

Greater Manchester's Clean Air Plan to tackle Nitrogen Dioxide Exceedances at the Roadside

Note 13: Traffic Impact on Neighbouring Authorities



Salford City Council



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1 Introduction

- 1.1 This note presents an analysis of vehicle flows from the highway models developed for the appraisal of the Greater Manchester Clean Air Zone (CAZ). The analysis has been undertaken to inform discussions concerning the potential road traffic impacts of the proposed CAZ on roads in neighbouring district authorities.
- 1.2 The impacts of the CAZ have been measured by using the traffic models to determine the proportions of non-compliant through trips (i.e. trips crossing the GM county boundary that have an origin and destination in the external area) which could re-route to avoid paying the CAZ charge.
- 1.3 Separate analyses have been carried out for 2021 and 2023.

2 GM CAP Proposals

- 2.1 The GM CAP proposals comprise a Category B CAZ implemented in Phase 1, which would extend to a Category C CAZ in Phase 2. The opening year for Phase 1 of the scheme would be 2021, with phase 2 opening in 2023.
- 2.2 Under the proposals, the drivers of non-compliant vehicles would have to pay a daily charge to enter the CAZ, which would cover the whole of Greater Manchester and include all non-compliant vehicles travelling on roads inside the County, excluding trips made entirely on the motorway network. Vehicles included in the category B CAZ comprise buses, coaches, taxis plus private hire cars and Heavy Goods Vehicles (HGVs). The category C CAZ would be extended to include Light Goods Vehicles (LGVs).
- 2.3 The minimum emission standards for compliant vehicles entering the CAZ are shown below in **Table 2-1**.

Table 2-1 CAZ Emission Standards

Vehicle Type	Euro Standard
Cars	Not Applicable
Taxis + Private Hire Cars	Euro 4 (petrol), Euro 6 (diesel)
Light Goods Vehicles	Euro 4 (petrol), Euro 6 (diesel)
Heavy Goods Vehicles	Euro VI
Buses	Euro VI

3 Overview of the Highway Modelling

3.1 The CAP highway modelling has been carried out using TfGM's county-wide Saturn model for a 2016 base year and three forecast years comprising:

- 2021, which represents the assumed opening year of the CAZ scheme
- 2023
- 2025

3.2 The 2023 and 2025 models were developed to assist in confirming the year of compliance and to help with modelling the phased introduction of the GM-wide CAZ C.

3.3 The Saturn model represents 3 time periods comprising:

- a weekday morning peak hour 0800-0900
- an evening peak hour 1700-1800
- an average inter-peak hour for the 1000-1530 time period

3.4 The results presented in this report show average daily traffic flows calculated from the hourly data.

3.5 The assignment matrices that are used with the model represent 8 user classes comprising:

- Compliant Car trips
- Non-Compliant Car trips
- Compliant LGV trips
- Non-Compliant LGV trips
- Compliant OGV trips
- Non-Compliant OGV trips
- Compliant Taxi trips (including private hire cars)
- Non-Compliant trips (including private hire cars)

3.6 Buses are not included in the assignment matrices, but are represented in the model as fixed link loads, with routes defined as chains of nodes in the buffer and simulation networks. Modelled bus services are based on 2015 service patterns and flows for scheduled services operating within the County. Coaches are not represented in the models.

3.7 Geographically, the model is focused on Greater Manchester, although it does extend to cover all of Great Britain, albeit in increasingly less detail with increasing distance from the county boundary, as illustrated

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3.9

3.10 Figure 4-1.

3.11 The analysis presented in this report has been undertaken using the 2021 and 2023 do-something models, which represent what is forecast to happen following the introduction of the CAZ.

3.12 **Modelling Behaviour Change**

3.12.1 The nature of the CAP proposals mean that non-compliant vehicles will face a daily charge for travelling in parts of Greater Manchester. The modelling therefore assessed what proportion of vehicles are likely to be non-compliant and therefore 'in scope' for a charge, and how they might respond.

3.12.2 The behavioural responses to the CAP proposals were modelled using a spreadsheet application developed as part of the option sifting and assessment exercise. The application uses stated preference data weighted towards the characteristics of Greater Manchester to estimate the impact of the introduction of a charging Clean Air Zone and the travel demand responses of non-compliant vehicle users.

