Appendix E Summary of Traffic Changes Arising from ORR CAZ B in 2020 and 2022 (v2 13/12/17)

1. This note provides a summary of the modelled forecast changes in all day (weekday 0700-1900 and estimated AADT[1]) traffic flows arising with the implementation of a Clean Air Zone covering Leeds within the Outer Ring Road and applying to HGVs only (taxis are not modelled separately within the Leeds Transport Model and buses are modelled as a fixed demand based on existing routes).

2. This is based on the following assumptions:

- HGV included but not cars or LGV
- Daily charges of £100 (HGV) for non-compliant vehicles
- No suppression of non-compliant trips
- Assumed compliance levels (%):

Table 1

2020	Car	LGV	HGV
Within CAZ	76.4	60.7	97.4
Outside CAZ	76.4	60.7	80.3

3. For the purpose of this test, the ORR has been defined as (clockwise from Colton): M1, M62, M621, A6110, A647 and A6120. These roads are deemed the most appropriate diversion route for non-compliant vehicles and are therefore excluded from the CAZ. The M621 between Junction 1 (A6110) and Junction 8 (M1) has been included within the CAZ.

4. The first section of the report considers the impacts on implementation in 2020, the second section examines the effect of the proposed City Centre Package (CCP) scheme which will close City Square to general traffic, reallocate highway capacity within the South Bank and provide additional capacity at Armley Gyratory and on the M621. (The latter scheme is being delivered by Highways England.)

5. Throughout this report the analysis is presented in various ways. Tables and graphs either contain direct outputs from the transport model or adjusted outputs that reflect existing traffic levels and how well the model reproduces them. The former are all labelled as Modelled the latter as Forecast. When it comes to understanding the percentage changes in traffic levels the Forecast data is regarded as being more robust. Both the Modelled and Forecast data are based on AADT estimates, with local factors applied to both traffic counts and model outputs to generate these. In addition, network plots of changes in modelled flows are also included – these are based on modelled 12 hour weekday flows.

6. Analysis of the model results indicates that there have been a few perverse outcomes, caused by the way the charges are applied in the Saturn highway model. In some locations non-compliant flows have increased within the CAZ. It is thought that these are trips that start and finish within the CAZ area, but in the DM test utilised the ORR for part of their

[1] Annual Average Daily Traffic

journey. The way the charges are applied means that these trips effectively pay double to follow these routes and therefore divert to make their full journey within the CAZ. There is no apparent way to rectify this within the options available in the Saturn software.

Section 1 – Impact in 2020 On Implementation of CAZ

Review of roads with increased traffic

7. The following plots show the modelled changes in flows from a 2020 Do Minimum situation. All changes in LGV and HGV are in vehicles.

8. The impact of the ORR CAZ B has only a modest effect upon HGV traffic across Leeds. Figure 1 shows the roads where an increase of 25 or more HGV's is forecast in either direction of travel over the 12 hour weekday.

9. Roads outside the CAZ that are attracting diverted traffic include the M606 in Bradford; the M62; the A58 from Drighlington to Back La; and the A62/Town St/Gildersome La/Back La/Tong Rd route between the M62 at Gildersome and the A6110.

10. Few of these roads are affected by a greater increase than 50 LGVs - see Figure 2. This is concentrated on the M62, which is acting as a diversion route for the M621.

11. Given that the A6110 is not included within the CAZ it is not clear why there is a diversion of traffic onto the Gildersome La route – and an accompanying small reduction on the A6110 – see Figure 3. This may simply be a reflection of 'model noise' as small changes in delays can on occasion result in reassignment if the competing routes have very similar travel times.

Figure 1 - HGV – increase of 25 or more vehicles (12 hour)

