



TECHNICAL NOTE 1

DATE:	12 April 2024	CONFIDENTIALITY:	Confidential
SUBJECT:	COMET 2014 Base Year Model Review		
PROJECT:	Strategic Road Network (SRN) – St Albans And Dacorum District	AUTHOR:	Bipin Muley
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1 INTRODUCTION

WSP has been commissioned to undertake a Strategic Road Network (SRN) review for National Highways (NH) for St Albans District Council (SADC) and Dacorum District. Hertfordshire County Council's (HCC) transport model COMET will be used for this work, which has a 2014 base year model.

The purpose of this technical note is to present the findings of the review of the existing 2014 base year model in the St Albans District (SAD) and Dacorum District to understand the performance of the COMET model on the SRN (M1, M25, A1(M)), roads approaching the SRN (such as A414 Breakspear Way) and major road network (such as A41, A414, A405 and A1081) within these two districts.

2 BASE YEAR MODEL REVIEW

To carry out the 2014 base year model review, the list of criteria identified is given below:

1. Comparison of 2014 Observed and Modelled traffic flow for the SRN road network, roads which approach the SRN and major road network
2. Journey Time Performance on SRN road network
3. Comparison between 2014 and 2023 traffic count data

These criteria were deemed suitable which would cover most of the critical aspects of the 2014 base year model for the Strategic Road Network (SRN) review within the SAD and Dacorum District.

3 COMPARISON OF 2014 OBSERVED AND MODELLED TRAFFIC FLOW

For the traffic flow validation performance review, only those traffic count locations on the SRN, roads approaching the SRN and major road network which lie within the SAD and Dacorum District boundary were identified. This is deemed acceptable as these are only relevant for understanding the model performance on the SRN within SADC and Dacorum District.

As per the TAG unit M3.1 (Section 3.3.11), the validation criteria and guidelines for link flows are defined in Table 1.

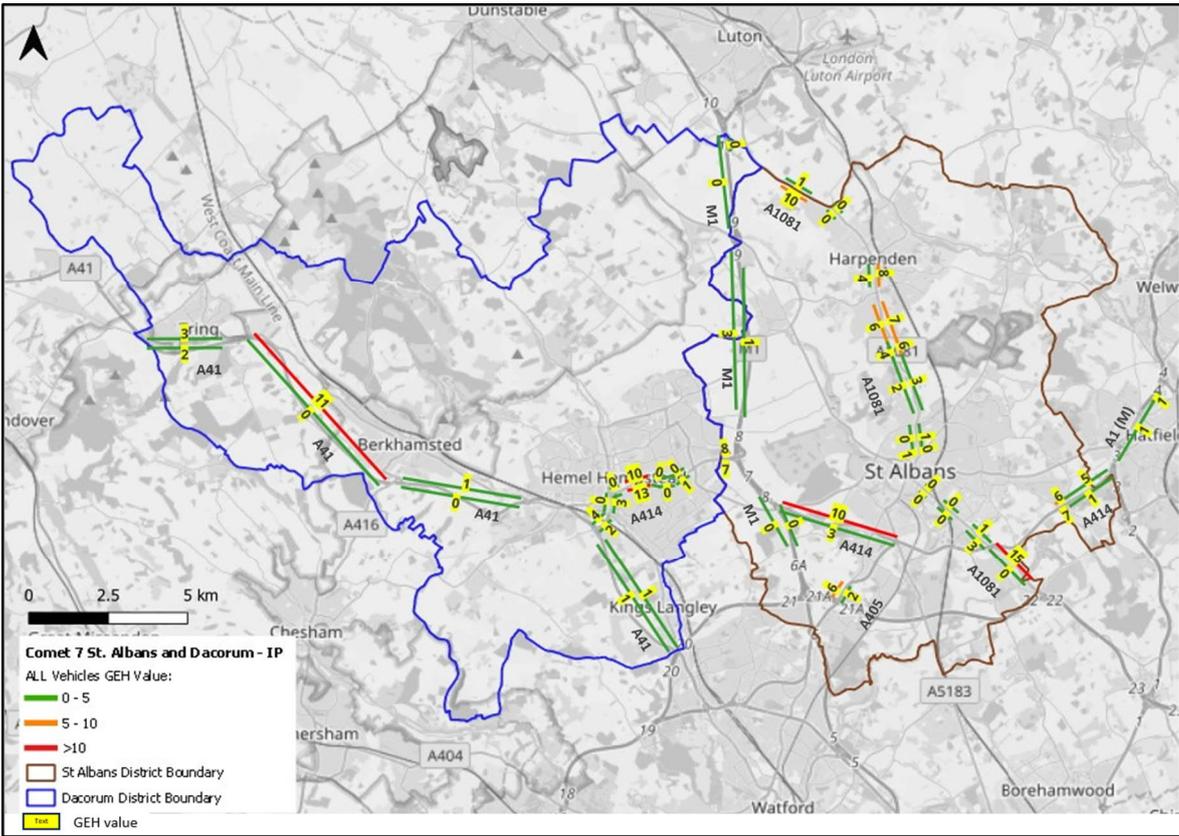


Figure 2: Link Flow Performance Calibration and Validation – All Vehicles (IP)

