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Birmingham Cordon 1999

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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.

<u>0730-0930 inbound</u>		<u>0730-0930 outbound</u>	
total vehicles	51,364	total vehicles	25,587
estimated pedal cycles	209	estimated pedal cycles	63
estimated bus	1,377	estimated bus	1,477
estimated light vehicles	47,983	estimated light vehicles	22,462
estimated goods vehicles	1,795	estimated goods vehicles	1,585
estimated persons light vehicles	60,722	estimated persons light vehicles	27,314
estimated persons heavy vehicles	2,367	estimated persons heavy vehicles	1,928
 <u>1000-1200 inbound</u>		 <u>1000-1200 outbound</u>	
total vehicles	31,090	total vehicles	26,331
estimated pedal cycles	86	estimated pedal cycles	34
estimated bus	1,318	estimated bus	1,393
estimated light vehicles	27,340	estimated light vehicles	22,835
estimated goods vehicles	2,345	estimated goods vehicles	2,068
estimated persons light vehicles	38,823	estimated persons light vehicles	29,914
estimated persons heavy vehicles	2,744	estimated persons heavy vehicles	2,440

Summary of Main Points

Total Vehicles

24 Hour

1999 inbound figures showed a decrease of less than 1% on 1997 figures. Compared with 1994, vehicles have decreased by 3.5%. (page 3, Table 3)

AM Peak (0730-0930)

Inbound morning peak figures have increased slightly on 1997 and 1995 figures and have returned to levels seen in 1994. (page 3, Table 3)

Off-Peak (1000-1200)

Traffic travelling inbound in the off-peak period has declined by 1.2% over 1997 figures. When compared with 1994 and 1995, numbers of vehicles declined by 3.7% and 2.9% respectively. However, the percentage of 24 hour traffic travelling in the am peak has remained constant at about 12.5% over the six years. (page 3, Table 3)

Saturday

Traffic travelling into Birmingham City Centre on a Saturday decreased considerably compared with previous surveys from 1994. Comparing 1999 with 1997 (the highest year), the largest decrease was in the 1000-1200 time period (10.5%). (page 8, Table 7)

Sunday

Again, traffic travelling on a Sunday during 1999 has decreased significantly especially during the 1000-1200 off-peak period. Compared with 1997 (again the highest year), traffic during this time period decrease by 31.6%. (page 8, Table 8)

People Trips

All Vehicles

Estimated occupancy figures for the morning peak show some 94,300 people travelling inbound compared with 91,300 in 1997 and 91,600 in 1995. Off-Peak, 62,700 people were recorded travelling inbound in 1999 compared with 57,600 in 1997 and 61,800 in 1995. (page 17, Tables 15 and 16)

Rail

Numbers of passengers travelling by rail during the morning peak has increased from 16,800 in 1997 to 19,00 in 1999. Off-peak, the level of passengers remained about the same at 7,500. (page 17, Tables 15 and 16)

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**. Manual counts were undertaken by Birmingham City Council.

Methodology

Counts of vehicles crossing a cordon around Birmingham City Centre are undertaken every two years using Automatic Traffic Counters (ATCs) 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 13.

Eleven sites are also surveyed manually by Birmingham City Council staff. Occupancy data was collected at two of these sites. 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 Birmingham Cordon Survey are presented on the following pages. Where appropriate, comparisons with previous years data have been made.

Background

Collection of the data took place in the two weeks beginning Monday 15th and 22nd November 1999. In future the intention will be to keep to the same weeks 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.

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 5.6% increase in inbound traffic and 4.0% decrease in outbound traffic during this time period compared with 1997.

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

	1993	1994	1995	1997	1999
Inbound Total	50,093	51,937	50,292	48,460	51,364
Outbound Total	25,817	28,072	26,501	26,660	25,587

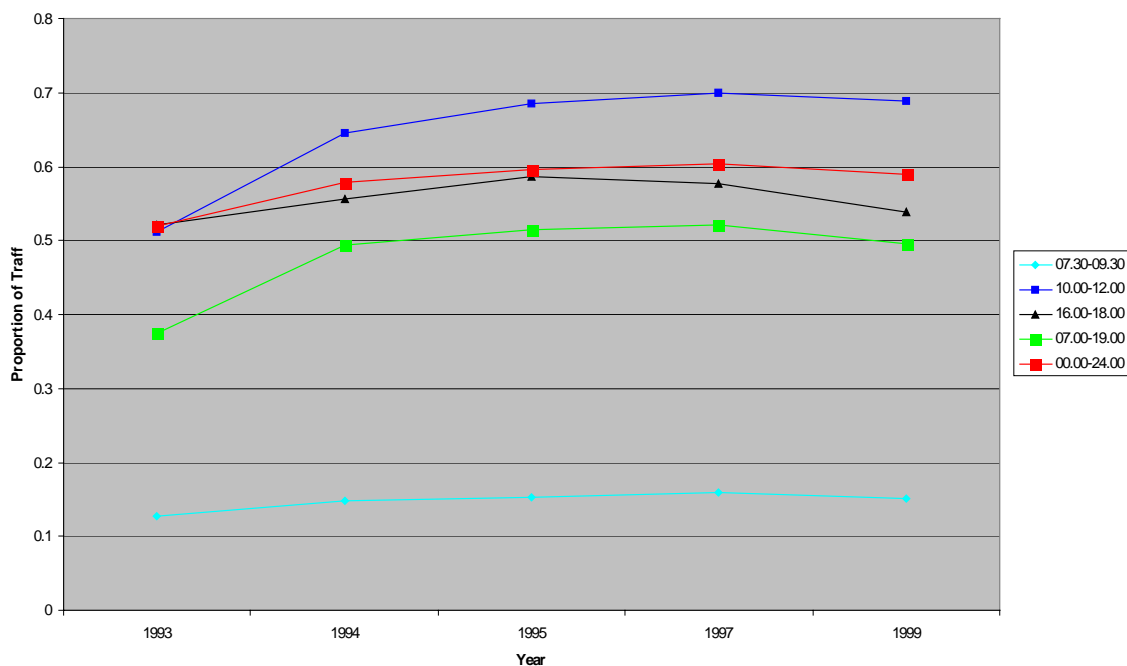
Table 2 shows the number of vehicles crossing the cordon line in the traditional off-peak morning period (10.00-12.00). The figures show very slight decreases compared with the data collected two years ago.

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

	1993	1994	1995	1997	1999
Inbound Total	31,166	32,302	32,033	31,483	31,090
Outbound Total	27,018	29,036	27,781	26,994	26,331

Figure 1 illustrates the trend in vehicles travelling into and out of the centre over the last 14 years.

Figure 1 Number of Vehicles Crossing the Cordon Line, AM Peak by Year.



The figures in Table 3 show that in 1999 around 20.5% 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 18.9%. The off-peak time period considered (1000-1200) shows 12.4% 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, overall, the numbers of vehicles counted in 1999 were slightly lower in the inbound direction and slightly higher in the outbound direction when compared with those counted 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)
1994					
Inbound	51,954	32,302	31,176	209,952	259,867
% of 24 hr	20.0	12.4	12.0	80.8	100
Outbound	28,085	29,036	48,349	205,335	259,503
% of 24 hr	10.8	11.2	18.6	79.1	100
NET	23,869	3,266	-17,173	4,617	364
1995					
Inbound	50,292	32,033	29,113	203,829	252,505
% of 24 hr	19.9	12.7	11.5	80.7	100
Outbound	26,501	27,781	45,534	196,830	249,165
% of 24 hr	10.6	11.1	18.3	79.0	100
NET	23,791	4,252	-16,421	6,999	3,340
1997					
Inbound	48,460	31,483	30,319	201,709	252,726
% of 24 hr	19.2	12.4	12.0	79.8	100
Outbound	26,660	26,994	44,061	192,289	246,484
% of 24 hr	10.8	11.0	17.9	78.0	100
NET	21,800	4,489	-13,742	9,420	6,242
1999					
Inbound	51,364	31,090	29,373	201,524	250,874
% of 24hr	20.5	12.4	11.7	80.3	100
Outbound	25,587	26,331	46,781	193,193	247,470
% of 24hr	10.3	10.6	18.9	78.1	100
NET	25,777	4,759	-17,408	8,331	3,404

Figure 2 Inbound Morning Peak Period: Vehicle Volumes by Quarter Hour - Average Weekday

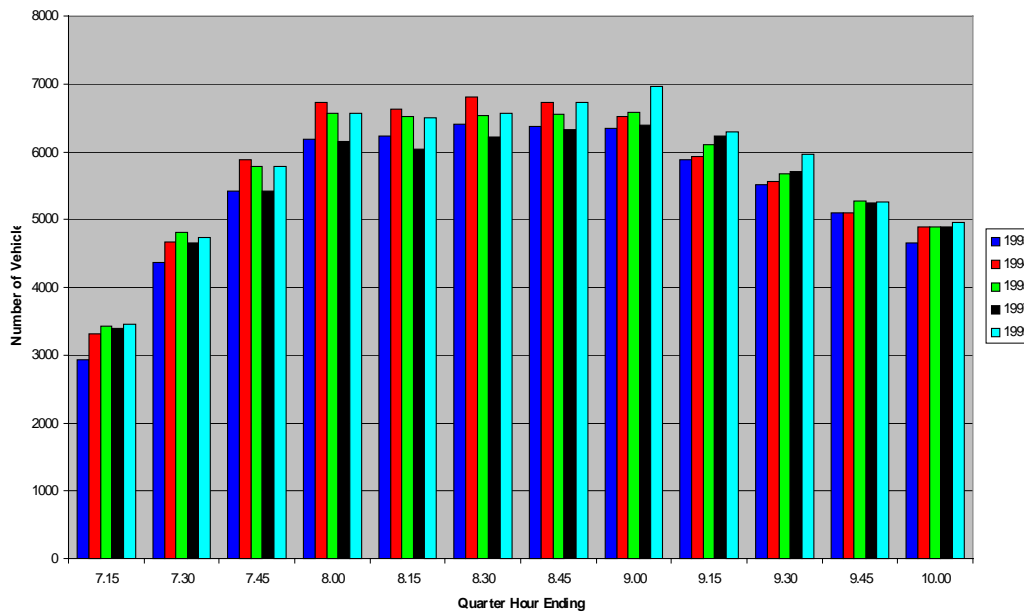


Figure 1 and Figure 2 show the two main peak periods by quarter hour. The morning figures are given from 7a.m. until 10a.m. and the evening from 4p.m. to 7p.m. These time periods are wider than those presented in previous tables. This allows a check on the traditional time periods as peak spreading may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

