General Report Data

The following two pages have been prepared to simplify the entering of general report data, such as the report title and QA records, that may appear in several locations within the report. Users need only input the data once. This page may be deleted after reading, but the second page containing the Data Input Table must remain as part of the 'WORD' file. Both pages must be omitted from the bound printed report.

The data are recorded in 'Bookmarks' in the column headed 'X' of the Data Input Table, and 'Bookmark References' display the data in the column headed 'Record of input' and in appropriate locations in the report. The Data Input Table also gives the names of the 'Bookmarks'. Do not delete a 'Bookmark' or a 'Bookmark Reference'.

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Guidance on entering specific data is as follows:

- Some of the 'Bookmarks', namely T2, T3, HL2 and HR2 may not be relevant to a particular report. For such 'Bookmarks', enter a couple of blank spaces. Do not input a void, otherwise the 'Bookmark' gives an error message.

- The report title, comprising up to three lines in bold LucidaSans[1] font, is displayed on pages i and ii. Users must change the font size so that the longest of the three lines fills the horizontal space made available for the title on page i. However, the font size must not exceed 26 points and should preferably be at least 22 points. The same font size is also used for the title lines on page ii.

  Do not insert 'Carriage Returns' to split 'Bookmark References' in the report titles on pages i and ii, otherwise the title may not display correctly. Where a title line is too long, shorten it by changing the appropriate 'Bookmark' entry.

- When preparing revisions B, C, etc of a report, users must update the Issue and Revision Record on page ii. The table row programmed with the 'bookmark references' contains the date and the revision letter for the latest revision and must be at the bottom of the table. To create a record for another revision, users must insert a row immediately above the bottom row. Users then enter the data for the superseded revision directly into this row. The date and the revision letter for the new revision (in the bottom row) is updated through the Data Input Table using the method previously described.

[1] The spelling of LucidaSans differs between computers. On some computers, the name comprises two words that is Lucida Sans (which is the correct version), on others the words are combined. In this template, the name is one word, which seems to be the normal case. Thus, on computers having the name in two words, the font in the main title of the report on pages i and ii must be selected and renewed to display properly.

Data Input Table – Do Not Delete

Item	Location	Bookmark name	X[1,2]	Record of input[3,4]
Report Title – first line	Pages i and ii	T1		Wolverhampton Cordon Survey
Report Title – second line	Pages i and ii	T2		Survey
Report Title – third line	Pages i and ii	T3		1998
Report Title or Heading – first line	Left aligned in headers	HL1		Wolverhampton Cordon Survey 1998
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
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		January 2000
Initials of word processor	Footers	INI		DMK

Notes

[1] This column contains the 'Bookmarks'. Do not enter data directly into this column or any other column in the table. Similarly, do not delete data in the columns.

To enter data, right click at the centre of the particular cell in column 'X' and choose 'Update Field' from the menu to enter data through the dialogue box. Do not enter a void in any of the dialogue boxes, otherwise an error message will be displayed. Enter a couple of blank spaces instead.

[2] If you delete a 'Bookmark', you will need to recreate it in the same place with the same name using 'Insert + Fields + Mail Merge + Ask'.

[3] This column and the appropriate locations in the report contain the 'Bookmark References'. These references can be updated by changing the 'View' from 'Normal' to 'Page Layout' and back again.

[4] If you delete a 'Bookmark Reference', you will need to recreate it in the same place with the same name using 'Insert + Fields + Links and References + Ref'. The help locate a reference (or any other 'Field Code') highlight the codes using 'Tools + Options + Field shading + Always'.

[5] Do not insert 'Carriage Returns' to split 'Bookmark references' in the report titles on pages i and ii, otherwise the title will not display correctly. Where a title line is too long, shorten it by changing the appropriate 'Bookmark' entry.

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Heantun House
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Wolverhampton Cordon Survey 1998

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Issue and Revision Record

Rev	Date	Originator (Print) (Signature)	Checker (Print) (Signature)	Approver (Print) (Signature)	Description
		D. King	J. Bates	B. Storey	
A	January 2000				First Issue

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Figures

Summary

The following is a summary of the information contained in this report. Estimates of people have only been calculated for the inbound morning peak period and the outbound evening peak period. 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		0730-0930 outbound	
total vehicles	29,023	total vehicles	18,926
estimated pedal cycles	253	estimated pedal cycles	106
estimated bus	953	estimated bus	638
estimated light vehicles	25,485	estimated light vehicles	16,844
estimated goods vehicles	2,335	estimated goods vehicles	1,340
estimated people (light vehs)	31,520	estimated people (light vehs)	19,231
estimated people (goods vehs)	2,600	estimated people (goods vehs)	1,584

1000-1200 inbound		1000-1200 outbound	
total vehicles	19,853	total vehicles	18,372
estimated pedal cycles	82	estimated pedal cycles	79
estimated bus	749	estimated bus	762
estimated light vehicles	16,781	estimated light vehicles	15,673
estimated goods vehicles	2,243	estimated goods vehicles	1,858

1630-1830 inbound		1630-1830 outbound	
total vehicles	22,261	total vehicles	28,747
estimated pedal cycles	202	estimated pedal cycles	459
estimated bus	690	estimated bus	787
estimated light vehicles	20,476	estimated light vehicles	26,427
estimated goods vehicles	897	estimated goods vehicles	1,076

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 Wolverhampton 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 Wolverhampton 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.

3 Background

The 1998 Wolverhampton Cordon survey was undertaken in the week beginning 12th October. Care was taken to avoid school holidays and the Christmas shopping seasons. In future, every effort will be made to keep the cordon survey to the same week in October.

The exact position of the automatic counts can be seen in Appendix 1.

4 Diary and Quality of Data Collection

As a result of road works on Bilston Road (site WV09) arising from the Metro Line 1, it was not possible to conduct the ATC traffic survey at this point. The most appropriate sites not affected by Metro Line were on Dixon St, Ettingshall Road and Bilston Road west of Cullwick Street and the ATC surveys were conducted at these sites accordingly. As a consequence, the traffic flows are marginally higher than would be expected at site WV09, and this fact should be taken into consideration when comparing cordon flows with previous years. It is anticipated that for the year 2000, a permanent ATC site will be in operation at site WV09.

5 Results

In the table below the figures for the number of vehicles crossing the cordon line in both directions during the morning peak period are presented. The period considered to be the morning peak has been taken as 0730 - 0930, in order to provide consistency with previous years, and allowing trends in vehicles entering and leaving Wolverhampton Town Centre to be analysed.

Table 1 No. of Vehicles Crossing the Cordon Line in the Morning Peak Period (0730 - 0930)

	1990	1992	1994	1996	1998
Inbound Total	30,004	29,058	29,099	26,930	29,023
Outbound Total	17,834	17,212	19,673	17,866	18,926

From these figures, the total number of vehicles crossing the cordon towards the town centre during this time period has returned to levels seen in 1994.

Data prior to 1994 is based on manual surveys collected at each site for one day of the week. Data from 1994 onwards has been collected in the same way via automatic counters.

The figures for the 1000-1200 time period are given in Table 2. Again, this time period has been considered as it is the off-peak time period that has been surveyed in previous years.

Table 2 No. of Vehicles Crossing the Cordon Line in the Off-Peak Period (1000 – 1200).

	1990	1992	1994	1996	1998
Inbound Total	19,452	19,602	20,465	21,118	19,853
Outbound Total	17,577	17,779	19,258	18,303	18,372

From these figures, the off-peak vehicles decreased by 6% in the inbound direction, with the outbound direction remaining at a similar level to 1996.

Table 3 Total Vehicles by Time Period on an Average Weekday, 1996 and 1998

	0730 - 0930	1000-1200	1600-1800	0700-1900 (12 hr)	24 hour
1996					
Inbound 1996	**26,930**	**21,118**	**21,409**	**129,719**	**161,704**
% of 24 hr	**16.65**	**13.05**	**13.23**	**80.22**	**100.00**
Outbound 1996	**17,866**	**18,303**	**27,898**	**125,848**	**161,404**
% of 24 hr	**11.07**	**11.34**	**17.28**	**77.97**	**100.00**
Net 1996(Inbound Minus Outbound)	**9,064**	**2,815**	**-6,489**	**3,871**	**300**
1998					
Inbound 1998	**29,023**	**19,853**	**22,261**	**132,658**	**165,384**
% of 24 hr	**17.54**	**12.0**	**13.46**	**80.21**	**100.00**
Outbound 1998	**18,926**	**18,372**	**28,747**	**128,274**	**162,946**
% of 24 hr	**11.61**	**11.27**	**17.64**	**78.72**	**100.00**
Net 1998(Inbound minus Outbound)	**10,097**	**1,481**	**-6,486**	**4,384**	**2,438**

The figures in Table 3 show that 17.5% of traffic flowing into the town centre on a typical day is crossing the cordon line between the hours of 7.30am and 9.30am. This corresponds with the figures for the outbound traffic between 4pm and 6pm which account for 17.6% of a daily outbound flow.

The off-peak time period considered (1000-1200) shows 12% of the daily traffic travelling into the town centre with 11% travelling out of the centre .