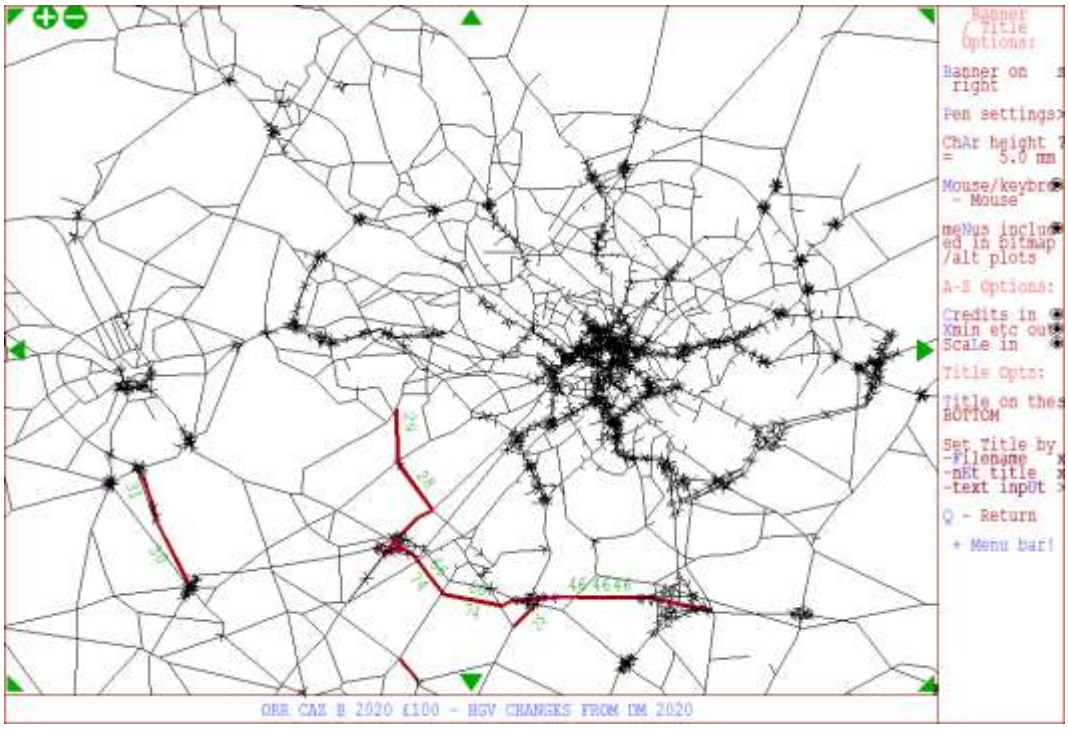


Figure 2 - HGV – increase of 50 or more vehicles (12 hour)

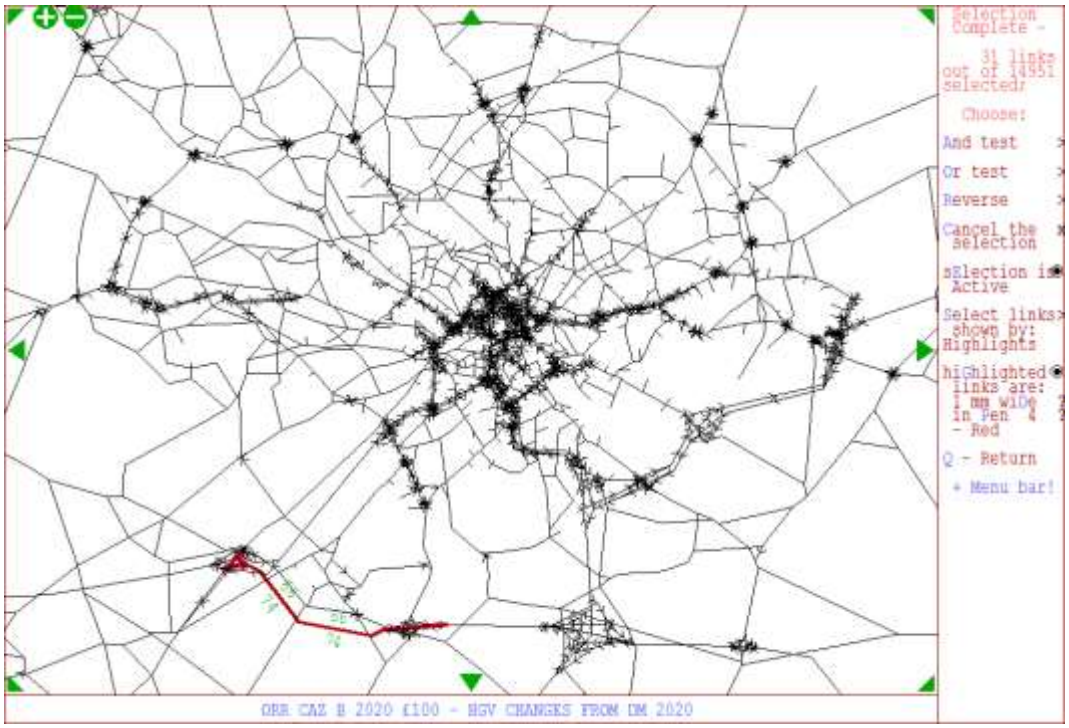
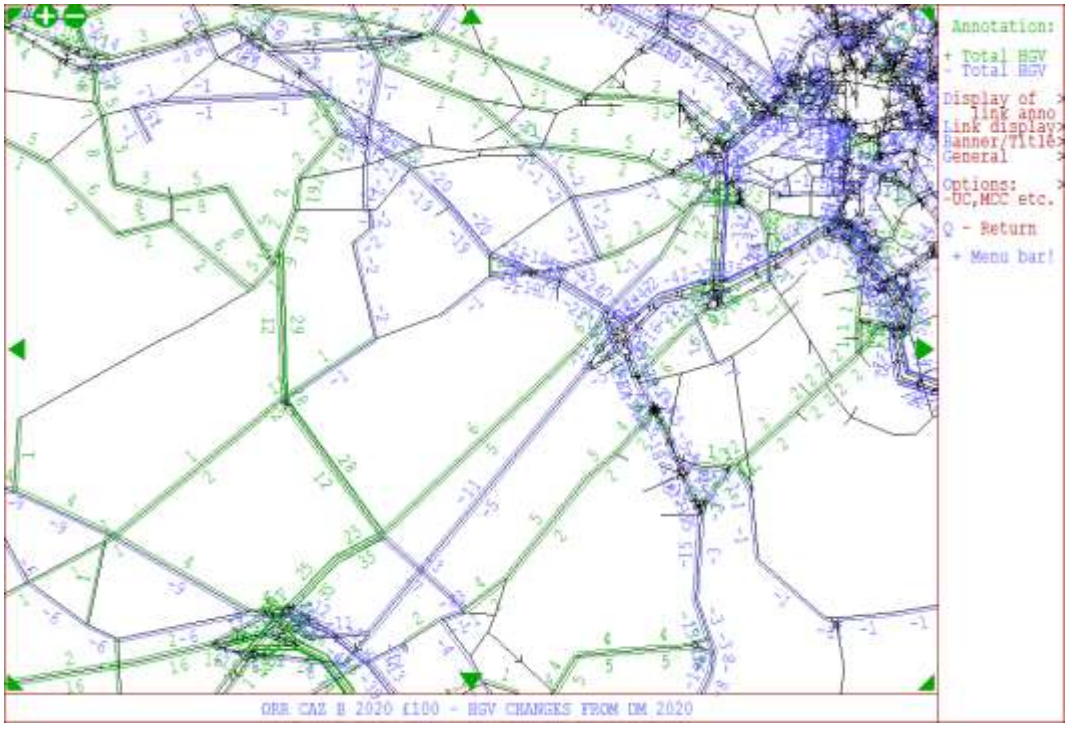