3.12.3 For those vehicles that are 'in scope' for a daily charge, there are a number of possible responses, as described below:

- continue to travel into, within or through the CAZ and pay the charge ('stay and pay')
- change their behaviour to avoid travelling into, within or through the CAZ, for example by travelling by a different mode or cancelling their trip. (Some 'cancelled' trips would in fact move to a different destination to avoid the charging area, but the available model did not allow us to consider that option in this analysis).
- upgrade to a compliant vehicle – this is assumed to be a newly purchased vehicle but note that another possible response is to swap to a compliant vehicle already owned (e.g. another vehicle in the household or in a commercial fleet).

3.12.4 The choice to upgrade is dependent both on the charge level – with higher charges leading to more change – and on the frequency of travel. Those who need to travel frequently in a charged zone are more likely to choose to upgrade their vehicle as it is more cost effective for them; conversely, those who travel infrequently are more likely to 'stay and pay' as the cost of upgrade would outweigh the cost of the charge.

3.12.5 The behavioural responses that have been used in the modelling are summarised below in **Table 3-1**.

Table 3-1 Behavioural Response to the GM CAP by Vehicle Type (%)

Behavioral Response	Car	Taxis	Private Hire Vehicles (PHVs)	Light Goods Vehicles (LGVs)	Heavy Goods vehicles (HGVs)	Buses/ Coaches
Pay Charge	6.7%	0%	24.2%	9.6%	9.4%	0%
Change Mode	12.8%	0%	18.9%	7.5%	0.0%	0%
Cancel Trip	15.1%	0%	18.7%	7.5%	4.2%	0%
Upgrade Vehicle	65.4%	100%	38.2%	75.4%	86.5%	100%

Source: Greater Manchester Clean Air Plan Outline Business Case

4 Results

4.1 This section presents summary results of the analysis for roads crossing the GM county boundary. There are, however, a number of caveats and limitations with regards to the modelling in the external area (outside of Greater Manchester) that need to be borne in mind when considering the results:

- The highway model uses a simplified network representation outside of the County, whose primary purpose is to allow traffic flows at the county boundary to be estimated within acceptable levels of accuracy
- The highway network is less dense outside of the County, and becomes increasingly less detailed with increasing distance from the county boundary, which might prevent some diversion routes from being captured
- The highway network in the external area does not include planned (future year) road schemes
- Traffic zones in the external area are larger than those within the County, which will affect the accuracy of the trip and flow estimates
- Origin-destination (trip matrix) data is less accurate in the external area
- Taxi/private hire car trips with an origin and destination outside of Greater Manchester are not modelled in the external area
- The model has not been validated in the external area.

4.2 It should also be borne in mind that the forecasts include national changes to the vehicle fleet mix and engine technology over time, as older more polluting vehicles are replaced by newer models which are compliant with stricter Euro standards. (The modelled improvements to the vehicle fleet are based on national forecasts of the fleet turnover, and how long vehicles last before they are scrapped).

4.3 **Table 4-1** shows modelled all vehicle 24 hour Annual Average Weekday Traffic flows (AAWT) for roads crossing the GM county boundary for 2021 and 2023, excluding motorways. The figures in the columns headed 'All Trips' show modelled flows for all movements combined, comprising compliant plus non-compliant vehicles with an origin or destination inside Greater Manchester and vehicles with an origin and destination outside the county (external-external/through trips) that cross the county boundary. The figures in the columns headed 'External-External (Through Trips)' show modelled cordon crossing flows for external-to-external trips only (i.e. movements that enter Greater Manchester, excluding trips with an origin or destination inside the county). For the purpose of this analysis we have assumed that through trips made in non-compliant vehicles are the trips which would potentially divert (change their route/re-assign) to avoid entering the CAZ.

