Road Network Performance & Research Team

RNPR Technical Note 5
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Major and Minor Road Traffic Flows

Précis:
A summary and analysis of major and minor road traffic flows as monitored through the TfL cordon survey programme. It investigates the hypothesis that perceived falling traffic levels are the result of traffic opting to divert from congested major road corridors to relatively free-flowing minor roads.

STREETS

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1 Introduction

1.1 This traffic note, produced by the Road Network Performance and Research (RNPR) Team within TfL provides a summary and analysis of major and minor road traffic flows as monitored through the cordon survey programme. There is a perception that falling traffic levels are the result of traffic opting to divert from congested major road corridors to relatively free-flowing minor roads. This report sets out to test this hypothesis by comparing traffic flow trends on both major and minor roads collected as part of the TfL cordon survey programme.

1.2 The purpose of the cordon survey programme is to estimate traffic flows on different parts of the network, and to monitor trends in traffic in London. Historically, traffic flows have been counted on defined cordons according to a regular cycle of surveys to contribute to long-run series of traffic trends. The surveys continue a series of counts begun by the Greater London Council in the 1970s, and continued by the Department for Transport before transferring to TfL.

1.3 Regular surveys are undertaken of three different cordons within Greater London. These are shown in Figure 2 on page 4.

1.4 The cordon surveys are formed of the:

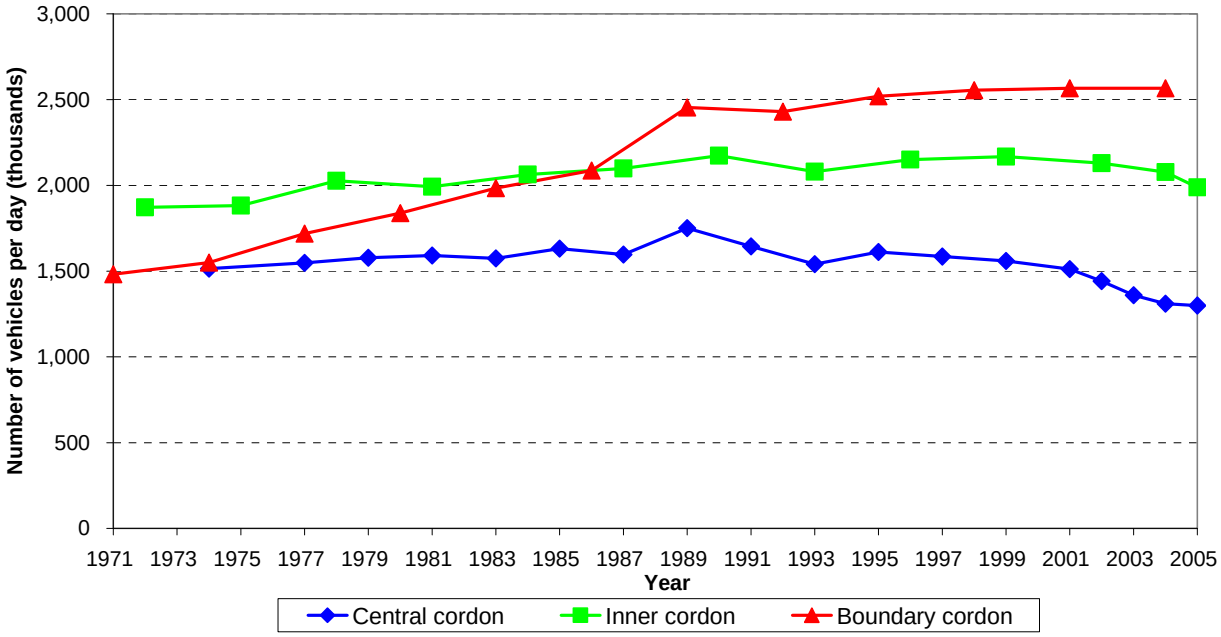
- **Central cordon** within a radius of 2.5 - 3 kms from a centre at Aldwych; surveyed annually since 2001 and once every three years prior to that. (Note – this cordon is not the same as the Congestion Charging cordon);
- **Inner cordon** enclosing an area roughly corresponding to the old London County Council, but excluding much of the boroughs of Greenwich and Lewisham, surveyed once every three years; and
- **Boundary cordon** roughly corresponding to the administrative boundary of Greater London and lying entirely within the M25 orbital motorway, surveyed once every three years.

1.5 The cordon survey programme is based on a three-year rolling programme. Consequently, compared periods vary for each cordon.

1.6 Technical information relating to the counting method, vehicle types and time periods can be found in Appendix 1.

1.7 Figure 1 overleaf shows the long term trend in all motor vehicle (AMV) traffic crossing each of the three cordons, based on 24 hr combined direction flows. AMV traffic crossing the central and inner cordons has remained fairly consistent over the last three decades rising steadily and peaking in 1989 and 1990 respectively. More recently AMV traffic has shown a reduction over the last ten years on the central cordon and last five years on the inner cordon. Conversely AMV traffic on the outer cordon has steadily increased throughout, recently slowing in the 3 surveys spanning the last six years.

Figure 1 – Long term trend in cordon crossings for all motor vehicles, 1971 to 2005

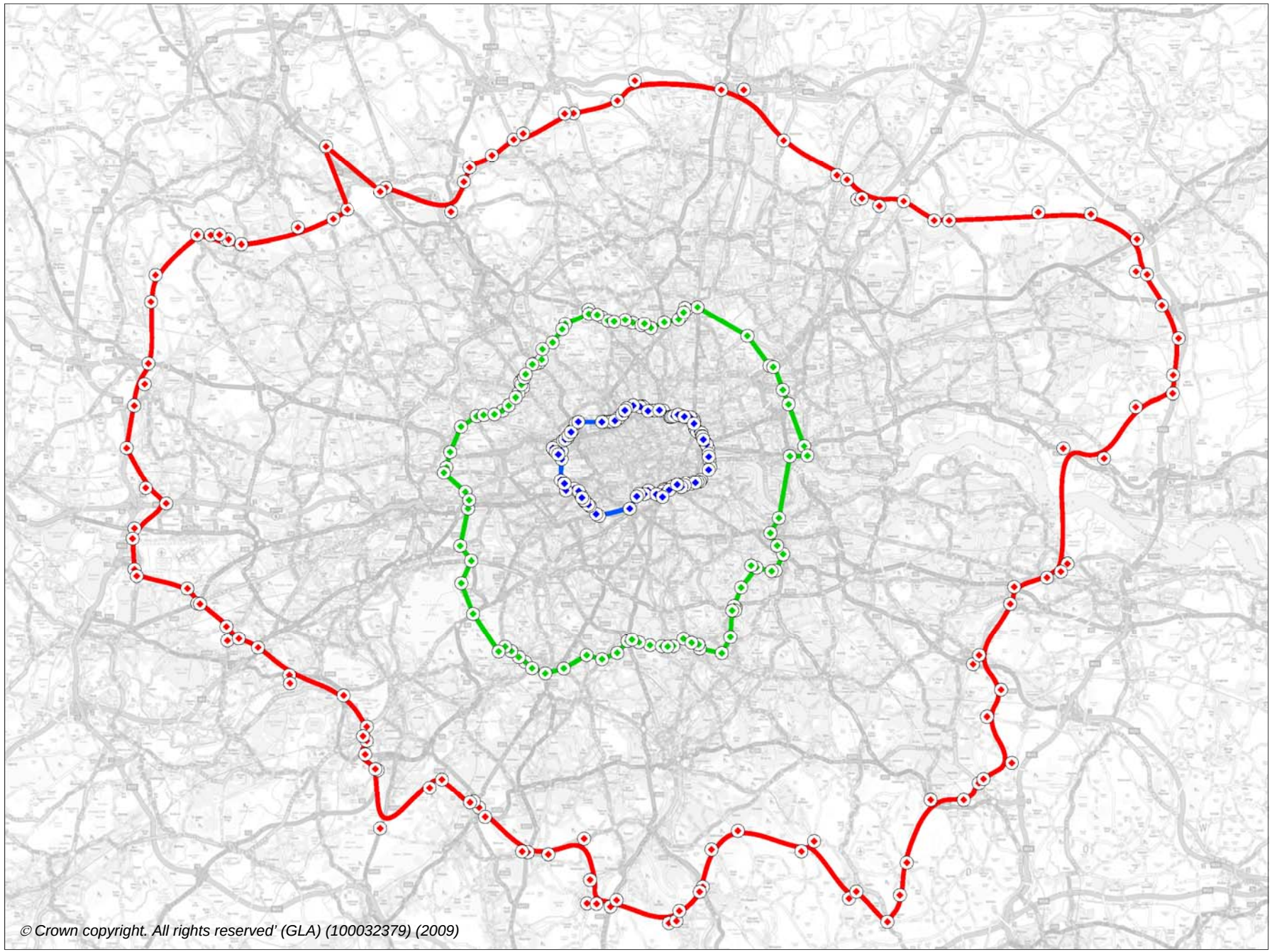


1.8 Greater detail about traffic flows in London can be found in RNPR Traffic Note 3 – TfL Cordon and Screenline Surveys 1971-2005.