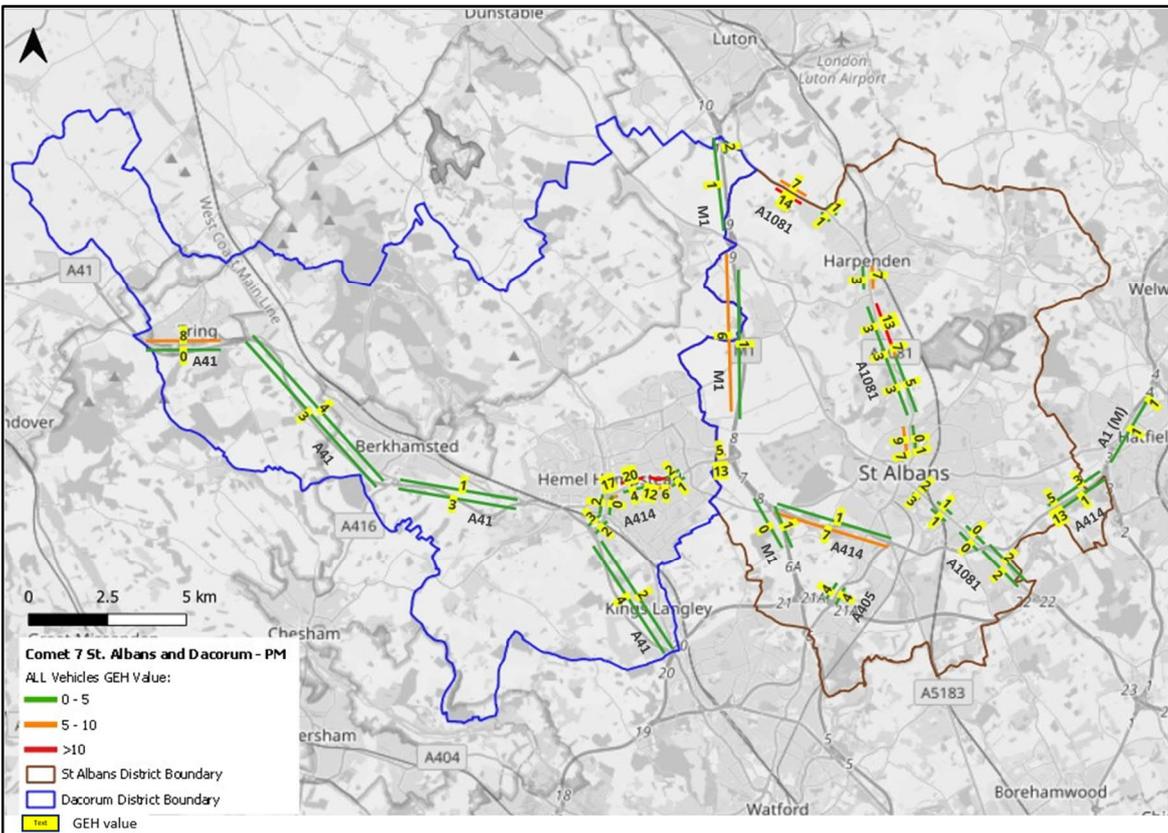


Figure 3: Link Flow Performance Calibration and Validation – All Vehicles (PM)

From Figure 1 to Figure 3, it is observed that calibration and validation of the total vehicles perform reasonably well (with GEH < 5) on the M1 and the A414 North Orbital Road in each time period (AM, IP, and PM). It is also observed that there are locations such as A414 St Albans Road in Hemel Hempstead, where GEH > 10 (in red) in each time period (AM, IP and PM), indicating a poor level of match between the observed and modelled traffic flows.

The summary of the calibration and validation for each time period (AM, IP and PM) and by each vehicle type (total vehicles, car, LGV and HGV) are presented in Table 2 and Table 3. Table 4 presents the performance of all the counts. The link performance is present for all roads (SRN, roads approaching SRN and major road network) as well as for the SRN roads only (M1, M25 and A1(M)) within St Albans and Dacorum District.

Table 2: Link Performance within St Albans and Dacorum District – Calibration Counts

Road Type	Period	TAG Criteria				GEH Performance Only				Flow Performance Only			
		Total	Cars	LGV	HGV	Total	Cars	LGV	HGV	Total	Cars	LGV	HGV
All Roads	AM	91%	94%	100%	97%	91%	91%	100%	85%	91%	94%	100%	94%
	IP	94%	94%	100%	100%	94%	94%	97%	97%	94%	91%	100%	100%
	PM	88%	88%	100%	100%	88%	88%	100%	100%	88%	88%	100%	100%
SRN Roads only	AM	100%	100%	100%	80%	100%	100%	100%	80%	100%	100%	100%	60%
	IP	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	PM	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table 3: Link Performance within St Albans and Dacorum District – Validation Counts

Road Type	Period	TAG Criteria				GEH Performance Only				Flow Performance Only			
		Total	Cars	LGV	HGV	Total	Cars	LGV	HGV	Total	Cars	LGV	HGV
All Roads	AM	35%	29%	90%	100%	32%	29%	74%	86%	35%	29%	90%	97%
	IP	58%	58%	97%	81%	58%	58%	90%	77%	58%	55%	97%	81%
	PM	52%	52%	94%	97%	48%	48%	74%	84%	48%	45%	94%	97%
SRN Roads only	AM	67%	67%	100%	100%	67%	67%	100%	88%	67%	67%	100%	67%
	IP	100%	100%	100%	67%	100%	100%	100%	67%	100%	100%	100%	67%
	PM	67%	100%	67%	67%	67%	100%	67%	67%	67%	100%	67%	67%

Table 4: Link Performance within St Albans and Dacorum District – All Counts

Road Type	Period	TAG Criteria				GEH Performance Only				Flow Performance Only			
		Total	Cars	LGV	HGV	Total	Cars	LGV	HGV	Total	Cars	LGV	HGV
All Roads	AM	64%	63%	95%	98%	63%	61%	88%	86%	64%	63%	95%	95%
	IP	77%	77%	98%	91%	77%	77%	90%	88%	77%	73%	98%	91%
	PM	70%	70%	97%	98%	69%	69%	88%	92%	69%	67%	97%	98%
SRN Roads only	AM	88%	88%	100%	88%	88%	88%	100%	88%	88%	88%	100%	63%
	IP	100%	100%	100%	88%	100%	100%	100%	88%	100%	100%	100%	88%
	PM	88%	100%	88%	88%	88%	100%	88%	88%	88%	100%	88%	88%

Table 2 shows that the calibration links (for all roads and SRN roads only) perform very well and meet TAG criteria for each of the time period (AM, IP and PM) and vehicle classes (total vehicles, cars, LGV and HGV). However, from Table 3, it is observed that the validation links performance (for all roads) is weaker, especially for total vehicles and cars on all roads and does not meet the TAG criteria in any time period for all roads. The validation link performance for SRN only links is better than the all roads performance however total vehicles and cars do not meet TAG criteria in the AM and PM while it meets the TAG criteria in the IP. Out of the 31 validation links (all roads), there are 21, 13, and 16 links which have GEH > 5 in the AM, IP and PM peaks respectively. Further analysis showed there are 11, 9 and 7 links that have GEH between 5 and 10 while there are 10, 4 and 9 links which have GEH > 10 in the AM, IP and PM peaks respectively.

Table 4 shows the performance of all the counts (calibration and validation). The total vehicles and cars do not meet the TAG criteria in any of the time periods for all roads but do meet TAG criteria for SRN in each time period (AM, IP and PM) for all vehicle classes. For all roads the AM peak performs is the weakest with only 64% of all the counts meeting the criteria.

The detailed summary of the calibration and validation for each link location is provided in Appendix A.

Overall, the 2014 base year model's traffic flow performance on the SRN, roads approaching the SRN and major road networks within the SAD and Dacorum District boundary indicate there are some areas which perform well against TAG criteria and others which are weaker.