Figure 3 Outbound Evening Peak Period: Vehicle Volumes by Quarter Hour – Average Weekday

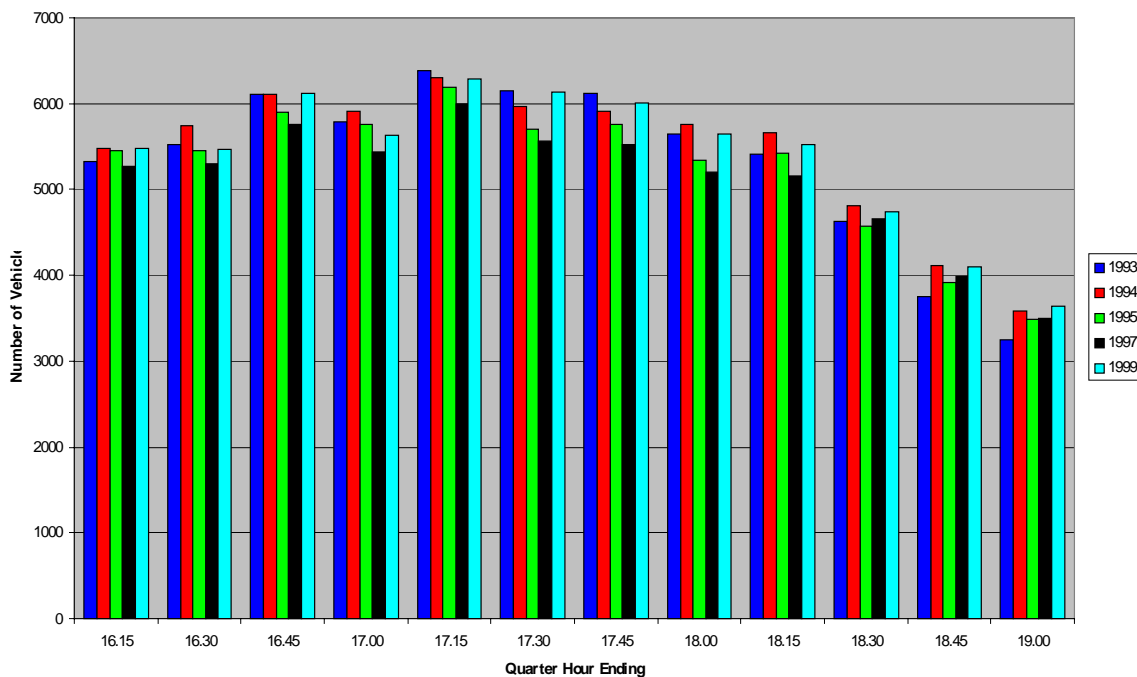


Figure 4 Inbound levels of vehicles, by hour – Average Weekday

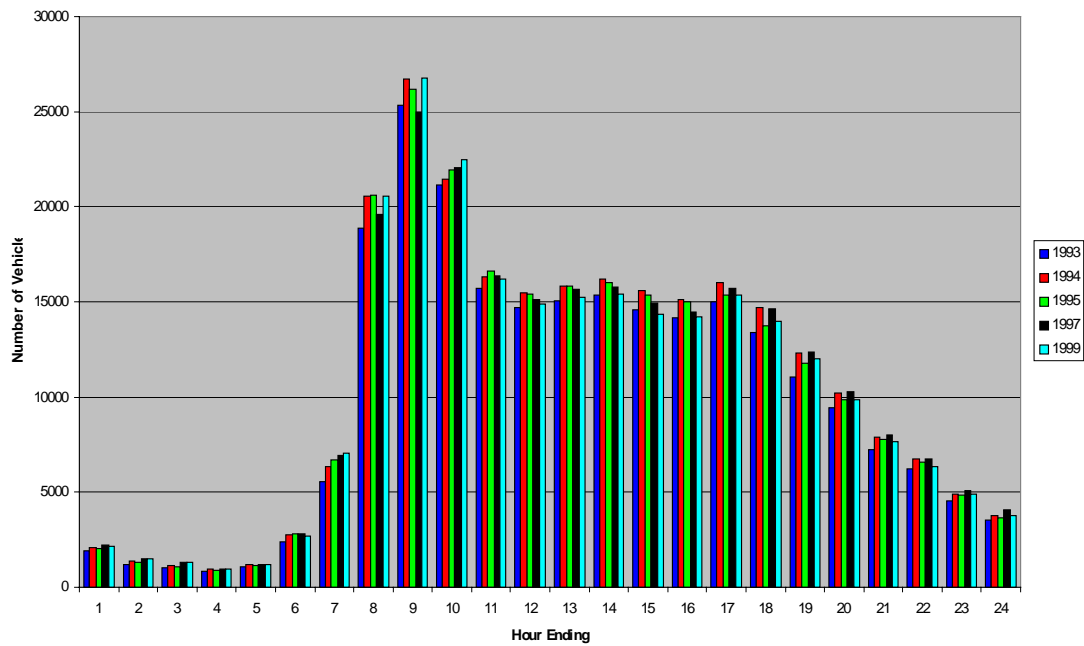
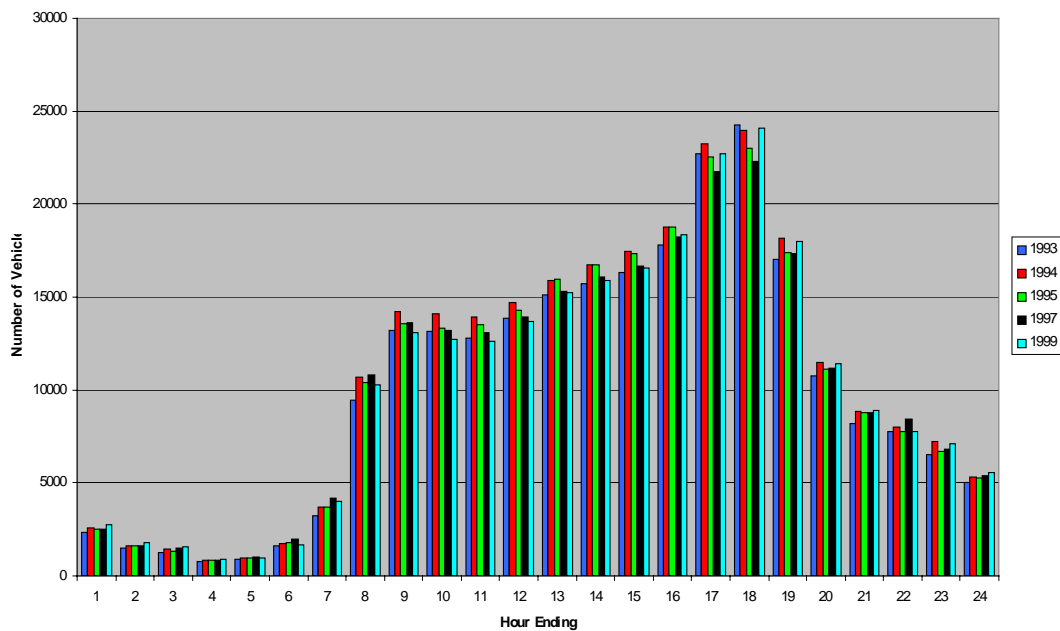


Figure 3 and Figure 4 show levels of traffic travelling inbound and outbound during the 24 hour period. In 1999 the peak hours for inbound and outbound traffic was 8-9 am and 5-6 pm respectively.

Figure 5 Outbound levels of vehicles, by hour – Average Weekday



1.1 Analysis by Corridor

Tables 4 and 5 show the number of vehicles travelling inbound and outbound by corridor. There appears to be various changes in flows between corridors over the four year period although the overall total remains around the same.

Table 4 Total Vehicles Inbound by Time Period by Corridor 1995-1999

Corridor	0730-0930	1000-1200	1600-1800	0700-1900	24 hour
1995 A	5,425	4,292	3,983	26,243	34,363
1997 A	5,134	4,104	3,710	25,186	35,014
1999 A	5,416	3,949	4,097	25,068	34,029
1995 B	7,126	4,404	3,792	27,804	33,122
1997 B	7,024	4,937	5,719	32,249	38,386
1999 B	8,250	4,669	4,276	30,467	36,295
1995 C	7,501	4,413	4,237	29,299	36,130
1997 C	6,217	3,714	3,458	24,307	30,078
1999 C	8,663	4,228	3,924	29,099	35,501
1995 D	11,943	7,599	6,587	47,284	57,488
1997 D	13,168	7,757	7,233	50,361	61,528
1999 D	11,724	6,734	6,356	44,043	53,573
1995 E	1,743	1,429	1,171	7,995	9,166
1997 E	1,609	1,137	1,075	6,828	7,873
1999 E	1,659	1,456	1,127	8,025	9,386
1995 F	7,240	4,343	3,809	27,730	33,848
1997 F	5,441	3,394	2,850	21,161	26,277
1999 F	5,980	3,955	3,211	24,146	29,856
1995 G	9,315	5,550	5,530	37,494	48,424
1997 G	9,870	6,443	6,281	41,651	53,626
1999 G	9,676	6,101	6,384	40,690	52,273
Total 1995	50,293	32,030	29,115	203,849	252,541
Total 1997	48,463	31,486	30,326	201,743	252,782
Total 1999	51,368	31,092	29,375	201,538	250,913

N.B Totals do not necessarily correspond with totals on summary page due to rounding errors

Table 5 Total Vehicles Outbound by Time Period by Corridor 1995-1999

Corridor	0730-0930	1000-1200	1600-1800	0700-1900	24 hour
1995 A	2,810	2,477	4,477	19,141	26,188
1997 A	2,290	2,079	3,625	15,609	22,535
1999 A	2,489	2,111	3,578	15,538	22,285
1995 B	3,001	3,802	6,947	26,644	32,655
1997 B	4,896	4,435	6,750	30,747	37,989
1999 B	3,207	4,065	8,169	29,693	36,544
1995 C	3,566	3,621	6,277	26,179	32,453
1997 C	3,076	3,215	5,675	23,284	28,893
1997 C	3,222	3,270	6,403	24,848	30,708
1995 D	6,705	6,709	9,694	46,729	58,840
1997 D	6,698	6,550	11,319	48,539	61,075
1999 D	6,882	6,389	11,560	48,224	61,563
1995 E	842	933	971	5,564	6,518
1997 E	633	791	1,110	5,160	5,963
1999 E	761	1,012	1,313	6,337	7,387
1995 F	3,450	4,171	7,641	29,463	36,015
1997 F	2,717	3,419	5,932	24,038	29,896
1999 F	2,776	33,843	6,406	24,742	30,698
1995 G	6,123	6,067	9,524	43,128	56,522
1997 G	6,356	6,511	9,651	44,936	60,180
1999 G	6,254	6,106	9,353	43,828	58,325
Total 1995	26,497	27,780	45,531	196,848	249,191
Total 1997	26,666	27,000	44,062	192,313	246,531
Total 1999	25,591	26,337	46,782	193,210	247,510

N.B Totals do not necessarily correspond with totals on summary page due to rounding errors

1.2 Daily and Hourly Variations

The figures in Table 6 give the proportions that each day contributes to an average weekday (Mon-Fri) for each of the traditional time periods. They 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 example, the inbound flow on a Monday between the hours of 7.30 and 9.30 was 48,681 vehicles. The proportion that Monday contributes to the average week day in this time period is 53,851/51,366 which appears as 1.048 in the table. The average weekday figures are calculated by all weekday figures added together and divided by five.