4.4 Features to note from **Table 4-1** include:

- Approximately 1.2 million vehicles are forecast to cross the county boundary in 2021 in terms the total 24 hour AAWT, rising to 1.25 million vehicles in 2023
- Overall, through trips (with an origin and destination outside Greater Manchester), represent approximately 17% of the total cordon crossing flow
- Approximately 98% of all trips are forecast to be compliant in both 2021 and 2023
- Approximately 95% of through trips are forecast to be compliant in 2021, with 96% of through trips forecast to be compliant in 2023
- The numbers of non-compliant heavy goods vehicles crossing the county boundary is forecast to fall between 2021 and 2023, due in part to improvements to the vehicle fleet over time, but also due to the impacts of the CAZ, and the expectation that the majority of operators of non-compliant vehicles with origins and destinations inside the county will choose to upgrade their vehicles. This is likely to deliver air-quality improvements in the external area as older more polluting vehicles are replaced by newer models.
- Overall, there is a small increase in the total number of non-compliant vehicles forecast to cross the county boundary between 2021 and 2023, due to the extension of the CAZ to include LGVs in 2023. In contrast, however, there is a small reduction in the number of non-compliant through trips that are forecast to cross the county boundary between 2021 and 2023, as the increase in the number of non-compliant LGV trips brought about by the extension of the CAZ in 2023 is off-set by a reduction in the number of non-compliant HGV through trips over this period, which make up a greater proportion of total through trips in the external area, partly due to their greater trip lengths.

4.5 **Table 4-2** shows modelled 24 hour AAWT flows broken down by site, as illustrated in

4.6

4.7

4.8 Figure 4-2.

4.9 As would be expected, the motorways carry the heaviest cordon crossing flows, with the M6 (sites 80 and 81) carrying between 140,000 and 145,000 vehicles per day in 2021, and the M62 (sites 78 and 79) carrying between 139,000 and 155,000 vehicles per day. There are, however, significant flows in other parts of the network, with the A580 on the border between St Helens and Wigan (site 67) having a 2021 forecast AADT flow of approximately 61,000 vehicles per day and the A555 on the border between Cheshire East and Stockport (sites 11/12) having a forecast flow of approximately 55,000 vehicles per day. **Notes:**

4.10 **Figures in** columns A have been rounded to the nearest 100 trips

1. *Figures in columns B have been rounded to the nearest 10 trips*
2. *Percentages are based on unrounded totals*

4.11 Table 4-3 shows the 20 sites with the greatest numbers of non-compliant through trips and the percentage of the total flow through each site, excluding motorways.

4.12 In general, the numbers of non-compliant through trips at these sites are relatively small, with the possible exception of the A58 in St Helens (Site 65), where the modelled non-compliant through trip flow is approximately 950 vehicles per day in 2021, which is equivalent to approximately 8% of the total flow through the site. If all of these vehicles were to divert, this would be equivalent to a re-assignment of approximately 2 vehicles every 3 minutes throughout the day, although this figure would be higher in the peaks. It seems reasonable to assume, however, that not all of the non-compliant vehicles would re-assign, as some drivers would choose to either pay the charge or to upgrade their vehicles. (It has not, however, been possible to determine the scale of these responses, as the behavioural impacts of the CAP proposals were not modelled for through trips). It should also be borne in mind that whilst the GM CAZ is primarily designed to improve air quality with the county, it will also provide benefits outside the region from cleaner vehicles affected by the CAZ travelling elsewhere, which are likely to be greater for areas close to the scheme.

5 Conclusions

- 5.1 This report has described the analysis that has been carried out to assess the potential road traffic impacts of the proposed GM CAZ on roads in neighbouring district authorities.
- 5.2 The report highlights several limitations to the modelling in the external area which must be borne in mind when considering the results. It is not thought, however, that the CAZ will have a significant impact on traffic flows on roads in the surrounding area, although the impacts will clearly vary by location, depending on the level of interaction with Greater Manchester, flows of non-compliant vehicles and the availability of diversion routes. It is also likely, however, that the scheme will deliver air quality improvements on routes to and from the County, which will provide air quality benefits in the surrounding districts.
- 5.3 The analysis that has been carried out so far has focussed on the proportions of non-compliant vehicles at sites on the county boundary which could re-route to avoid paying the CAZ charge. It would, however, be possible to use the models to identify the origins and destinations of traffic that might re-assign and possible re-assignment routes, subject to the uncertainty surrounding the modelling in the external area referred to above. Neighbouring authorities might also have their own (more detailed) local models that could be used to assess the re-assignment effects outside the scheme area, if necessary.

