42	1781
22 00	1924	2165	-241	1540
23 00	1298	1491	-193	1347
24 00	859	1115	-256	1091

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



**Figure 6 Net accumulation of vehicles, by hour – Average Weekday**



## 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 2001	Outbound 2001	Net loss / gain 2001
SO01	Lode Lane	11,475	11,774	-299
SO02	Warwick Rd (South)	12,988	13,510	-522
SO03	New Road	8,649	8,791	-142
SO04	Church Hill Road	4,997	5,329	-332
SO05	Monkspath Hall Rd	8,444	8,515	-71
SO06	Blossomfield Road	10,731	10,536	195
SO07	Streetsbrook Road	11,573	11,021	552
SO08	Ashleigh Road	3,017	2,183	834
SO09	Warwick Rd (North)	6,336	5,456	880

## 4.3 Mode of travel

The three 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**

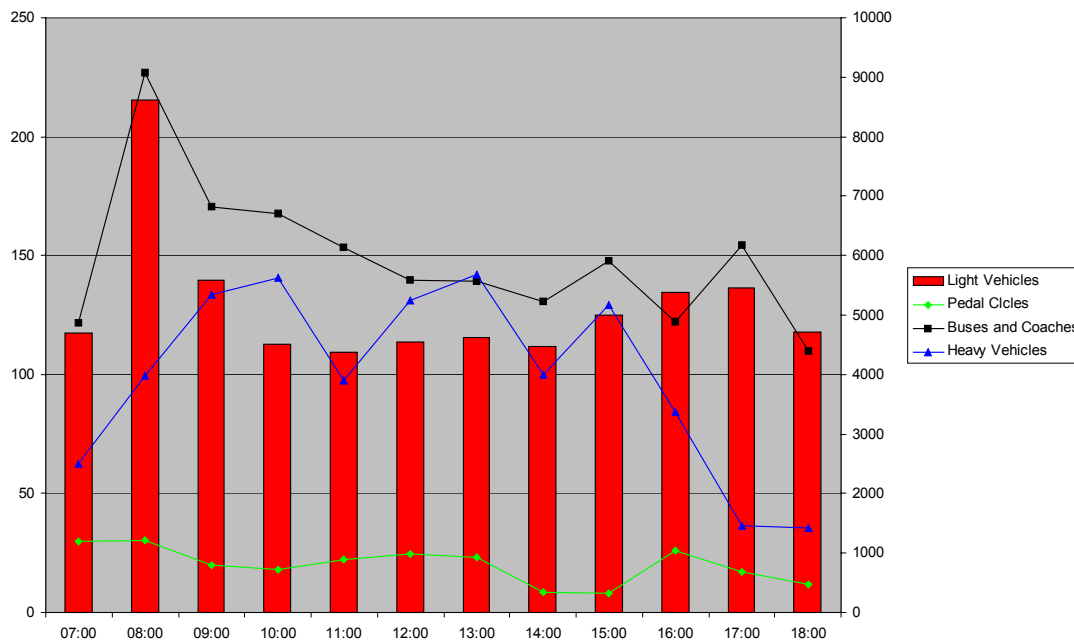
TIME STARTING	TOTAL VEH	PEDAL CYC	BUS & COACH	Light Vehs	Heavy Vehs	% pedal cycle	% bus	% light vehs	% heavy vehs
07.00	251	2	9	237	3	0.8	3.59	94.42	1.2
07.15	367	3	13	347	4	0.82	3.54	94.55	1.09
07.30	501	5	8	481	7	1.0	1.6	96.01	1.4
07.45	694	1	15	669	9	0.14	2.16	96.4	1.3
08.00	807	1	17	780	9	0.12	2.11	96.65	1.12
08.15	838	4	14	808	12	0.48	1.67	96.42	1.43
08.30	818	4	22	786	6	0.49	2.69	96.09	0.73
08.45	779	2	29	739	9	0.26	3.72	94.87	1.16
09.00	646	2	18	612	14	0.31	2.79	94.74	2.17
09.15	501	2	17	474	8	0.4	3.39	94.61	1.6
09.30	492	0	13	468	11	0.0	2.64	95.12	2.24
09.45	441	3	12	412	14	0.68	2.72	93.42	3.17
Total	7135	29	187	6813	106	0.41	2.62	95.49	1.49

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

TIME STARTING	number of automatic vehs	estimated ped cyc	estimated bus	estimated light vehs	Estimated Heavy vehs
07.00	674	5	24	636	8
07.15	926	8	33	876	10
07.30	1393	14	22	1337	19
07.45	1919	3	41	1850	25
08.00	2201	3	46	2127	25
08.15	2282	11	38	2200	33
08.30	2320	11	62	2229	17
08.45	2168	6	81	2057	25
09.00	1840	6	51	1743	40
09.15	1474	6	50	1395	24
09.30	1327	0	35	1262	30
09.45	1267	9	34	1184	40
Total	19791	80	519	18896	295

Figures 7 and 8 show estimated modes of transport during the 07.00-19.00 period. 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**