Figure 3 - HGV – changes in 12 hr weekday flows



Note: Green = increase, blue = decrease

12. There is no evidence of any significant reassignment of LGVs, which is as expected.

13. With regards to the routes outside Leeds District, the flow changes cannot be taken as necessarily representative as the model is not validated in this area. However, the level of

change of 30 additional HGV (12 hr weekday) on the M606, is very marginal. DfT counts indicates that the HGV AADF on the M606 in 2016 was over 5,600 vehicles (2 way)[2].

14. It is clear, therefore, that the significant issues with displaced traffic that apply with an IRR CAZ do not apply when the boundary is extended out to the outer ring road.

15. As a comparator with the IRR CAZ C, Table 2 shows the impact of the ORR CAZ B on the minor roads to the north and west of the city centre affected by the former. This has utilised observed traffic levels together with the forecasts changes in the model to arrive at an estimated change in overall traffic arising from the ORR CAZ.

Table 2 – Forecast Change in Traffic Levels on Routes affected by an IRR CAZ C

Road	Observed	Modelled AADT			Estimated 2020 AADT			
	Est AADT 2015	Base 2015	DM 2020	CAZ 2020	DM 2020	CAZ 2020	Change	%age change
Torre Rd	7000	3370	3570	3578	7200	7208	8	0%
Lincoln Green Rd	9900	6909	7551	7548	10542	10539	-3	0%
Woodhouse St	8400	8872	9119	9099	8647	8627	-20	0%
Hyde Park Rd	5800	9240	9349	9416	5909	5976	67	1%
Woodsley Rd	5800	6713	6785	6784	5872	5871	-1	0%
Canal Rd	13100	16831	17533	17507	13802	13776	-26	0%
Town St	10300	12641	13015	13018	10674	10677	3	0%
Upper Wortley Rd	10700	11310	11859	11854	11249	11244	-5	0%

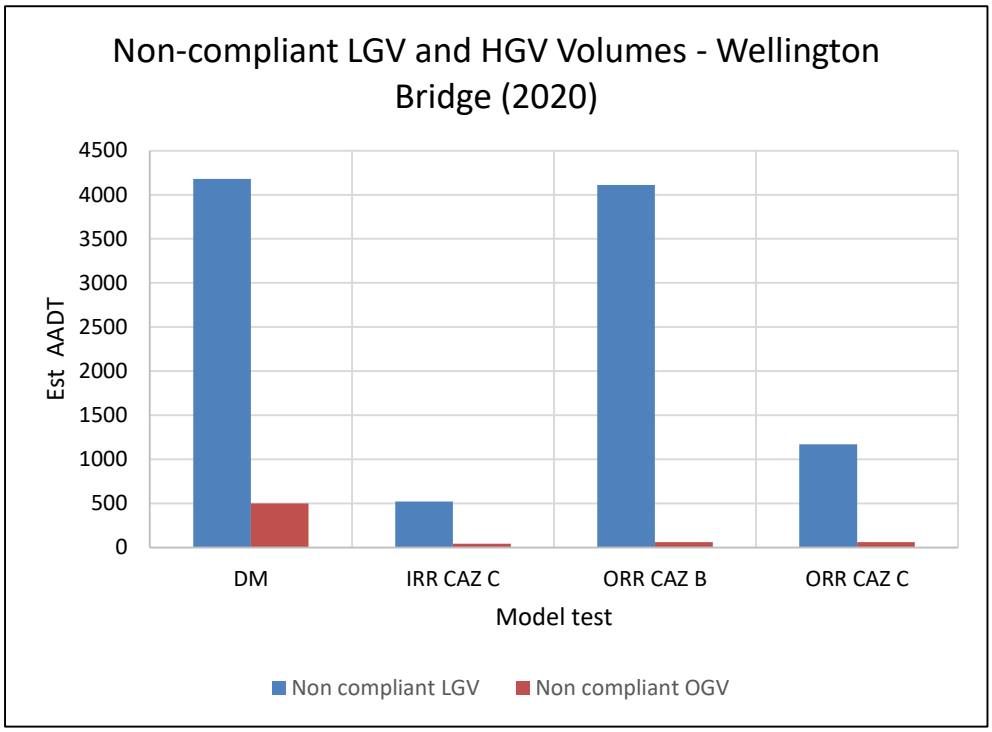
16. Forecast changes in LGV and HGV flows on these roads are equally minimal – see Appendix A.