Table 4-1 GM CAP Study Modelled Do-Something AAWT Flows for All Roads Crossing the GM County Boundary Broken Down By Vehicle Type (00:00 to 24:00, Inbound + Outbound Vehicles Flows, Excluding Motorways)

Vehicle Type	2021						2023					
	All Trips			External-External (Through Trips)			All Trips			External-External (Through Trips)		
	Compliant + Non-Compliant Vehicles (A)	Non-Compliant Vehicles (B)	Percentage Compliant (A-B/A)	Compliant + Non-Compliant Vehicles (C)	Non-Compliant Vehicles (D)	Percentage compliant (C-D/C)	Compliant + Non-Compliant Vehicles (A)	Non-Compliant Vehicles (B)	Percentage Compliant (A-B/A)	Compliant + Non-Compliant Vehicles (C)	Non-Compliant Vehicles (D)	Percentage Compliant (C-D/C)
Car	945,000	0	100%	166,000	0	100%	966,000	0	100%	168,000	0	100%
LGV	134,000	0	100%	7,000	0	100%	138,000	10,000	93%	7,000	2,000	69%
HGV	92,000	11,000	88%	34,000	10,000	71%	95,000	7,000	92%	35,000	6,000	82%
Taxi + Private Hire	49,000	7,000	86%	NA	NA	NA	51,000	4,000	93%	NA	NA	NA
Total	1,220,000	18,000	98%	207,000	10,000	95%	1,250,000	21,000	98%	210,000	8,000	96%

Notes:

1. External-external trips are not modelled for Taxi + Private Hire Vehicles
2. Totals have been rounded to the nearest 1000 trips
3. Percentages are based on unrounded totals

Table 4-2 GM CAP Study Modelled Do-Something Two-Way AAWT Flows for Roads Crossing the GM County Boundary (00:00 to 24:00, All Vehicles, Excluding Buses)

Site ID	Road Number	Neighbouring Authority	2021			2023		
			All Trips	External-External (Through) Trips		All Trips	External-External (Through) Trips	
			Compliant + Non-Compliant Vehicles	Non-Compliant Through Trips	Percentages of Non-Compliant Through Trips	Compliant + Non-Compliant Vehicles	Non-Compliant Through Trips	Percentages of Non-Compliant Through Trips
			(A)	(B)	(B/A)	(A)	(B)	(B/A)
1	A56	Cheshire East	37,600	60	0.2%	38,000	40	0.1%
2	Ashley Road	Cheshire East	3,800	0	0.0%	4,200	0	0.0%
3	Mill Lane	Cheshire East	1,200	10	0.4%	1,200	10	1.1%
4	A538	Cheshire East	37,900	480	1.3%	39,000	460	1.2%
5	B5166	Cheshire East	14,100	0	0.0%	14,700	0	0.0%
6	A555	Cheshire East	32,600	650	2.0%	33,800	460	1.3%
7	B5358	Cheshire East	26,700	50	0.2%	27,100	60	0.2%
8	A555	Cheshire East	36,200	560	1.5%	37,200	400	1.1%
9	Earl Road	Cheshire East	1,400	0	0.0%	1,500	0	0.0%
10	A34	Cheshire East	38,300	10	0.0%	40,100	40	0.1%
11	A555	Cheshire East	55,200	570	1.0%	57,300	420	0.7%
12	A555	Cheshire East	55,200	570	1.0%	57,300	420	0.7%
13	A5102	Cheshire East	13,000	100	0.7%	13,300	130	1.0%
14	A5149	Cheshire East	35,700	230	0.6%	36,700	240	0.7%
15	Woodford Road	Cheshire East	11,500	30	0.2%	11,400	20	0.2%
16	A523	Cheshire East	25,000	130	0.5%	25,200	250	1.0%
17	A6	Cheshire East	32,200	390	1.2%	31,800	430	1.3%
18	Jacksons Edge Road	Cheshire East	6,800	130	1.9%	7,300	80	1.1%
19	B6101	Cheshire East	6,900	110	1.6%	38,000	40	0.1%