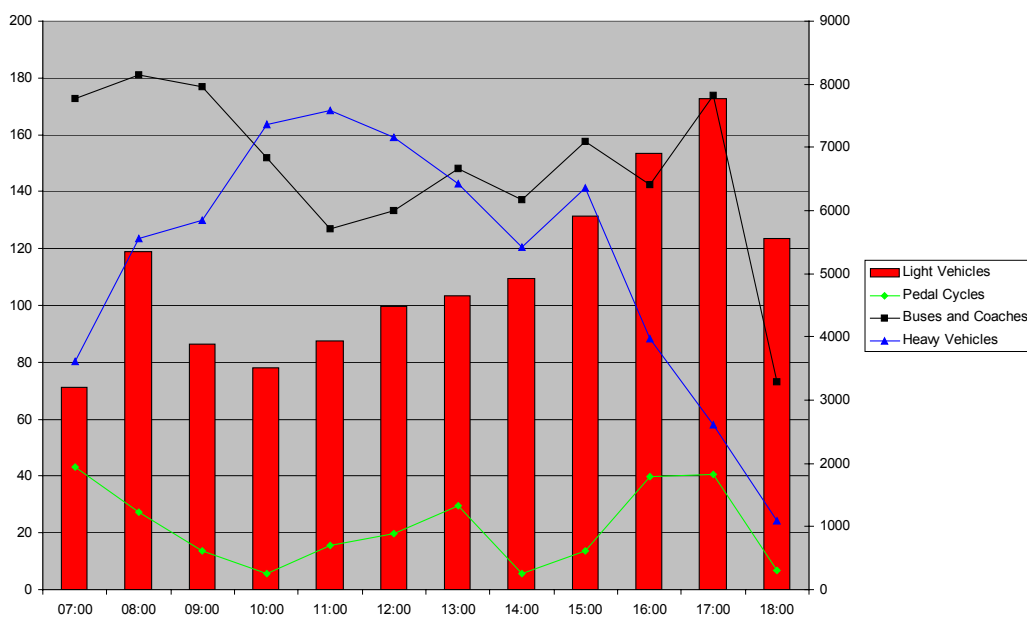
The summary for outbound modes from the manual data can be found in Table 9 with the estimated outbound in Table 10 and the graph representing these figures in Figure 8. The figures collected in the manual surveys can be found in Appendix 2.

**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	171	1	7	159	4	0.58	4.09	92.98	2.34
07.15	252	5	12	228	7	1.98	4.76	90.48	2.78
07.30	308	4	16	283	5	1.30	5.19	91.88	1.62
07.45	405	4	21	370	10	0.99	5.19	91.36	2.47
08.00	405	1	15	381	8	0.25	3.70	94.07	1.98
08.15	509	2	14	483	10	0.39	2.75	94.89	1.96
08.30	447	4	14	424	5	0.89	3.13	94.85	1.12
08.45	523	2	17	486	18	0.38	3.25	92.93	3.44
09.00	451	0	21	417	13	0.00	4.66	92.46	2.88
09.15	354	3	13	332	6	0.85	3.67	93.79	1.69
09.30	344	1	11	318	14	0.29	3.20	92.44	4.07
09.45	373	1	19	339	14	0.27	5.09	90.88	3.75
Total	4542	28	180	4220	114	0.62	3.96	92.91	2.51

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

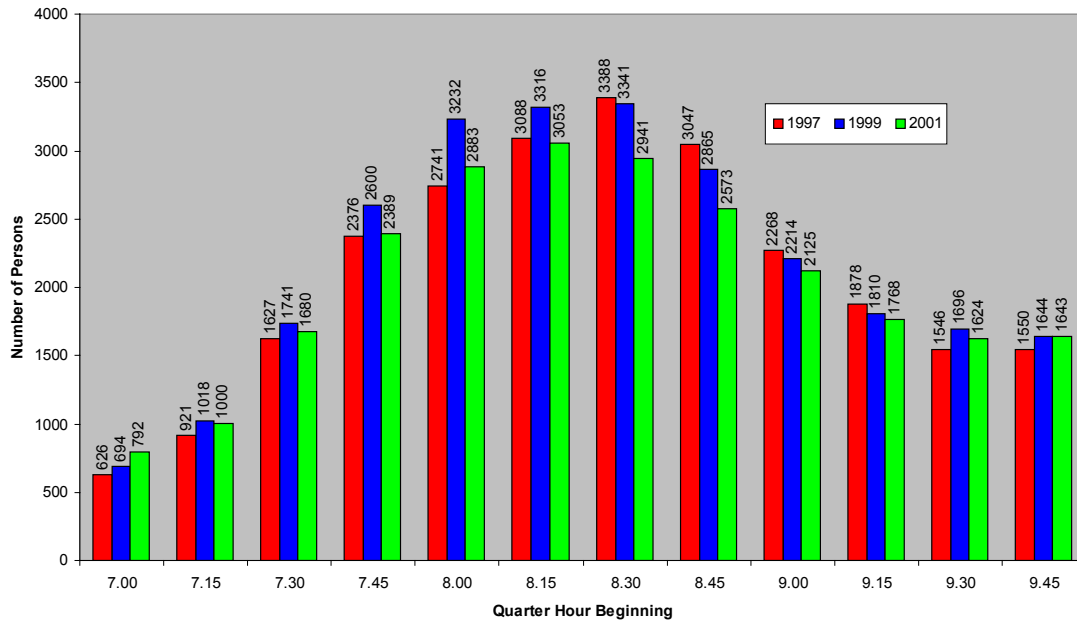
TIME	No. auto vehs.	estimated ped cyc	estimated bus	estimated light	estimated goods
STARTING					
07.00	560	3	23	521	13
07.15	699	14	33	632	19
07.30	955	12	50	877	16
07.45	1287	13	67	1176	32
08.00	1420	4	53	1336	28
08.15	1437	6	40	1364	28
08.30	1414	13	44	1341	16
08.45	1410	5	46	1310	49
09.00	1209	0	56	1118	35
09.15	1044	9	38	979	18
09.30	948	3	30	876	39
09.45	1006	3	51	914	38
Total	13389	84	531	12445	329