1.9 The purpose of this report is to investigate whether, despite an overall reduction in cordon traffic levels, there has been any change in major and minor road traffic distribution and if so whether or not such a change can be attributed to time of day.

1.10 A map showing the location of cordon count sites is shown in Figure 2 overleaf.

Figure 2 – Locations of cordon count sites monitored by TfL survey programme



2 Central Cordon

2.1 This section provides a summary and analysis of traffic crossing the central cordon. The cordon itself is made up of 105 count sites; surveyed in autumn each year. Of these, 37 are located on major and 68 on minor roads. Table 1 below shows major road trends for AMV traffic crossing the cordon.

Table 1 – All motor vehicle traffic crossing the central cordon on major roads by time of day and direction, 2001 to 2005

Thousands of vehicles per day

	Morning Peak			Off Peak	Evening Peak			Daytime Total	Late Evening	Night	24 Hour Total
Year	In	Out	Both	Both	In	Out	Both	Both	Both	Both	Both
2001	120	77	197	357	91	117	208	762	250	134	1146
2002	105	72	177	325	83	102	185	687	235	137	1060
2003	98	69	167	311	79	98	177	655	236	135	1027
2004	97	65	162	305	76	98	173	640	225	120	986
2005	95	67	162	295	77	97	174	631	218	123	972

2.2 Generally, as in the case of the overall trend seen on all roads[1], road traffic levels on major roads crossing the central cordon have fallen since 2001 and continued to do so since the introduction of Congestion Charging in 2003. However, central cordon minor road trends, as seen in Table 2 below suggest flows on these roads may, for certain time periods, be increasing such that 2005 flows are above 2003 (post-Congestion Charging) levels.

Table 2 – All motor vehicle traffic crossing the central cordon on minor roads by time of day and direction, 2001 to 2005

Thousands of vehicles per day

	Morning Peak			Off Peak	Evening Peak			Daytime Total	Late Evening	Night	24 Hour Total
Year	In	Out	Both	Both	In	Out	Both	Both	Both	Both	Both
2001	43	23	67	123	32	40	71	261	74	32	367
2002	42	24	66	128	31	41	72	266	80	37	383
2003	36	19	54	109	29	32	62	225	72	36	333
2004	34	21	56	106	27	33	60	222	70	33	325
2005	35	21	57	108	29	34	63	228	69	33	329

2.3 Night-time flows are based on counts at only a proportion of sites. As a result they are subject to large sampling variation and therefore must be treated with caution. Daytime traffic flows may therefore be a more reliable trend indicator.

2.4 Major road AMV traffic flow accounts for around 74% of the overall total daytime flow on its 35% share of central cordon roads. The average daytime flow on each major road crossing this cordon is approximately 19,000, whereas the average on each minor road is approximately 4,000 vehicles. Table 3 overleaf shows all motor vehicle traffic crossing the central cordon on major roads by sector, time of day and direction.

[1] RNPR Traffic Note 3 – TfL Cordon and Screenline Surveys 1971-2005

Table 3 – All motor vehicle traffic crossing the central cordon on major roads by sector, time of day and direction, 2001 to 2005

Thousands of vehicles per day

		Morning Peak			Off Peak	Evening Peak			Daytime Total	Late Evening	Night	24 Hour Total
Sector	**Year**	**In**	**Out**	**Both**	**Both**	**In**	**Out**	**Both**	**Both**	**Both**	**Both**	**Both**
North	2001	29	18	47	87	22	30	51	185	61	32	278
	2002	25	17	42	80	20	25	45	167	56	32	255
	2003	24	17	41	76	19	25	44	162	59	33	254
	2004	23	16	40	77	19	25	44	161	54	29	244
	2005	21	15	37	67	17	23	40	144	52	28	224
South	2001	42	24	65	110	27	38	64	240	74	41	354
	2002	36	21	57	98	24	33	57	212	73	43	329
	2003	30	18	48	82	21	28	49	179	64	38	281
	2004	33	17	50	84	21	29	50	184	67	37	288
	2005	31	17	49	82	21	29	50	181	61	34	276
East	2001	18	11	29	50	14	18	31	110	37	24	170
	2002	15	10	26	43	12	14	25	94	31	22	148
	2003	15	10	25	48	12	15	27	100	35	22	157
	2004	13	8	21	42	10	13	23	87	28	17	132
	2005	14	11	25	46	12	15	28	98	31	21	151
West	2001	31	25	57	110	29	32	61	228	78	37	343
	2002	29	24	53	104	28	30	58	214	75	40	329
	2003	29	24	53	104	27	30	57	214	78	42	334
	2004	28	23	51	102	26	30	56	208	76	37	321
	2005	28	24	52	100	26	30	56	208	74	39	321

2.5 The quadrants are defined as:

North sector: Shoot up Hill (A5) in Brondesbury round to High Road (A10) in Tottenham.

East sector: Lea Bridge Road (A104) in Lea Bridge round to Loam Pit Vale (A20) in Lewisham.

South sector: Vicars Hill in Ladywell round to Roehampton Vale (A3) in Putney Vale.

West sector: Clarence Lane in Roehampton round to Exeter Road in Brondesbury.

2.6 Individual sectors experience different traffic flow patterns and trends. The table above shows an overall decrease in daytime flow in 2005 for north and southern sectors compared to previous surveys. Eastern sector has seen an increase between 2004 and 2005, whereas western sector flows have remained much the same. It is evident that the introduction of congestion charging in 2003 has had some effect on major road vehicle usage, with a fall of 5,000 (3%) seen in the north and 33,000 (15.6%) in the south between 2002 and 2003. As the majority of the south sector falls within the congestion charging zone, (introduced in February 2003) the large decrease in flow is as expected. Western sector usage remained at the same level over this time period, although fell in 2004. The eastern sector rose by 6,000 vehicles (6%), possibly as a result of roadworks on the A13and completion of the Shoreditch Triangle scheme.

2.7 Table 4 overleaf shows minor road traffic flows in to and out of central London by sector.

Table 4 – All motor vehicle traffic crossing the central cordon on minor roads by sector, time of day and direction, 2001 to 2005

Thousands of vehicles per day

		Morning Peak			Off Peak	Evening Peak			Daytime Total	Late Evening	Night	24 Hour Total
Sector	Year	In	Out	Both	Both	In	Out	Both	Both	Both	Both	Both
North	2001	19	9	29	52	13	18	31	111	31	11	153
	2002	19	10	28	53	13	18	31	112	32	15	159
	2003	16	8	24	46	12	15	27	97	31	16	144
	2004	17	10	26	47	12	15	27	100	31	15	147
	2005	17	9	27	48	13	16	28	103	31	14	149
South	2001	6	2	9	12	3	5	8	28	7	4	39
	2002	6	3	8	12	3	4	7	28	7	4	38
	2003	3	1	5	7	2	2	4	16	4	3	23
	2004	2	1	3	6	2	2	4	14	4	2	20
	2005	3	2	4	7	2	2	4	16	4	2	22
East	2001	4	3	6	12	3	3	6	25	7	4	36
	2002	4	2	6	13	3	3	6	25	8	4	37
	2003	3	1	5	10	3	2	6	20	7	3	30
	2004	4	2	6	9	2	3	5	19	5	3	27
	2005	4	2	6	9	3	3	6	21	5	3	29
West	2001	14	9	23	48	13	14	26	97	29	13	139
	2002	14	10	23	50	13	15	28	101	33	14	148
	2003	12	8	21	46	13	13	25	92	30	14	136
	2004	12	9	21	44	11	13	24	89	30	13	131
	2005	12	8	20	43	12	13	24	88	28	13	128

2.8 The above table for minor roads shows an overall decrease in daytime flow for all sectors in 2003 compared to 2001. This is likely to be attributed to the introduction of congestion charging in 2003. Reductions of as much as 15,000 vehicles in the north and 12,000 in the south are evident between 2002 and 2003. Other decreases of between five and nine thousand vehicles can be seen in east and western sectors. Slight increases in vehicle numbers crossing the cordon on minor roads are evident post 2003 in the north and eastern sectors. However, numbers in south sector have remained the same, whilst those in west decreased.