4 JOURNEY TIME PERFORMANCE

A review of the journey time validation was conducted between the observed and modelled data for all the SRN, roads approaching the SRN and major road network within the SAD and Dacorum District boundary. The 2014 observed journey time data is sourced from Traffic Master journey time data as specified in the COMET LMVR¹.

As per TAG M3.1 (Section 3.3.15), the journey time validation and acceptability guidelines are presented in Table 5.

Table 5: Journey Time Validation Criteria and Acceptability Guideline

Criteria	Acceptability Guideline
Modelled times along routes should be within 15% of surveyed times (or 1 minute, if higher than 15%)	> 85% of routes

The location of overall journey time routes in the 2014 base year model (highlighted in black) and journey time routes assessed within the SAD and Dacorum District boundary (highlighted in red) is shown in Figure 4. A zoomed image of the journey time routes within the SAD is presented in Figure 5 with route identifications highlighted yellow.

A total of 22 routes (two-way) were identified to be lying within or majorly crossing the SAD and Dacorum District boundary. Table 6 provides the journey time validation summary along these routes for each time period (AM, IP and PM) and by direction.

It is observed that a total of 73%, 95% and 68% of the journey time routes on the SRN, roads approaching the SRN and major road networks pass the TAG criteria in the AM, IP and PM peaks respectively. As such, only the Inter-peak meets the TAG guideline for journey times with AM and PM falling short of meeting TAG criteria. However, the Journey time routes for SRN links perform well, with 80% passing in AM, 100% in IP and 90% in the PM peak.

¹ Hertfordshire COMET: Local Model Development and Validation Report (LMVR) v5.2, March 2020

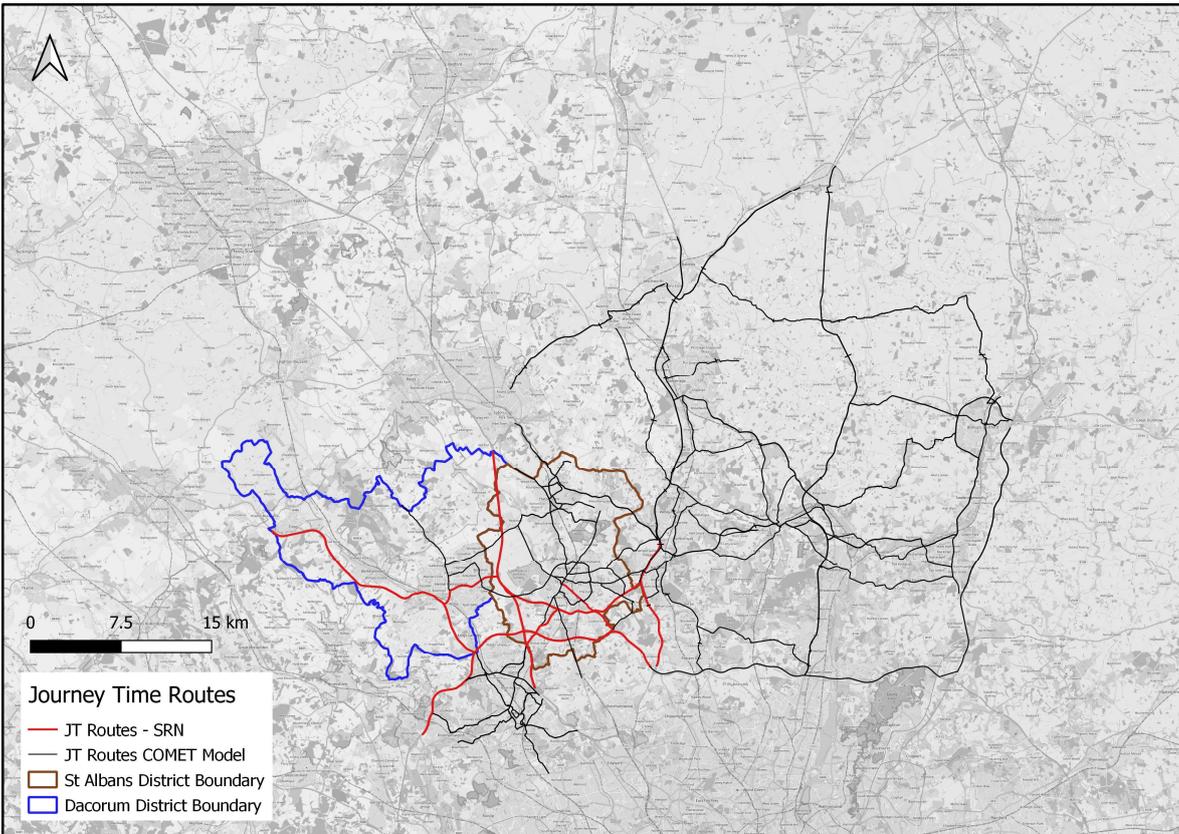


Figure 4: Journey Time Routes (SRN)