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

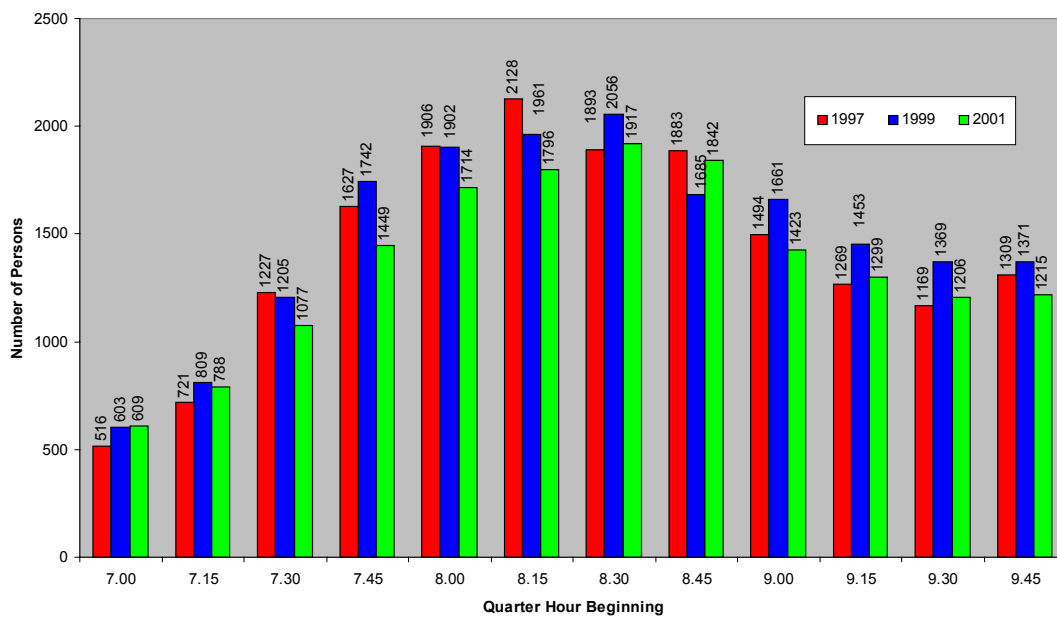
#### 4.4 Occupancy Levels

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
SO01	Lode Lane	Between Warwick Road and Keresley Close
SO02	Warwick Rd (South)	Between George Road and Union Road
SO03	New Road	Between Warwick Rd and Malvern Park Rd
SO04	Church Hill Road	Between Whitefields Road and Princes Way
SO05	Monkspath Hall Rd	Between Whitefields Rd and Princes Way
SO06	Blossomfield Road	Between Dorchester Rd and Station App.
SO07	Streetsbrook Road	Between Station App. And Broad Oaks Rd
SO08	Ashleigh Road	Between Streetsbrook Rd and The Crescent
SO09	Warwick Rd (North)	Between Lode Lane and Manor Rd

**Table 12 Manual Count sites**

R1902	Blossomfield Rd	Near Station Approach
N1470	Monkspath Hall Rd	North of Whitefields Road
R2276	Lode Lane	Outside Hospital