2.9 Figure 3 and Figure 4 overleaf provide a comparison of 2005 major and minor flows against the base average of 1995-2001 for morning peak and evening peak traffic respectively.

2.10 Figure 3 shows that 2005 morning peak flows have decreased in all sectors compared to 1995-1999 base average. The sharpest decline can be seen in the south where minor inbound traffic has reduced by 61.6%. South sector calculations are however based on low flows. Other reductions vary between thirty and ten percent.

2.11 Figure 4 tells a similar story. All sectors experience a reduction in evening peak flow for both road types, when compared to 1995-1999 base average. The largest decline is evident in the south where minor road outbound traffic has reduced by 49%. Other reductions vary from thirty-five to eleven percent.

Figure 3 – Major and minor morning peak flow - % change in 2005 compared to 1995-1999 base average

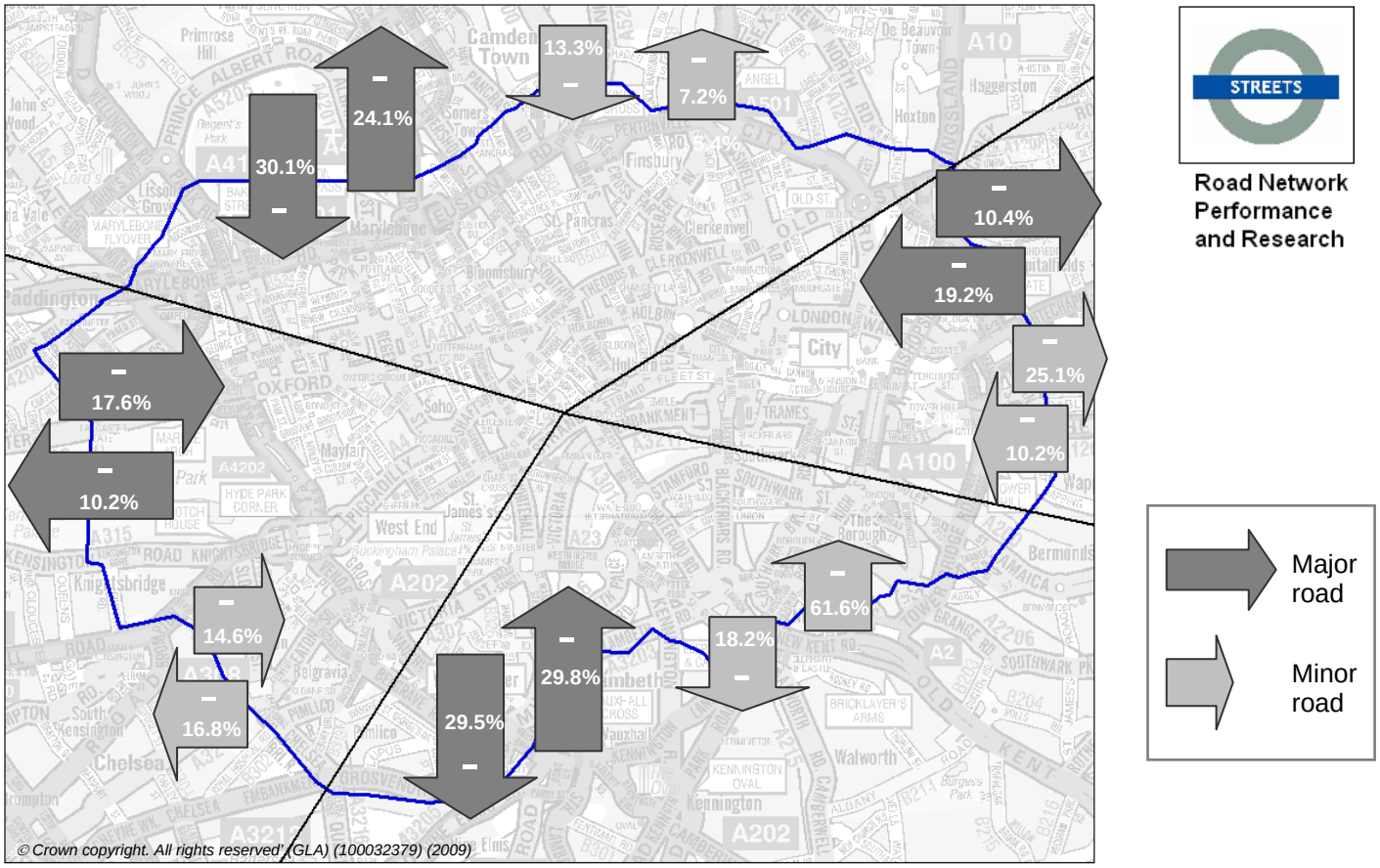
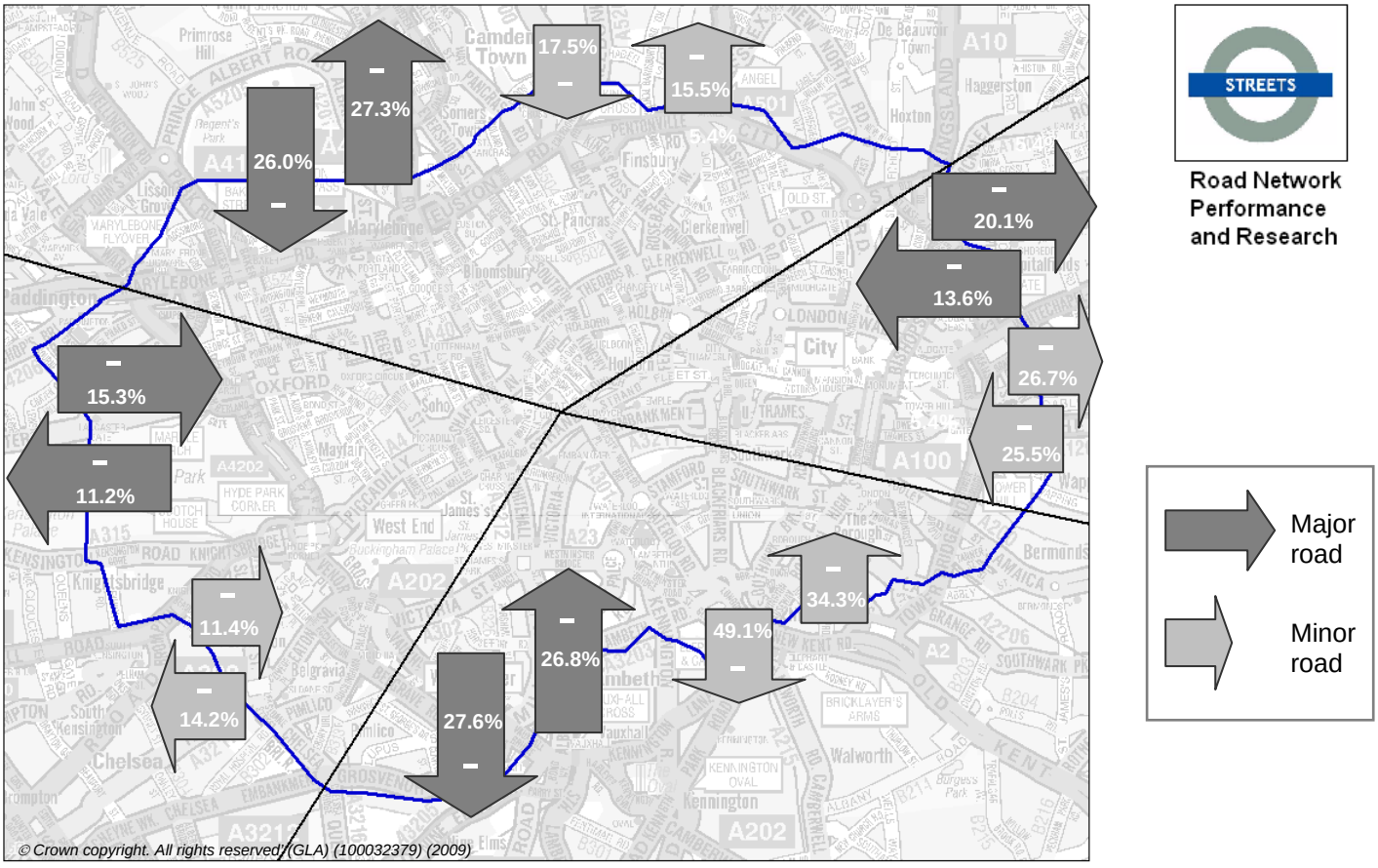


Figure 4 – Major and minor evening peak flow - % change in 2005 compared to 1995-1999 base average



3 Inner Cordon

3.1 This section provides a summary and analysis of traffic crossing the inner cordon. The cordon is made up of 95 count sites; 40 major and 55 minor roads which are surveyed in June/July each year. Table 5 below shows the trend in AMV traffic crossing the cordon on major roads by time period for 1996 to 2005. Flows for morning and evening peak periods are additionally shown by inbound and outbound directions, when the flows are most tidal.