Table 6 Variations in traffic flow, by time of day 1999

	Mon.	Tues.	Wed.	Thur.	Fri.	Sat.	Sun.
Inbound							
07.30 - 09.30	1.048	1.050	1.010	0.971	0.922	0.382	0.152
10.00 - 12.00	1.016	1.026	1.020	0.965	0.972	0.806	0.689
16.00 - 18.00	1.018	1.017	1.026	0.995	0.946	0.636	0.538
07.00 - 19.00	1.020	1.030	1.017	0.967	0.967	0.652	0.496
00.00 - 24.00	0.989	1.018	1.005	0.977	1.012	0.769	0.590
Outbound							
07.30 - 09.30	1.000	1.009	0.985	0.996	1.011	0.470	0.256
10.00 - 12.00	0.970	0.984	1.004	1.001	1.041	0.815	0.572
16.00 - 18.00	1.023	1.013	1.006	0.992	0.967	0.579	0.472
07.00 - 19.00	0.983	1.000	0.995	0.993	1.030	0.684	0.528
00.00 - 24.00	0.947	0.984	1.001	1.014	1.055	0.792	0.643

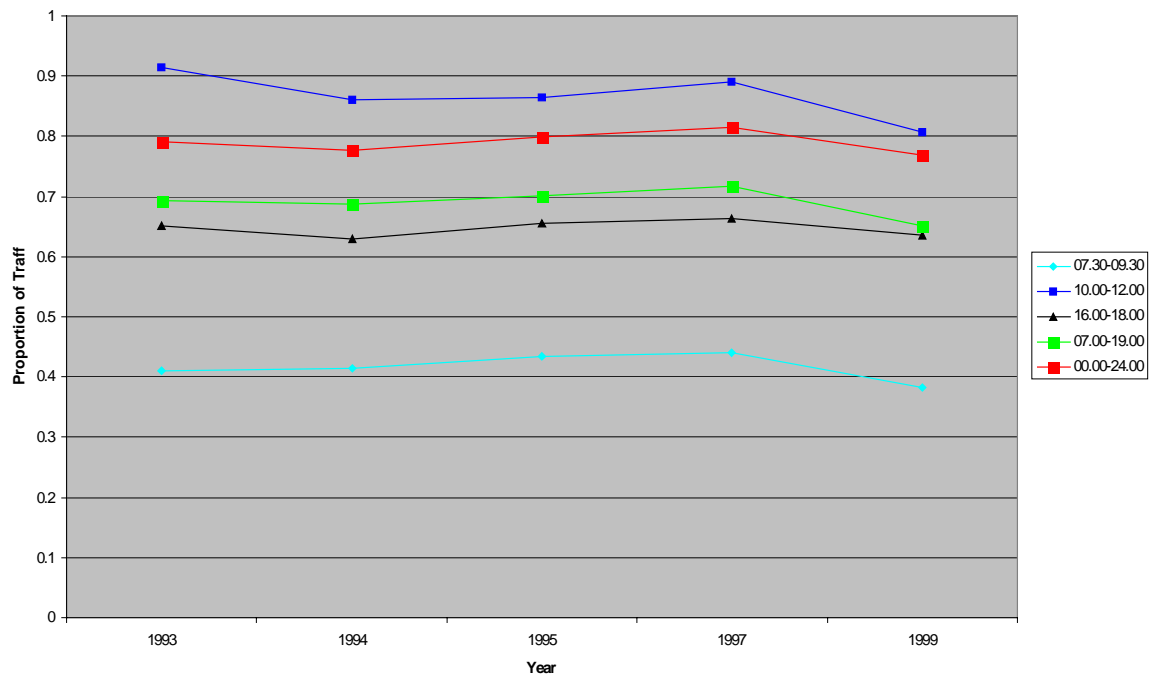
Table 7 Numbers and Average Weekday Proportions of Inbound Saturday Traffic 1993-1999

	1993	1994	1995	1997	1999
Inbound					
0730-0930	20,126 (0.411)	21,542 (0.415)	21,883 (0.435)	21,320 (0.440)	19,634 (0.382)
1000-1200	28,029 (0.914)	27,788 (0.860)	27,672 (0.864)	28,030 (0.890)	25,069 (0.806)
1600-1800	18,534 (0.651)	19,651 (0.630)	19,072 (0.655)	20,144 (0.664)	18,680 (0.636)
0700-1900	138,905 (0.693)	144,233 (0.687)	143,166 (0.702)	144,524 (0.717)	131,486 (0.652)
0000-2400	190,884 (0.791)	201,802 (0.777)	201,845 (0.799)	205,702 (0.814)	193,019 (0.769)

Table 8 Numbers and Average Weekday Proportions of Inbound Sunday Traffic 1993-1999

	1993	1994	1995	1997	1999
Inbound					
0730-0930	6,405 (0.128)	7,712 (0.148)	7,680 (0.153)	7,758 (0.160)	7,820 (0.152)
1000-1200	16,109 (0.511)	20,827 (0.645)	21,927 (0.685)	22,011 (0.699)	15,050 (0.572)
1600-1800	14,898 (0.521)	17,330 (0.556)	17,098 (0.587)	17,501 (0.577)	15,800 (0.538)
0700-1900	84,305(0.374)	103,596 (0.494)	104,780 (0.514)	105,147 (0.521)	100,054 (0.496)
0000-2400	126,216 (0.519)	150,413 (0.579)	150,501 (0.596)	152,709 (0.604)	148,001 (0.590)

Figure 6 Proportions of Inbound Saturday Traffic 1993-1999



Figures 5 and 6 show tables 7 and 8 in a graphical format. After steady rises in proportions of Saturday and Sunday traffic, levels in 1999 have declined slightly.

Figure 7 Proportions of Inbound Sunday Traffic 1993-1999

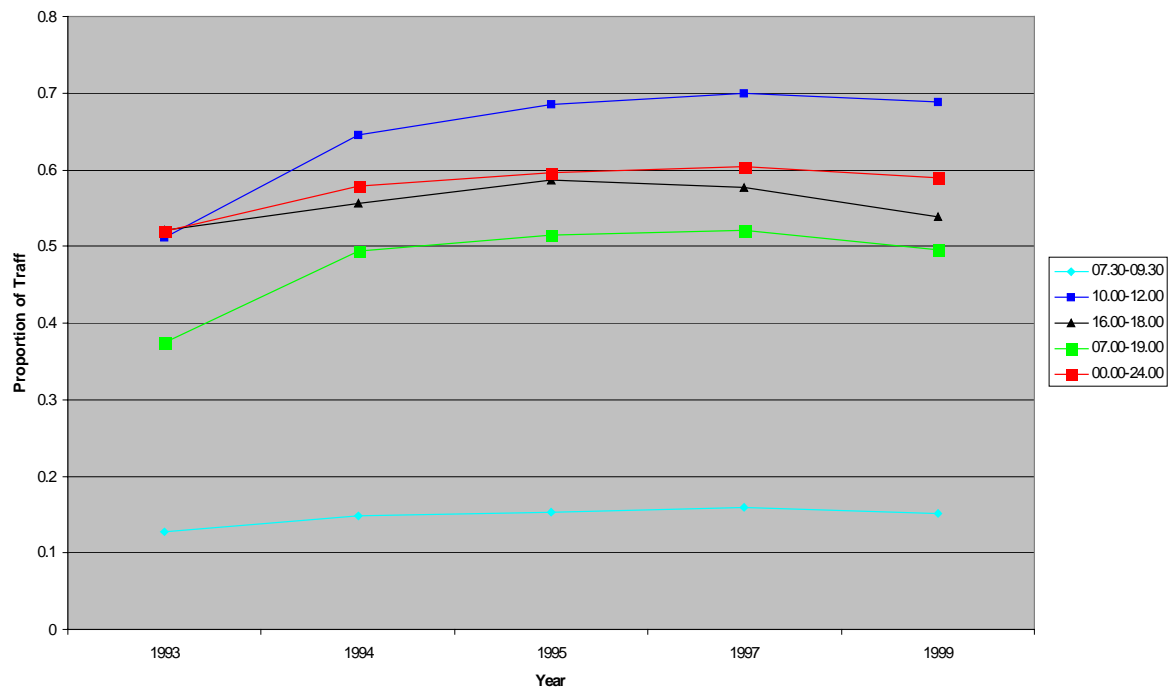


Figure 7 and Figure 8 show the gain in vehicles to the cordon by hour and the total accumulation of vehicles to the cordon. The figures used in these graphs are given in Table 9.