## 6 Appendix 2 Solihull Modal Split Results 1997/2001

**Table 13 Inbound Modal Share Figures 1997-2001**

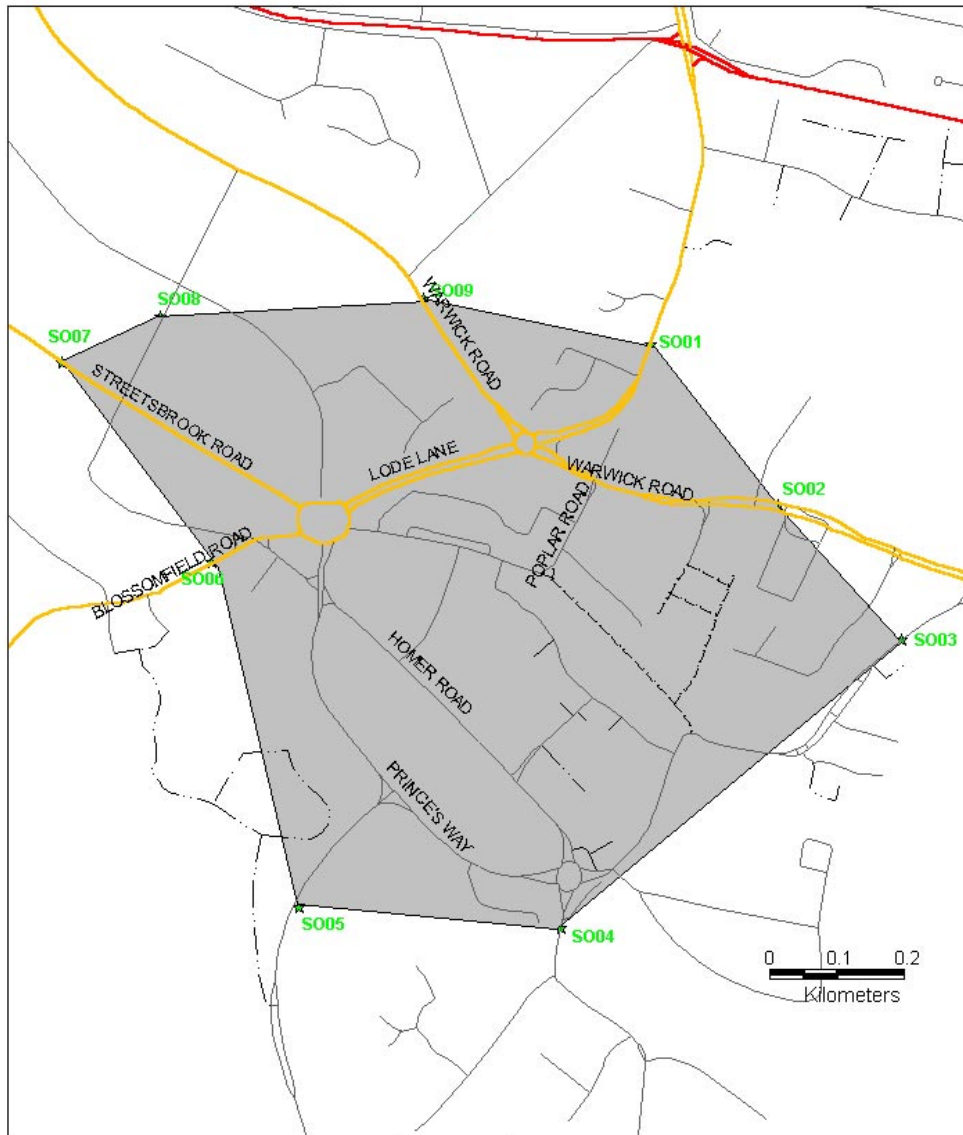
	0730-0930			1000-1200			0700-1230		
	1997	1999	2001	1997	1999	2001	1997	1999	2001
<b>Bus Trips</b>	3,264	3,354	3,315	2,471	2,506	2,828	7,227	7,285	7,755
<b>Estimated Car</b>	19,036	19,552	18,167	10,428	10,491	11,377	36,923	37,346	36,949
<b>Est Light Veh Trips</b>	20,002	20,579	19,132						
<b>Occupancy Factor</b>	1.26	1.32	1.28	1.38	1.38	1.38	1.31	1.34	1.31
<b>Train Trips</b>	250	319	374	112	126	197	406	525	678
<b>Total Trips (car,bus,train)</b>	22,550	23,225	21,831	13,011	13,123	14,402	44,556	45,156	45,382
<b>Bus Modal Share</b>	14.47%	14.44%	15.18%	18.99%	19.10%	19.64%	16.22%	16.13%	17.09%
<b>Car Modal Share</b>	84.42%	84.19%	83.22%	80.15%	79.94%	79.00%	82.87%	82.70%	81.42%
<b>Train Modal Share</b>	1.11%	1.37%	1.71%	0.86%	0.96%	1.37%	0.91%	1.16%	1.49%

**Table 14 Outbound Modal Share Figures 1997-2001**


	0730-0930			1000-1200			0700-1230		
	1997	1999	2001	1997	1999	2001	1997	1999	2001
<b>Bus Trips</b>	2,233	1,910	1,633	1,624	1,573	1,409	4,823	4,471	3,856
<b>Estimated Car</b>	12,083	12,427	11,332	9,778	10,195	8,817	28,035	29,164	25,870
<b>Occupancy Factor</b>	1.28	1.29	1.28	1.34	1.4	1.33	1.3	1.33	1.29
<b>Train Trips</b>	442	659	463	140	207	139	772	1,011	740
<b>Total Trips</b>	14,758	14,996	13,428	11,542	11,975	10,365	33,630	34,646	30,466
<b>Bus Modal Share</b>	15.13%	12.74%	12.16%	14.07%	13.14%	13.59%	14.34%	12.90%	12.66%
<b>Car Modal Share</b>	81.87%	82.87%	84.39%	84.72%	85.14%	85.07%	83.36%	84.18%	84.91%
<b>Train Modal Share</b>	2.99%	4.39%	3.45%	1.21%	1.73%	1.34%	2.30%	2.92%	2.43%

NB. Occupancy factors for 1999 are calculated from totals of all vehicles as light and heavy vehicles were not split this year. 1997 and 2001 occupancy factors are calculated from light vehicles only.