Table 5 – All motor vehicle traffic crossing the inner cordon on major roads by time of day and direction, 1996 to 2005

Thousands of vehicles per day

	Morning Peak			Off Peak	Evening Peak			Daytime Total	Late Evening	Night	24 Hour Total
Year	In	Out	Both	Both	In	Out	Both	Both	Both	Both	Both
1996	166	121	287	514	131	174	304	1105	320	142	1568
1999	178	114	293	498	126	169	295	1085	343	165	1594
2002	166	110	276	489	128	160	288	1053	326	171	1551
2004	164	113	277	489	135	153	288	1054	321	162	1537
2005	158	106	265	459	118	156	273	997	290	154	1441

3.2 It can be seen, as in the case of the overall trend seen on all roads[2], that major road traffic levels have generally fallen since 1999. However, as seen in Table 6 below, minor road flow trends show a small increase from 2004 to 2005. Yet, such flows are still lower than earlier years, contributing to the general downward trend.

Table 6 – All motor vehicle traffic crossing the inner cordon on minor roads by time of day and direction, 1996 to 2005

Thousands of vehicles per day

	Morning Peak			Off Peak	Evening Peak			Daytime Total	Late Evening	Night	24 Hour Total
Year	In	Out	Both	Both	In	Out	Both	Both	Both	Both	Both
1996	73	38	111	186	49	76	125	422	120	40	582
1999	72	35	107	181	47	73	120	408	123	44	575
2002	64	39	103	186	50	69	119	407	124	47	578
2004	62	38	99	174	45	65	110	383	113	45	541
2005	65	39	104	173	47	67	114	391	111	45	547

3.3 Night-time flows are based on counts at only a sample of sites. As a result, they are subject to large sampling variation and therefore must be treated with caution. Daytime traffic flows are therefore a more reliable trend indicator.

3.4 Major road AMV traffic flow attributes for around 72% of the overall total daytime flow on its 42% share of inner cordon roads. The average daytime flow on each major road crossing this cordon is approximately 25,000, whereas the average on each minor road is approximately 7,000 vehicles. Table 7 overleaf shows all motor vehicle traffic crossing the inner cordon on major roads by sector, time of day and direction.

[2] RNPR Traffic Note 3 – TfL Cordon and Screenline Surveys 1971-2005

Table 7 – All motor vehicle traffic crossing the inner cordon on major roads by sector, time of day and direction, 1996 to 2005

Thousands of vehicles per day

		Morning Peak			Off Peak	Evening Peak			Daytime Total	Late Evening	Night	24 Hour Total
Sector	Year	In	Out	Both	Both	In	Out	Both	Both	Both	Both	Both
North	1996	28	20	48	91	24	29	53	192	59	25	275
	1999	28	17	45	82	21	26	47	174	56	26	256
	2002	28	17	45	82	21	26	47	174	56	26	256
	2004	25	17	42	77	21	24	45	164	54	26	243
	2005	27	16	42	74	19	28	47	163	50	23	235
South	1996	49	33	82	142	37	52	89	312	93	37	443
	1999	43	31	74	134	35	46	82	289	89	43	421
	2002	43	31	74	134	35	46	82	289	89	43	421
	2004	44	30	74	131	35	45	81	286	84	40	409
	2005	41	29	70	122	32	41	73	266	79	40	385
East	1996	48	36	85	155	37	57	94	334	91	48	473
	1999	59	32	92	154	38	53	91	336	103	64	503
	2002	59	32	92	154	38	53	91	336	103	64	503
	2004	56	37	94	163	47	49	95	352	105	60	517
	2005	54	33	87	150	35	56	91	328	91	56	476
West	1996	42	31	73	126	32	36	68	267	78	32	377
	1999	36	30	66	118	34	35	69	254	79	37	370
	2002	36	30	66	118	34	35	69	254	79	37	370
	2004	38	30	67	118	33	34	67	252	79	36	367
	2005	37	28	65	113	31	30	62	240	70	36	346

3.5 The quadrants are defined as:

North sector: Shoot up Hill (A5) in Brondesbury round to High Road (A10) in Tottenham.

East sector: Lea Bridge Road (A104) in Lea Bridge round to Loam Pit Vale (A20) in Lewisham.

South sector: Vicars Hill in Ladywell round to Roehampton Vale (A3) in Putney Vale.

West sector: Clarence Lane in Roehampton round to Exeter Road in Brondesbury.

3.6 Table 7 above shows an overall decrease for each sectoral daytime flow in 2005 compared to 2004. The smallest reduction is evident in the northern sector whilst other sectors, such as the east, have experienced a decline of up to twenty-four thousand vehicles crossing the inner cordon on major roads.

3.7 North, south and western sectors show a decrease in daytime flow over the ten-year period 1996 to 2005. In contrast, the eastern sector showed an increase from 1996, peaking in 2004, followed by a large decrease in 2005. This is likely to be due to changes in the major road network in this sector.

3.8 Table 8 overleaf shows minor road traffic flows into and out of inner London by sector.

Table 8 – All motor vehicle traffic crossing the inner cordon on minor roads by sector, time of day and direction, 1996 to 2005

Thousands of vehicles per day

		Morning Peak			Off Peak	Evening Peak			Daytime Total	Late Evening	Night	24 Hour Total
Sector	Year	In	Out	Both	Both	In	Out	Both	Both	Both	Both	Both
North	1996	24	15	38	68	19	27	46	152	44	14	210
	1999	24	11	35	64	16	26	42	141	45	15	201
	2002	20	13	33	64	18	23	41	139	43	16	197
	2004	19	14	33	63	17	22	39	135	41	17	193
	2005	21	13	34	60	16	22	38	133	37	15	185
South	1996	31	13	44	70	18	30	48	162	46	15	224
	1999	34	14	48	73	18	31	50	171	50	19	240
	2002	30	17	47	78	20	30	50	175	53	21	249
	2004	28	14	43	70	18	26	44	156	46	18	220
	2005	30	16	46	74	20	30	50	170	48	20	237
East	1996	1	0	1	2	0	2	2	5	1	1	7
	1999	..*	..*	..*	..*	..*	..*	..*	..*	..*	..*	..*
	2002	..*	..*	..*	..*	..*	..*	..*	..*	..*	..*	..*
	2004	..*	..*	..*	..*	..*	..*	..*	..*	..*	..*	..*
	2005	..*	..*	..*	..*	..*	..*	..*	..*	..*	..*	..*
West	1996	18	9	27	47	12	16	29	102	28	10	141
	1999	15	9	24	43	13	16	28	96	28	9	133
	2002	14	9	22	43	12	16	28	94	28	10	132
	2004	14	10	24	41	11	16	27	92	26	10	128
	2005	14	9	23	39	11	16	27	88	26	10	125

*too few minor roads in this sector to warrant meaningful analysis.

3.9 The above table for minor roads shows that daytime totals have reduced in both northern and western sectors in 2005 relative to 2004, contributing to the overall downward trend since 1996. In contrast, the south has experienced an increase in minor road traffic flow in 2005 compared to 2004, although flows are lower than those that occurred in 2002.

3.10 Figure 5 and Figure 6 overleaf provide a comparison of 2005 major and minor flows against the base average of 1996-1999 for morning peak and evening peak traffic respectively. There are no other obvious patterns of change when comparing inbound to outbound flows and major to minor road flows.

3.11 Figure 5 shows that almost all road type and direction combinations have experienced a decrease in levels in 2005 when compared to1996-1999 base average. The exception is outbound minor road traffic flow, which has increased by 16.7% in the south and 1.2% in the west.

3.12 Figure 6 shows that the majority of road type and direction combinations have experienced a decrease in levels in 2005 when compared to 1996-1999 base average. Exceptions to this are a 0.5% increase on eastern sector outbound major roads and 11.1% increase on southern inbound minor roads.