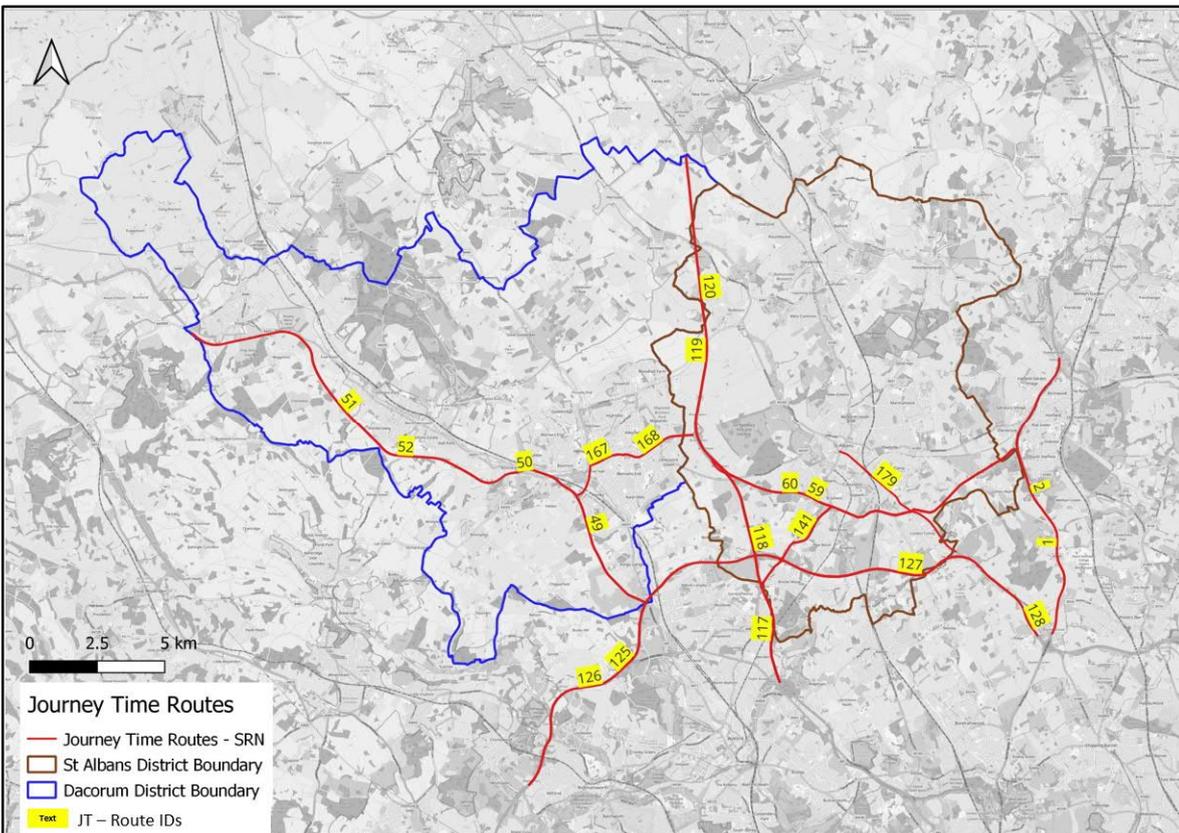


Figure 5: Journey Time Routes (SRN) within SAD and Dacorum District



Table 6: Journey Time Validation Summary

Route ID	Route	Direction	Observed Time (sec)			Modelled Time (sec)			Difference			% Difference			TAG Compliant		
			AM	IP	PM	AM	IP	PM	AM	IP	PM	AM	IP	PM	AM	IP	PM
1	A1(M) J1-J4	Northbound	435	398	478	421	401	433	-14	3	-45	-3%	1%	-10%	YES	YES	YES
2	A1(M) J1-J4	Southbound	466	403	456	528	398	506	62	-5	50	13%	-1%	11%	YES	YES	YES
51	A41 B4009 - A4251	Eastbound	508	494	486	555	544	546	47	50	60	9%	10%	12%	YES	YES	YES
52	A41 B4009 - A4251	Westbound	494	490	488	551	546	573	57	56	85	12%	11%	17%	YES	YES	NO
49	A41 A4251 - M25	Eastbound	489	276	281	526	290	308	37	15	27	7%	5%	9%	YES	YES	YES
50	A41 A4251 - M25	Westbound	262	260	267	278	276	282	16	17	15	6%	6%	6%	YES	YES	YES
125	M25 J17 -J21a	Northbound	502	504	533	569	526	716	68	21	183	13%	4%	34%	YES	YES	NO
126	M25 J17 -J21a	Southbound	624	487	515	483	517	568	-140	30	53	-22%	6%	10%	NO	YES	YES
127	M25 J21a -J23	Eastbound	483	450	466	426	406	418	-57	-44	-48	-12%	-10%	-10%	YES	YES	YES
128	M25 J21a -J23	Westbound	464	421	415	415	409	415	-49	-12	0	-11%	-3%	0%	YES	YES	YES
59	A414 J8 - A1(M) J3	Eastbound	934	690	736	982	707	796	48	17	60	5%	2%	8%	YES	YES	YES
60	A414 J8 - A1(M) J3	Westbound	755	670	712	590	653	648	-165	-16	-64	-22%	-2%	-9%	NO	YES	YES
167	St Albans Rd - A414 to M1	Eastbound	701	512	837	496	481	479	-205	-31	-358	-29%	-0.06	-43%	NO	YES	NO
168	St Albans Rd - A414 to M1	Westbound	539	504	701	473	462	511	-66	-42	-191	-12%	-8%	-27%	YES	YES	NO
117	M1 J5 -J7	Northbound	370	392	554	372	370	487	2	-22	-67	1%	-6%	-12%	YES	YES	YES
118	M1 J5 -J7	Southbound	501	382	387	597	380	398	97	-2	10	19%	-1%	3%	NO	YES	YES
119	M1 J7 -J10	Northbound	356	371	472	348	347	448	-7	-23	-23	-2%	-6%	-5%	YES	YES	YES
120	M1 J7 -J10	Southbound	407	311	318	361	316	330	-46	5	12	-11%	2%	4%	YES	YES	YES
141	A405 N Orbital Road (Watford Route 2a upper)	Northbound	388	324	505	282	305	630	-106	-20	125	-27%	-6%	25%	NO	YES	NO
142	A405 N Orbital Road (Watford Route 2a upper)	Southbound	556	273	437	461	214	220	-95	-59	-217	-17%	-22%	-50%	NO	NO	NO
179	A1081 St Albans	Westbound	788	670	765	675	634	779	-113	-36	14	-14%	-5%	2%	YES	YES	YES
180	A1081 St Albans	Eastbound	595	549	616	665	583	728	70	33	112	12%	6%	18%	YES	YES	NO
Total Routes															22	22	22
Total Routes Passing TAG criteria															16	21	15
Pass %															73%	95%	68%
SRN Routes (A1(M), M25 and M1)															10	10	10
SRN Routes Passing TAG criteria															8	10	9
SRN Pass %															80%	100%	90%

5 COMPARISON OF OBSERVED TRAFFIC FLOWS BETWEEN 2014 AND 2023

A comparison of the observed traffic flows between the 2014 and 2023 observed traffic counts was undertaken to understand the level of growth in traffic on the SRN, roads approaching the SRN and major road networks within the SAD and Dacorum boundary.

Figure 6 presents the location of the 2023 traffic count location along with the 2014 observed traffic count location.