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



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 jdt Licence number LA08946L, 1999  
 Wbdo01\users\47995\monitoring\Solihull Cordon 2001\sites.wor

<b>Title</b>					 <b>Mott MacDonald Limited</b> Canterbury House 85 Newhall Street, Birmingham, B3 1LZ	Telephone 0121-237-4002 Fax 0121-237-4003
<b>Location of Solihull ATC Cordon sites</b>						
Date	Drawn	Checked	Approved	Status	Drawing no.	Rev.
10/12/01	DMK	JTB	BWS	Final	47995/BG11/01	A

### Appendix 3 Estimates of Vehicle Type from Passage Count Data

Inbound														
Start Time	Tot Vehs	Pedal Cyc	Bus & Coach	Light Vehs	Heavy Vehs	% Pedal Cyc	% Bus & Coach	%Light Vehs	% Heavy Vehs	No. Auto Vehs	Est. Cyc	Est. Coach	Est. Bus & Light Vehs	Est. Heavy Vehs
07:00	1813	11	45	1734	23	0.61%	2.48%	95.64%	1.27%	4912	30	122	4698	62
08:00	3242	11	82	3113	36	0.34%	2.53%	96.02%	1.11%	8971	30	227	8614	100
09:00	2080	7	60	1966	47	0.34%	2.88%	94.52%	2.26%	5908	20	170	5684	133
10:00	1614	6	56	1505	47	0.37%	3.47%	93.25%	2.91%	4829	18	168	4503	141
11:00	1667	8	55	1569	35	0.48%	3.30%	94.12%	2.10%	4647	22	153	4374	98
12:00	1772	9	51	1664	48	0.51%	2.88%	93.91%	2.71%	4849	25	140	4553	131
13:00	1701	8	48	1596	49	0.47%	2.82%	93.83%	2.88%	4928	23	139	4624	142
14:00	1696	3	47	1610	36	0.18%	2.77%	94.93%	2.12%	4714	8	131	4475	100
15:00	2003	3	56	1895	49	0.15%	2.80%	94.61%	2.45%	5281	8	148	4996	129
16:00	1932	9	42	1852	29	0.47%	2.17%	95.86%	1.50%	5617	26	122	5384	84
17:00	2014	6	55	1940	13	0.30%	2.73%	96.33%	0.65%	5653	17	154	5445	36
18:00	1642	4	37	1589	12	0.24%	2.25%	96.77%	0.73%	4877	12	110	4720	36
<b>Total</b>	<b>23176</b>	<b>85</b>	<b>634</b>	<b>22033</b>	<b>424</b>	<b>0.37%</b>	<b>2.74%</b>	<b>95.07%</b>	<b>1.83%</b>	<b>65186</b>	<b>239</b>	<b>1783</b>	<b>61971</b>	<b>1193</b>
<b>10-12 Total</b>	<b>3281</b>	<b>14</b>	<b>111</b>	<b>3074</b>	<b>82</b>	<b>0.43%</b>	<b>3.38%</b>	<b>93.69%</b>	<b>2.50%</b>	<b>9476</b>	<b>40</b>	<b>321</b>	<b>8877</b>	<b>238</b>
07:00	251	2	9	237	3	0.80%	3.59%	94.42%	1.20%	674	5	24	636	8
07:15	367	3	13	347	4	0.82%	3.54%	94.55%	1.09%	926	8	33	876	10
07:30	501	5	8	481	7	1.00%	1.60%	96.01%	1.40%	1393	14	22	1337	19
07:45	694	1	15	669	9	0.14%	2.16%	96.40%	1.30%	1919	3	41	1850	25
08:00	807	1	17	780	9	0.12%	2.11%	96.65%	1.12%	2201	3	46	2127	25
08:15	838	4	14	808	12	0.48%	1.67%	96.42%	1.43%	2282	11	38	2200	33
08:30	818	4	22	786	6	0.49%	2.69%	96.09%	0.73%	2320	11	62	2229	17
08:45	779	2	29	739	9	0.26%	3.72%	94.87%	1.16%	2168	6	81	2057	25
09:00	646	2	18	612	14	0.31%	2.79%	94.74%	2.17%	1840	6	51	1743	40
09:15	501	2	17	474	8	0.40%	3.39%	94.61%	1.60%	1474	6	50	1395	24
09:30	492	0	13	468	11	0.00%	2.64%	95.12%	2.24%	1327	0	35	1262	30
09:45	441	3	12	412	14	0.68%	2.72%	93.42%	3.17%	1267	9	34	1184	40
<b>7.00-10.00</b>	<b>7135</b>	<b>29</b>	<b>187</b>	<b>6813</b>	<b>106</b>	<b>0.41%</b>	<b>2.62%</b>	<b>95.49%</b>	<b>1.49%</b>	<b>19791</b>	<b>80</b>	<b>519</b>	<b>18896</b>	<b>295</b>
<b>7.30-9.30 Total</b>	<b>5584</b>	<b>21</b>	<b>140</b>	<b>5349</b>	<b>74</b>	<b>0.38%</b>	<b>2.51%</b>	<b>95.79%</b>	<b>1.33%</b>	<b>15597</b>	<b>59</b>	<b>391</b>	<b>14941</b>	<b>207</b>
16:00	514	3	13	487	11	0.58%	2.53%	94.75%	2.14%	1457	9	37	1380	31
16:15	476	3	6	461	6	0.63%	1.26%	96.85%	1.26%	1483	9	19	1436	19
16:30	467	1	7	455	4	0.21%	1.50%	97.43%	0.86%	1364	3	20	1329	12
16:45	475	2	16	449	8	0.42%	3.37%	94.53%	1.68%	1313	6	44	1241	22
17:00	534	2	14	516	2	0.21%	1.90%	97.04%	0.85%	1423	3	27	1381	12
17:15	473	1	9	459	4	0.37%	2.62%	96.63%	0.37%	1421	5	37	1373	5
17:30	480	1	10	463	6	0.21%	2.08%	96.46%	1.25%	1416	3	30	1366	18
17:45	527	2	22	502	1	0.38%	4.17%	95.26%	0.19%	1393	5	58	1327	3
18:00	389	1	10	374	4	0.26%	2.57%	96.14%	1.03%	1301	3	33	1251	13
18:15	424	1	8	414	1	0.24%	1.89%	97.64%	0.24%	1219	3	23	1190	3
18:30	413	1	8	403	1	0.24%	1.94%	97.58%	0.24%	1191	3	23	1162	3
18:45	416	1	11	398	6	0.24%	2.64%	95.67%	1.44%	1166	3	31	1116	17
<b>Total 16.30-18.30</b>	<b>3769</b>	<b>11</b>	<b>96</b>	<b>3632</b>	<b>30</b>	<b>0.29%</b>	<b>2.55%</b>	<b>96.37%</b>	<b>0.80%</b>	<b>10850</b>	<b>32</b>	<b>276</b>	<b>10456</b>	<b>86</b>