Figure 5 – Major and minor morning peak flow - % change in 2005 compared to 1996-1999 base average

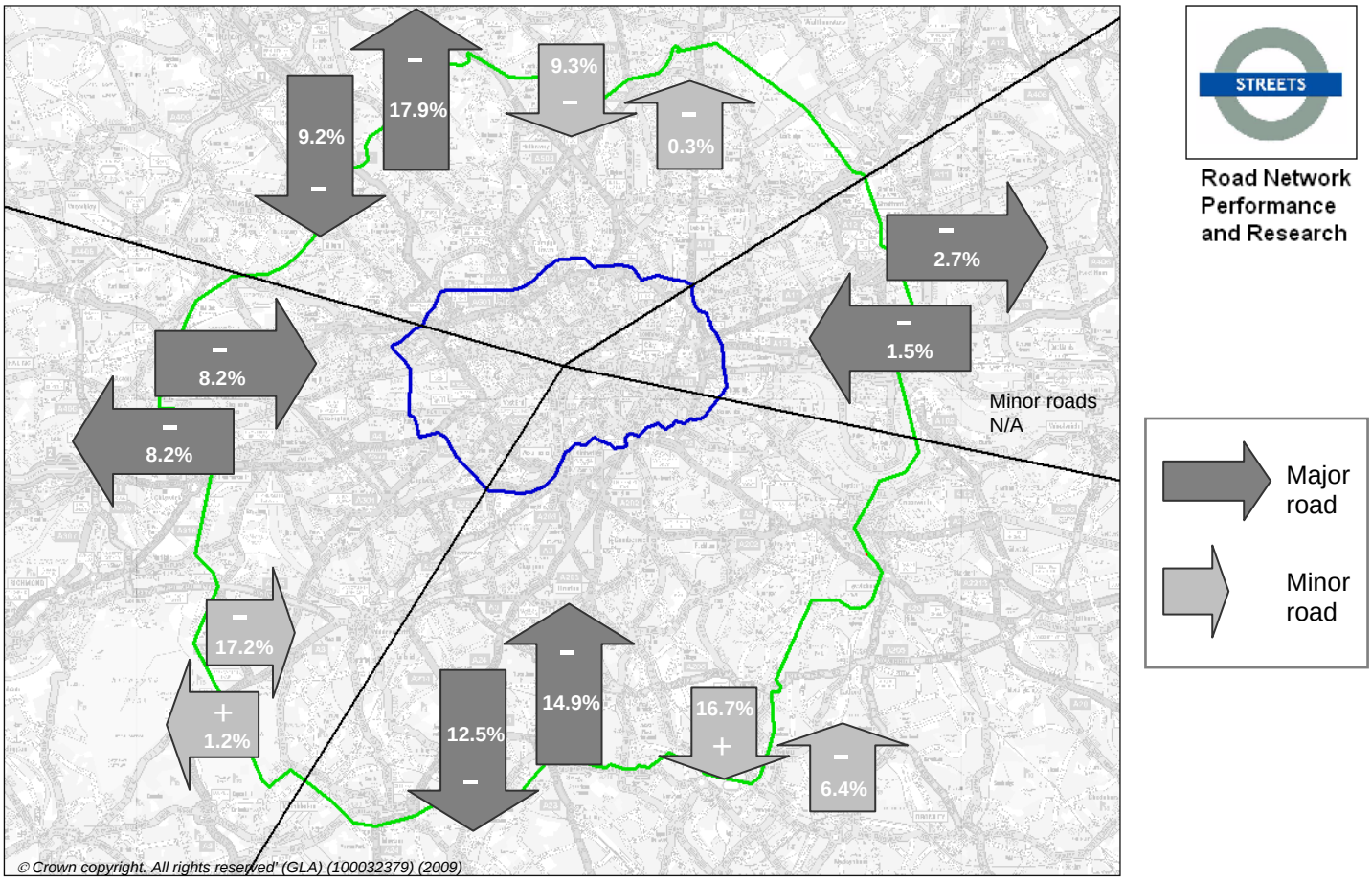
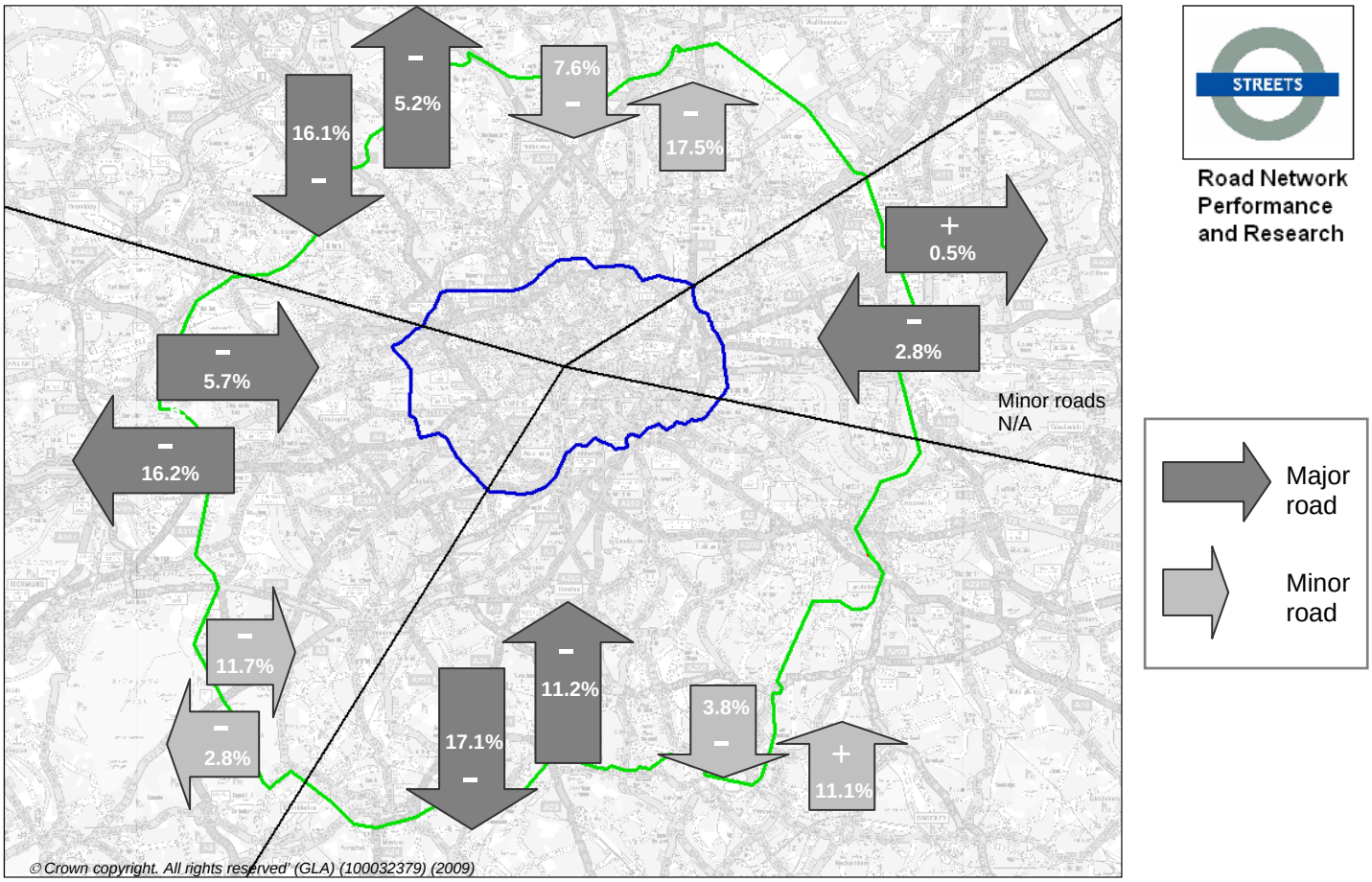


Figure 6 – Major and minor evening peak flow - % change in 2005 compared to 1996-1999 base average



4 Boundary Cordon

4.1 This section provides a summary and analysis of traffic crossing the boundary cordon. The cordon itself is made up of 117 count sites which are surveyed in June/July each year. Of these, 56 are located on Major and 61 on Minor roads. Table 9 below shows the trend in AMV traffic crossing the cordon on major roads. For the morning and evening peak periods the flows are additionally shown by inbound and outbound directions, when the flows are most tidal.

Table 9 – All motor vehicle traffic crossing the boundary cordon on major roads by time of day and direction, 1992 to 2004

Thousands of vehicles per day

	Morning Peak			Off Peak	Evening Peak			Daytime Total	Late Evening	Night	24 Hour Total
Year	In	Out	Both	Both	In	Out	Both	Both	Both	Both	Both
1992	257	177	435	641	189	255	443	1520	342	121	1983
1995	258	188	447	655	201	262	462	1565	362	144	2070
1998	259	196	455	679	210	258	468	1602	345	157	2104
2001	252	201	454	682	216	253	469	1604	359	148	2111
2004	244	194	438	703	205	233	437	1579	375	179	2133

4.2 Since 2001, AMV traffic crossing the boundary cordon on major roads has fallen during peak times but increased at off-peak, late evening and night time periods. Despite this, the daytime total still remains higher than 1992 and 1995 figures. However, as seen in Table 10 below, AMV traffic on minor roads has decreased at all time periods since 2001, except for at night, with overall daytime flows at their lowest over the period 1992 to 2004.