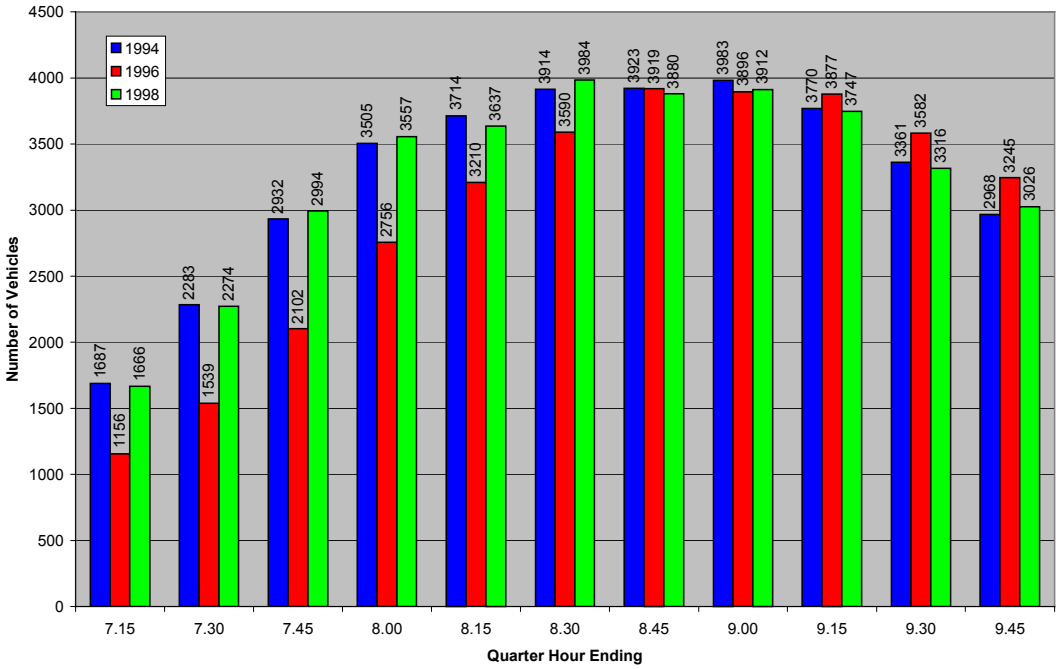
Around 80% of an average day's traffic is crossing the cordon during the main 12-hr day.

The net figure of 10,097 for the morning peak period gives some idea of the amount of the journey to work traffic to the town centre. Full figures for the net vehicles in the town centre are given in Table 5 by hour and Table 6 by station.

The time periods considered have been kept consistent with the time periods surveyed in previous years but, in future, any time period could be considered.

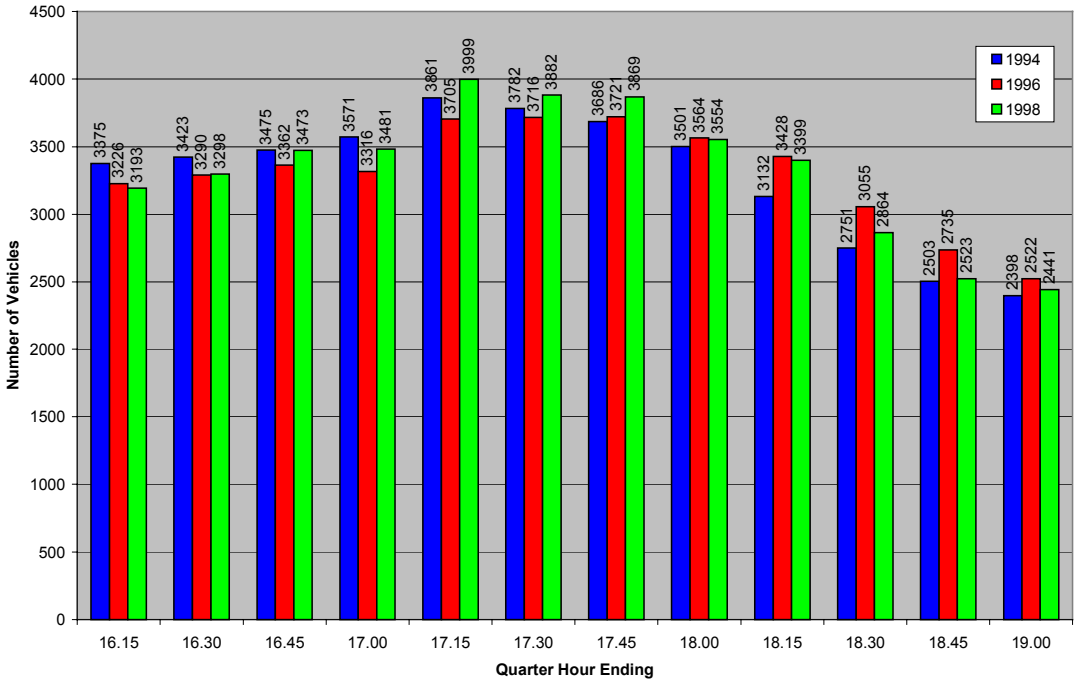
Figure 1 and 2 give a pictorial view of traffic flow in the two peak time periods, by quarter-hour periods.

Figure 1 Inbound Morning Peak: Vehicle Volumes by Quarter Hour



As expected, the graph shows the number of vehicles entering the town centre gradually increasing from 7am, with the peak number between 8.30 – 8.45am.

Figure 2 Outbound Evening Peak: Vehicle Volumes by Quarter Hour



The evening peak hour for vehicles leaving the town centre is from 5-6pm with the highest quarter hour period being 17.15-17.30.

The following Figure 3 and Figure 4 present the 24 hour variations in Total Traffic for the inbound and outbound data.

Figure 3 Inbound 24 Hour Variations in Total Traffic

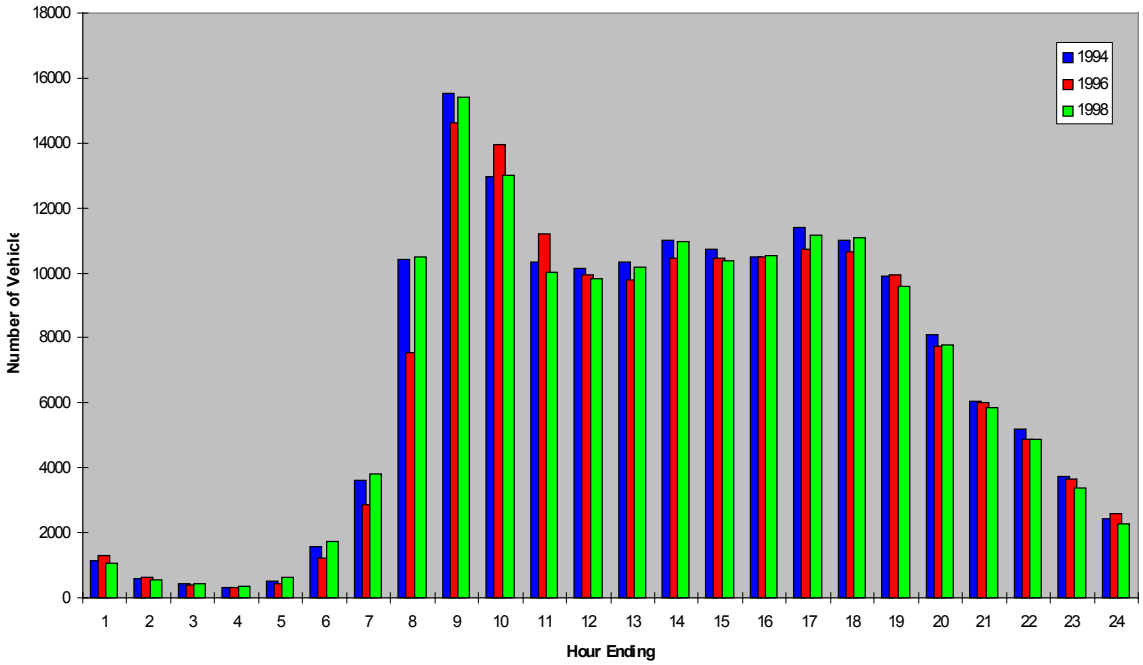
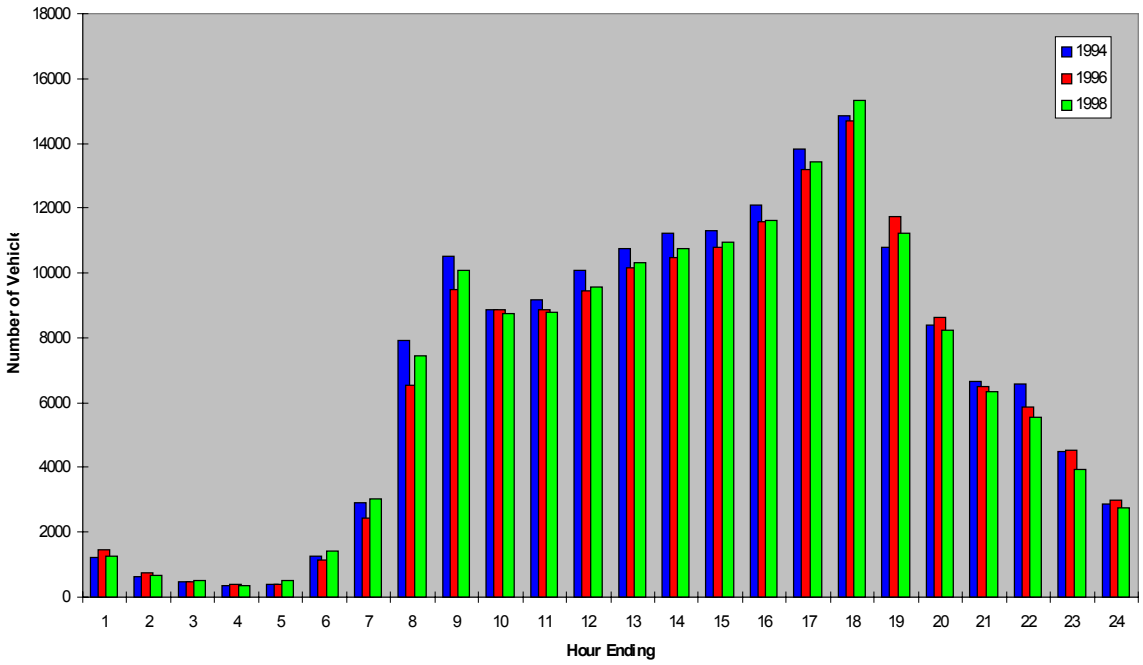
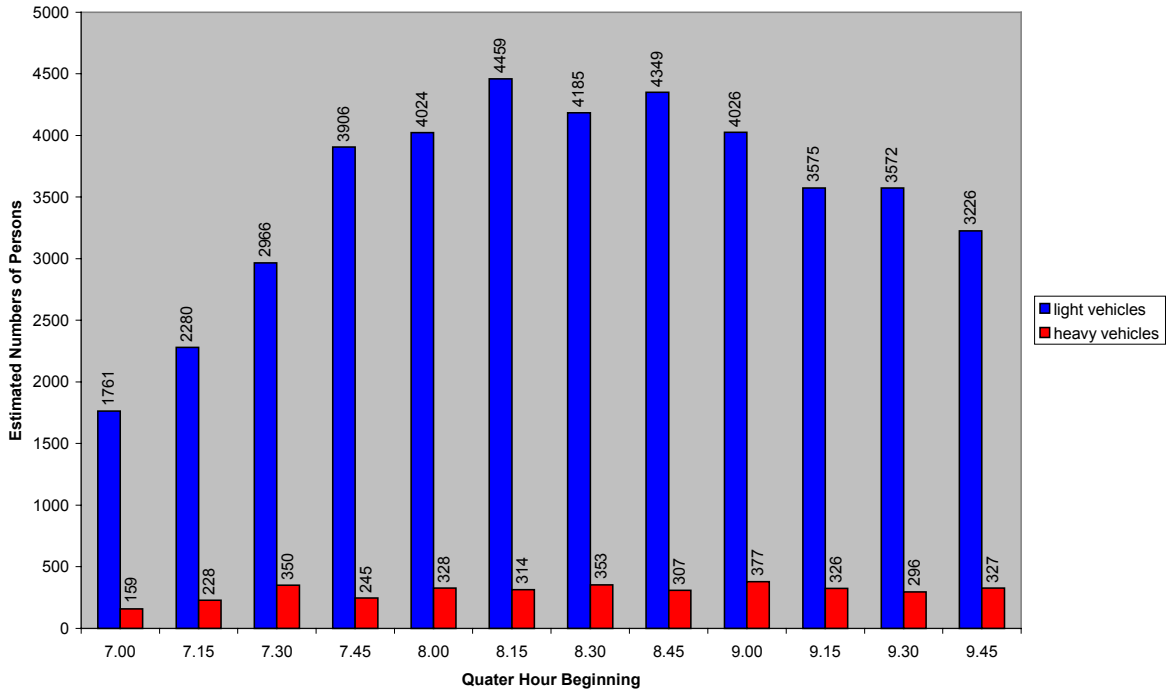