17. In contrast, the fact that traffic is not being diverted off the inner ring road onto these minor roads means that the reduction in non-compliant vehicles is significantly less and therefore the effect upon air quality is also likely to be much more limited.

18. Figure 4 shows the modelled changes in non-compliant LGV and HGV on the inner ring road at Wellington Bridge. All three tests deliver a substantial reduction in non-compliant HGVs of around 90%. There is no real change in non-compliant LGVs with the ORR CAZ B (as would be expected). The difference between the two CAZ C tests is because the IRR option results in non-compliant vehicles diverting onto the minor road network.

[2] CP 73112 2016 AADF

Figure 4 – Modelled Levels of Non-compliant Vehicles – Leeds IRR



19. Table 3 shows the modelled changes in traffic on the Leeds routes affected by diverted traffic under the ORR CAZ B.

20. Comprehensive up to date classified counts are not available to assess the current levels of LGVs and HGVs on these routes, however, the use of a number of historic counts from 2015 has enabled a broad brush assessment of the forecast changes. The overall flow changes are very modest.

21. Overall HGV levels are forecast to rise by 14% on Gildersome La – Table 4. The increase in non-compliant vehicles is marginal, however, the diversion being predominantly compliant HGVs which supports the view expressed earlier that this is simply a fluctuation in the assignment (see Appendix A).

Table 3 – Forecast Change in Traffic Levels on Routes with Diverted Traffic under ORR CAZ B

Road	Observed	Modelled AADT			Estimated 2020 AADT			
	Est AADT 2015	Base 2015	DM 2020	CAZ 2020	DM 2020	CAZ 2020	Change	%age change
A6120 Ring Rd Farsley	23013	22241	24288	24269	25060	25041	-19	0%
Gildersome La	6800	6419	6743	6747	7124	7128	4	0%
Tong Rd	11000	11319	11822	11812	11503	11493	-10	0%

Table 4 – Forecast Change in HGVs on Routes with Diverted Traffic under ORR CAZ B

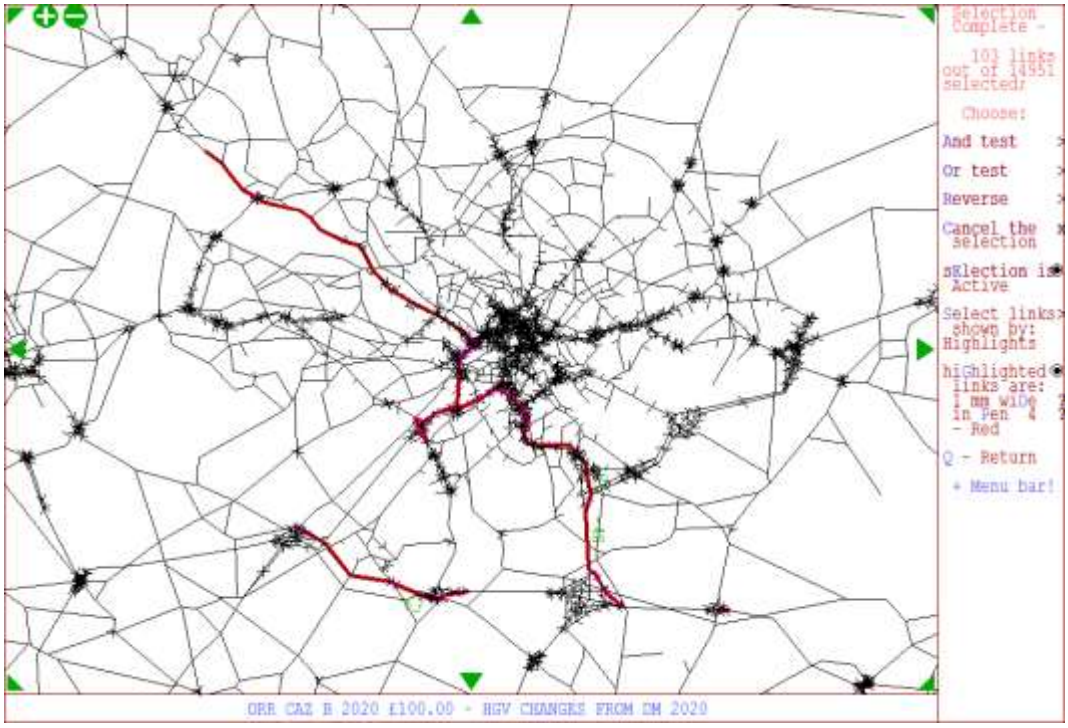
Road	Observed	Modelled AADT			Estimated 2020 AADT			
	Est AADT 2015	Base 2015	DM 2020	CAZ 2020	DM 2020	CAZ 2020	Change	%age change
A6120 Ring Rd Farsley	579	270	251	280	560	589	29	5%
Gildersome La	250	262	278	314	266	302	36	14%
Tong Rd	340	338	349	368	351	370	19	5%