Table 10 – All motor vehicle traffic crossing the boundary cordon on minor roads by time of day and direction, 1992 to 2004

Thousands of vehicles per day

	Morning Peak			Off Peak	Evening Peak			Daytime Total	Late Evening	Night	24 Hour Total
Year	In	Out	Both	Both	In	Out	Both	Both	Both	Both	Both
1992	57	39	96	146	44	59	103	344	78	24	446
1995	55	40	95	150	45	58	104	348	78	22	449
1998	58	41	99	144	47	58	106	349	77	25	451
2001	54	44	97	154	48	56	104	355	78	22	455
2004	48	38	86	145	46	53	100	331	74	28	433

4.3 Night-time flows are based on counts at a small sample of sites. As a result they are subject to large sampling variation and must be treated with caution. Daytime traffic flows may therefore be a more reliable trend indicator.

4.4 Major road AMV traffic flow accounts for around 73% of the overall total daytime flow on its 48% share of boundary cordon roads. The average daytime flow on each major road crossing this cordon is approximately 28,000, whereas the coverage on each minor road is approximately 5,400 vehicles. Table 11 overleaf shows all motor vehicle traffic crossing the inner cordon on major roads by sector, time of day and direction

Table 11 – All motor vehicle traffic crossing the boundary cordon on major roads by sector, time of day and direction, 1992 to 2004

Thousands of vehicles per day

		Morning Peak			Off Peak	Evening Peak			Daytime Total	Late Evening	Night	24 Hour Total
Sector	Year	In	Out	Both	Both	In	Out	Both	Both	Both	Both	Both
North	1992	51	31	82	116	32	49	81	279	63	22	364
	1995	52	33	85	125	35	53	88	297	69	26	393
	1998	49	34	83	126	37	50	87	296	64	30	390
	2001	46	32	78	126	37	46	84	288	61	27	376
	2004	42	29	72	113	32	39	71	256	63	30	349
South	1992	43	35	79	123	38	46	84	286	65	22	373
	1995	44	38	82	116	39	44	83	281	66	24	371
	1998	44	39	83	122	40	43	83	288	63	26	377
	2001	40	40	80	120	38	43	80	280	68	21	369
	2004	41	39	80	132	43	44	88	300	64	31	396
East	1992	69	42	112	161	47	68	115	388	85	32	505
	1995	69	45	113	166	50	70	119	399	93	43	535
	1998	70	47	117	174	52	69	121	412	88	49	549
	2001	76	52	128	192	64	75	139	458	106	50	614
	2004	72	53	125	219	57	74	131	476	106	57	639
West	1992	93	69	162	241	72	91	163	567	129	45	741
	1995	94	73	166	249	78	95	173	588	133	50	771
	1998	96	76	173	256	81	96	176	605	130	52	788
	2001	91	77	168	244	77	89	166	578	124	50	752
	2004	88	73	161	239	71	76	147	547	142	61	749

4.5 The quadrants are defined as:

> **North sector:** M1 Yorkshire Motorway in Aldenham round to Sewardstone Road (A112);
> **East sector:** Epping New Road in Epping Forest (A104) round to Sidcup By-Pass (A20) in Sidcup;
> **South sector:** Hockenden Lane in Crockenhill round to Esher By-Pass (A3) in Hook;
> **West sector:** Woodstock Lane in Hook round to The Common (A4140) in Stanmore.

4.6 Individual sectors experience different traffic flows and trends at differing times of day.

4.7 Table 11 above shows a reduction in overall major road daytime total flow for two sectors, northern and western, and an increase for the remaining two sectors, southern and eastern, in 2004 compared to 2001. Longer term daytime trends show that flows in the north have continually fallen since 1992. This is of contrast to the east, where flows have increased with each survey and the south and west, where fluctuations of approximately twenty and sixty thousand vehicles, have occurred respectively over the past five surveys.

4.8 Table 12 overleaf shows minor road traffic flows into and out of outer London by sector.

Table 12 – All motor vehicle traffic crossing the boundary cordon on minor roads by sector, time of day and direction, 1992 to 2004

Thousands of vehicles per day

		Morning Peak			Off Peak	Evening Peak			Daytime Total	Late Evening	Night	24 Hour Total
Sector	Year	In	Out	Both	Both	In	Out	Both	Both	Both	Both	Both
North	1992	6	2	8	8	3	4	7	23	5	1	29
	1995	4	2	6	7	2	3	6	19	4	1	24
	1998	5	2	7	9	3	4	7	23	4	1	28
	2001	5	3	7	9	3	4	7	23	4	1	29
	2004	5	3	8	12	3	4	7	26	5	3	34
South	1992	21	16	37	53	18	20	38	128	30	9	166
	1995	21	17	37	55	18	22	40	132	30	8	169
	1998	21	17	38	51	19	20	39	127	29	9	165
	2001	20	17	37	58	20	21	41	135	31	8	175
	2004	16	15	31	56	19	20	38	126	27	10	162
East	1992	12	10	22	38	11	15	26	87	20	6	113
	1995	13	10	23	39	12	16	27	90	20	6	116
	1998	15	11	26	38	11	16	28	91	20	8	120
	2001	13	11	24	38	12	15	27	89	20	5	115
	2004	11	9	20	32	10	13	23	75	16	6	97
West	1992	18	11	30	46	12	19	31	107	23	8	138
	1995	17	12	29	48	13	18	31	108	24	7	140
	1998	18	11	29	47	15	18	32	108	24	7	139
	2001	16	13	30	49	14	16	30	108	23	7	137
	2004	15	12	27	45	15	17	32	104	26	9	139

4.9 Table 12 above for minor roads by sectors shows that three out of the four sectors, southern, eastern and western, have seen reductions in their overall daytime flows in 2004 when compared to 2001. However, the northern sector shows an increase over the same time period, although the flows are relatively low. The same patterns are true for all sectors when comparing 2004 figures to surveys prior to 2001.

4.10 Figure 7 and Figure 8 overleaf provide a comparison of 2004 major and minor flows against the base average of 1995-1998 for morning peak and evening peak traffic respectively.

4.11 Figure 7 shows that 2004 morning peak major road flows for northern, southern and western sectors have reduced in both directions when compared to 1995-1998 base average - the highest reduction of 16.7% for north sector inbound traffic. However, major road flow in the eastern sector has increased in both directions. For comparison, for minor road traffic levels outbound south sector and both directions eastern sector usage have fallen, whilst both directions north and outbound in the west sector and inbound in south sector have increased.

4.12 Figure 8 for the evening peak shows a similar pattern for the east and northern sectors to that seen in Figure 7, with the northern sector recording the highest percentage increase of 25% in inbound minor road flow. It is however important to reiterate that northern sector calculations are based on very low flows. For other sectors, like the south, evening peak major road usage has increased in 2004 compared to 1995-1998 base average, where in the morning peak it was seen to decrease. In the west, only inbound minor road flows have increased.

Figure 7 – Major and minor morning peak flow - % change in 2004 compared to 1995-1998 base average