Figure 4 Outbound 24 Hour Variations in Total Traffic



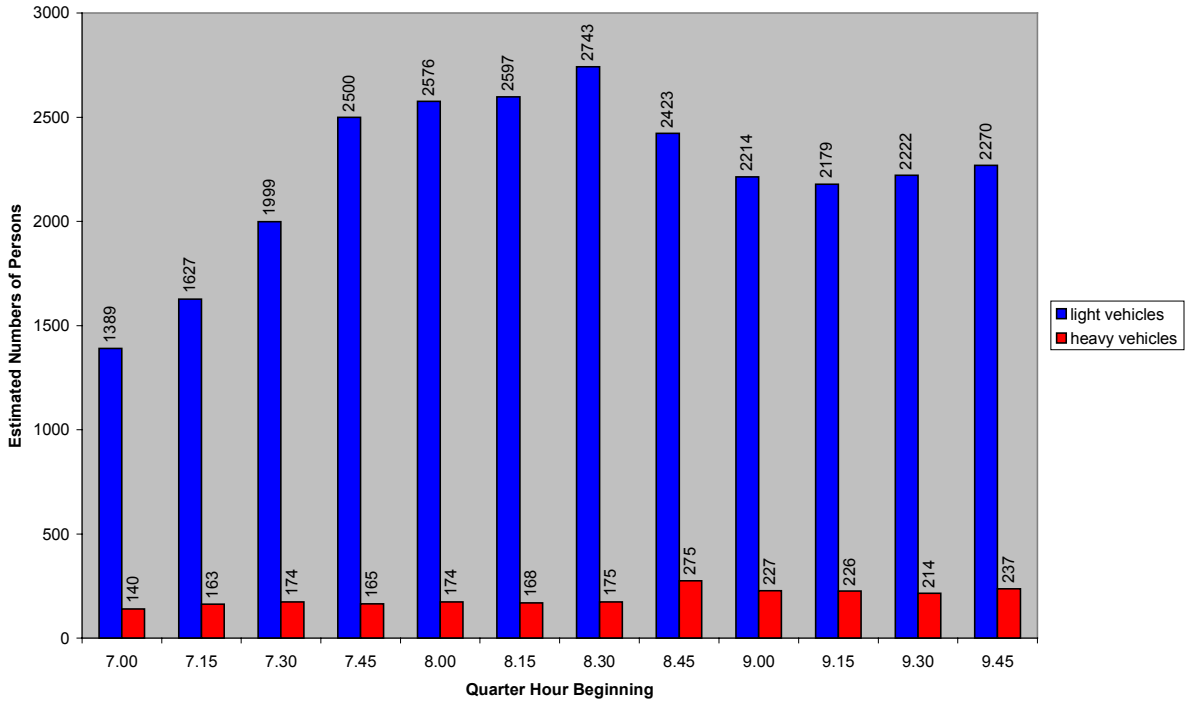
5.1 Occupancy Levels

Figure 5 Estimate of Numbers of Persons Travelling Inbound - Morning Peak



Figures 5 and 6 show the estimated numbers of persons crossing the cordon calculated from the occupancy counts at the four manual sites and the number of vehicles counted automatically per time period.

Figure 6 Estimate of Numbers of Persons Travelling Outbound - Morning Peak



5.2 Daily and Hourly Variations

Table 4 Variations in Traffic Flow by Time of Day, 1998

	MON	TUE	WED	THUR	FRI	SAT	SUN
Inbound							
0730-0930	**0.999**	**1.015**	**0.996**	**1.003**	**0.988**	**0.491**	**0.164**
1000-1200	**0.990**	**0.990**	**1.006**	**0.988**	**1.027**	**1.059**	**0.732**
1600-1800	**0.975**	**1.008**	**0.993**	**1.002**	**1.022**	**0.677**	**0.622**
0700-1900	**0.987**	**0.993**	**0.993**	**0.993**	**1.034**	**0.792**	**0.583**
0000-2400	**0.970**	**0.986**	**0.988**	**1.001**	**1.056**	**0.890**	**0.658**
Outbound							
0730-0930	**1.003**	**1.016**	**0.985**	**1.022**	**0.976**	**0.481**	**0.202**
1000-1200	**1.000**	**0.984**	**0.985**	**0.987**	**1.044**	**1.011**	**0.708**
1600-1800	**1.010**	**1.006**	**0.992**	**0.997**	**0.995**	**0.737**	**0.524**
0700-1900	**0.992**	**0.993**	**0.991**	**0.993**	**1.032**	**0.835**	**0.593**
0000-2400	**0.973**	**0.988**	**0.988**	**1.003**	**1.048**	**0.877**	**0.659**

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

Figure 7 Net Loss/gain in Vehicles Inside the Cordon, by Hour.