Table 4 Continued

Site ID	Road Number	Neighbouring Authority	2021			2023		
			All Trips	External-External (Through) Trips		All Trips	External-External (Through) Trips	
			Compliant + Non-Compliant Vehicles	Non-Compliant Through Trips	Percentages of Non-Compliant Through Trips	Compliant + Non-Compliant Vehicles	Non-Compliant Through Trips	Percentages of Non-Compliant Through Trips
			(A)	(B)	(B/A)	(A)	(B)	(B/A)
20	Briargrove Road	High Peak	6,600	0	0.1%	7,200	80	1.1%
21	A626	High Peak	15,600	110	0.7%	7,000	10	0.1%
22	Long Lane	High Peak	10,700	0	0.0%	16,000	120	0.8%
23	A57	High Peak	31,600	140	0.4%	11,400	0	0.0%
24	A628	High Peak	18,000	580	3.2%	31,400	180	0.6%
25	A635	Kirklees	17,000	10	0.1%	18,900	470	2.5%
26	A62	Kirklees	20,300	110	0.5%	18,000	20	0.1%
27	A640	Kirklees	11,900	20	0.1%	20,800	100	0.5%
28	A672	Calderdale	6,500	10	0.1%	12,400	10	0.1%
29	A58	Calderdale	17,600	30	0.1%	6,700	10	0.2%
30	B6138	Calderdale	16,400	50	0.3%	18,000	50	0.3%
31	A6033	Calderdale	200	0	0.0%	16,900	70	0.4%
32	Calderbrook Road	Calderdale	4,400	70	1.7%	100	0	0.0%
33	A671	Rossendale	21,200	10	0.0%	4,400	70	1.5%
34	B6377	Rossendale	8,600	10	0.1%	21,600	0	0.0%
35	A680	Rossendale	12,800	30	0.2%	8,600	0	0.0%
36	Bury Road	Rossendale	600	0	0.0%	13,300	20	0.2%
37	A56	Rossendale	5,500	0	0.0%	700	0	0.0%
38	A676	Rossendale	11,600	0	0.0%	5,600	0	0.0%
39	B6214	Rossendale	21,500	60	0.3%	11,900	0	0.0%

Table 4 Continued

Site ID	Road Number	Neighbouring Authority	2021			2023		
			All Trips	External-External (Through) Trips		All Trips	External-External (Through) Trips	
			Compliant + Non-Compliant Vehicles	Non-Compliant Through Trips	Percentages of Non-Compliant Through Trips	Compliant + Non-Compliant Vehicles	Non-Compliant Through Trips	Percentages of Non-Compliant Through Trips
			(A)	(B)	(B/A)	(A)	(B)	(B/A)
40	Bury Road	Blackburn & Darwen	7,800	10	0.2%	8,000	10	0.1%
41	B6391	Blackburn & Darwen	3,200	0	0.0%	3,200	0	0.0%
42	A666	Blackburn & Darwen	21,000	140	0.6%	21,500	110	0.5%
43	Longworth Road	Blackburn & Darwen	5,000	0	0.0%	4,900	0	0.0%
44	A675	Blackburn & Darwen	5,700	0	0.1%	6,400	10	0.2%
45	Scout Road	Blackburn & Darwen	8,800	0	0.0%	9,200	0	0.0%
46	A673	Chorley	12,400	50	0.4%	12,900	30	0.2%
47	A6	Chorley	16,200	260	1.6%	17,300	200	1.2%
48	A5106	Chorley	19,800	130	0.6%	19,900	80	0.4%
49	A49	Chorley	29,700	450	1.5%	30,400	360	1.2%
50	Boundary Lane	West Lancashire	10,200	100	1.0%	10,100	90	0.9%
51	A5209	West Lancashire	28,500	520	1.8%	28,900	410	1.4%
52	Back Lane	West Lancashire	3,200	0	0.0%	3,500	20	0.7%
53	B5375	West Lancashire	7,200	0	0.0%	7,000	0	0.0%
54	MILL LANE	West Lancashire	2,100	0	0.0%	2,800	20	0.8%
55	A577	West Lancashire	2,700	0	0.0%	4,500	0	0.0%
56	Sefton Road	West Lancashire	2,600	0	0.0%	1,700	0	0.0%
57	Sandbrook Road	West Lancashire	6,000	40	0.7%	6,500	80	1.2%