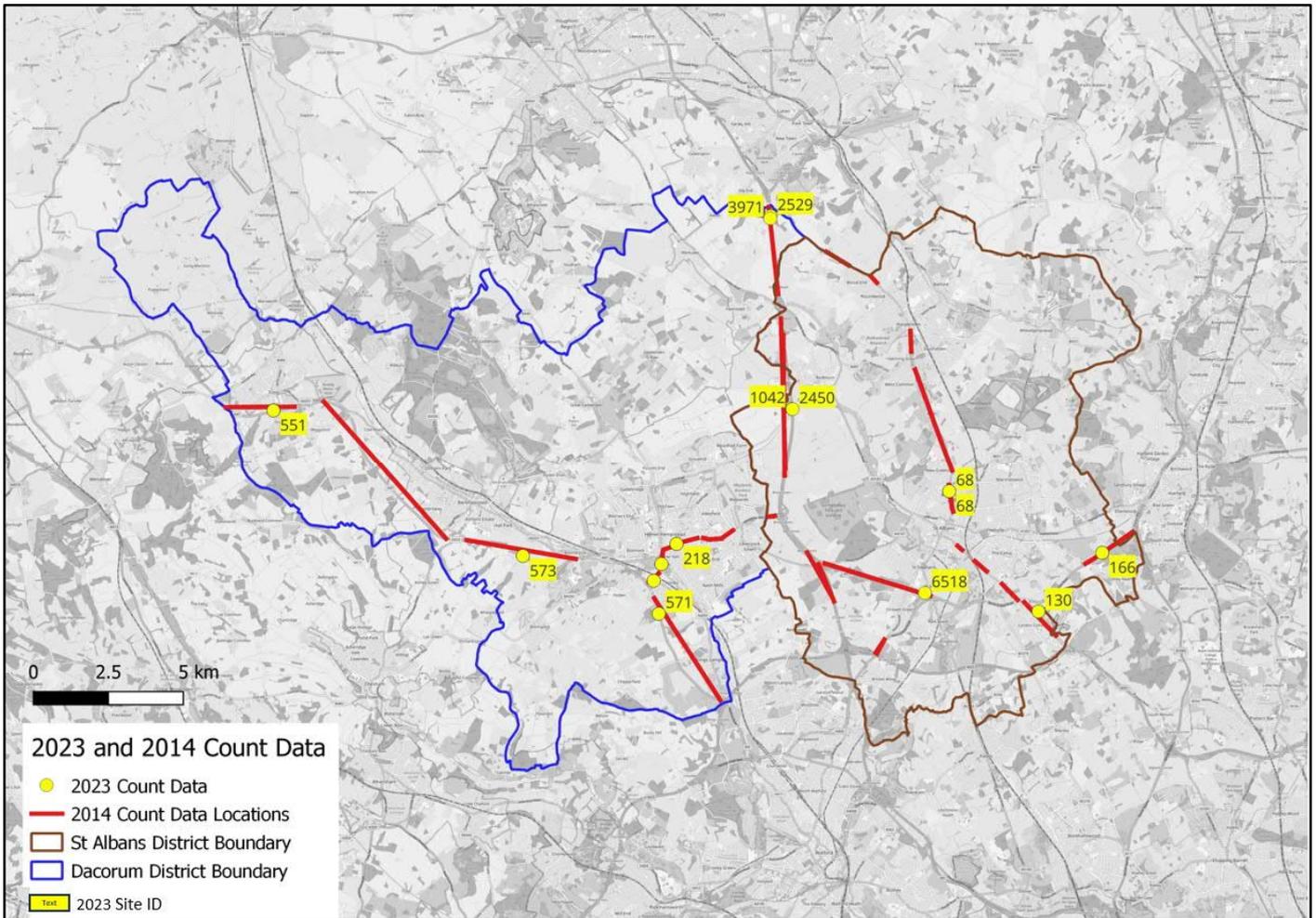


Figure 6: 2023 and 2014 Observed Count Locations within SAD and Dacorum District



Table 7 summarises the total observed traffic flow values in 2023 and 2014 with differences.

Table 7: Comparison of 2023 and 2014 Observed Traffic Flows

Site ID	Direction	2023 Total Flow			2014 Observed Flow			Difference (2023 – 2014)			% Difference		
		AM	IP	PM	AM	IP	PM	AM	IP	PM	AM	IP	PM
68	Northbound	304	221	397	325	280	439	-21	-9	-42	6%	-3%	-10%
68	Southbound	362	306	327	445	303	336	-83	-2	-9	19%	-1%	-3%
103	Southbound	874	659	919	834	775	1,211	40	-67	-292	-5%	-9%	-24%
130	Southbound	736	579	879	899	632	945	-163	-33	-67	18%	-5%	-7%
130	Northbound	515	178	508	1,086	697	1,010	-572	-469	-503	53%	-67%	-50%
166	Westbound	1,346	1,334	1,598	1,937	1,285	1,971	-591	113	-373	31%	9%	-19%
166	Eastbound	1,522	1,254	1,516	1,824	1,255	1,835	-302	102	-318	17%	8%	-17%
218	Westbound	1,205	942	1,311	1,360	1,088	1,355	-155	-30	-44	11%	-3%	-3%
218	Eastbound	1,238	942	1,230	1,056	1,059	1,347	182	-27	-117	-17%	-3%	-9%
349	Northbound	953	786	991	1,103	842	977	-150	10	14	14%	1%	1%
349	Southbound	1,069	833	1,138	1,153	897	1,232	-84	-3	-94	7%	0%	-8%
551	Northbound	1,359	769	1,082	1,018	662	1,427	341	127	-345	-34%	19%	-24%
551	Southbound	1,122	718	1,544	1,293	631	984	-171	198	560	13%	31%	57%
571	Northbound	1,538	1,123	2,507	1,344	1,185	2,393	193	137	113	-14%	12%	5%
571	Southbound	1,770	1,302	1,650	1,467	1,138	1,488	304	142	162	-21%	12%	11%
573	Northbound	1,599	1,030	2,235	1,527	1,026	2,364	72	189	-129	-5%	18%	-5%
573	Southbound	1,882	1,181	1,588	2,112	1,030	1,464	-230	167	124	11%	16%	8%
1042	Northbound	5,191	5,503	6,499	4,858	4,727	6,120	333	776	379	7%	16%	6%
2450	Southbound	6,384	4,952	5,606	6,499	4,561	5,707	-115	392	-102	-2%	9%	-2%
2529	Southbound	5,311	4,784	5,600	5,142	4,222	5,529	169	562	71	3%	13%	1%
3971	Northbound	5,343	5,325	6,464	5,090	4,711	6,494	252	614	-31	5%	13%	0%
6518	Eastbound	1,037	763	1,305	1,032	752	1,239	5	12	66	1%	2%	5%
Total		42,660	35,486	46,893	43,404	33,759	47,868	-744	2,899	-975	-2%	8%	-2%

*The **bold** entries represent counts on the SRN link.

Overall, it is observed that there is a net reduction in traffic flows in 2023 compared to 2014 in the AM and PM peak, -2%, on the SRN, roads approaching the SRN and major road network within the SAD and Dacorum District. However, there is an average increase in the inter-peak of 8%.