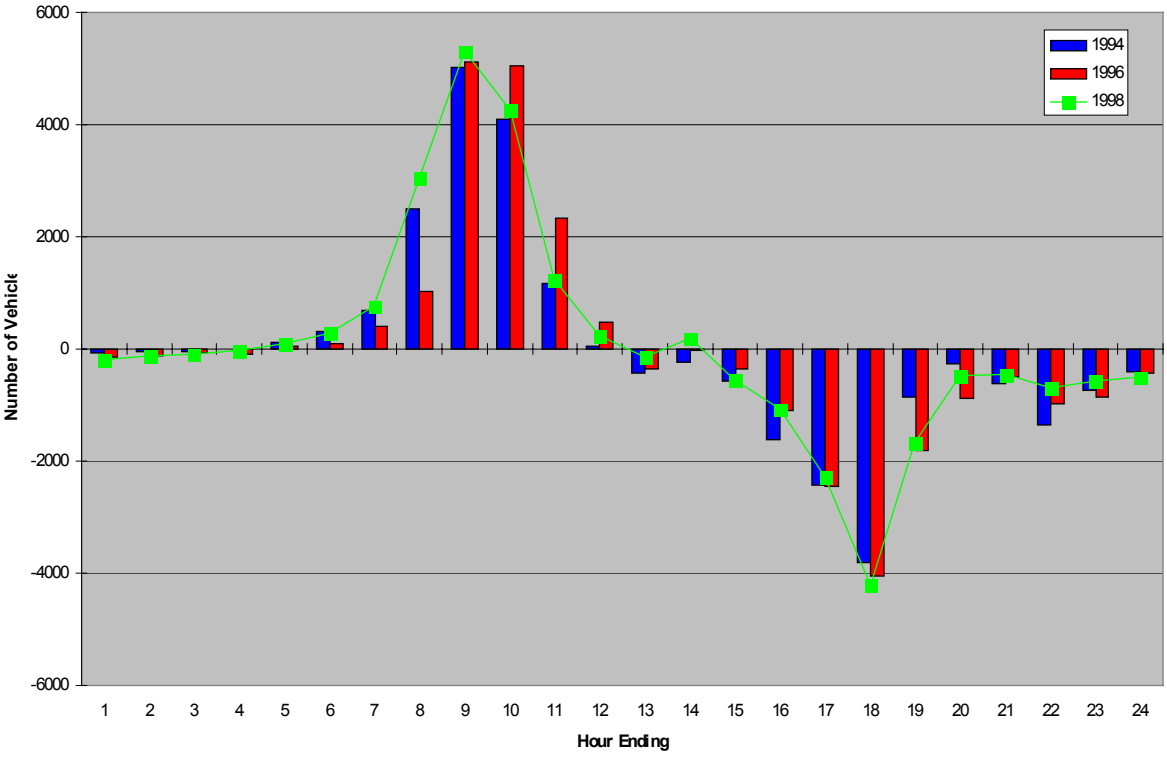
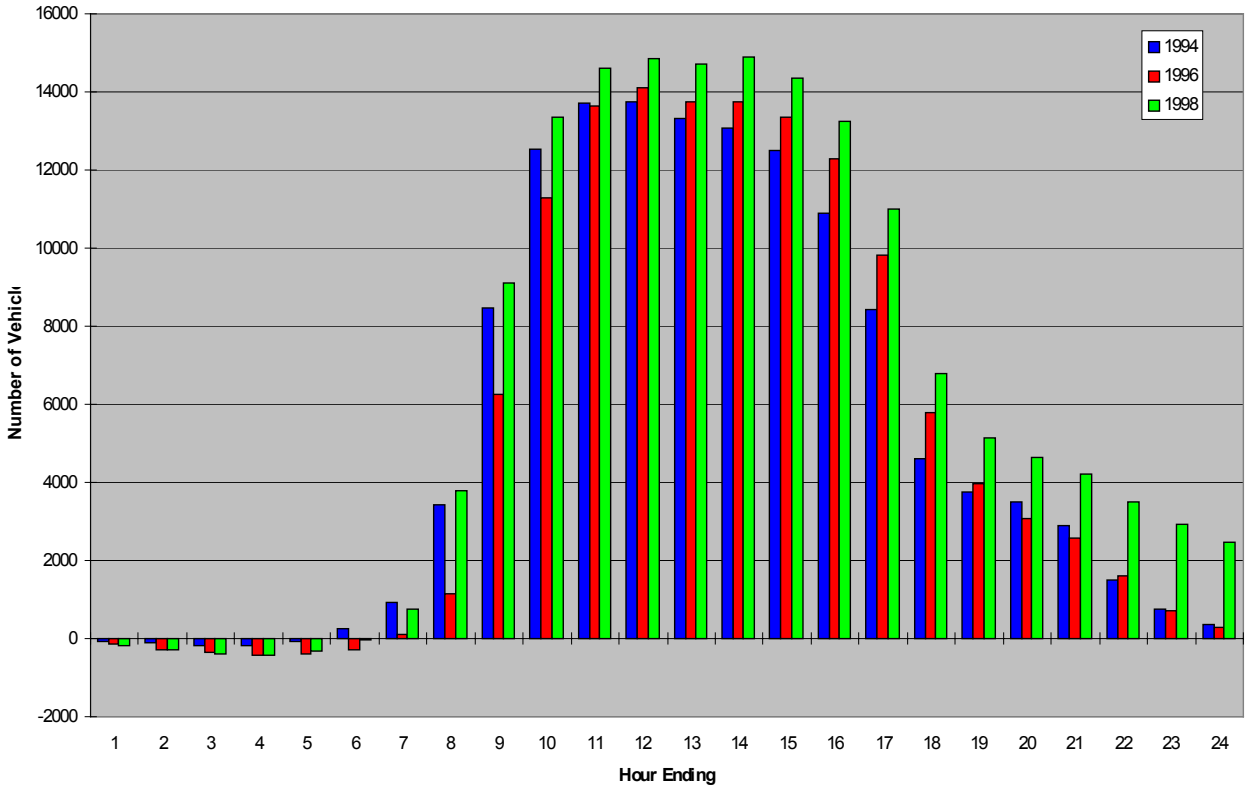


Figure 7 shows the net loss or gain to the town centre of vehicles throughout an average weekday. Stationary vehicles are not taken into account, only the movement of vehicles across the cordon line. Figure 8 shows the net accumulation of vehicles inside the cordon area by hour. The figures used for Figure 7 and Figure 8 are given in Table 5.

Table 5 Net Loss/Gain and Accumulation in Vehicles, by Hour 1998.

Hour Ending	Inbound	Outbound	Net Loss/Gain	Accumulation
1.00	1066	1255	-189	-189
2.00	565	674	-109	-298
3.00	421	527	-106	-404
4.00	354	370	-16	-420
5.00	615	525	90	-330
6.00	1727	1433	294	-36
7.00	3822	3050	772	736
8.00	10491	7449	3042	3778
9.00	15413	10095	5318	9096
10.00	13002	8734	4268	13364
11.00	10020	8785	1235	14599
12.00	9835	9587	248	14847
13.00	10176	10320	-144	14703
14.00	10958	10759	199	14902
15.00	10390	10945	-555	14347
16.00	10547	11627	-1080	13267
17.00	11170	13445	-2275	10992
18.00	11095	15304	-4209	6783
19.00	9571	11227	-1656	5127
20.00	7783	8251	-468	4659
21.00	5870	6327	-457	4202
22.00	4874	5566	-692	3510
23.00	3366	3936	-570	2940
24.00	2270	2761	-491	2449

Figure 8 Net Accumulation of Vehicles Inside Cordon Area, by Hour.



5.3 Patterns of Travel

The figures in Table 6 show the number of vehicles travelling into the town centre and out of the town centre by each individual site on an average weekday. By examining these figures, it is possible to determine some patterns of behaviour in the traffic. For example, people may prefer to use one road to enter the town centre in the mornings and another to leave the town at night.

Table 6 Net Loss/Gain in Vehicles on an Average Weekday, by Site

Site	Location	1996 inbound	1996 outbound	Net	1998 inbound	1998 outbound	Net
WV01	Tettenhall Road	11946	11681	265	10085	10050	35
WV02	New Hampton Road West	10401	9487	914	8844	7395	1449
WV03	Dunstall Road	1648	1917	-269	3507	3671	-164
WV04	Stafford Road	19989	19893	96	19147	18463	684
WV05	Cannock Road	12682	11905	777	12961	12088	873
WV06	Hilton Street	1298	994	304	1325	1261	64
WV07	Wednesfield Road	12215	12784	-569	13117	12782	335
WV08	Willenhall Road	15013	16286	-1273	15163	15528	-365
WV09	Bilston Road	7052	7135	-83	Replaced by	R213, R214	& R217
WV10	Steelhouse Lane	5418	5985	-567	3143	2987	156
WV11	Vicarage Road	2168	1892	276	1749	1382	367
WV12	Birmingham Road	11844	12310	-466	10651	11617	-966
WV13	Dudley Road	11009	8667	2342	11082	9205	1877
WV14	Penn Road	17287	18189	-902	15785	16363	-578
WV15	Gt. Brickkiln Street	3420	3778	-358	3148	3479	-331
WV16	Merridale Road	8977	9014	-37	10927	11548	-621
WV17	Compton Road	9349	9555	-206	8829	9394	-565
R213	Dixon Street				3054	2948	86
R214	Eltingshall Road				3322	2907	415
R217	Bilston Road				9560	9912	-352

5.4 Mode of Travel

The four manual surveys give us an indication of the mode of travel.
Table 7 shows a summary of the data collected from the four manually surveyed sites. For the purpose of this table, light vehicles includes motorcycles, cars & taxis, and Goods Vehicles less than 1.5 tonnes. The heavy vehicle category includes all vehicles greater than 1.5 tonnes.

In Table 7 the percentage the vehicle category contributes to the total vehicles in that hour is given in brackets. In Tables 8 and 10 we have multiplied these percentages by the number of vehicles counted automatically, giving an indication of the number of each type of vehicle.