**Outbound**

Start Time	Tot Vehs	Pedal Cyc	Bus & Coach	Light Vehs	Heavy Vehs	% Pedal Cyc	% Bus & Coach	% Light Vehs	% Heavy Vehs	No. Auto Vehs	Est. Pedal Cyc	Est. Bus & Coach	Est. Light Vehs	Est. Heavy Vehs
07:00	1136	14	56	1040	26	1.23%	4.93%	91.55%	2.29%	3501	43	173	3205	80
08:00	1884	9	60	1774	41	0.48%	3.18%	94.16%	2.18%	5681	27	181	5349	124
09:00	1522	5	64	1406	47	0.33%	4.20%	92.38%	3.09%	4207	14	177	3886	130
10:00	1311	2	52	1201	56	0.15%	3.97%	91.61%	4.27%	3834	6	152	3512	164
11:00	1639	6	49	1519	65	0.37%	2.99%	92.68%	3.97%	4250	16	127	3939	169
12:00	1691	7	47	1581	56	0.41%	2.78%	93.49%	3.31%	4803	20	133	4491	159
13:00	1848	11	55	1729	53	0.60%	2.98%	93.56%	2.87%	4975	30	148	4655	143
14:00	1852	2	49	1758	43	0.11%	2.65%	94.92%	2.32%	5183	6	137	4920	120
15:00	2284	5	58	2179	52	0.22%	2.53%	94.99%	2.27%	6228	14	157	5916	141
16:00	2521	14	50	2426	31	0.56%	1.98%	96.23%	1.23%	7176	40	142	6906	88
17:00	2779	14	60	2685	20	0.50%	2.16%	96.62%	0.72%	8046	41	174	7774	58
18:00	2558	3	33	2511	11	0.12%	1.29%	98.16%	0.43%	5659	7	73	5555	24
<b>Total</b>	<b>23035</b>	<b>92</b>	<b>633</b>	<b>21809</b>	<b>501</b>	<b>0.40%</b>	<b>2.75%</b>	<b>94.68%</b>	<b>2.17%</b>	<b>63543</b>	<b>254</b>	<b>1746</b>	<b>60161</b>	<b>1382</b>
<b>10-12 Total</b>	<b>2950</b>	<b>8</b>	<b>101</b>	<b>2720</b>	<b>121</b>	<b>0.27%</b>	<b>3.42%</b>	<b>92.20%</b>	<b>4.10%</b>	<b>8084</b>	<b>21</b>	<b>279</b>	<b>7451</b>	<b>332</b>
07:00	171	1	7	159	4	0.58%	4.09%	92.98%	2.34%	560	3	23	521	13
07:15	252	5	12	228	7	1.98%	4.76%	90.48%	2.78%	699	14	33	632	19
07:30	308	4	16	283	5	1.30%	5.19%	91.88%	1.62%	955	12	50	877	16
07:45	405	4	21	370	10	0.99%	5.19%	91.36%	2.47%	1287	13	67	1176	32
08:00	405	1	15	381	8	0.25%	3.70%	94.07%	1.98%	1420	4	53	1336	28
08:15	509	2	14	483	10	0.39%	2.75%	94.89%	1.96%	1437	6	40	1364	28
08:30	447	4	14	424	5	0.89%	3.13%	94.85%	1.12%	1414	13	44	1341	16
08:45	523	2	17	486	18	0.38%	3.25%	92.93%	3.44%	1410	5	46	1310	49
09:00	451	0	21	417	13	0.00%	4.66%	92.46%	2.88%	1209	0	56	1118	35
09:15	354	3	13	332	6	0.85%	3.67%	93.79%	1.69%	1044	9	38	979	18
09:30	344	1	11	318	14	0.29%	3.20%	92.44%	4.07%	948	3	30	876	39
09:45	373	1	19	339	14	0.27%	5.09%	90.88%	3.75%	1006	3	51	914	38
<b>7.00-10.00</b>	<b>4542</b>	<b>28</b>	<b>180</b>	<b>4220</b>	<b>114</b>	<b>0.62%</b>	<b>3.96%</b>	<b>92.91%</b>	<b>2.51%</b>	<b>13389</b>	<b>84</b>	<b>531</b>	<b>12445</b>	<b>329</b>
<b>7.30-9.30 Total</b>	<b>3402</b>	<b>20</b>	<b>131</b>	<b>3176</b>	<b>75</b>	<b>0.59%</b>	<b>3.85%</b>	<b>93.36%</b>	<b>2.20%</b>	<b>10176</b>	<b>61</b>	<b>393</b>	<b>9501</b>	<b>220</b>
16:00	667	3	18	637	9	0.45%	2.70%	95.50%	1.35%	1685	52	374	9500	244
16:15	636	3	11	606	13	0.94%	1.73%	95.28%	2.04%	1803	41	358	9239	250
16:30	661	3	12	639	7	0.45%	1.82%	96.67%	1.06%	1861	8	34	1799	20
16:45	557	2	9	544	2	0.36%	1.62%	97.67%	0.36%	1827	7	30	1784	7
17:00	670	5	24	635	6	0.75%	3.58%	94.78%	0.90%	2023	15	72	1917	18
17:15	691	3	7	675	6	0.43%	1.01%	97.68%	0.87%	2017	9	20	1970	18
17:30	649	3	19	623	4	0.46%	2.93%	95.99%	0.62%	2068	10	61	1985	13
17:45	769	3	10	752	4	0.39%	1.30%	97.79%	0.52%	1938	8	25	1895	10
18:00	702	1	15	682	4	0.14%	2.14%	97.15%	0.57%	1640	2	35	1593	9
18:15	694	0	7	682	5	0.00%	1.01%	98.27%	0.72%	1479	0	15	1453	11
18:30	564	1	4	558	1	0.18%	0.71%	98.94%	0.18%	1275	2	9	1261	2
18:45	598	1	7	589	1	0.17%	1.17%	98.49%	0.17%	1265	2	15	1246	2
<b>Total 16.30-18.30</b>	<b>5393</b>	<b>20</b>	<b>103</b>	<b>5232</b>	<b>38</b>	<b>0.37%</b>	<b>1.91%</b>	<b>97.01%</b>	<b>0.70%</b>	<b>14653</b>	<b>55</b>	<b>284</b>	<b>14410</b>	<b>105</b>