6 SUMMARY AND RECOMMENDATIONS

This technical note summarises the review undertaken for the COMET 2014 base year traffic model on the SRN, roads approaching the SRN and major road networks within SADC and Dacorum District.

The 2014 base year review comprises of:

- Comparison of the 2014 observed and modelled traffic flows
- Journey Time Performance
- Comparison of observed traffic flows between 2014 and 2023

The performance of the 2014 base year traffic model is summarised in Table 8.

Table 8: Summary of Performance

Road Type	Criteria	AM	IP	PM
All Roads	Calibration Counts	91%	94%	88%
	Validation Counts	35%	58%	52%
	All Counts	64%	77%	70%
	Journey Times	73%	95%	68%
SRN Roads only (M1, M25 and A1(M))	Calibration Counts	100%	100%	100%
	Validation Counts	67%	100%	67%
	All Counts	88%	100%	88%
	Journey Times	80%	100%	90%

This shows the performance of SRN roads is good. The calibration and all counts meet the TAG criteria in each time period (AM, IP and PM) while the validation counts only meets the TAG criteria in the IP. The journey times also meet the TAG criteria in IP and PM, while very close to TAG criteria in the AM.

For the 'all road' performance the AM peak is the weakest performing time period, it meets TAG criteria for the calibration counts but fails to meet TAG criteria for other elements, with the validation counts being the weakest. In the IP the calibration counts and journey times meet TAG criteria, with the validation counts performance being the weakest against TAG criteria and all count performance not far from meeting TAG. The PM peak like the AM peak meets TAG criteria for the calibration counts but fails to meet TAG criteria in other elements although the validation count performance is not as weak as the AM peak.

APPENDIX A

Table A1: Individual Link Flow Calibration and Validation – AM

Location	Direction	Calibration /Validation	Total Observed	Total Modelled	Difference (Modelled - Observed)	% Difference	GEH	Meet TAG Criteria
A41 Tring	NB	Calibration	1018	1090	72	7%	2.22	Yes
A41	NWB	Calibration	1189	1217	28	2%	0.80	Yes
A41 Tring	SB	Calibration	1293	1223	-70	-5%	1.98	Yes
A41	WB	Calibration	1527	1531	4	0%	0.10	Yes
A41	SEB	Calibration	949	1007	58	6%	1.86	Yes
Two Waters Rd	NB	Calibration	1103	1127	24	2%	0.72	Yes
A414 St Albans Road	WB	Calibration	1281	1287	6	0%	0.16	Yes
A414 St Albans Road	EB	Calibration	1388	1245	-143	-10%	3.95	Yes
A41 Kings Langley	NB	Calibration	1344	1381	37	3%	0.99	Yes
M1 J9 to J10	NB	Calibration	5090	4882	-209	-4%	2.96	Yes
M1 J10 to J9	SB	Calibration	5142	5020	-122	-2%	1.71	Yes
A41 Kings Langley	SB	Calibration	1467	1615	149	10%	3.78	Yes
A41	EB	Calibration	2112	2091	-21	-1%	0.46	Yes
Two Waters Rd	SB	Calibration	1153	1123	-29	-3%	0.87	Yes
A1081 London Road	WB	Calibration	762	748	-14	-2%	0.51	Yes
A1081 St Albans Road	NB	Calibration	802	831	30	4%	1.04	Yes
A1081 St Albans Road	SB	Calibration	731	888	156	21%	5.49	No
Harpenden Road	NB	Calibration	325	349	25	8%	1.34	Yes
Harpenden Road	SB	Calibration	445	495	51	11%	2.35	Yes
Harpenden Road	NB	Calibration	409	414	5	1%	0.23	Yes
Harpenden Road	SB	Calibration	627	619	-8	-1%	0.33	Yes
A1081 London Road	WB	Calibration	384	497	113	29%	5.39	No
A1081 London Road	EB	Calibration	514	580	66	13%	2.81	Yes
A1081 London Road	NWB	Calibration	1188	1110	-78	-7%	2.29	Yes
A414	WB	Calibration	1937	1973	36	2%	0.82	Yes
M1 J7 to J6A	SB	Calibration	6368	6072	-296	-5%	3.76	Yes
M1 J6A to J7	NB	Calibration	5581	5318	-263	-5%	3.56	Yes
A1081 London Road	SEB	Calibration	882	1077	196	22%	6.25	No
A1081 London Road	EB	Calibration	496	498	2	0%	0.09	Yes
A1081 Luton Road	SB	Calibration	674	623	-51	-8%	2.01	Yes
A1081 Luton Road	NB	Calibration	486	583	96	20%	4.16	Yes
A414	EB	Calibration	1824	1657	-166	-9%	3.99	Yes

Location	Direction	Calibration /Validation	Total Observed	Total Modelled	Difference (Modelled - Observed)	% Difference	GEH	Meet TAG Criteria
A1(M) Hatfield Tunnel	SB	Calibration	3988	3845	-143	-4%	2.28	Yes
A414 St Albans Road between Lower Yott and Wood Lane	WB	Validation	1360	845	-515	-38%	15.50	No
A414 St Albans Road	EB	Validation	1389	1152	-237	-17%	6.66	No
A414 St Albans Road	SWB	Validation	1603	881	-722	-45%	20.48	No
A414 St Albans Road	NEB	Validation	1122	1002	-120	-11%	3.68	Yes
A414 St Albans Road	WB	Validation	1507	1095	-412	-27%	11.41	No
A414 St Albans Road	EB	Validation	1257	835	-422	-34%	13.06	No
A414	SB	Validation	834	1202	368	44%	11.54	No
A414 St Albans Road between Lower Yott and Wood Lane	EB	Validation	1056	889	-168	-16%	5.37	No
A414 St Albans Road	WB	Validation	1520	835	-685	-45%	19.96	No
A414	NB	Validation	1290	1328	38	3%	1.04	Yes
A405 North Orbital Road	NEB	Validation	1414	1125	-289	-20%	8.12	No
A1081 Harpenden Road	SB	Validation	405	750	344	85%	14.32	No
A1081 Harpenden Road	NB	Validation	530	658	127	24%	5.23	No
A405 North Orbital Road	SWB	Validation	1177	1264	87	7%	2.49	Yes
A1081 St Albans Road	NB	Validation	486	841	355	73%	13.78	No
A414 Breakspear Way	EB	Validation	1836	2071	235	13%	5.32	Yes
A414	WB	Validation	1032	814	-218	-21%	7.16	No
M1 J7 to J9	NB	Validation	4858	4921	63	1%	0.90	Yes
A1081 Luton Road	EB	Validation	456	693	237	52%	9.88	No
A1081 St Albans Road	SB	Validation	736	970	234	32%	8.01	No
A1081 Harpenden Road	NB	Validation	532	748	215	40%	8.51	No
A414	EB	Validation	1143	1002	-141	-12%	4.31	Yes
A1081 Harpenden Road	SB	Validation	433	701	268	62%	11.27	No
A414	WB	Validation	2019	2502	482	24%	10.15	No
A414	EB	Validation	1721	1768	46	3%	1.10	Yes
A1081 London Road	SB	Validation	899	832	-67	-7%	2.28	Yes
M1 J9 to J7	SB	Validation	6499	5949	-551	-8%	6.98	No