Table 7 Summary of inbound modal data from manual surveys

Time Starting	Total Vehs	Pedal Cycles	Bus & Coach	Total Light Vehicles	Total Heavy Vehicles
07:00	**2243**	**27 (1.20%)**	**114 (5.08%)**	**1914 (85.33%)**	**188 (8.38%)**
08:00	**3010**	**22 (0.73%)**	**84 (2.79%)**	**2668 (88.64%)**	**236 (7.84%)**
09:00	**2735**	**16 (0.59%)**	**104 (3.80%)**	**2368 (86.58%)**	**247 (9.03%)**
10:00	**2391**	**11 (0.46%)**	**93 (3.89%)**	**2018 (84.40%)**	**269 (11.25%)**
11:00	**2441**	**9 (0.37%)**	**89 (3.65%)**	**2066 (84.64%)**	**277 (11.35%)**
12:00	**2628**	**12 (0.46%)**	**81 (3.08%)**	**2254 (85.77%)**	**281 (10.69%)**
13:00	**2590**	**11 (0.42%)**	**85 (3.28%)**	**2245 (86.68%)**	**249 (9.61%)**
14:00	**2529**	**18 (0.71%)**	**100 (3.95%)**	**2194 (86.75%)**	**217 (8.58%)**
15:00	**2484**	**3 (0.12%)**	**96 (3.86%)**	**2188 (88.08%)**	**197 (7.93%)**
16:00	**2780**	**23 (0.83%)**	**97 (3.49%)**	**2530 (91.01%)**	**133 (4.78%)**
17:00	**2742**	**27 (0.98%)**	**78 (2.84%)**	**2547 (92.89%)**	**90 (3.28%)**
18:00	**2271**	**8 (0.35%)**	**51 (2.25%)**	**2154 (94.85%)**	**58 (2.55%)**
Total	**30844**	**187 (0.61%)**	**1072 (3.48%)**	**27146 (88.01%)**	**2442 (7.92%)**

Table 8 Estimated inbound mode of transport figures

Time Starting	No. Vehs counted automatically	estimated ped cyc	estimated bus	estimated light vehs	estimated heavy vehs
07:00	**10491**	**126**	**533**	**8952**	**879**
08:00	**15413**	**113**	**430**	**13662**	**1208**
09:00	**13002**	**76**	**494**	**11257**	**1174**
10:00	**10020**	**46**	**390**	**8457**	**1127**
11:00	**9835**	**36**	**359**	**8324**	**1116**
12:00	**10176**	**46**	**314**	**8728**	**1088**
13:00	**10958**	**47**	**360**	**9498**	**1053**
14:00	**10390**	**74**	**411**	**9014**	**892**
15:00	**10547**	**13**	**408**	**9290**	**836**
16:00	**11170**	**92**	**390**	**10166**	**534**
17:00	**11095**	**109**	**316**	**10306**	**364**
18:00	**9571**	**34**	**215**	**9078**	**244**
Total	**132668**	**804**	**4611**	**116762**	**10504**

Figure 9 Estimated inbound mode of transport figures

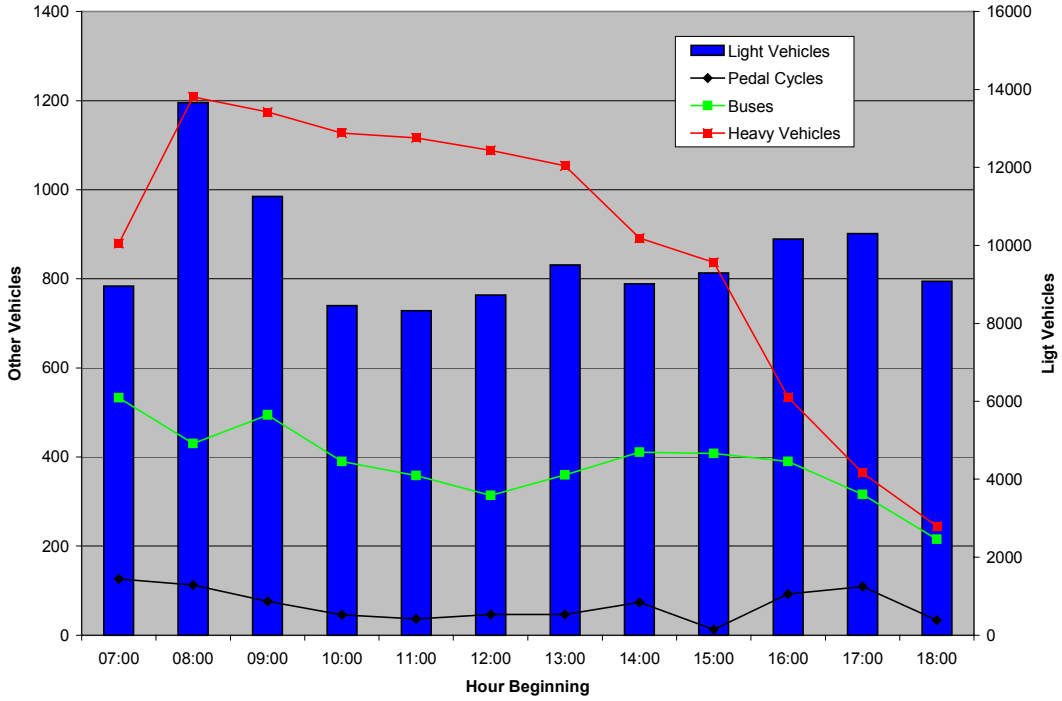


Figure 9 graphically illustrates the figures in Table 8. The lines in the graph are to be read from the left hand axis and the bar (light vehicles) from the right hand axis. The corresponding figures for manually counted outbound vehicles are given in Table 9, and estimated figures in Table 10 and Figure 10.

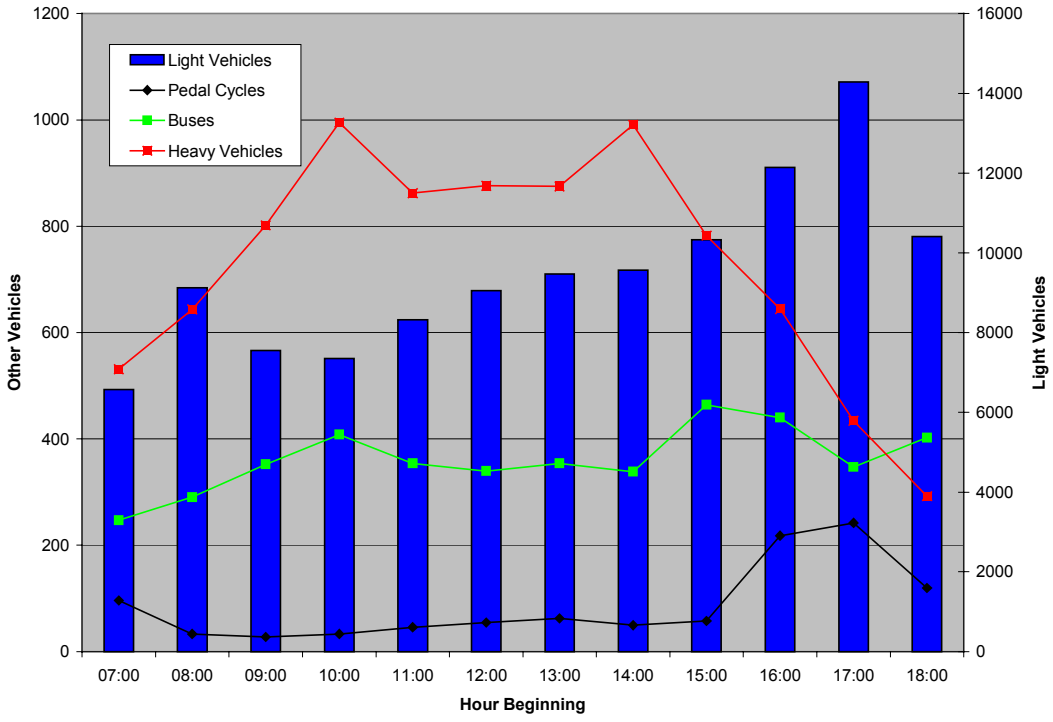
Table 9 Summary of outbound modal data from manual surveys

Time Starting	Total Vehs	Pedal Cycles	Bus & Coach	Total Light Vehicles	Total Heavy Vehicles
07:00	**2087**	**22** (1.05%)	**79** (3.79%)	**1776** (85.10%)	**210** (10.06%)
08:00	**2759**	**18** (0.65%)	**94** (3.41%)	**2361** (85.57%)	**286** (10.37%)
09:00	**2333**	**3** (0.13%)	**120** (5.14%)	**1834** (78.61%)	**376** (16.12%)
10:00	**2421**	**7** (0.29%)	**132** (5.45%)	**1881** (77.70%)	**401** (16.56%)
11:00	**2524**	**7** (0.28%)	**125** (4.95%)	**1966** (77.89%)	**426** (16.88%)
12:00	**2606**	**7** (0.27%)	**113** (4.34%)	**2105** (80.78%)	**381** (14.62%)
13:00	**2919**	**15** (0.51%)	**90** (3.08%)	**2567** (87.94%)	**247** (8.46%)
14:00	**2966**	**9** (0.30%)	**103** (3.47%)	**2624** (88.47%)	**230** (7.75%)
15:00	**3110**	**35** (1.13%)	**111** (3.57%)	**2742** (88.17%)	**222** (7.14%)
16:00	**3218**	**28** (0.87%)	**127** (3.95%)	**2915** (90.58%)	**148** (4.60%)
17:00	**3351**	**31** (0.93%)	**103** (3.07%)	**3102** (92.57%)	**115** (3.43%)
18:00	**2362**	**21** (0.89%)	**133** (5.63%)	**2141** (90.64%)	**67** (2.84%)
Total	**32656**	**203** (0.62%)	**1330** (4.07%)	**28014** (85.79%)	**3109** (9.52%)