Review of roads with reduced traffic

22. Figure 8 shows the parts of the highway network where the overall volume of HGVs is forecast to fall by 25 or more vehicles per 12 hour weekday with an ORR CAZ B. The reductions cover routes where through traffic is able to divert to avoid the CAZ: the A65, western IRR, M621 and the A650.

23. The scale of change here is relatively modest, with falls typically in the range of 40-60 HGVs.

Figure 8 - HGV – decrease of 25 or more vehicles (12 hour)



Conclusions

24. In summary, an ORR CAZ B would avoid the significant level of traffic re-assignment associated with an IRR CAZ, in particular there would be no diversion of non-compliant vehicles from the IRR onto unsuitable minor roads to the north and west of the city centre.

25. Outside the ORR, the model tests indicate that there would be some diversion of both compliant and non-compliant vehicles, although the volumes concerned are significantly less than with an IRR CAZ.

26. Routes affected by this reassignment include the M606 in Bradford; the M62; the A58 from Drighlington to Back La; and the A62/Town St/Gildersome La/Back La/Tong Rd route between the M62 at Gildersome and the A6110.

27. Of these, Gildersome La is forecast to attract an additional 14% HGVs, however, the increase in non-compliant vehicles is marginal, the diversion being predominantly compliant HGVs. It is not clear why this is being forecast, but it is likely that this is simply a fluctuation in the model assignment as the A6110 remains available for both compliant and non-compliant HGVs.

Section 2 – Impact in 2022 On Completion of City Centre Package

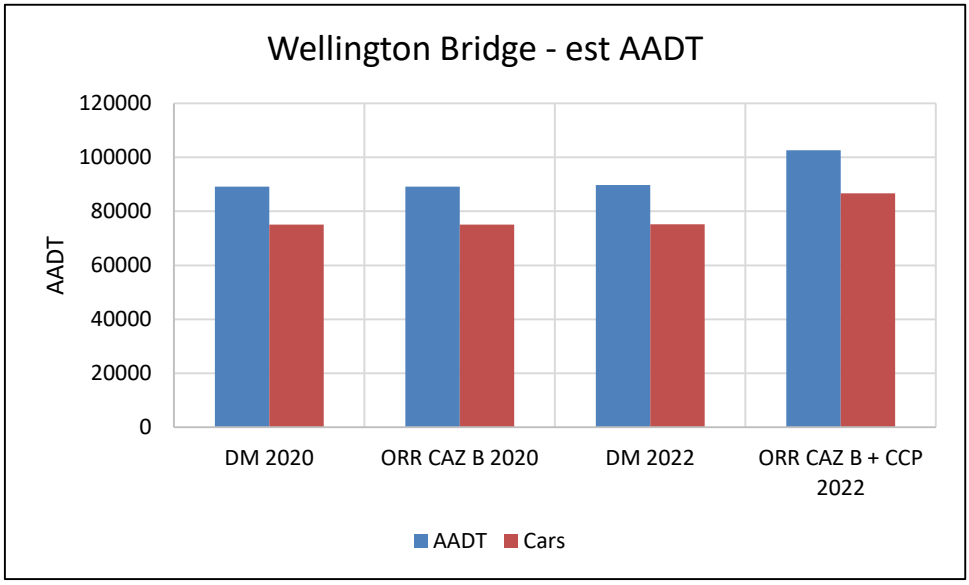
Review of roads with increased traffic

28. The CCP is designed to reduce the level of through traffic within the city centre. This is achieved through a combination of road closures and roadspace reallocation and the provision of additional circulatory capacity on the IRR and M621.

29. In particular the CCP increases traffic levels on the western IRR, the section where air quality is of most concern. Figure 9 shows the modelled changes in overall traffic on A58 Wellington Bridge in 2020 and 2022.

30. The introduction of the CAZ in 2020 results in a marginal change in total traffic. The combination of the CAZ with the CCP, however, increases all traffic and car volumes by 15% compared with the 2020 DM (modelled flows).

Figure 9 – Wellington Bridge Modelled Traffic Changes 2020 and 2022 (AADT)



31. The impact upon non-compliant HGVs remains significant with levels falling by over 90% from the 2020 DM situation, however, there is no forecast displacement onto the minor road network north and west of the city centre.

32. The overall levels of non-compliant LGVs and HGVs on Wellington Bridge are modelled to be 30% and 44% lower in 2022 (with the ORR CAZ B and CCP) than with the ORR CAZ B in 2020 – see Figures 10 and 11.