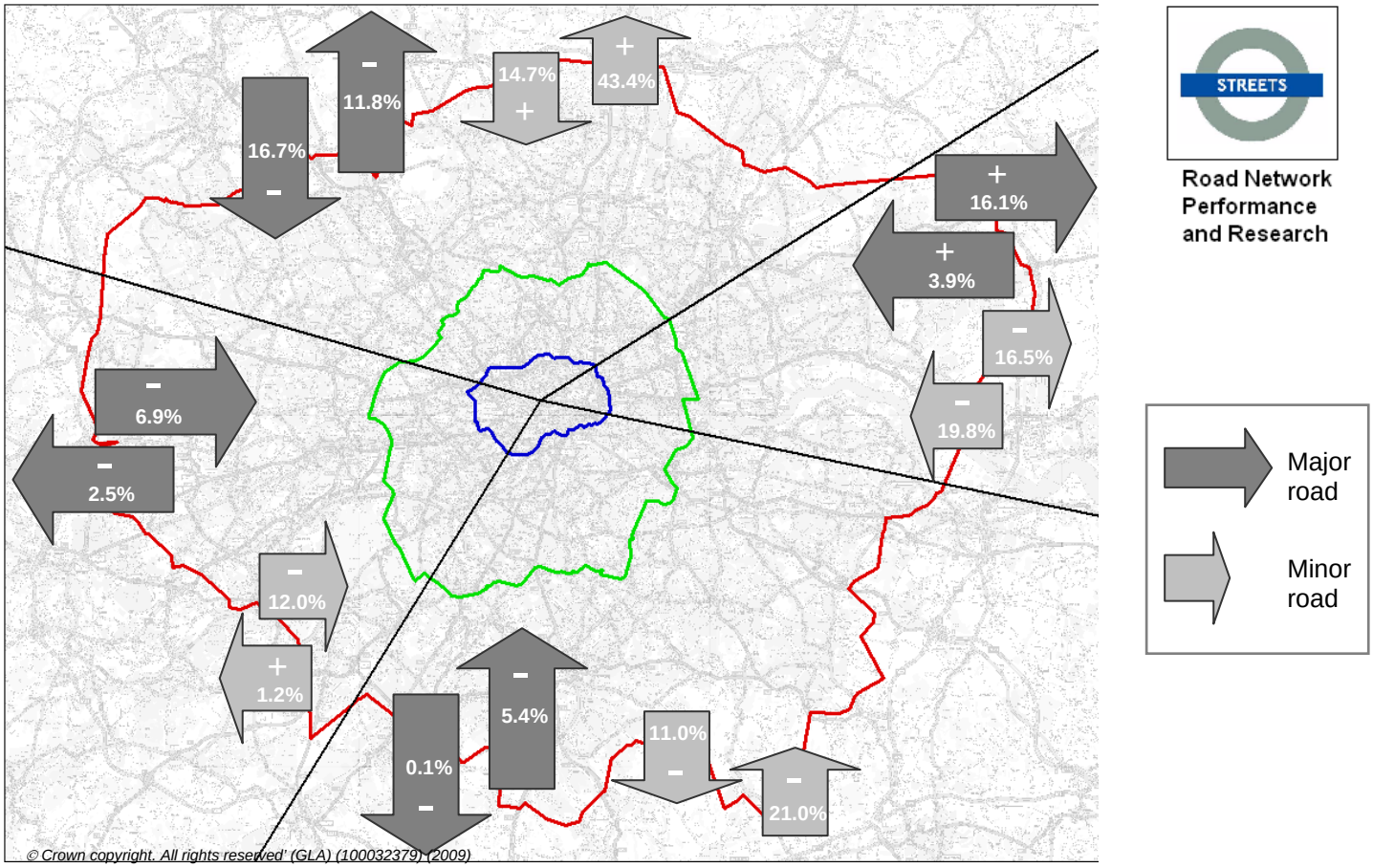
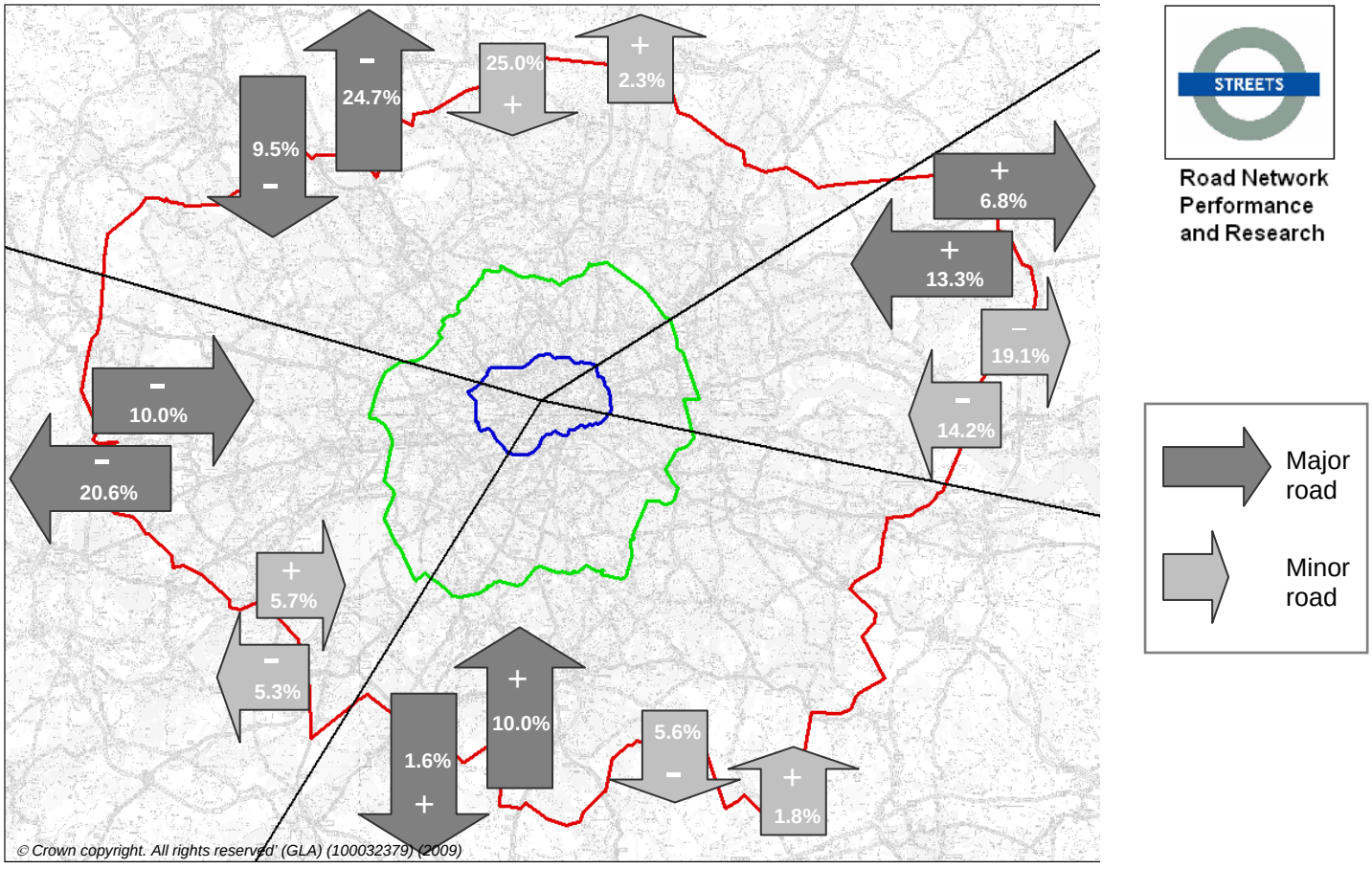


Figure 8 – Major and minor evening peak flow - % change in 2004 compared to 1995-1998 base average



5 Summary

5.1 It is evident that there have been changes in traffic flows on major and minor roads at the three cordons. However, the trends are varied and because of the differing time periods of survey on each cordon, care must be taken when interpreting the results. Between Year 4 and Year 5 the proportion of traffic on minor roads rose 0.7% across the central cordon, 1.5% across the inner cordon, and fell by 0.8% across the boundary cordon. However the number of actual vehicles comprising these percentages are relatively small, 6,000 more vehicles a day crossing the central cordon on minor roads, 8,000 more a day on the inner cordon and 24,000 fewer a day crossing the boundary cordon. These changes represent a change in the volume of flow of 2.7% growth on minor roads for the central cordon, 2.1% growth for the inner cordon and a fall of 6.8% for the boundary cordon.

5.2 Table 13 below shows the change in proportion of daytime traffic flows on major and minor roads for all three cordons over the past five survey years.

Table 13 – Major and minor road traffic flow – proportion change

	Central					Inner					Boundary				
	Major		Minor		Both	Major		Minor		Both	Major		Minor		Both
Year	Num.	%	Num.	%	Total	Num.	%	Num.	%	Total	Num.	%	Num.	%	Total
Year 1	762	74.5	261	25.5	1023	1105	72.4	422	27.6	1527	1520	81.5	344	18.5	1864
Year 2	687	72.1	266	27.9	953	1085	72.7	408	27.3	1493	1565	81.8	348	18.2	1913
Year 3	655	74.4	225	25.6	880	1053	72.1	407	27.9	1460	1602	82.1	349	17.9	1951
Year 4	640	74.2	222	25.8	862	1054	73.3	383	26.7	1437	1604	81.9	355	18.1	1959
Year 5	631	73.5	228	26.5	859	997	71.8	391	28.2	1388	1579	82.7	331	17.3	1910

Central: Year 1=2001, Year 2=2002, Year 3=2003, Year 4=2004, Year 5=2005.
Inner: Year 1=1996, Year 2=1999, Year 3=2002, Year 4=2004, Year 5=2005.
Boundary: Year 1=1992, Year 2=1995Year 3=1998, Year 4=2001, Year 5=2004.