Table 9 Net loss / gain and accumulation in vehicles crossing the cordon, by hour – Average Weekday

Hour ending	Inbound	Outbound	Net	Cum
1.00	2158	2728	-570	-570
2.00	1504	1772	-268	-838
3.00	1285	1546	-261	-1099
4.00	959	901	58	-1041
5.00	1203	942	261	-780
6.00	2663	1665	998	218
7.00	7057	4011	3046	3264
8.00	20543	10302	10241	13505
9.00	26760	13060	13700	27205
10.00	22480	12710	9770	36975
11.00	16180	12638	3542	40517
12.00	14910	13693	1217	41734
13.00	15210	15220	-10	41724
14.00	15436	15887	-451	41273
15.00	14360	16576	-2216	39057
16.00	14245	18326	-4081	34976
17.00	15369	22714	-7345	27631
18.00	14004	24067	-10063	17568
19.00	12027	18000	-5973	11595
20.00	9844	11442	-1598	9997
21.00	7643	8896	-1253	8744
22.00	6339	7754	-1415	7329
23.00	4919	7091	-2172	5157
24.00	3776	5529	-1753	3404

Figure 8 Net loss / gain in vehicles crossing the cordon, by hour – Average Weekday

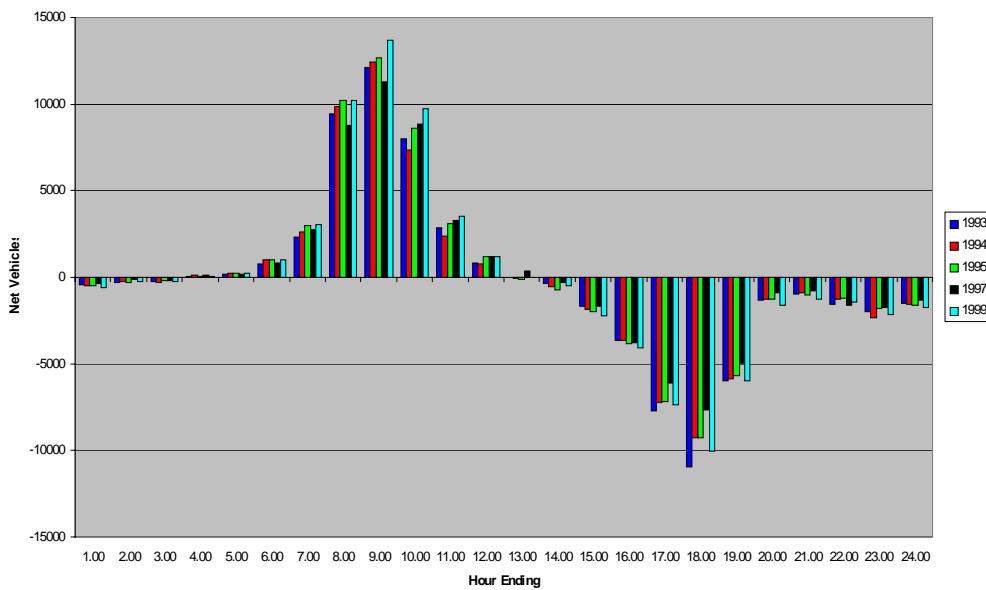
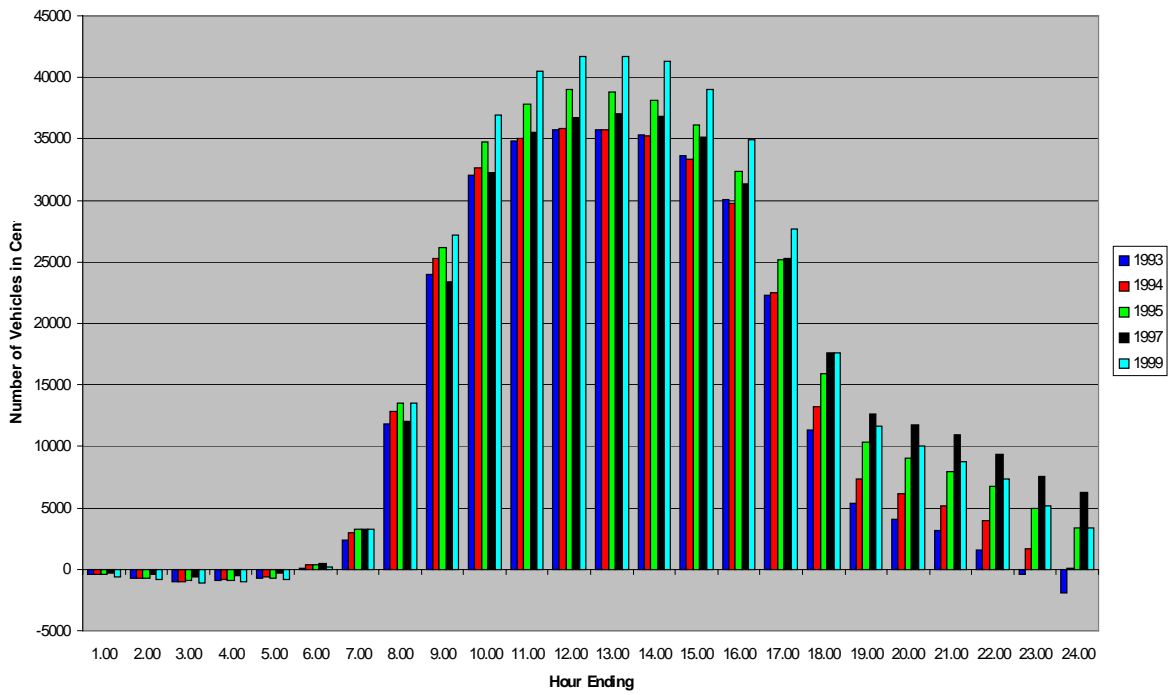


Figure 9 Net accumulation of vehicles, by hour – Average Weekday



1.3 Patterns of Travel

The figures in Table 10 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 10 Net loss / gain in vehicles on an average weekday, by site 1997&1999

Site	Location	Inbound	Inbound	Outbound	Outbound	Net 1997	Net 1999
		1997	1999	1997	1999		
MR1S	A38M Aston Exp	8916	9633	9230	11118	-314	-1485
EX01	A38M Aston Exp	33319	25731	31700	32230	1619	-6499
MR02	A34 Newtown Row	18053	21043	16815	18489	1238	2554
MR03	Summer Lane	6076	8263	5967	6184	109	2079
MR06	A41 Hockley Circus	12412	12776	11824	11596	588	1180
MR08	Pitsford Street	1157	1054	682	724	475	330
MR09	Warstone Lane	4135	4394	5427	7160	-1292	-2766
MR10	Carver Street	1508	1159			1508	1159
MR11	Pope Street			860	791	-860	-791
MR12	Camden Street	719	690			719	690
MR13	A457 Summer Hill	16068	13758	16485	13498	-417	260
MR14	King Edward Road	1083	1381	1081	1417	2	-36
MR15	Ledsam Street	1299	1083	1628	1358	-329	-275
MR19	A456 Broad Street	17620	18982	15690	15476	1930	3506
MR20	Tennant Street	2876	2623	1186	1275	1690	1348
MR21	B4127 Bath Row	10632	9512	1235	1428	9397	115
MR22	Wheeleys Lane			8762	8413	-8762	-8413
MR23	Elvetham Road	528	275	529	292	-1	-17
MR24	Spring Street	119	89	695	741	-576	-652
MR25	A38 Bristol Street	39223	37133	38240	36537	983	596
MR26	A441 Pershore Road	13755	14772	11958	12343	1797	2429
MR27	St Lukes Road	136	202	254	270	-118	-68
MR28	Gooch Street	1593	1334	2732	3019	-1139	-1685
MR29	Frank Street	437	630	1688	1748	-1251	-1118
MR31	Conybere Street	2252	2607	2289	981	-37	1626
MR32	Leopold Street	1216	1234	1916	1764	-700	-530
MR34	Moseley Road	2213	3107	1469	1150	744	1957
MR36	A41 Camp Hill	11663	10888	12461	12509	-798	-1621
MR37	A45 Coventry Road	9165	9858	9627	9256	-462	602
MR43	Curzon Street	4476	4744	7155	6633	-2679	-1889
MR46	A47 Jennens Road	10361	11263	8223	8662	2138	2601
MR48	Lister Street	2274	2203	2479	2920	-205	-717
MR49	Blews Street	744	880	186	262	558	618
MR50	Adderley Street	1295	1298	697	828	598	470
MR51	Great Barr Street	6584	8090	5264	6563	1320	1527
MR52	St Vincent Street	1763	1743	1262	1040	501	703
MR53	Grosvenor Street	2127	1171	3158	3068	-1031	-1897
MR54	Well Street	5075	5315	5670	5777	-595	-462

1.4 Mode of travel

The eleven manual surveys give us an indication of mode of travel data. The eleven sites counted manually are shown in Table 20.

Table 11 summarises the data recorded at the eleven 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 11 the percentage each vehicle category contributes to the total vehicles in that ¼ hour is given in brackets. In Table 12 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 11 Summary of Inbound mode of transport data from manual surveys

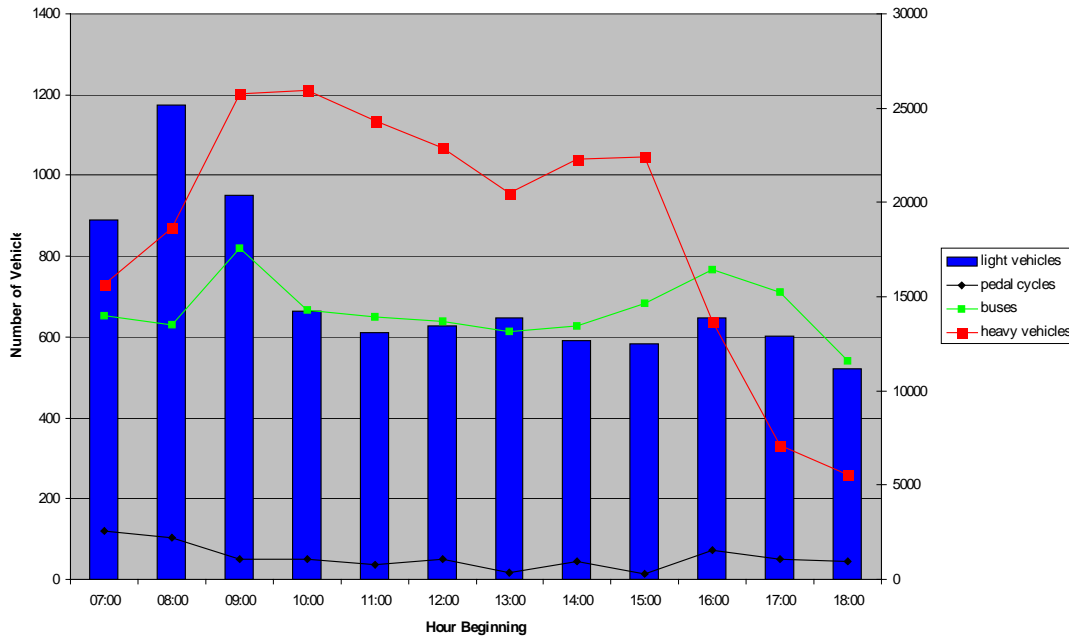
TIME STARTING	TOTAL VEH	PEDAL CYC	BUS & COACH	Light Vehs	Heavy Vehs	% pedal cycle	% bus	% light	% goods
07.00	5641	33	179	5228	201	0.59	3.17	92.68	3.56
08.00	7267	28	171	6832	236	0.39	2.35	94.01	3.25
09.00	6214	14	227	5641	332	0.23	3.65	90.78	5.34
10.00	4264	13	176	3756	319	0.30	4.13	88.09	7.48
11.00	3994	10	174	3506	304	0.25	4.36	87.78	7.61
12.00	3948	13	166	3492	277	0.33	4.20	88.45	7.02
13.00	4554	5	181	4086	282	0.11	3.97	89.72	6.19
14.00	4113	13	180	3622	298	0.32	4.38	88.06	7.25
15.00	4048	4	194	3553	297	0.10	4.79	87.77	7.34
16.00	4228	20	211	3821	176	0.47	4.99	90.37	4.16
17.00	3974	14	202	3664	94	0.35	5.08	92.20	2.37
18.00	2907	11	131	2702	63	0.38	4.51	92.95	2.17
Total	55152	178	2192	49903	2879	0.32	3.97	90.48	5.22