Figure 10 – Wellington Bridge Modelled LGV/HGV Traffic Changes 2020 and 2022 (AADT)

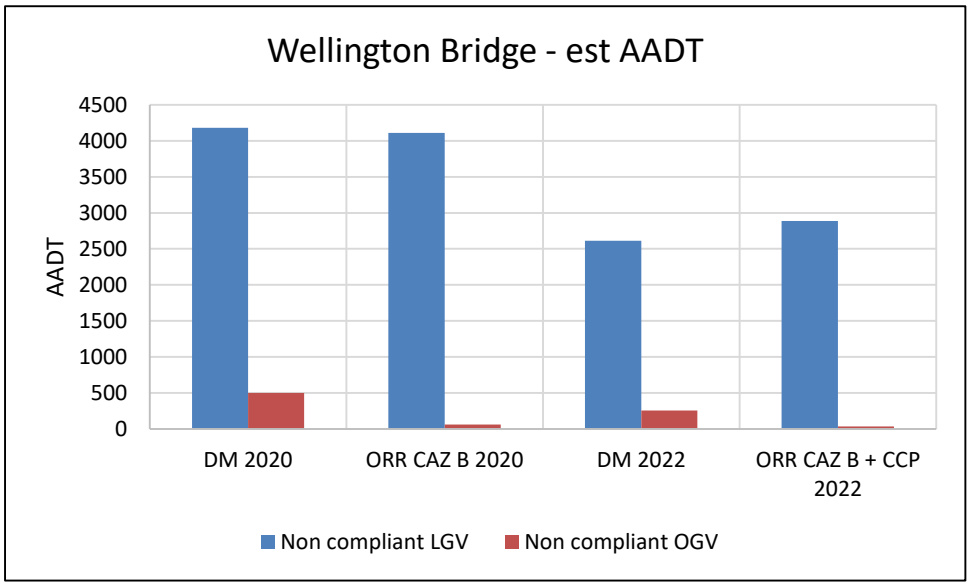
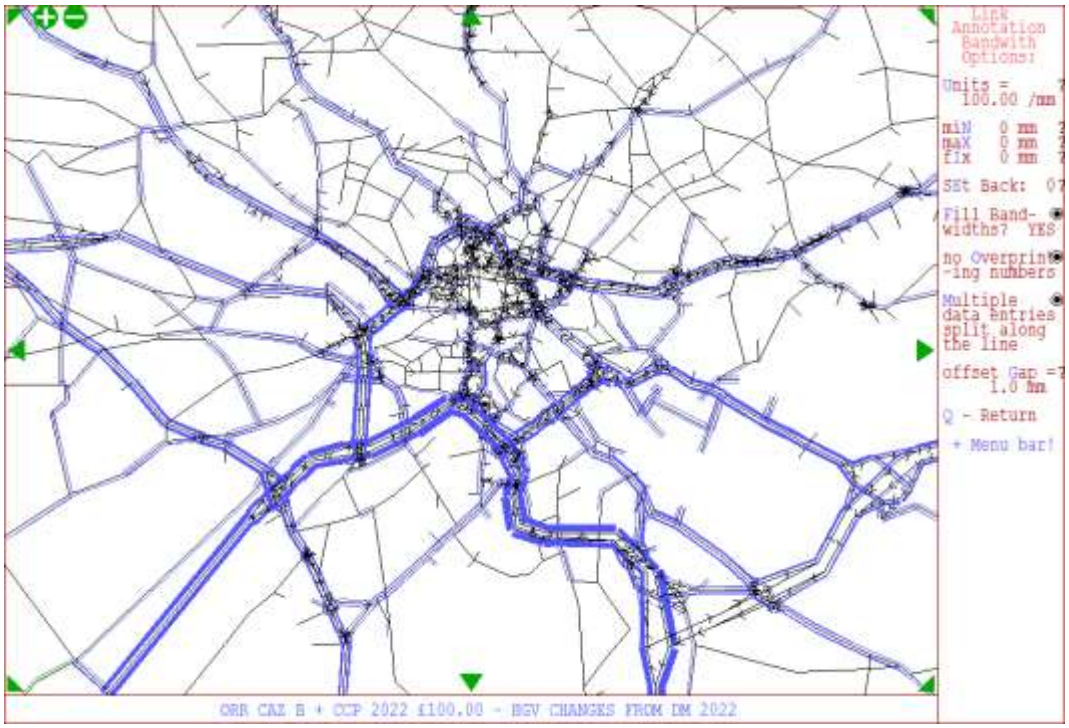


Figure 11 – Non-compliant HGV changes (12 hour) 2022



Note: Green = increase, blue = decrease

33. The section of the IRR most affected by additional traffic is A643 Ingram Distributor, where volumes are forecast to increase by 38% compared with the 2022 DM – see Table 5.