Table 10 Estimated outbound mode of transport figures

Time Starting	No. Vehs counted automatically	estimated ped cyc	estimated bus	estimated light vehs	estimated heavy vehs
07:00	**7449**	**96**	**247**	**6575**	**531**
08:00	**10095**	**33**	**291**	**9128**	**644**
09:00	**8734**	**27**	**352**	**7553**	**802**
10:00	**8785**	**33**	**408**	**7349**	**995**
11:00	**9587**	**46**	**354**	**8325**	**862**
12:00	**10320**	**54**	**340**	**9050**	**876**
13:00	**10759**	**63**	**354**	**9467**	**875**
14:00	**10945**	**50**	**339**	**9566**	**991**
15:00	**11627**	**57**	**464**	**10323**	**783**
16:00	**13445**	**218**	**440**	**12143**	**644**
17:00	**15304**	**242**	**347**	**14281**	**434**
18:00	**11227**	**120**	**402**	**10413**	**292**
Total	**128277**	**1039**	**4338**	**114171**	**8729**

Figure 10 Estimated outbound mode of transport figures



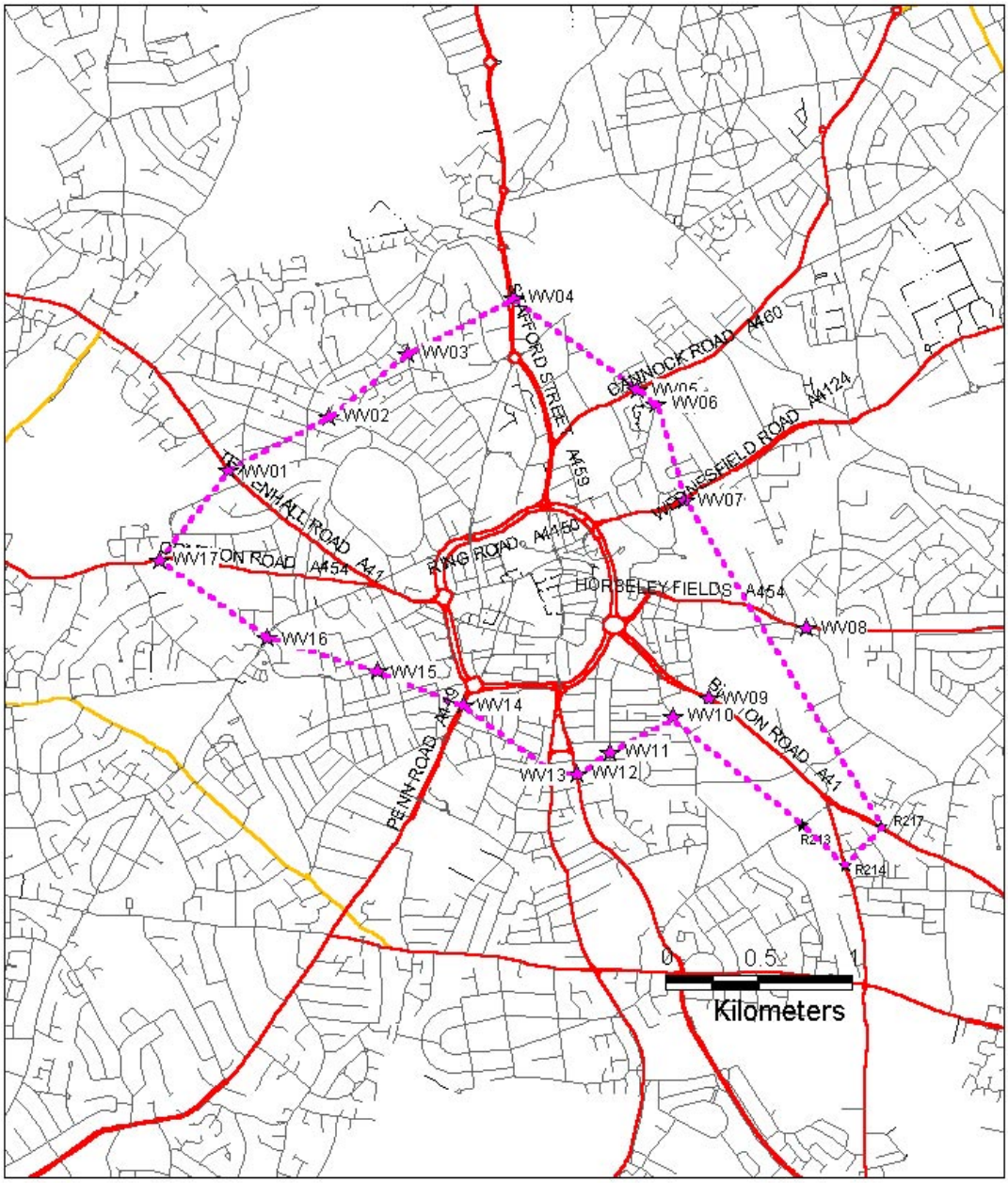
Appendix 1 Position Of Cordon Sites

The sites were chosen so as to create a closed cordon. The sites remain in the same position as those carried out manually in previous years. The map overleaf shows roughly where the sites were positioned, a description of the exact locations are given below.

Table A1. 1 Description of the Position of the Cordon Sites

Site	Name of Road	Exact Position
WV01	Tettenhall Road	Between Paget Road and St. Jude's Road West
WV02	New Hampton Rd West	Between Hunter St and Evans St.
WV03	Dunstall Road	Between Lowe Street and Evans Street
WV05	Cannock Road	Between Cambridge Street and Prole Street
WV04	Stafford Road	Between Gorsebrook Rd and Fiveways
WV06	Hilton Street	Between Springfield Rd and Yarwell Close
WV07	Wednesfield Road	Between Sun Street and Lincoln Street
WV08	Willenhall Road	Between Colliery Rd and Hickman Ave.
WV10	Steelhouse Lane	Between Gordon Street and Eagle Street
WV11	Vicarage Road	Between All Saints Rd and Bowdler Rd.
WV12	Birmingham Road	Between Derry St and Cartwright St
WV13	Dudley Road	Between Cartwright St and Drayton St.
WV14	Penn Road	Between Ablow St and Ring Road
WV15	Gt. Brickkiln St	Between Ashland St and Cherry St
WV16	Merridale Road	Between Merridale Ln and Aspen Way
WV17	Compton Road	Between Clark Rd and Richmond Rd
R213	Dixon Street	At Railway Bridge
R214	Ettingshall Road	South of Hinks Street
R217	Bilston Road	West of Cullwick Street

Figure 11 Location of Wolverhampton ATC Sites



Title						
Location of Wolverhampton ATC Cordon sites					Mott MacDonald **Mott MacDonald Limited** **Canterbury House** **85 Newhall Street, Birmingham, B3 1LZ**	**Telephone 0121-237-4002** **Fax 0121-237-4003**
Date	Drawn	Checked	Approved	Status	Drawing no.	Rev.
07/10/99	**JTB**	**BWS**	**BWS**	**Final**	**47995/BA15/01**	**A**

Appendix 2 Comparison of Manual and Automatic Counts

Four 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 A2. 1 WV05 Cannock Road Monday 12th October 1998

	INBOUND		OUTBOUND	
	Manual	Automatic	Manual	Automatic
Time Period				
07.30 - 09.30	1789	1863	1607	1390
16.30 - 18.30	1749	1602	2023	2037
07.00 - 19.00	10093	9981	9471	9436

Table A2. 2 WV06 Hilton Road Tuesday 13th October 1998

	INBOUND		OUTBOUND	
	Manual	Automatic	Manual	Automatic
Time Period				
07.30 - 09.30	223	274	95	128
16.30 - 18.30	149	182	172	233
07.00 - 19.00	912	1134	809	1068

Table A2. 3 WV07 Wednesfield Road Wednesday 14th October 1998

	INBOUND		OUTBOUND	
	Manual	Automatic	Manual	Automatic
Time Period				
07.30 - 09.30	2005	2116	1535	1684
16.30 - 18.30	1732	1847	1872	1987
07.00 - 1900	9678	10364	9446	9999

Table A2.4 WV08 Willenhall Road Friday 16th October 1998

	INBOUND		OUTBOUND	
	Manual	Automatic	Manual	Automatic
Time Period				
07.30 - 09.30	1855	2304	1961	2255
16.30 - 18.30	1740	1864	1905	2024
07.00 - 1900	10161	11748	10548	12062