## 7 Appendix 4 Estimates of Persons from Occupancy data

Start Time	Number of vehicles with					Total Veh	Total Pass	Ave Occupancy	Automatically Counted		Estimated Buses	Estimated Pedal Cycles	Estimated B+C	Est. Light Vehs.	E	F	G	H	Est People Light Vehs + Ped Cyc	Estimated Heavy Vehs	Est People Heavy Vehs	Est People Light & Heavy
	1	2	3	4	5				Vehicles	Vehs												
Occupants																						
07.00	181	37	3	1	0	222	268	1.21	674	24	5	30	636	768	774	8	18	792	792			
07.15	322	32	6	0	0	360	404	1.12	926	33	8	40	876	983	990	10	10	1000	1000			
07.30	431	83	11	2	1	528	643	1.22	1393	22	14	36	1337	1629	1643	19	37	1680	1680			
07.45	526	126	21	5	0	678	861	1.27	1919	41	3	44	1850	2349	2352	25	37	2389	2389			
08.00	613	162	37	13	0	825	1100	1.33	2201	46	3	49	2127	2836	2839	25	44	2883	2883			
08.15	523	184	36	3	1	747	1016	1.36	2282	38	11	49	2200	2993	3004	33	49	3053	3053			
08.30	552	137	28	10	0	727	950	1.31	2320	62	11	74	2229	2913	2924	17	17	2941	2941			
08.45	537	125	15	0	1	678	837	1.23	2168	81	6	86	2057	2539	2545	25	28	2573	2573			
09.00	478	99	6	0	0	583	694	1.19	1840	51	6	57	1743	2075	2081	40	44	2125	2125			
09.15	355	100	7	0	0	462	576	1.25	1474	50	6	56	1395	1739	1745	24	24	1768	1768			
<b>07.30-09.30</b>	<b>4015</b>	<b>1016</b>	<b>161</b>	<b>33</b>	<b>3</b>	<b>5228</b>	<b>6677</b>	<b>1.28</b>	<b>15597</b>	<b>393</b>	<b>59</b>	<b>451</b>	<b>14939</b>	<b>19073</b>	<b>19132</b>	<b>207</b>	<b>280</b>	<b>19411</b>	<b>19411</b>			
09.30	359	107	3	1	0	470	586	1.25	1327	35	0	35	1262	1574	1574	30	50	1624	1624			
09.45	293	96	10	1	4	404	539	1.33	1267	34	9	43	1184	1579	1588	40	55	1643	1643			
10.00	268	77	10	2	1	358	465	1.30														
10.15	234	130	9	2	1	376	534	1.42														
10.30	283	116	11	2	0	412	556	1.35														
10.45	223	101	9	6	0	339	476	1.40														
11.00	245	134	11	4	2	396	572	1.44														
11.15	221	87	10	0	0	318	425	1.34														
11.30	283	104	18	4	0	409	561	1.37														
11.45	245	116	15	1	1	378	531	1.40														
<b>10.00-12.00</b>	<b>2002</b>	<b>865</b>	<b>93</b>	<b>21</b>	<b>5</b>	<b>2986</b>	<b>4120</b>	<b>1.38</b>														
12.00	179	64	10	3	0	256	349	1.36														
12.15	171	63	10	1	0	245	331	1.35														
<b>07.00-12.30</b>	<b>7522</b>	<b>2280</b>	<b>296</b>	<b>61</b>	<b>12</b>	<b>10171</b>	<b>13274</b>	<b>1.31</b>														