Table 5 – Forecast Change in Traffic Levels on Leeds IRR/M621 (2022)

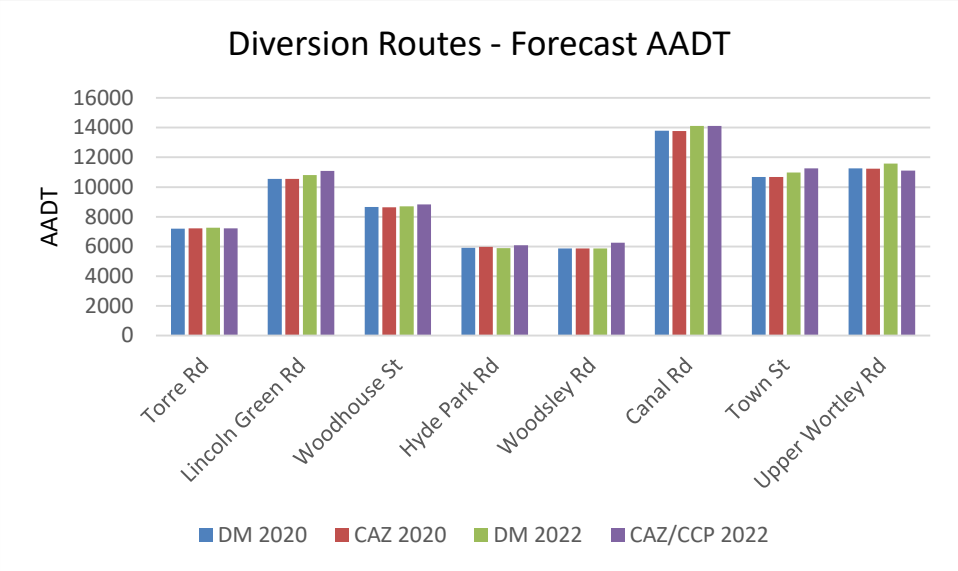
Road	Observed	Modelled AADT			Estimated 2022 AADT			
	Est AADT 2015	Base 2015	DM 2022	CAZ/CCP 2022	DM 2022	CAZ/CCP 2022	Change	%age change
IRR Lovell Park Br	44200	55092	60420	64182	49528	53290	3762	8%
IRR Woodhouse tunnel	71000	73191	77687	84228	75496	82037	6541	9%
IRR Wellington Br	86700	85539	89778	102644	90939	103805	12866	14%
A643 Ingram	53300	55483	59498	81834	57315	79651	22336	39%
M621 Jn 2-2a	70000	67795	74247	86668	76452	88873	12421	16%
M621 Jn 2a-3	n/a	82397	90774	95458	92979	97663	4684	5%
M621 Jn 3-4	69100	66025	73605	70299	76680	73374	-3306	-4%
John Smeaton Viaduct	30100	30910	34329	36415	33519	35605	2086	6%
IRR East Street	28700	27817	31904	37231	32787	38114	5327	16%

34. These increases include higher levels of LGVs and HGVs on Ingram Distributor, M621 2-2a and East Street. The level of non-compliant HGVs is forecast to fall by around 80% on Ingram Distributor, M621 2-2a and East Street compared with the 2022 DM – see Appendix B.

35. Similarly to Wellington Bridge, when compared with the IRR CAZ B in 2020, the volume of non-compliant vehicles on Ingram Distributor is forecast to be reduced by 18% (LGV) and 30% (HGV).

36. The changes in overall traffic forecast for the minor roads to the north and west of the city centre is marginal – see Figure 12, with the greatest forecast increase being just 7% on Woodsley Rd and traffic falling on several roads compared with the 2022 DM – see Appendix B. Changes in LGV and HGV volumes are forecast at broadly similar levels.

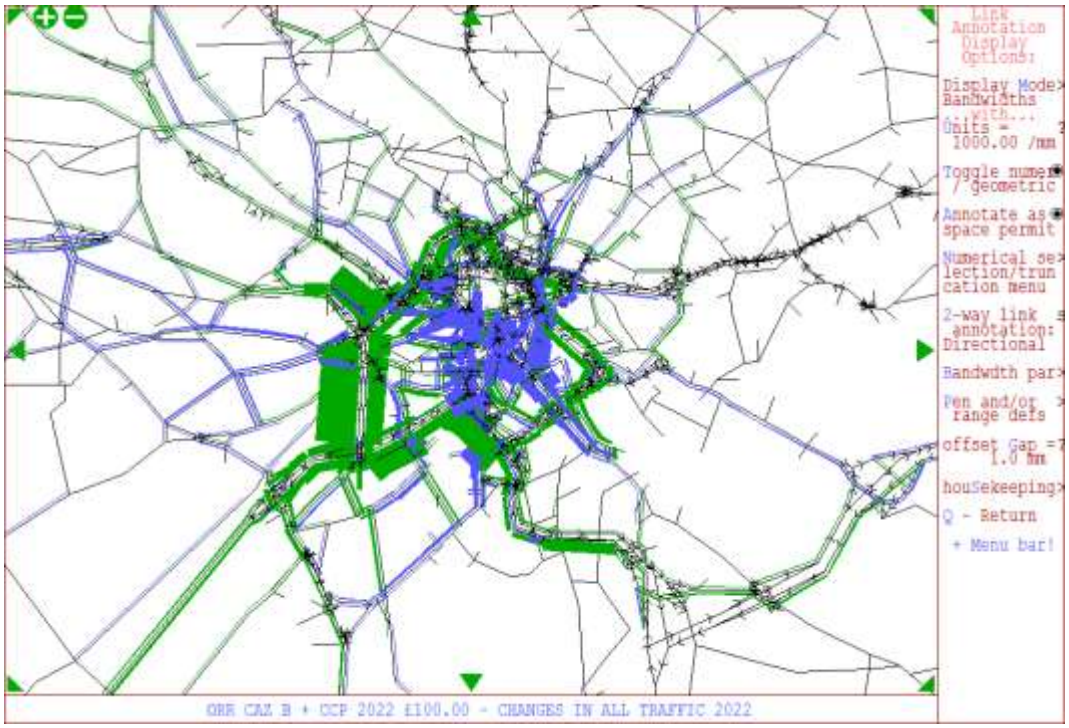
Figure 12 – Minor Road Diversion Routes – Forecast Traffic Changes 2020 and 2022 (AADT)