Location	Direction	Calibration /Validation	Total Observed	Total Modelled	Difference (Modelled - Observed)	% Difference	GEH	Meet TAG Criteria
A1081 London Road	NB	Validation	1086	794	-293	-27%	9.54	No
A1081 Luton Road	WB	Validation	586	655	69	12%	2.77	Yes
A414 - Breakspear Way	WB	Validation	2190	2155	-35	-2%	0.76	Yes
A1(M) Oldings Corner	SB	Validation	3988	3845	-143	-4%	2.28	Yes

Table A2: Individual Link Flow Calibration and Validation – IP

Location	Direction	Calibration /Validation	Total Observed	Total Modelled	Difference (Modelled - Observed)	% Difference	GEH	Meet TAG Criteria
A41 Tring	NB	Calibration	662	706	45	7%	1.71	Yes
A41	NWB	Calibration	796	797	1	0%	0.03	Yes
A41 Tring	SB	Calibration	631	550	-81	-13%	3.35	Yes
A41	WB	Calibration	1026	1015	-12	-1%	0.36	Yes
A41	SEB	Calibration	209	411	202	96%	11.44	No
Two Waters Rd	NB	Calibration	842	852	10	1%	0.33	Yes
A414 St Albans Road	WB	Calibration	1165	1146	-19	-2%	0.56	Yes
A414 St Albans Road	EB	Calibration	1183	1177	-5	0%	0.16	Yes
A41 Kings Langley	NB	Calibration	1185	1229	44	4%	1.27	Yes
M1 J9 to J10	NB	Calibration	4711	4713	1	0%	0.02	Yes
M1 J10 to J9	SB	Calibration	4222	4233	10	0%	0.16	Yes
A41 Kings Langley	SB	Calibration	1138	1174	36	3%	1.06	Yes
A41	EB	Calibration	1030	1054	25	2%	0.76	Yes
Two Waters Rd	SB	Calibration	897	803	-94	-10%	3.23	Yes
A1081 London Road	WB	Calibration	476	476	0	0%	0.01	Yes
A1081 St Albans Road	NB	Calibration	593	689	95	16%	3.76	Yes
A1081 St Albans Road	SB	Calibration	600	820	220	37%	8.27	No
Harpenden Road	NB	Calibration	280	272	-8	-3%	0.5	Yes
Harpenden Road	SB	Calibration	303	324	21	7%	1.2	Yes
Harpenden Road	NB	Calibration	326	336	9	3%	0.52	Yes
Harpenden Road	SB	Calibration	348	348	0	0%	0.01	Yes
A1081 London Road	WB	Calibration	445	442	-3	-1%	0.13	Yes
A1081 London Road	EB	Calibration	445	455	10	2%	0.45	Yes
A1081 London Road	NWB	Calibration	726	798	72	10%	2.61	Yes
A414	WB	Calibration	1285	1321	36	3%	1	Yes

Location	Direction	Calibration /Validation	Total Observed	Total Modelled	Difference (Modelled - Observed)	% Difference	GEH	Meet TAG Criteria
M1 J7 to J6A	SB	Calibration	4532	4517	-15	0%	0.23	Yes
M1 J6A to J7	NB	Calibration	4975	4967	-7	0%	0.11	Yes
A1081 London Road	SEB	Calibration	746	783	37	5%	1.33	Yes
A1081 London Road	EB	Calibration	481	480	-1	0%	0.03	Yes
A1081 Luton Road	SB	Calibration	478	474	-4	-1%	0.19	Yes
A1081 Luton Road	NB	Calibration	512	512	0	0%	0.02	Yes
A414	EB	Calibration	1255	1425	171	14%	4.66	Yes
A1(M) Hatfield Tunnel	SB	Calibration	2458	2410	-48	-2%	0.97	Yes
A414 St Albans Road between Lower Yott and Wood Lane	WB	Validation	1088	697	-390	-36%	13.07	No
A414	SB	Validation	775	839	63	8%	2.23	Yes
A414 St Albans Road between Lower Yott and Wood Lane	EB	Validation	1059	752	-308	-29%	10.22	No
A414	NB	Validation	866	975	109	13%	3.6	Yes
A405 North Orbital Road	NEB	Validation	1390	1638	248	18%	6.38	No
A1081 Harpenden Road	SB	Validation	459	595	136	30%	5.92	No
A1081 Harpenden Road	NB	Validation	459	508	49	11%	2.22	Yes
A405 North Orbital Road	SWB	Validation	1455	1364	-91	-6%	2.42	Yes
A1081 St Albans Road	NB	Validation	439	577	138	31%	6.12	No
A414 Breakspear Way	EB	Validation	1363	1689	326	24%	8.35	No
A414	WB	Validation	752	684	-67	-9%	2.51	Yes
M1 J7 to J9	NB	Validation	4727	4920	193	4%	2.78	Yes
A1081 Luton Road	EB	Validation	400	412	12	3%	0.59	Yes
A1081 St Albans Road	SB	Validation	457	617	159	35%	6.88	No
A1081 Harpenden Road	NB	Validation	468	558	89	19%	3.94	Yes
A414	EB	Validation	693	984	291	42%	10.04	No
A1081 Harpenden Road	SB	Validation	446	522	76	17%	3.47	Yes
A414	WB	Validation	1381	1659	278	20%	7.13	No
A414	EB	Validation	1366	1591	225	16%	5.85	No
A1081 London Road	SB	Validation	632	1073	441	70%	15.1	No
M1 J9 to J7	SB	Validation	4561	4630	69	2%	1.02	Yes