Table 4 Continued

Site ID	Road Number	Neighbouring Authority	2021			2023		
			All Trips	External-External (Through) Trips		All Trips	External-External (Through) Trips	
			Compliant + Non-Compliant Vehicles	Non-Compliant Through Trips	Percentages of Non-Compliant Through Trips	Compliant + Non-Compliant Vehicles	Non-Compliant Through Trips	Percentages of Non-Compliant Through Trips
			(A)	(B)	(B/A)	(A)	(B)	(B/A)
58	Crank Road	St Helens	10,700	410	3.9%	9,900	220	2.2%
59	B5206	St Helens	10,300	110	1.1%	11,300	100	0.9%
60	A571	St Helens	8,800	10	0.1%	7,200	20	0.2%
61	Ashton Road	St Helens	2,800	0	0.0%	2,900	0	0.0%
62	Booth's Brow Road	St Helens	3,900	0	0.0%	3,900	0	0.0%
63	B5207	St Helens	2,100	0	0.0%	2,200	0	0.0%
64	Low Bank Road	St Helens	4,000	0	0.0%	4,000	0	0.0%
65	A58	St Helens	12,500	950	7.6%	12,300	810	6.6%
66	A49	St Helens	29,700	0	0.0%	30,000	0	0.0%
67	A580	St Helens	61,400	460	0.8%	62,200	430	0.7%
68	Rob Lane	St Helens	1,400	0	0.0%	1,300	0	0.0%
69	A573	St Helens	10,000	30	0.3%	10,400	30	0.3%
70	A572	St Helens	4,000	0	0.0%	4,200	10	0.1%

Table 4 Continued

Site ID	Road Number	Neighbouring Authority	2021			2023		
			All Trips	External-External (Through) Trips		All Trips	External-External (Through) Trips	
			Compliant + Non-Compliant Vehicles	Non-Compliant Through Trips	Percentages of Non-Compliant Through Trips	Compliant + Non-Compliant Vehicles	Non-Compliant Through Trips	Percentages of Non-Compliant Through Trips
			(A)	(B)	(B/A)	(A)	(B)	(B/A)
71	A579	Warrington	15,900	140	0.9%	16,200	110	0.7%
72	B5207	Warrington	3,900	10	0.3%	4,100	10	0.2%
73	A574	Warrington	18,300	30	0.2%	18,900	20	0.1%
74	A580	Warrington	42,000	590	1.4%	43,400	550	1.3%
75	A57	Warrington	30,000	30	0.1%	30,600	70	0.2%
76	Warburton Bridge Rd	Warrington	17,200	0	0.0%	17,400	0	0.0%
77	A6144	Warrington	8,700	0	0.0%	8,800	0	0.0%
78	M62	Warrington	155,200	3,990	2.6%	157,700	3,240	2.1%
79	M62	Calderdale	139,500	3,470	2.5%	144,400	3,170	2.2%
80	M6	St Helens	145,200	5,270	3.6%	151,900	6,010	4.0%
81	M6	West Lancashire	140,400	6,990	5.0%	143,900	7,380	5.1%
82	M58	West Lancashire	60,400	1,300	2.1%	61,600	1,090	1.8%
83	M66	Rossendale	70,300	1,670	2.4%	73,400	1,260	1.7%
84	M61	Chorley	92,900	390	0.4%	96,000	390	0.4%
85	M56	Cheshire East	152,500	1,490	1.0%	159,800	1,270	0.8%

Notes:

3. Figures in columns A have been rounded to the nearest 100 trips
4. Figures in columns B have been rounded to the nearest 10 trips
5. Percentages are based on unrounded totals

Table 4-3 20 Sites With Highest Non-Compliant Through Trip Flows (AAWT, 00:00 to 24:00, All Vehicles, Excluding Buses)

Site ID	Road Number	Neighbouring Authority	2021	% of Total flow Through Site	2023	% of Total Flow Through Site
65	A58	St Helens	950	7.6%	810	6.6%
6	A555	Cheshire East	650	2.0%	460	1.3%
74	A580	Warrington	590	1.4%	550	1.3%
24	A628	High Peak	580	3.2%	470	2.5%
11	A555	Cheshire East	570	1.0%	420	0.7%
12	A555	Cheshire East	570	1.0%	420	0.7%
8	A555	Cheshire East	560	1.5%	400	1.1%
51	A5209	West Lancashire	520	1.8%	410	1.4%
4	A538	Cheshire East	480	1.3%	460	1.2%
67	A580	St Helens	460	0.8%	430	0.7%
49	A49	Chorley	450	1.5%	360	1.2%
58	Crank Road	St Helens	410	3.9%	220	2.2%
17	A6	Cheshire East	390	1.2%	430	1.3%
47	A6	Chorley	260	1.6%	200	1.2%
14	A5149	Cheshire East	230	0.6%	240	0.7%
23	A57	High Peak	140	0.4%	180	0.6%
42	A666	Blackburn &h Darwen	140	0.6%	110	0.5%
71	A579	Warrington	140	0.9%	110	0.7%
16	A523	Cheshire East	130	0.5%	250	1.0%
18	Jacksons Edge Road	Cheshire East	130	0.6%	80	0.4%