5.3 Overall, the proportion of boundary traffic on major roads is increasing over time except for year 4 to year 5. For minor roads there is not much change except for a decrease between years 4 and 5. Note years 4 and 5 are more relevant as years 1 to 3 are for 1992 to 1998. It is only at inner and central cordons that there have been 5 years of decreases on major roads and increases on minor, these being more evident from year 4 to year 5. This may indicate a switch from major to minor roads, but the volumes involved are small.

5.4 Table 14 overleaf shows in detail the changes from the calculated base average for each cordon, by sector, by peak period, road type and direction to the most recent survey year. Note that figures are subject to rounding and may differ to those used in earlier calculations.

5.5 Table 14 shows that all sectors within the central cordon have experienced either a decrease or no real change in major and minor road flow in 2005, compared to the cordon base average. The same downward trend is apparent for all peak road types crossing the inner cordon with only the south sector showing growth in minor road flows. The boundary cordon shows similar patterns to this when comparing its base average to last survey year (2004). For example, eastern sector peak time major road flows have increased, whereas all minor road flows decreased.

Table 14 – Net gain/loss in traffic flow for latest cordon survey, by sector and road type against base average

Thousands of vehicles per day

			Morning Peak				Evening Peak			
			Major		Minor		Major		Minor	
Cordon	**Sector**		**In**	**Out**	**In**	**Out**	**In**	**Out**	**In**	**Out**
Central	North	1995-1999 (base average)	30	20	20	31	24	31	45	19
		2005	21	15	17	9	17	23	13	16
		Net change	**-9**	**-5**	**-3**	**-22**	**-7**	**-8**	**-32**	**-3**
	South	1995-1999 (base average)	45	25	7	2	28	40	3	5
		2005	31	17	3	2	21	29	2	2
		Net change	**-14**	**-8**	**-4**	**0**	**-7**	**-11**	**-1**	**-3**
	East	1995-1999 (base average)	18	12	4	2	14	19	4	4
		2005	14	11	4	2	12	15	3	3
		Net change	**-4**	**-1**	**0**	**0**	**-2**	**-4**	**-1**	**-1**
	West	1995-1999 (base average)	34	26	14	10	31	34	13	15
		2005	28	24	12	8	26	30	12	13
		Net change	**-6**	**-2**	**-2**	**-2**	**-5**	**-4**	**-1**	**-2**
Inner	North	1996-1999 (base average)	29	19	24	13	23	29	17	27
		2005	27	16	21	13	19	28	16	22
		Net change	**-2**	**-3**	**-3**	**0**	**-4**	**-1**	**-1**	**-5**
	South	1996-1999 (base average)	48	33	32	14	36	50	18	31
		2005	41	29	30	16	32	41	20	30
		Net change	**-7**	**-4**	**-2**	**+2**	**-4**	**-9**	**+2**	**-1**
	East	1996-1999 (base average)	55	34	..*	..*	36	56	..*	..*
		2005	54	33	..*	..*	35	56	..*	..*
		Net change	**-1**	**-1**	**..***	**..***	**-1**	**0**	**..***	**..***
	West	1996-1999 (base average)	40	31	16	9	33	36	13	16
		2005	37	28	14	9	31	30	11	16
		Net change	**-3**	**-3**	**-2**	**0**	**-2**	**-6**	**-2**	**0**
Boundary	North	1995-1998 (base average)	51	33	4	2	36	52	2	4
		2004	42	29	5	3	32	39	3	4
		Net change	**-9**	**-4**	**+1**	**+1**	**-4**	**-13**	**+1**	**0**
	South	1995-1998 (base average)	44	39	21	17	39	44	18	21
		2004	41	39	16	15	43	44	19	20
		Net change	**-3**	**0**	**-5**	**-2**	**+4**	**0**	**+1**	**-1**
	East	1995-1998 (base average)	69	46	14	10	51	69	11	16
		2004	72	53	11	9	57	74	10	13
		Net change	**+3**	**+7**	**-3**	**-1**	**+6**	**+5**	**-1**	**-3**
	West	1995-1998 (base average)	95	75	17	11	79	95	14	18
		2004	88	73	15	12	71	76	15	17
		Net change	**-7**	**-2**	**-2**	**+1**	**-8**	**-19**	**+1**	**-1**

*too few minor roads in this sector to warrant meaningful analysis.

5.6 The general conclusion is that whilst reductions in major road usage at cordon monitoring sites are evident (for certain time periods, directions and sectors within cordons), the levels of flow increase on minor roads, for the most recent surveys, does not counterbalance major road reductions**.** As a result, there is no conclusive evidence that significant numbers of motorised journeys are altering routing behaviour to make use of the minor road network as opposed to the major road network.

6 Appendix 1 Counting Methodology

6.1 The studies are based on a sample of 6-minute manual classified traffic counts taken four times each hour over a 16-hour period from 6 am to 10 pm (12 hours prior to the mid 1990's). Counts are taken on every road site crossing the cordon. On a sample of up to 20 sites the counts are extended to cover 24 hours and the results used to estimate nighttime and 24 hour counts for each vehicle type on other roads. Prior to 1990 overnight counts were made at much smaller numbers of sites. Estimates of night-time flows from this period should be treated with caution.

6.2 The vehicle classification includes All Motor Vehicles (AMV) split into Cars (Car), Taxis (Taxi), Buses and Coaches (Bus), Light Goods Vehicles (LGV), Medium Goods Vehicles (MGV), Heavy Goods Vehicles (HGV) and Powered Two Wheelers (PTWs). These last four categories are defined as:

LGV: Goods vehicles with 2 axles, 4 wheels

MGV: Goods vehicles with 2 axles, 6 wheels

HGV: Goods vehicles with 3 or more axles

PTW: Motorcycles, scooters and mopeds

In addition Pedal Cycles (Cycles) are also counted.
This report will look into All Motor Vehicle (AMV) traffic flows only.

6.3 The time periods referred to and summarised for the purposes of this note are:

Morning peak: 7:00am – 10:00am

Off peak: 10:00am – 4:00pm

Evening Peak 4:00pm – 7:00pm

Late evening: 7:00pm – 00:15am

Night: 0:15am – 7:00am

Daytime: 7:00am to 7:00pm

All count periods are for weekdays.

7 Library of technical notes

Other technical notes in the RNPR series include:

Technical notes

- ITIS – Validation Paper July 2005
- RNPR Technical Note 1 – ITIS Speed Survey Data
- RNPR Technical Note 2 – Traffic Delays in London on Weekdays, Saturdays and Sundays
- RNPR Technical Note 3 – Total vehicle delay for London
- RNPR Technical Note 4 - Validation of radar traffic monitoring equipment (published as an internal working document)
- RNPR Technical Note 6 - Validation of automatic traffic & cycle counters 2006 (published as an internal working document)

Traffic Notes

DfT NRTCC Counts

- RNPR Traffic Note 1 – Traffic levels on major roads in Greater London 1993-2007 (Published November 2008. Update with 2008 flows due in Autumn 2009)

TfL Automatic Traffic Counts

- RNPR Traffic Note 2 - Expansion factors for road traffic counts in London

TfL Cordon and Screenline Counts

- RNPR Traffic Note 3 – TfL Cordon and Screenlines 1975 to 2007 (2008 update due Spring 2009)
- RNPR Traffic Note 5 - Major and Minor traffic flows measured through TfL Cordon surveys

ITIS and Moving Observer Survey Data

- RNPR Traffic Note 4 – Traffic Speed in London 2003-2007 (Draft in preparation – publication date TBC)
- RNPR Traffic Note 6 – Traffic delays in the London Boroughs 2007 (published on LondonStreetWorks website)

Cycling

- RNPR Traffic Note 7 - Weather conditions and the levels of cycling on the TLRN
- RNPR Traffic Note 8 – Proportion of cyclists violating red lights
- RNPR Traffic Note 9 – Cycling trends in London (due to be published in early 2009)
- RNPR Traffic Note 10 – TfL Pedestrian and Cycle Thames Screenline Surveys 2006-2007 (due to be published in early 2009)
- RNPR Traffic Note 11 – Cycling journey time reliability (due to be published in early 2009)

Other useful documents

- London Travel Report 2007 – http://www.tfl.gov.uk/assets/downloads/corporate/London-Travel-Report-2007-final.pdf
- Transport Statistics for Great Britain 2007 - http://www.dft.gov.uk/162259/162469/221412/217792/2214291/TSGB2007Final_linksV12.pdf

8 Contacts for further information

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