Table 12 Estimated Inbound mode of transport figures

TIME STARTING	number of automatic vehs	estimated ped cyc	estimated bus	estimated light	Estimated Heavy
07.00	20543	120	652	19039	732
08.00	26760	103	630	25158	869
09.00	22480	51	821	20407	1201
10.00	16180	49	668	14252	1210
11.00	14910	37	650	13088	1135
12.00	15210	50	640	13453	1067
13.00	15436	17	614	13850	956
14.00	14360	45	628	12646	1040
15.00	14245	14	683	12503	1045
16.00	15369	73	767	13890	640
17.00	14004	49	712	12912	331
18.00	12027	46	542	11179	261
Total	201524	650	8010	182344	10520

The figures in Table 12 are represented in Figure 9. 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 10 Estimated Inbound mode of transport figures



The summary for outbound modes from the manual data can be found in Table 13 with the estimated outbound in Table 14 and the graph representing these figures in Figure 10. The figures collected in the manual surveys can be found in Appendix 2.

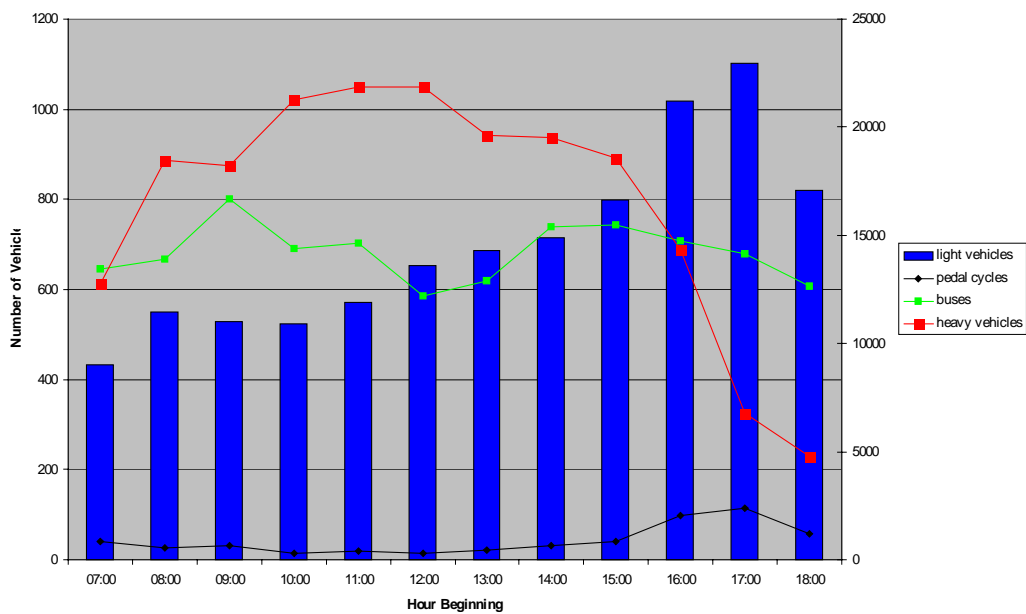
Table 13 Summary of Outbound mode of transport data from manual surveys

TIME STARTING	TOTAL VEH	PEDAL CYC	BUS & COACH	Light Vehs	Heavy Vehs	% pedal cycle	% bus	% light	% goods
07.00	2813	11	176	2459	167	0.39	6.26	87.42	5.94
08.00	3815	8	195	3353	259	0.21	5.11	87.89	6.79
09.00	3788	9	239	3279	261	0.24	6.31	86.56	6.89
10.00	3567	4	195	3080	288	0.11	5.47	86.35	8.07
11.00	4153	6	213	3616	318	0.14	5.13	87.07	7.66
12.00	4394	4	169	3918	303	0.09	3.85	89.17	6.90
13.00	4677	6	182	4212	277	0.13	3.89	90.06	5.92
14.00	4870	9	217	4369	275	0.18	4.46	89.71	5.65
15.00	5453	12	221	4955	265	0.22	4.05	90.87	4.86
16.00	6675	29	208	6236	202	0.43	3.12	93.42	3.03
17.00	7121	34	201	6790	96	0.48	2.82	95.35	1.35
18.00	5542	18	187	5266	71	0.32	3.37	95.02	1.28
Total	56868	150	2403	51533	2782	0.26	4.23	90.62	4.89

Table 14 Estimated Outbound mode of transport figures

TIME STARTING	No. auto vehs.	estimated ped cyc	estimated bus	estimated light	estimated goods
07.00	10302	40	645	9006	612
08.00	13060	27	668	11478	887
09.00	12710	30	802	11002	876
10.00	12638	14	691	10913	1020
11.00	13693	20	702	11922	1048
12.00	15220	14	585	13571	1050
13.00	15887	20	618	14307	941
14.00	16576	31	739	14871	936
15.00	18326	40	743	16652	891
16.00	22714	99	708	21220	687
17.00	24067	115	679	22948	324
18.00	18000	58	607	17104	231
Total	193193	509	8187	174995	9502

Figure 11 Estimated Outbound mode of transport figures



1.5 Occupancy Levels

Figures 11 and 12 show the estimated numbers of persons crossing the cordon calculated from the occupancy counts at two of the manual sites and the number of vehicles counted automatically per time period

Figure 12 Estimates of persons Travelling in Private Vehicles - Inbound Morning Peak Period

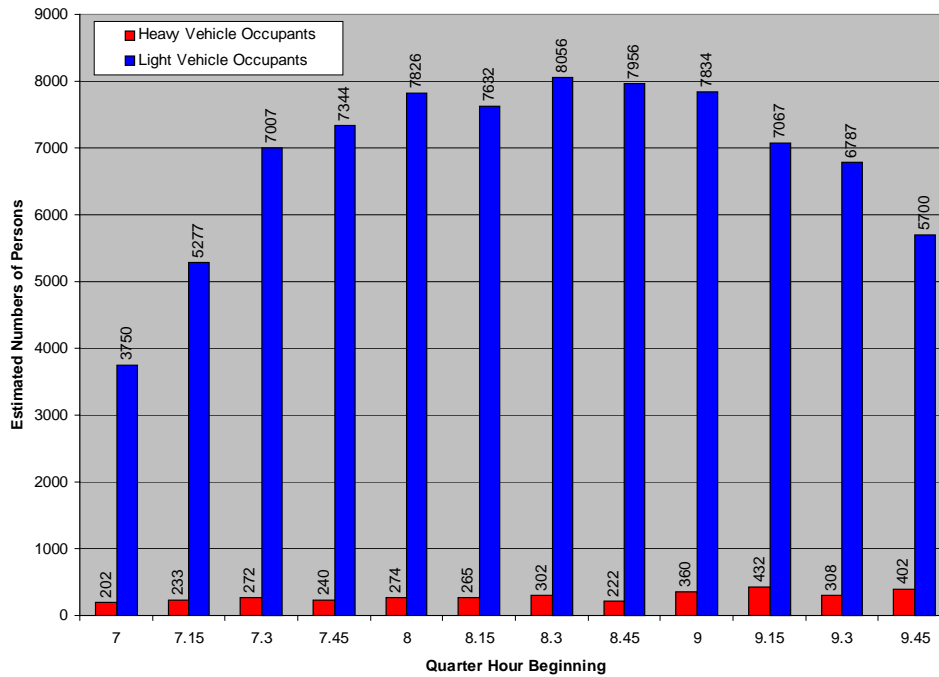
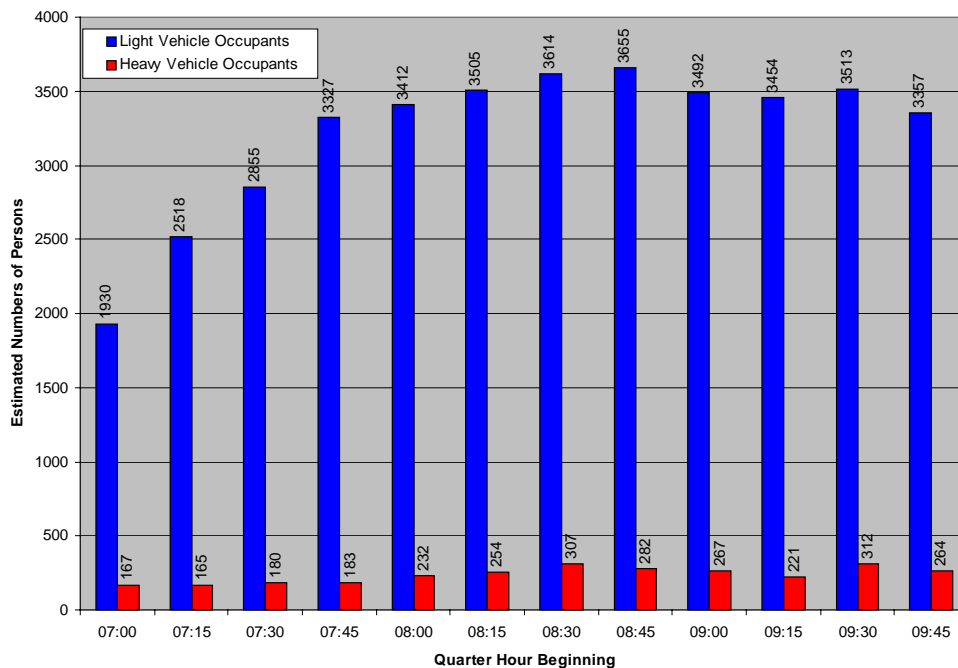


Figure 13 Estimates of persons Travelling in Private Vehicles - Outbound Morning Peak Period



1.6 Birmingham Modal Split Results 1995-1999

Tables 15 and 16 show numbers of trips into and out of Birmingham City Centre by mode of travel. Trips by rail do not include through trips (e.g. Inter City). Centro's bus counts do not include coach or taxi but do include through bus trips. All vehicle trips exclude ring road trips. People travelling on foot are excluded. Light vehicles include cars and taxis, motor cycles and light goods<30cwt.