Notes:

1. Flows have been rounded to the nearest 10 trips

Figure 4-1 2016 Saturn Network

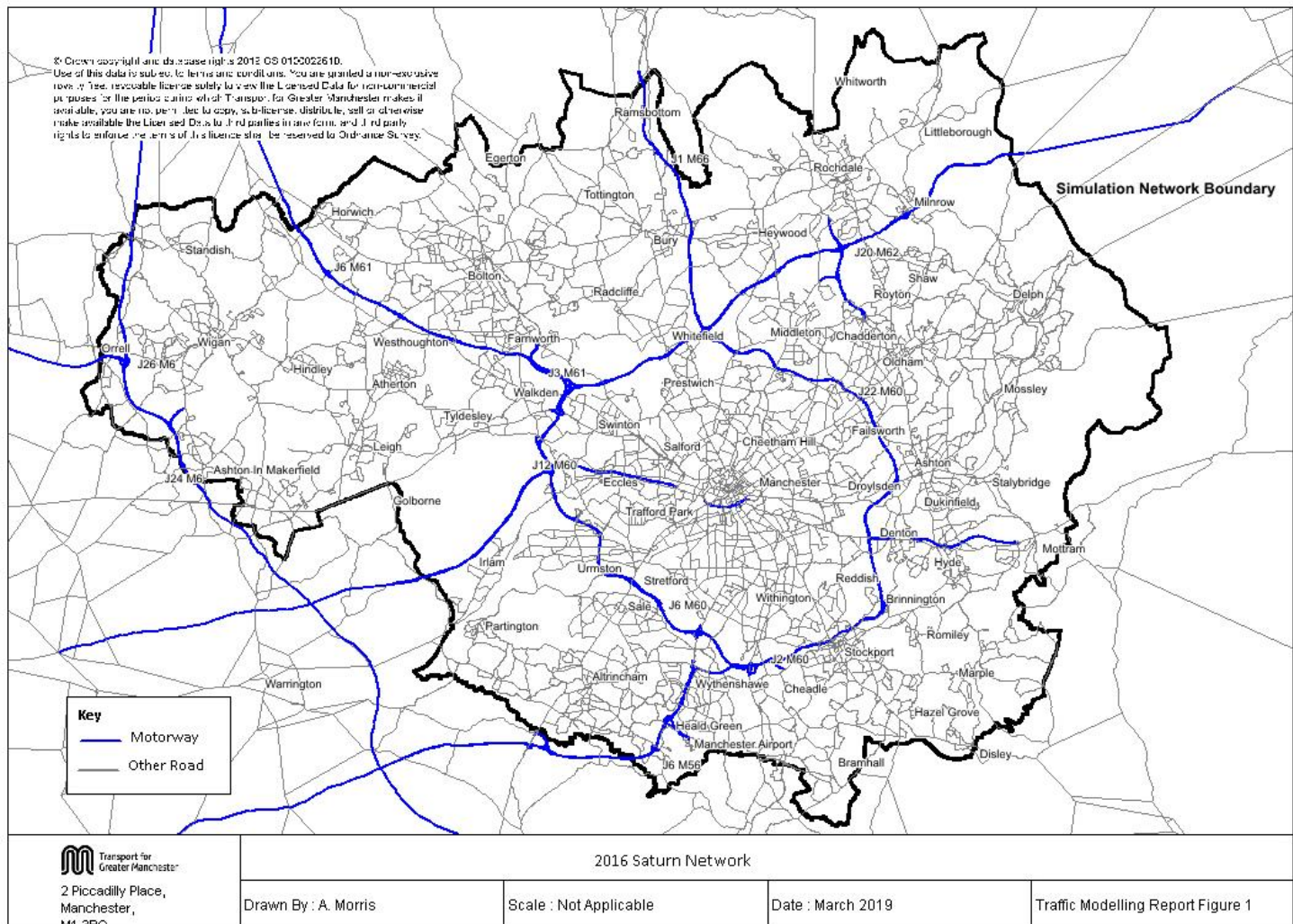


Figure 4-2 External Cordon Crossing Sites