Location	Direction	Calibration /Validation	Total Observed	Total Modelled	Difference (Modelled - Observed)	% Difference	GEH	Meet TAG Criteria
A1081 London Road	NB	Validation	697	698	0	0%	0.01	Yes
A1081 Luton Road	WB	Validation	368	582	214	58%	9.82	No
A414 - Breakspear Way	WB	Validation	1277	1549	272	21%	7.23	No
A1(M) Oldings Corner	SB	Validation	2458	2410	-48	-2%	0.97	Yes

Table A3: Individual Link Flow Calibration and Validation – PM

Location	Direction	Calibration /Validation	Total Observed	Total Modelled	Difference (Modelled - Observed)	% Difference	GEH	Meet TAG Criteria
A41 Tring	NB	Calibration	1427	1440	13	1%	0.35	Yes
A41	NWB	Calibration	2008	1879	-129	-6%	2.92	Yes
A41 Tring	SB	Calibration	984	756	-228	-23%	7.74	No
A41	WB	Calibration	2364	2207	-157	-7%	3.29	Yes
A41	SEB	Calibration	453	545	93	21%	4.16	Yes
Two Waters Rd	NB	Calibration	977	902	-74	-8%	2.42	Yes
A414 St Albans Road	WB	Calibration	1476	1516	40	3%	1.04	Yes
A414 St Albans Road	EB	Calibration	1280	1208	-72	-6%	2.05	Yes
A41 Kings Langley	NB	Calibration	2393	2192	-202	-8%	4.21	Yes
M1 J9 to J10	NB	Calibration	6494	6451	-43	-1%	0.54	Yes
M1 J10 to J9	SB	Calibration	5529	5376	-153	-3%	2.07	Yes
A41 Kings Langley	SB	Calibration	1488	1554	66	4%	1.69	Yes
A41	EB	Calibration	1464	1508	44	3%	1.13	Yes
Two Waters Rd	SB	Calibration	1232	1246	14	1%	0.40	Yes
A1081 London Road	WB	Calibration	547	534	-13	-2%	0.55	Yes
A1081 St Albans Road	NB	Calibration	735	826	91	12%	3.26	Yes
A1081 St Albans Road	SB	Calibration	766	973	206	27%	6.99	No
Harpenden Road	NB	Calibration	439	271	-168	-38%	8.92	No
Harpenden Road	SB	Calibration	336	344	8	2%	0.44	Yes
Harpenden Road	NB	Calibration	560	410	-150	-27%	6.83	No
Harpenden Road	SB	Calibration	430	451	21	5%	0.98	Yes
A1081 London Road	WB	Calibration	640	569	-71	-11%	2.88	Yes
A1081 London Road	EB	Calibration	491	536	45	9%	1.98	Yes
A1081 London Road	NWB	Calibration	962	973	11	1%	0.34	Yes
A414	WB	Calibration	1971	2022	51	3%	1.14	Yes
M1 J7 to J6A	SB	Calibration	5740	5660	-80	-1%	1.06	Yes
M1 J6A to J7	NB	Calibration	6830	6840	10	0%	0.12	Yes

Location	Direction	Calibration /Validation	Total Observed	Total Modelled	Difference (Modelled - Observed)	% Difference	GEH	Meet TAG Criteria
A1081 London Road	SEB	Calibration	917	911	-6	-1%	0.21	Yes
A1081 London Road	EB	Calibration	745	717	-28	-4%	1.03	Yes
A1081 Luton Road	SB	Calibration	572	556	-16	-3%	0.69	Yes
A1081 Luton Road	NB	Calibration	776	758	-18	-2%	0.64	Yes
A414	EB	Calibration	1835	1705	-130	-7%	3.09	Yes
A1(M) Hatfield Tunnel	SB	Calibration	3762	3796	34	1%	0.56	Yes
A414 St Albans Road between Lower Yott and Wood Lane	WB	Validation	1355	1198	-157	-12%	4.39	Yes
A414 St Albans Road	EB	Validation	1534	1083	-451	-29%	12.46	No
A414 St Albans Road	SWB	Validation	1591	1260	-331	-21%	8.77	No
A414 St Albans Road	NEB	Validation	1277	742	-535	-42%	16.83	No
A414 St Albans Road	WB	Validation	1502	1274	-228	-15%	6.11	No
A414 St Albans Road	EB	Validation	1681	660	-1021	-61%	29.83	No
A414	SB	Validation	1211	1290	80	7%	2.25	Yes
A414 St Albans Road between Lower Yott and Wood Lane	EB	Validation	1347	693	-654	-49%	20.47	No
A414 St Albans Road	WB	Validation	1631	1171	-460	-28%	12.28	No
A414	NB	Validation	1345	1233	-112	-8%	3.13	Yes
A405 North Orbital Road	NEB	Validation	1724	1558	-166	-10%	4.10	Yes
A1081 Harpenden Road	SB	Validation	547	732	186	34%	7.34	No
A1081 Harpenden Road	NB	Validation	709	622	-87	-12%	3.36	Yes
A405 North Orbital Road	SWB	Validation	1624	1799	175	11%	4.23	Yes
A1081 St Albans Road	NB	Validation	673	739	67	10%	2.51	Yes
A414 Breakspear Way	EB	Validation	2056	2296	239	12%	5.13	Yes
A414	WB	Validation	1239	1009	-230	-19%	6.86	No
M1 J7 to J9	NB	Validation	6120	6608	487	8%	6.11	No
A1081 Luton Road	EB	Validation	624	466	-158	-25%	6.78	No
A1081 St Albans Road	SB	Validation	502	826	325	65%	12.59	No
A1081 Harpenden Road	NB	Validation	739	672	-67	-9%	2.53	Yes
A414	EB	Validation	1106	1129	23	2%	0.68	Yes
A1081 Harpenden Road	SB	Validation	538	651	113	21%	4.65	Yes



Location	Direction	Calibration /Validation	Total Observed	Total Modelled	Difference (Modelled - Observed)	% Difference	GEH	Meet TAG Criteria
A414	WB	Validation	2057	2697	640	31%	13.13	No
A414	EB	Validation	1760	1965	205	12%	4.75	Yes
A1081 London Road	SB	Validation	945	1001	56	6%	1.79	Yes
M1 J9 to J7	SB	Validation	5707	5651	-57	-1%	0.75	Yes
A1081 London Road	NB	Validation	1010	948	-63	-6%	2.01	Yes
A1081 Luton Road	WB	Validation	543	923	381	70%	14.06	No
A414 - Breakspear Way	WB	Validation	1794	2398	604	34%	13.19	No
A1(M) Oldings Corner	SB	Validation	3762	3796	34	1%	0.56	Yes