Table 15 Estimates of Numbers of Persons by Modal Split 07.30-09.30

Mode of Trip	Number of Trips Inbound			Number of Trips Outbound		
	1995	1997	1999	1995	1997	1999
Light Vehicles (of which in cars)	57,385 (52,992)	57,913 (52,710)	60,722 (54,827)	27,798 (23,994)	28,992 (24,702)	27,314 (23,534)
Heavy Vehicles	2,188	1,783	2,367	2,060	2,466	1,928
Cycles	301	193	209	53	53	63
Buses	31,694	31,387	31,048	9,805	10,006	9,886
Total	91,568	91,276	94,346	39,716	41,517	39,191
Rail	N/A	16,813*	18,987	N/A	5,124*	4,854
Metro	N/A	N/A	998	N/A	N/A	256

* These figures have been changed by Centro

Table 16 Estimates of Numbers of Persons by Modal Split 10.00-12.00

Mode of Trip	Number of Trips Inbound			Number of Trips Outbound		
	1995	1997	1999	1995	1997	1999
Light Vehicles (of which in cars)	36,519 (31,170)	34,184 (28,626)	38,823 (32,475)	30,448 (25,143)	28,684 (23,328)	29,914 (24,355)
Heavy Vehicles	2,959	2,440	2,744	2,938	2,789	2,440
Cycles	96	62	86	55	26	34
Buses	22,247	20,928	21,096	11,711	11,197	11,372
Total	61,821	57,614	62,749	45,152	42,696	43,760
Rail	N/A	7,504*	7,388	N/A	5,007*	3,974
Metro	N/A	N/A	720	N/A	N/A	487

* These figures have been changed by Centro

Bus, Metro and rail figures have been supplied by Centro.

1.7 Trips by Corridor Analysis 1999

Numbers of people travelling by private and bus transport in each corridor have been estimated using data from the automatic count machines. Numbers of vehicles taken from these counts were multiplied by the occupancy factor taken from the occupancy counts at MR26 Sherlock Street and MR46 Jennens Road.

The number of buses in each corridor (from the CENTRO report) was deducted from the number of automatically counted vehicles in that corridor before the figures were multiplied by the occupancy factor from the manual survey. The estimates are given in Tables 17 and 18.

The numbers of people travelling by bus in each corridor were obtained from the CENTRO bus cordon survey report, the allocation of sites into corridors is given below.

Corridor A is based on sites MR19, MR20 and MR21, MR52, MR53 and includes bus count sites 2 and 3. Corridor B is likewise based on MR06, MR08, MR09, MR10, MR11, MR12, MR13, MR14, MR15 and includes bus count sites 4, 5, 80% of site 6 and 80% of site 7. Corridor C is based on MR02, MR03, MR49, MR54, 20% site 6, 20% site 7, and sites 8, 9, 10. Corridor D includes MR1S, MR1U, MR43, MR46, MR48 and bus count sites 11, 12, and 13; Site 14 is in Corridor E as are MR50 and MR51. Corridor F is based on MR27, MR28, MR29, MR31, MR32, MR34, MR36, MR37 and includes bus count sites 15, 16, 17 and 18. Corridor G is based on MR22, MR23, MR24, MR25, MR26, and includes bus count sites 19, 20 and also site 1.

Table 17 Estimates of people, by corridor Inbound 1995-1999

Corridor		Time period 07.30 - 09.30 Inbound			Time period 10.00 - 12.00 Inbound		
		1995	1997	1999	1995	1997	1999
A	Private transport	6,702	6,320	6,643	5,356	4,795	5,289
	Bus transport	4,189	4,033	4,458	3,353	2,979	3,404
	Total for Corridor	10,891	10,353	11,101	8,709	7,774	8,693
B	Private transport	9,461	8,778	10,315	5,770	5,893	6,362
	Bus transport	3,825	4,004	3,544	2,566	2,416	2,176
	Total for Corridor	13,286	12,782	13,859	8,336	8,309	8,538
C	Private transport	9,740	7,731	10,824	5,295	4,388	5,753
	Bus transport	5,043	5,174	5,106	2,982	2,909	2,840
	Total for Corridor	14,783	12,905	15,930	8,277	7,297	8,593
D	Private transport	14,761	16,459	14,618	10,157	9,240	9,184
	Bus transport	6,366	6,327	5,823	4,489	3,829	3,632
	Total for Corridor	21,127	22,786	20,441	14,646	13,069	12,816
E	Private transport	1,806	2,018	2,059	1,243	1,368	1,987
	Bus transport	558	655	971	353	381	726
	Total for Corridor	2,364	2,673	3,030	1,596	1,749	2,713
F	Private transport	8,875	6,595	7,252	5,644	3,816	5,167
	Bus transport	8,701	8,065	7,716	5,921	5,611	4,996
	Total for Corridor	17,576	14,660	14,968	11,565	9,427	10,163
G	Private transport	10,777	12,411	12,137	6,801	7,722	8,361
	Bus transport	3,009	3,129	3,430	2,582	2,803	3,322
	Total for Corridor	13,786	15,540	15,567	9,383	10,525	11,683
	Total	93,813	91,699	94,896	62,512	58,150	63,199

Table 18 Estimates of people, by corridor Outbound 1995-1999

Corridor		Time period 07.30 - 09.30 Outbound			Time period 10.00 - 12.00 Outbound		
		1995	1997	1999	1995	1997	1999
A	Private transport	3,091	2,669	2,845	3,071	2,324	2,532
	Bus transport	1,296	1,286	1,449	1,764	1,594	1,828
	Total for Corridor	4,387	3,955	4,294	4,835	3,918	4,360
B	Private transport	3,340	5,960	3,778	4,595	5,277	5,123
	Bus transport	1,184	1,408	1,270	1,350	1,425	1,130
	Total for Corridor	4,524	7,368	5,048	5,945	6,702	6,253
C	Private transport	3,985	3,672	3,783	4,183	3,775	4,107
	Bus transport	1,560	1,451	1,340	1,570	1,617	1,509
	Total for Corridor	5,545	5,123	5,128	5,753	5,392	5,616
D	Private transport	7,876	8,077	8,175	8,435	7,773	8,089
	Bus transport	1,960	1,859	1,864	2,362	1,925	2,042
	Total for Corridor	9,836	9,936	10,039	10,797	9,698	10,131
E	Private transport	964	763	888	1,033	946	1,270
	Bus transport	173	209	316	186	204	390
	Total for Corridor	1,137	972	1,204	1,219	1,150	1,660
F	Private transport	3,857	3,100	3,107	5,063	3,844	4,073
	Bus transport	2,692	2,570	2,302	3,117	3,002	2,726
	Total for Corridor	6,549	5,670	5,409	8,180	6,846	6,799
G	Private transport	7,426	7,772	7,504	7,510	7,803	7,777
	Bus transport	931	1,223	1,345	1,359	1,430	1,747
	Total for Corridor	8,357	8,995	8,849	8,869	9,233	9,524
	Total	40,344	42,019	39,971	45,598	42,939	44,343

Appendix 1 Position of Cordon Sites

Table 19 Automatic count sites

Site	Sector	Corridor	Road Used	Exact Position
MR1S	NE	D	A38M Aston Expressway	Dartmouth Circus South Slips
MR1U	*	D	A38M Aston Expressway	Dartmouth Circus Underpass
MR02*	NW	C	A34 Newtown Row	New John St West - Hatchett St
MR03	NW	C	Summer Lane	New John St West - Hatchett St
MR06	*	B	A41 Soho Hill	North of Hockley Circus
MR08*	W	B	Pitsford St	Icknield St - Vyse St
MR09*	W	B	Warstone Lane	Carver St - Tenby St
MR10	W	B	Carver St	Warstone Lane - Tenby St North
MR11	W	B	Pope St	Icknield St - Moreton St
MR12	W	B	Camden St	Icknield St - Powell St
MR13*	W	B	A457 Summer Hill	Icknield St - St Marks St
MR14*	W	B	King Edward Road	Ladywood M'way - St Marks Crescent
MR15*	W	B	Ledsam St	Ladywood M'way - Rodeney Close
MR19	W	A	A456 Broad St	East of Bishopsgate St
MR20	W	A	Tennant St	Islington Row - Bishopsgate St
MR21	W	A	B4127 Bath Row	Islington Row - Bishopsgate St
MR22*	W	G	Wheeleys Lane	Islington Row - Bath Row
MR23	SW	G	Elvetham Rd	Bell Barn Lane - Lee Bank Rd
MR24	SW	G	Spring St	Rickman Drive - Sun Street West
MR25	SW	G	A38 Bristol Street	Belgrave Rd - Rickman Drive
MR26*	SW	G	A441 Pershore Rd	Belgrave Rd - Hope St
MR27	SE	F	St Lukes Road	Belgrave Rd - Berrington Walk
MR28	SE	F	Gooch St	Belgrave Rd - Highgate St
MR29	SE	F	Frank St	Belgrave Rd - Highgate St
MR31	SE	F	Conybere St	Link Rd - Highgate Middleway
MR32	SE	F	Leopold St	Upper Highgate St - Highgate M'way
MR34	SE	F	Moseley Road	Chandos St - Moseley St
MR36	SE	F	A41 Camp Hill	Ravenhurst St - Bradford St
MR37*	E	F	A45 Coventry Rd	Bowyer St - New Bond St
MR43	E	D	Curzon St	Penn St - Lawley St
MR46*	E	D	A47 Jennens Rd	Holt St - Dartmouth St
MR48	E	D	Lister Street	Oxygen St - Dartmouth St
MR49	NW	C	Blews St	Turn at New John St
MR50	E	E	Adderley St	Glover St - Liverpool St
MR51	E	E	Great Barr St	Glover St - Liverpool St
MR52*	W	A	St Vincent St West	Gilby Rd - Ledsam St
MR53	W	A	Grosvenor St West	Ruston St - Ryland St
MR54	NW	C	Well St	South of New John Street

* Sites also counted manually.