Total Outbound		Number of vehicles with					A		B		C		D		E		F		G		Est People		Estimated		Est People		Est People		
Start Time	1	2	3	4	5	Total Veh	Total Pass	Ave Occupancy	Automatically Counted Vehicles	Estimated Number of Buses	Estimated Pedal Cycles	B+C	Est. Light Vehs.	Est.Ave Occ	Light Vehs + Ped Cyc	Heavy Vehs	Heavy Vehs	Light&Heavy	Heavy Vehs	Light&Heavy	Heavy Vehs	Light&Heavy	Heavy Vehs	Light&Heavy	Heavy Vehs	Light&Heavy	Heavy Vehs	Light&Heavy	
Occupants																													
07.00	158	13	2	2	0	175	198	1.13	560	23	3	26	521	589	592	13	16	609	589	592	13	16	609	589	592	13	16	609	
07.15	197	22	6	2	0	227	267	1.18	699	33	14	47	632	744	758	19	31	788	744	758	19	31	788	744	758	19	31	788	
07.30	273	40	7	2	0	322	382	1.19	955	50	12	62	877	1041	1053	16	23	1077	1041	1053	16	23	1077	1041	1053	16	23	1077	
07.45	315	52	7	1	0	375	444	1.18	1287	67	13	79	1176	1392	1405	32	44	1449	1392	1405	32	44	1449	1392	1405	32	44	1449	
08.00	344	73	14	0	1	432	537	1.24	1420	53	4	56	1336	1661	1664	28	50	1714	1661	1664	28	50	1714	1661	1664	28	50	1714	
08.15	394	79	18	7	1	499	639	1.28	1437	40	6	45	1364	1746	1752	28	44	1796	1746	1752	28	44	1796	1746	1752	28	44	1796	
08.30	352	93	33	10	2	490	687	1.40	1414	44	13	57	1341	1880	1893	16	24	1917	1880	1893	16	24	1917	1880	1893	16	24	1917	
08.45	381	96	29	5	2	513	690	1.35	1410	46	5	51	1310	1762	1768	49	75	1842	1762	1768	49	75	1842	1762	1768	49	75	1842	
09.00	354	61	13	4	0	432	531	1.23	1209	56	0	56	1118	1374	1374	35	49	1423	1374	1374	35	49	1423	1374	1374	35	49	1423	
09.15	276	83	11	2	0	372	483	1.30	1044	38	9	47	979	1271	1280	18	19	1299	1271	1280	18	19	1299	1271	1280	18	19	1299	
<b>07.30-09.30</b>	<b>2689</b>	<b>577</b>	<b>132</b>	<b>31</b>	<b>6</b>	<b>3435</b>	<b>4393</b>	<b>1.28</b>	<b>10176</b>	<b>393</b>	<b>61</b>	<b>454</b>	<b>9501</b>	<b>12128</b>	<b>12189</b>	<b>220</b>	<b>327</b>	<b>12516</b>	<b>12128</b>	<b>12189</b>	<b>220</b>	<b>327</b>	<b>12516</b>	<b>12128</b>	<b>12189</b>	<b>220</b>	<b>327</b>	<b>12516</b>	
09.30	250	77	11	0	1	339	442	1.30	948	30	3	33	876	1143	1145	39	61	1206	948	1143	39	61	1206	948	1143	39	61	1206	
09.45	265	75	6	0	0	346	433	1.25	1006	51	3	54	914	1144	1147	38	68	1215	1006	1144	38	68	1215	1006	1144	38	68	1215	
10.00	225	77	11	3	1	317	429	1.35																					
10.15	233	76	12	2	0	323	429	1.33																					
10.30	253	69	5	0	1	328	411	1.25																					
10.45	251	78	9	4	0	342	450	1.32																					
11.00	262	119	17	1	1	400	560	1.40																					
11.15	249	96	2	1	0	348	451	1.30																					
11.30	273	96	14	1	0	384	511	1.33																					
11.45	263	99	18	1	0	381	519	1.36																					
<b>10.00-12.00</b>	<b>2099</b>	<b>710</b>	<b>88</b>	<b>13</b>	<b>3</b>	<b>2823</b>	<b>3760</b>	<b>1.33</b>																					
12.00	191	56	2	3	1	253	326	1.29																					
12.15	210	58	5	1	0	274	345	1.26																					
<b>07.00-12.30</b>	<b>5969</b>	<b>1588</b>	<b>252</b>	<b>52</b>	<b>11</b>	<b>7872</b>	<b>10164</b>	<b>1.29</b>																					