Appendix 3 Estimates of Vehicle Type from Passage Count Data

Direction: Inbound															
TIME STARTING	TOTAL VEH	PEDAL CYC	BUS & COACH	Light Vehs	Heavy Vehs		% pedal cycle	% bus	% light	% heavy	No. auto vehs	est. ped cyc	est. bus	est. light	est. heavy
07:00	2243	27	114	1914	188		1.20%	5.08%	85.33%	8.38%	10491	126	533	8952	879
08:00	3010	22	84	2668	236		0.73%	2.79%	88.64%	7.84%	15413	113	430	13662	1208
09:00	2735	16	104	2368	247		0.59%	3.80%	86.58%	9.03%	13002	76	494	11257	1174
10:00	2391	11	93	2018	269		0.46%	3.89%	84.40%	11.25%	10020	46	390	8457	1127
11:00	2441	9	89	2066	277		0.37%	3.65%	84.64%	11.35%	9835	36	359	8324	1116
12:00	2628	12	81	2254	281		0.46%	3.08%	85.77%	10.69%	10176	46	314	8728	1088
13:00	2590	11	85	2245	249		0.42%	3.28%	86.68%	9.61%	10958	47	360	9498	1053
14:00	2529	18	100	2194	217		0.71%	3.95%	86.75%	8.58%	10390	74	411	9014	892
15:00	2484	3	96	2188	197		0.12%	3.86%	88.08%	7.93%	10547	13	408	9290	836
16:00	2780	23	97	2530	133		0.83%	3.49%	91.01%	4.78%	11170	92	390	10166	534
17:00	2742	27	78	2547	90		0.98%	2.84%	92.89%	3.28%	11095	109	316	10306	364
18:00	2271	8	51	2154	58		0.35%	2.25%	94.85%	2.55%	9571	34	215	9078	244
Total	**30844**	**187**	**1072**	**27146**	**2442**		**0.61%**	**3.48%**	**88.01%**	**7.92%**	**132668**	**804**	**4611**	**116762**	**10504**
7.00	363	2	22	307	32		0.55%	6.06%	84.57%	8.82%	1666	9	101	1409	147
7.15	487	4	35	408	40		0.82%	7.19%	83.78%	8.21%	2274	19	163	1905	187
7.30	692	12	32	577	71		1.73%	4.62%	83.38%	10.26%	2994	52	138	2496	307
7.45	701	9	25	622	45		1.28%	3.57%	88.73%	6.42%	3557	46	127	3156	228
8.00	718	7	30	624	57		0.97%	4.18%	86.91%	7.94%	3637	35	152	3161	289
8.15	764	7	14	687	56		0.92%	1.83%	89.92%	7.33%	3984	37	73	3582	292
8.30	805	5	24	706	70		0.62%	2.98%	87.70%	8.70%	3880	24	116	3403	337
8.45	723	3	16	651	53		0.41%	2.21%	90.04%	7.33%	3912	16	87	3522	287
9.00	751	3	28	658	62		0.40%	3.73%	87.62%	8.26%	3747	15	140	3283	309
9.15	718	6	26	624	62		0.84%	3.62%	86.91%	8.64%	3316	28	120	2882	286
9.30	634	4	25	546	59		0.63%	3.94%	86.12%	9.31%	3026	19	119	2606	282
9.45	632	3	25	540	64		0.47%	3.96%	85.44%	10.13%	2913	14	115	2489	295
Total 0730-0930	**5872**	**52**	**195**	**5149**	**476**		**0.89%**	**3.32%**	**87.69%**	**8.11%**	**29027**	**253**	**952**	**25486**	**2336**
Total 0700-1000	**7988**	**65**	**302**	**6950**	**671**		**0.81%**	**3.78%**	**87.01%**	**8.40%**	**38906**	**313**	**1451**	**33895**	**3246**

TIME STARTING	TOTAL VEH	PEDAL CYC	BUS & COACH	Light Vehs	Heavy Vehs		% pedal cycle	% bus	% light	% heavy	No. auto vehs	est. ped cyc	est. bus	est. light	est. heavy
16.00	693	5	24	628	36		0.72%	3.46%	90.62%	5.19%	2769	20	96	2509	144
16.15	670	8	27	597	38		1.19%	4.03%	89.10%	5.67%	2667	32	107	2376	151
16.30	698	7	20	642	29		1.00%	2.87%	91.98%	4.15%	2862	29	82	2632	119
16.45	719	3	23	663	30		0.42%	3.20%	92.21%	4.17%	2872	12	92	2648	120
17.00	758	13	29	685	31		1.72%	3.83%	90.37%	4.09%	2897	50	111	2618	118
17.15	672	4	12	643	13		0.60%	1.79%	95.68%	1.93%	2775	17	50	2655	54
17.30	713	4	21	665	23		0.56%	2.95%	93.27%	3.23%	2755	15	81	2570	89
17.45	599	6	16	554	23		1.00%	2.67%	92.49%	3.84%	2668	27	71	2468	102
18.00	668	1	16	636	15		0.15%	2.40%	95.21%	2.25%	2527	4	61	2406	57
18.15	543	6	12	512	13		1.10%	2.21%	94.29%	2.39%	2398	26	53	2261	57
18.30	543	0	14	516	13		0.00%	2.58%	95.03%	2.39%	2340	0	60	2224	56
18.45	517	1	9	490	17		0.19%	1.74%	94.78%	3.29%	2306	4	40	2186	76
Total 1630-1830	**5370**	**44**	**149**	**5000**	**177**		**0.82%**	**2.77%**	**93.11%**	**3.30%**	**21754**	**179**	**600**	**20258**	**716**
Total 1600-1900	**7793**	**58**	**223**	**7231**	**281**		**0.74%**	**2.86%**	**92.79%**	**3.61%**	**31836**	**235.63**	**904.043**	**29553**	**1143.33**

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	2173	28	72	1918	155		1.29%	3.31%	88.27%	7.13%	7449	96	247	6575	531
08:00	2745	9	79	2482	175		0.33%	2.88%	90.42%	6.38%	10095	33	291	9128	644
09:00	2233	7	90	1931	205		0.31%	4.03%	86.48%	9.18%	8734	27	352	7553	802
10:00	2110	8	98	1765	239		0.38%	4.64%	83.65%	11.33%	8785	33	408	7349	995
11:00	2301	11	85	1998	207		0.48%	3.69%	86.83%	9.00%	9587	46	354	8325	862
12:00	2462	13	81	2159	209		0.53%	3.29%	87.69%	8.49%	10320	54	340	9050	876
13:00	2582	15	85	2272	210		0.58%	3.29%	87.99%	8.13%	10759	63	354	9467	875
14:00	2651	12	82	2317	240		0.45%	3.09%	87.40%	9.05%	10945	50	339	9566	991
15:00	2630	13	105	2335	177		0.49%	3.99%	88.78%	6.73%	11627	57	464	10323	783
16:00	2963	48	97	2676	142		1.62%	3.27%	90.31%	4.79%	13445	218	440	12143	644
17:00	3350	53	76	3126	95		1.58%	2.27%	93.31%	2.84%	15304	242	347	14281	434
18:00	2344	25	84	2174	61		1.07%	3.58%	92.75%	2.60%	11227	120	402	10413	292
Total	**30544**	**242**	**1034**	**27153**	**2115**		**0.79%**	**3.39%**	**88.90%**	**6.92%**	**128277**	**1039**	**4338**	**114171**	**8729**
7.00	400	6	13	346	35		1.50%	3.25%	86.50%	8.75%	1376	21	45	1190	120
7.15	481	5	11	433	42		1.04%	2.29%	90.02%	8.73%	1626	17	37	1464	142
7.30	611	10	25	529	47		1.64%	4.09%	86.58%	7.69%	2041	33	84	1767	157
7.45	681	7	23	610	41		1.03%	3.38%	89.57%	6.02%	2406	25	81	2155	145
8.00	732	2	22	668	40		0.27%	3.01%	91.26%	5.46%	2450	7	74	2236	134
8.15	661	3	14	607	37		0.45%	2.12%	91.83%	5.60%	2541	12	54	2333	142
8.30	720	3	17	656	44		0.42%	2.36%	91.11%	6.11%	2593	11	61	2363	158
8.45	632	1	26	551	54		0.16%	4.11%	87.18%	8.54%	2511	4	103	2189	215
9.00	597	2	25	517	53		0.34%	4.19%	86.60%	8.88%	2222	7	93	1924	197
9.15	564	2	23	489	50		0.35%	4.08%	86.70%	8.87%	2165	8	88	1877	192
9.30	549	1	25	472	51		0.18%	4.55%	85.97%	9.29%	2164	4	99	1860	201
9.45	523	2	17	453	51		0.38%	3.25%	86.62%	9.75%	2183	8	71	1891	213
Total 0730-0930	**5198**	**30**	**175**	**4627**	**366**		**0.58%**	**3.37%**	**89.02%**	**7.04%**	**18929**	**106**	**638**	**16844**	**1340**
Total 0700-1000	**7151**	**44**	**241**	**6331**	**545**		**0.62%**	**3.37%**	**88.53%**	**7.62%**	**26278**	**156**	**889**	**23250**	**2016**