Table 20 **Manual Count sites**

MR46	R508	Jennens Road	Between Belmont and Lawley M'way
MR13	R5741	Summer Hill Rd	East of Icknield St
MR37	R3074	Coventry Road	East of Bowyer Street
MR9	R5687	Warstone Lane	Near Carver St
MR52	R5603	St Vincent St West	East of Gilby St
MR26	R2548	Sherlock St	South of St Lukes Road
MR2	R7309	New Town Row	South of New John St West
MR15	R6062	Ledsam St	South of Ladywood Middleway
MR14	R7839	King Edward's Rd	South of Ladywood Middleway
MR8	R2508	Pitsford St	East of Icknield Street
MR22	R5937	Wheeley's Lane	Between Islington and Bath Row

Appendix 2 Estimates of Vehicle Type from Passage Count Data

Direction: Inbound															
TIME	TOTAL	PEDAL	BUS &	Light	Heavy		% pedal	% bus	% light	% heavy	No. auto	est.	est.	est.	
STARTING	VEH	CYC	COACH	Vehs	Vehs		cycle				vehs	ped cyc	bus	light	heavy
07:00	5641	33	179	5228	201		0.59%	3.17%	92.68%	3.56%	20543	120	652	19039	732
08:00	7267	28	171	6832	236		0.39%	2.35%	94.01%	3.25%	26760	103	630	25158	869
09:00	6214	14	227	5641	332		0.23%	3.65%	90.78%	5.34%	22480	51	821	20407	1201
10:00	4264	13	176	3756	319		0.30%	4.13%	88.09%	7.48%	16180	49	668	14252	1210
11:00	3994	10	174	3506	304		0.25%	4.36%	87.78%	7.61%	14910	37	650	13088	1135
12:00	3948	13	166	3492	277		0.33%	4.20%	88.45%	7.02%	15210	50	640	13453	1067
13:00	4554	5	181	4086	282		0.11%	3.97%	89.72%	6.19%	15436	17	614	13850	956
14:00	4113	13	180	3622	298		0.32%	4.38%	88.06%	7.25%	14360	45	628	12646	1040
15:00	4048	4	194	3553	297		0.10%	4.79%	87.77%	7.34%	14245	14	683	12503	1045
16:00	4228	20	211	3821	176		0.47%	4.99%	90.37%	4.16%	15369	73	767	13890	640
17:00	3974	14	202	3664	94		0.35%	5.08%	92.20%	2.37%	14004	49	712	12912	331
18:00	2907	11	131	2702	63		0.38%	4.51%	92.95%	2.17%	12027	46	542	11179	261
Total	55152	178	2192	49903	2879		0.32%	3.97%	90.48%	5.22%	201524	650	8010	182344	10520
07:00	941	7	41	849	44		0.74%	4.36%	90.22%	4.68%	3459	26	151	3121	162
07:15	1329	6	43	1221	59		0.45%	3.24%	91.87%	4.44%	4741	21	153	4356	210
07:30	1587	7	48	1483	49		0.44%	3.02%	93.45%	3.09%	5784	26	175	5405	179
07:45	1784	13	47	1675	49		0.73%	2.63%	93.89%	2.75%	6559	48	173	6158	180
08:00	1724	5	42	1617	60		0.29%	2.44%	93.79%	3.48%	6495	19	158	6092	226
08:15	1818	7	36	1709	66		0.39%	1.98%	94.00%	3.63%	6571	25	130	6177	239
08:30	1822	11	40	1709	62		0.60%	2.20%	93.80%	3.40%	6722	41	148	6305	229
08:45	1903	5	53	1797	48		0.26%	2.79%	94.43%	2.52%	6972	18	194	6584	176
09:00	1705	3	53	1579	70		0.18%	3.11%	92.61%	4.11%	6296	11	196	5831	258
09:15	1643	6	56	1496	85		0.37%	3.41%	91.05%	5.17%	5965	22	203	5431	309
09:30	1520	3	58	1376	83		0.20%	3.82%	90.53%	5.46%	5266	10	201	4767	288
09:45	1346	2	60	1190	94		0.15%	4.46%	88.41%	6.98%	4953	7	221	4379	346
Total 0730-0930	13986	57	375	13065	489		0.41%	2.68%	93.41%	3.50%	51364	209	1377	47983	1795
Total 0700-1000	19122	75	577	17701	769		0.39%	3.02%	92.57%	4.02%	69783	274	2103	64606	2801
TIME	TOTAL	PEDAL	BUS &	Light	Heavy		% pedal	% bus	% light	% heavy	No. auto	est.	est.	est.	est.
STARTING	VEH	CYC	COACH	Vehs	Vehs		cycle				vehs	ped cyc	bus	light	heavy
16:00	1042	2	52	939	49		0.19%	4.99%	90.12%	4.70%	2769	5	138	2495	130
16:15	1068	6	60	953	49		0.56%	5.62%	89.23%	4.59%	2667	15	150	2380	122
16:30	1040	4	59	928	49		0.38%	5.67%	89.23%	4.71%	2862	11	162	2554	135
16:45	1078	8	40	1001	29		0.74%	3.71%	92.86%	2.69%	2872	21	107	2667	77
17:00	1103	6	56	1007	34		0.54%	5.08%	91.30%	3.08%	2897	16	147	2645	89
17:15	987	0	51	910	26		0.00%	5.17%	92.20%	2.63%	2775	0	143	2559	73
17:30	972	5	50	900	17		0.51%	5.14%	92.59%	1.75%	2755	14	142	2551	48
17:45	912	3	45	847	17		0.33%	4.93%	92.87%	1.86%	2668	9	132	2478	50
18:00	797	4	39	740	14		0.50%	4.89%	92.85%	1.76%	2527	13	124	2346	44
18:15	797	4	41	730	22		0.50%	5.14%	91.59%	2.76%	2398	12	123	2196	66
18:30	687	0	25	650	12		0.00%	3.64%	94.61%	1.75%	2340	0	85	2214	41
18:45	626	3	26	582	15		0.48%	4.15%	92.97%	2.40%	2306	11	96	2144	55
Total 1630-1830	7686	34	381	7063	208		0.44%	4.96%	91.89%	2.71%	21754	96	1080	19995	583
Total 1600-1900	11109	45	544	10187	333		0.41%	4.90%	91.70%	3.00%	31836	127	1549	29228	932

Direction: Outbound														
TIME	TOTAL	PEDAL	BUS &	Light	Heavy	% pedal	% bus	% light	% heavy	No. auto	est.	est.	est.	est.
STARTING	VEH	CYC	COACH	Vehs	Vehs	cycle				vehs	ped cyc	bus	light	heavy
07:00	2813	11	176	2459	167	0.39%	6.26%	87.42%	5.94%	10302	40	645	9006	612
08:00	3815	8	195	3353	259	0.21%	5.11%	87.89%	6.79%	13060	27	668	11478	887
09:00	3788	9	239	3279	261	0.24%	6.31%	86.56%	6.89%	12710	30	802	11002	876
10:00	3567	4	195	3080	288	0.11%	5.47%	86.35%	8.07%	12638	14	691	10913	1020
11:00	4153	6	213	3616	318	0.14%	5.13%	87.07%	7.66%	13693	20	702	11922	1048
12:00	4394	4	169	3918	303	0.09%	3.85%	89.17%	6.90%	15220	14	585	13571	1050
13:00	4677	6	182	4212	277	0.13%	3.89%	90.06%	5.92%	15887	20	618	14307	941
14:00	4870	9	217	4369	275	0.18%	4.46%	89.71%	5.65%	16576	31	739	14871	936
15:00	5453	12	221	4955	265	0.22%	4.05%	90.87%	4.86%	18326	40	743	16652	891
16:00	6675	29	208	6236	202	0.43%	3.12%	93.42%	3.03%	22714	99	708	21220	687
17:00	7121	34	201	6790	96	0.48%	2.82%	95.35%	1.35%	24067	115	679	22948	324
18:00	5542	18	187	5266	71	0.32%	3.37%	95.02%	1.28%	18000	58	607	17104	231
Total	56868	150	2403	51533	2782	0.26%	4.23%	90.62%	4.89%	193193	509	8187	174995	9502
7.00	516	2	29	445	40	0.39%	5.62%	86.24%	7.75%	1903	7	107	1641	148
7.15	676	4	41	588	43	0.59%	6.07%	86.98%	6.36%	2417	14	147	2102	154
7.30	744	2	56	647	39	0.27%	7.53%	86.96%	5.24%	2835	8	213	2465	149
7.45	877	3	50	779	45	0.34%	5.70%	88.83%	5.13%	3147	11	179	2795	161
8.00	907	6	56	786	59	0.66%	6.17%	86.66%	6.50%	3209	21	198	2781	209
8.15	935	1	49	823	62	0.11%	5.24%	88.02%	6.63%	3246	3	170	2857	215
8.30	989	0	52	868	69	0.00%	5.26%	87.77%	6.98%	3253	0	171	2855	227
8.45	984	1	38	876	69	0.10%	3.86%	89.02%	7.01%	3352	3	129	2984	235
9.00	1006	2	74	866	64	0.20%	7.36%	86.08%	6.36%	3355	7	247	2888	213
9.15	963	3	51	856	53	0.31%	5.30%	88.89%	5.50%	3190	10	169	2836	176
9.30	926	2	54	795	75	0.22%	5.83%	85.85%	8.10%	3077	7	179	2642	249
9.45	893	2	60	762	69	0.22%	6.72%	85.33%	7.73%	3088	7	207	2635	239
Total 0730-0930	842	1	426	6501	460	0.12%	50.59%	772.09%	54.63%	25587	63	1477	22462	1585
Total 0700-1000	10416	28	610	9091	687	0.27%	5.86%	87.28%	6.60%	36072	98	2118	31482	2374
TIME	TOTAL	PEDAL	BUS &	Light	Heavy	% pedal	% bus	% light	% heavy	No. auto	est.	est.	est.	est.
STARTING	VEH	CYC	COACH	Vehs	Vehs	cycle				vehs	ped cyc	bus	light	heavy
16.00	1615	7	50	1497	61	0.43%	3.10%	92.69%	3.78%	5484	24	170	5083	207
16.15	1622	3	55	1503	61	0.18%	3.39%	92.66%	3.76%	5470	10	185	5069	206
16.30	1877	14	54	1759	50	0.75%	2.88%	93.71%	2.66%	6121	46	176	5736	163
16.45	1561	5	49	1477	30	0.32%	3.14%	94.62%	1.92%	5639	18	177	5336	108
17.00	1860	12	42	1774	32	0.65%	2.26%	95.38%	1.72%	6285	41	142	5994	108
17.15	1821	11	61	1723	26	0.60%	3.35%	94.62%	1.43%	6132	37	205	5802	88
17.30	1822	8	42	1753	19	0.44%	2.31%	96.21%	1.04%	6007	26	138	5780	63
17.45	1618	3	56	1540	19	0.19%	3.46%	95.18%	1.17%	5643	10	195	5371	66
18.00	1626	6	48	1555	17	0.37%	2.95%	95.63%	1.05%	5517	20	163	5276	58
18.15	1477	7	55	1391	24	0.47%	3.72%	94.18%	1.62%	4745	22	177	4469	77
18.30	1290	4	46	1222	18	0.31%	3.57%	94.73%	1.40%	4098	13	146	3882	57
18.45	1149	1	38	1098	12	0.09%	3.31%	95.56%	1.04%	3640	3	120	3478	38
Total 1630-1830	13662	66	407	12972	217	0.48%	2.98%	94.95%	1.59%	46089	221	1374	43763	731
Total 1600-1900	19338	81	596	18292	369	0.42%	3.08%	94.59%	1.91%	64781	271	1996	61276	1239

Appendix 3 Estimates of Persons from Occupancy data

INBOUND	(Total Surveys Carried out at Jennens Road and Sherlock Street)					Total Veh	Total Pass	Ave Occupancy					
	1	2	3	4	5								
	Number of vehicles with shown number of occupants											estimated	estimated people
Start Time	1	2	3	4	5	Total Veh	Total Pass	Ave Occupancy				light vehs	in light vehs
07:00	211	42	5	0	0	258	310	1.20				3121	3750
07:15	323	67	4	3	0	397	481	1.21				4356	5277
07:30	293	93	11	1	0	398	516	1.30				5405	7007
07:45	419	85	2	3	0	509	607	1.19				6158	7344
08:00	325	92	14	1	0	432	555	1.28				6092	7826
08:15	399	87	14	1	0	501	619	1.24				6177	7632
08:30	418	115	16	2	0	551	704	1.28				6305	8056
08:45	423	92	7	1	0	523	632	1.21				6584	7956
09:00	364	93	30	4	1	492	661	1.34				5831	7834
09:15	328	105	8	3	1	445	579	1.30				5431	7067
09:30	296	111	21	11	0	439	625	1.42				4767	6787
09:45	314	91	13	2	1	421	548	1.30				4379	5700
10:00	237	87	12	6	1	343	476	1.39					
10:15	199	69	32	6	3	309	472	1.53				estimated people in light	82236
10:30	201	81	16	2	1	301	424	1.41				vehicles 07.00-10.00	
10:45	187	57	10	4	1	259	352	1.36					
11:00	171	75	8	6	4	264	389	1.47				estimated people in light	60722
11:15	188	71	18	4	0	281	400	1.42				vehicles 07.30-09.30	
11:30	180	59	12	2	5	258	367	1.42					
11:45	169	48	13	4	0	234	320	1.37					
12:00	208	83	14	7	1	313	449	1.43					
12:15	196	61	8	2	2	269	360	1.34					
12:30	205	80	8	3	0	296	401	1.35					
12:45	210	62	10	3	1	286	381	1.33					
0730-0930	2969	762	102	16	2	3851	4873	1.27					
1000-1200	1532	547	121	34	15	2249	3200	1.42					
0700-1230	6049	1764	288	75	21	8197	10846	1.32					

Days Carried out at Jennens Road and Sherlock Street)									
of vehicles with shown number of occupants				Total Veh	Total Pass	Ave Occupancy	estimated light vehicles	estimated people in light vehicles	
2	3	4	5						
18	2	1	0	142	167	1.18	1641	1930	
23	6	0	0	177	212	1.20	2102	2518	
24	2	0	0	177	205	1.16	2465	2855	
33	3	1	0	221	263	1.19	2795	3327	
26	8	1	1	216	265	1.23	2781	3412	
32	3	1	2	216	265	1.23	2857	3505	
26	6	4	1	203	257	1.27	2855	3614	
29	5	2	1	218	267	1.22	2984	3655	
27	6	1	0	201	243	1.21	2888	3492	
35	2	0	1	197	240	1.22	2836	3454	
38	7	4	0	194	258	1.33	2642	3513	
34	8	1	1	208	265	1.27	2635	3357	
48	4	3	0	220	285	1.30			
40	7	1	0	192	249	1.30	estimated people in light vehicles 07.00-10.00	38633	
33	4	3	0	195	245	1.26			
43	4	3	0	221	281	1.27			
57	8	0	1	230	307	1.33	estimated people in light vehicles 07.30-09.30	27314	
48	9	1	2	229	306	1.34			
51	12	3	1	248	336	1.35			
55	7	5	0	259	343	1.32			
49	8	7	2	264	358	1.36			
72	18	6	3	294	432	1.47			
70	12	4	4	301	423	1.41			
54	8	6	3	251	351	1.40			
232	35	10	6	1649	2005	1.22			
375	55	19	4	1794	2352	1.31			
841	139	48	16	4722	6049	1.28			

Appendix 4 Comparison of Manual and Automatic Counts

Eleven of the automatic sites were manually surveyed for the 12 hour period (0700 - 1900)

The figures presented here compare the results of the manual surveys with the results of the automatic surveys for certain time periods.

The conclusion of the comparison revealed that although the automatic counts are over counting in some time periods and under counting in others, these discrepancies would even themselves out over a longer time period.

The Department of Transport's Traffic Appraisal Manual (TAM) quotes +/- 5% as being the error margin for a 95% confidence interval of the true flows for an automatic count taken over a period of more than 12 hours (TAM 1981 6.2.5). The corresponding error margin for a manual count taken over a short period of time is +/- 10% (TAM 1981 6.3.5).

Table A4. 1 MR02 Newtown Row Tuesday 23rd November 1999

	INBOUND		OUTBOUND	
	Manual	Automatic	Manual	Automatic
Time Period				
07.30 - 09.30	3,225	5,132	1,812	2,074
16.30 - 18.30	1,968	1,915	2,919	3,371
07.00 - 19.00	12,825	16,657	12,538	14,327

Table A4. 2 MR08 Pitsford Street Wednesday 24th November 1999

	INBOUND		OUTBOUND	
	Manual	Automatic	Manual	Automatic
Time Period				
07.30 - 09.30	234	245	37	50
16.30 - 18.30	101	101	80	107
07.00 - 19.00	900	974	445	709

Table A4. 3 MR09 Warstone Lane Wednesday 17th November 1999

	INBOUND		OUTBOUND	
	Manual	Automatic	Manual	Automatic
Time Period				
07.30 - 09.30	1,190	1,037	286	502
16.30 - 18.30	395	350	1,315	2,021
07.00 - 19.00	4,166	3,680	3,878	6,121

Table A4. 4 MR13 Summer Hill Road Tuesday 16th November 1999

	INBOUND		OUTBOUND	
	Manual	Automatic	Manual	Automatic
Time Period				
07.30 - 09.30	3,465	3,262	1,376	1,291
16.30 - 18.30	1,673	1,575	2,857	2,829
07.00 - 19.00	11,966	11,492	10,908	10,592

Table A4. 5 MR14 King Edwards Road Wednesday 24th November 1999

	INBOUND		OUTBOUND	
	Manual	Automatic	Manual	Automatic
Time Period				
07.30 - 09.30	99	176	43	86
16.30 - 18.30	98	153	234	396
07.00 - 19.00	685	1,032	584	1,108

Table A4. 6 MR15 Ledsam Street Tuesday 23rd November 1999

	INBOUND		OUTBOUND	
	Manual	Automatic	Manual	Automatic
Time Period				
07.30 - 09.30	157	178	113	118
16.30 - 18.30	116	126	263	295
07.00 - 19.00	806	926	959	1,061

Table A4. 7 MR22 Wheellys Lane Thursday 25th November 1999

	INBOUND		OUTBOUND	
	Manual	Automatic	Manual	Automatic
Time Period				
07.30 - 09.30			893	918
16.30 - 18.30			1,554	1,580
07.00 - 19.00			5,970	6,222

Table A4. 8 MR26 Sherlock Street Monday 22nd November 1999

	INBOUND		OUTBOUND	
	Manual	Automatic	Manual	Automatic
Time Period				
07.30 - 09.30	1,676	2,560	910	996
16.30 - 18.30	885	1,540	1,434	1,672
07.00 - 19.00	7,375	11,203	8,252	9,251

Table A4. 9 MR37 Coventry Road Tuesday 16th November 1999

	INBOUND		OUTBOUND	
	Manual	Automatic	Manual	Automatic
Time Period				
07.30 - 09.30	1,335	1,562	834	882
16.30 - 18.30	857	910	1,270	1,686
07.00 - 19.00	6,423	7,579	6,114	7,280

Table A4. 10 MR46 Jennens Road Monday 15th November 1999

	INBOUND		OUTBOUND	
	Manual	Automatic	Manual	Automatic
Time Period				
07.30 - 09.30	2,328	2,358	1,016	1,046
16.30 - 18.30	1,290	1,309	1,530	1,565
07.00 - 19.00	8,641	8,992	6,446	6,612

Table A4. 11 MR52 St Vincent St West Thursday 18th November 1999

	INBOUND		OUTBOUND	
	Manual	Automatic	Manual	Automatic
Time Period				
07.30 - 09.30	277	254	85	86
16.30 - 18.30	303	314	172	198
07.00 - 19.00	1,365	1,407	774	846