TIME STARTING	TOTAL VEH	PEDAL CYC	BUS & COACH	Light Vehs	Heavy Vehs		% pedal cycle	% bus	% light	% heavy	No. auto vehs	est. ped cyc	est. bus	est. light	est. heavy
16.00	775	10	31	696	38		1.29%	4.00%	89.81%	4.90%	3193	41	128	2868	157
16.15	675	5	27	606	37		0.74%	4.00%	89.78%	5.48%	3298	24	132	2961	181
16.30	778	18	21	701	38		2.31%	2.70%	90.10%	4.88%	3473	80	94	3129	170
16.45	735	15	18	673	29		2.04%	2.45%	91.56%	3.95%	3481	71	85	3187	137
17.00	930	16	19	863	32		1.72%	2.04%	92.80%	3.44%	3999	69	82	3711	138
17.15	804	13	21	748	22		1.62%	2.61%	93.03%	2.74%	3882	63	101	3612	106
17.30	839	12	16	789	22		1.43%	1.91%	94.04%	2.62%	3869	55	74	3638	101
17.45	777	12	20	726	19		1.54%	2.57%	93.44%	2.45%	3554	55	91	3321	87
18.00	702	12	21	650	19		1.71%	2.99%	92.59%	2.71%	3399	58	102	3147	92
18.15	576	3	19	541	13		0.52%	3.30%	93.92%	2.26%	2864	15	94	2690	65
18.30	596	5	27	541	23		0.84%	4.53%	90.77%	3.86%	2523	21	114	2290	97
18.45	470	5	17	442	6		1.06%	3.62%	94.04%	1.28%	2441	26	88	2296	31
Total 1630-1830	**6141**	**101**	**155**	**5691**	**194**		**1.64%**	**2.52%**	**92.67%**	**3.16%**	**28521**	**466**	**724**	**26435**	**896**
Total 1600-1900	**8657**	**126**	**257**	**7976**	**298**		**1.46%**	**2.97%**	**92.13%**	**3.44%**	**39976**	**579**	**1186**	**36850**	**1362**

Appendix 4 Estimates of Persons From Occupancy Data

	Light vehicles (2,3,5) inbound											
	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 vehicles	in light vehicles	
7.00	242	58	6	1	1	308	385	1.25		1409	1761	
7.15	325	65	5	1	0	396	474	1.20		1905	2280	
7.30	455	85	6	2	0	548	651	1.19		2496	2966	
7.45	474	109	12	3	0	598	740	1.24		3156	3906	
8.00	473	128	15	1	2	619	788	1.27		3161	4024	
8.15	522	134	12	2	0	670	834	1.24		3582	4459	
8.30	566	102	16	7	1	692	851	1.23		3403	4185	
8.45	503	124	10	2	0	639	789	1.23		3522	4349	
9.00	512	124	6	2	1	645	791	1.23		3283	4026	
9.15	484	111	12	4	0	611	758	1.24		2882	3575	
9.30	367	138	27	2	0	534	732	1.37		2606	3572	
9.45	390	111	14	5	0	520	674	1.30		2489	3226	
10.00	347	112	10	2	0	471	609	1.29				
10.15	346	141	19	2	0	508	693	1.36		**estimated people in light**	42330	
10.30	369	134	11	2	2	518	688	1.33		**vehicles 07.00-10.00**		
10.45	347	131	18	6	1	503	692	1.38				
11.00	366	124	18	3	3	514	695	1.35		**estimated people in light**	31490	
11.15	343	136	6	6	0	491	657	1.34		**vehicles 07.30-09.30**		
11.30	354	129	28	4	2	517	722	1.40				
11.45	384	128	14	4	0	530	698	1.32				
12.00	416	134	16	4	0	570	748	1.31				
12.15	426	107	8	3	1	545	681	1.25				
12.30	371	108	17	8	2	506	680	1.34				
12.45	440	136	24	5	2	607	814	1.34				
0730-0930	3989	917	89	23	4	5022	6202	1.23				
1000-1200	2856	1035	124	29	8	4052	5454	1.35				
0700-1230	9011	2565	289	68	14	11947	15350	1.28				

	Light Vehicles (2,3,5) Outbound											
	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 vehicles	in light vehicles	
7.00	243	40	4	0	0	287	335	1.17		1190	1389	
7.15	358	45	0	0	0	403	448	1.11		1464	1627	
7.30	446	63	2	0	0	511	578	1.13		1767	1999	
7.45	529	73	8	3	0	613	711	1.16		2155	2500	
8.00	529	61	11	3	0	604	696	1.15		2236	2576	
8.15	506	42	9	1	0	558	621	1.11		2333	2597	
8.30	505	55	16	2	0	578	671	1.16		2363	2743	
8.45	457	44	5	0	0	506	560	1.11		2189	2423	
9.00	439	67	5	0	0	511	588	1.15		1924	2214	
9.15	383	56	8	0	0	447	519	1.16		1877	2179	
9.30	353	50	12	1	1	417	498	1.19		1860	2222	
9.45	364	65	7	3	0	439	527	1.20		1891	2270	
10.00	378	46	3	2	0	429	487	1.14				
10.15	298	61	3	3	1	366	446	1.22		**estimated people in light**	26739	
10.30	331	60	7	2	2	402	490	1.22		**vehicles 07.00-10.00**		
10.45	336	94	11	2	4	447	585	1.31				
11.00	411	82	8	3	0	504	611	1.21		**estimated people in light**	**19231**	
11.15	336	76	6	2	0	420	514	1.22		**vehicles 07.30-09.30**		
11.30	361	87	8	5	2	463	589	1.27				
11.45	412	90	7	3	0	512	625	1.22				
12.00	402	98	10	2	0	512	636	1.24				
12.15	373	102	7	4	1	487	619	1.27				
12.30	342	96	10	4	0	452	580	1.28				
12.45	440	87	10	4	1	542	665	1.23				
0730-0930	3794	461	64	9	0	4328	4944	1.14				
1000-1200	2863	596	53	22	9	3543	4347	1.23				
0700-1230	8750	1457	157	41	11	10416	12354	1.19				

	Heavy vehicles (6-12) inbound											
	Number of vehicles with shown number of occupnats									estimated heavy vehicles	estimated people in	
Start Time	1	2	3	4	5	Total Veh	Total Pass	Ave Occupancy			heavy vehicles	
7.00	23	2	0	0	0	25	27	1.08		147	159	
7.15	25	7	0	0	0	32	39	1.22		187	228	
7.30	50	6	1	0	0	57	65	1.14		307	350	
7.45	37	3	0	0	0	40	43	1.08		228	245	
8.00	46	5	1	0	0	52	59	1.13		289	328	
8.15	49	4	0	0	0	53	57	1.08		292	314	
8.30	63	3	0	0	0	66	69	1.05		337	353	
8.45	39	3	0	0	0	42	45	1.07		287	307	
9.00	47	11	1	0	0	59	72	1.22		309	377	
9.15	56	9	0	0	0	65	74	1.14		286	326	
9.30	54	3	0	0	0	57	60	1.05		282	296	
9.45	59	5	1	0	0	65	72	1.11		295	327	
10.00	49	2	0	0	0	51	53	1.04				
10.15	54	15	0	0	1	70	89	1.27		**estimated people in heavy**	**3610**	
10.30	53	8	1	0	0	62	72	1.16		**vehicles 07.00-10.00**		
10.45	59	12	0	1	0	72	87	1.21				
11.00	55	12	2	0	0	69	85	1.23		**estimated people in heavy**	**2601**	
11.15	72	11	0	0	0	83	94	1.13		**vehicles 07.30-09.30**		
11.30	40	7	1	0	1	49	62	1.27				
11.45	62	6	1	0	0	69	77	1.12				
12.00	69	8	1	0	0	78	88	1.13				
12.15	48	6	0	0	0	54	60	1.11				
12.30	52	7	0	0	0	59	66	1.12				
12.45	43	3	0	0	0	46	49	1.07				
0730-0930	387	44	3	0	0	434	484	1.12				
1000-1200	444	73	5	1	2	525	619	1.18				
0700-1230	1109	148	10	1	2	1270	1449	1.14				

	Heavy vehicles (6-12) outbound												
	Number of vehicles with shown number of occupants										estimated heavy vehicles	estimated people	
Start Time	1	2	3	4	5	Total Veh	Total Pass	Ave Occupancy				in heavy vehicles	
7.00	30	6	0	0	0	36	42	1.17			120	140	
7.15	30	3	1	0	0	34	39	1.15			142	163	
7.30	35	1	0	1	0	37	41	1.11			157	174	
7.45	44	5	1	0	0	50	57	1.14			145	165	
8.00	24	8	1	0	0	33	43	1.30			134	174	
8.15	28	4	1	0	0	33	39	1.18			142	168	
8.30	45	3	1	0	0	49	54	1.10			158	175	
8.45	32	3	4	0	0	39	50	1.28			215	275	
9.00	51	9	0	0	0	60	69	1.15			197	227	
9.15	43	7	1	0	0	51	60	1.18			192	226	
9.30	43	3	0	0	0	46	49	1.07			201	214	
9.45	56	7	0	0	0	63	70	1.11			213	237	
10.00	55	4	0	0	1	60	68	1.13					
10.15	51	5	1	1	0	58	68	1.17			**estimated people in heavy**		
10.30	23	4	3	0	0	30	40	1.33			**vehicles 07.00-10.00**	**2338**	
10.45	48	7	1	0	0	56	65	1.16					
11.00	49	3	0	0	0	52	55	1.06			**estimated people in heavy**		
11.15	45	7	1	0	0	53	62	1.17			**vehicles 07.30-09.30**	**1584**	
11.30	47	3	0	0	0	50	53	1.06					
11.45	38	11	0	0	0	49	60	1.22					
12.00	40	3	0	1	0	44	50	1.14					
12.15	44	6	1	0	0	51	59	1.16					
12.30	53	4	0	0	0	57	61	1.07					
12.45	46	2	0	0	0	48	50	1.04					
0730-0930	302	40	9	1	0	352	413	1.17					
1000-1200	356	44	6	1	1	408	471	1.15					
0700-1230	901	112	17	3	1	1034	1193	1.15					