Review of roads with reduced traffic

37. Figure 13 shows the changes in total traffic around the city centre resulting from the combination of the ORR CAZ and the CCP. The increases on the western IRR and westbound M621 are very clear, as are the significant falls in traffic within the city centre – in particular through City Square and across Crown Point Bridge.

Figure 13 – Total Traffic Changes (12 hour pcus) 2022



Note: Green = increase, blue = decrease

38. Traffic levels on Crown Point Bridge are forecast to fall by around a third compared with the 2022 DM and on Bishopgate St by around 80% - see Table 6.

Table 6 – Forecast Change in Traffic Levels on Routes with Reduced Traffic (2022)

Road	Observed	Modelled AADT			Estimated 2022 AADT			
	Est AADT 2015	Base 2015	DM 2022	CAZ/CCP 2022	DM 2022	CAZ/CCP 2022	Change	%age change
Duke Street	35790	33529	35948	32562	38209	34823	-3386	-9%
The Calls	11000	12606	13832	8616	12226	7010	-5216	-43%
Bishopgate St	24000	20106	21401	791	25295	4685	-20610	-81%
Crown Point Br	31700	27459	29403	18921	33644	23162	-10482	-31%
Great Wilson St	32300	29014	31812	18531	35098	21817	-13281	-38%

39. The volume of traffic entering the city centre (inside the IRR) is forecast to fall by 8.5% overall, with a 10% reduction in LGVs and 13% in HGVs – see Table 7. The fall in non-compliant vehicles is much more variable, with an 11% fall in LGVs but a substantial 88% fall in HGVs, reflecting the differential impact of the CAZ.

40. Overall traffic levels on the approach to the IRR, however, are only forecast to change marginally (up less than 1%), with a marginal change in non-compliant LGVs (up 0.2%) but a very substantial 86% drop in non-compliant HGVs.

Table 7 – Modelled Changes in Traffic Crossing Cordons Around Leeds City Centre (AADT 2022)

				Compliant		Non compliant			Total	
Summary		AADT	Cars	LGV	OGV	LGV	OGV	PSV	LGV	OGV
Cordon on approaches to IRR										
DM 2022		670664	567073	55335	18372	17477	2042	10365	72812	20414
ORR CAZ B + CCP 2022		676288	571211	56671	20254	17505	288	10359	74176	20542
IRR Cordon Changes		5624	4138	1336	1882	28	-1754	-6	1364	128
Percentage change		0.8%	0.7%	2.4%	10.2%	0.2%	-85.9%	-0.1%	1.9%	0.6%
Cordon within IRR										
DM 2022		340435	291219	24521	6652	7745	740	9558	32266	7392
ORR CAZ B + CCP 2022		311406	266343	22223	6336	6866	89	9549	29089	6425
Within IRR Changes		-29029	-24876	-2298	-316	-879	-651	-9	-3177	-967
Percentage change		-8.5%	-8.5%	-9.4%	-4.8%	-11.3%	-88.0%	-0.1%	-9.8%	-13.1%

Conclusions

41. In summary, the impact of the City Centre Package (CCP) alongside the ORR CAZ B is marginal on the minor road network to the north and west of the city centre.

42. Traffic levels within the City Centre are forecast to reduce significantly, however, this results in additional traffic on both the M621 and western IRR, in particular A643 Ingram Distributor which is forecast to attract an additional 39% traffic (compared with the 2022 DM) , together with more LGVs and HGVs. The volume of non-compliant HGVs, however, is forecast to fall by around 80%.

43. Traffic levels on A58 Wellington St, M621 Jn 2-2a and East Street are forecast to rise by around 15%, although the volumes of non-compliant HGVs is forecast to fall by 85% to 90%.

APPENDIX A

Table A1 – Forecast Changes in LGV volumes – minor roads to N and W of city centre

Road	Observed	Modelled AADT			Estimated 2020 AADT			
	Est AADT 2015	Base 2015	DM 2020	CAZ 2020	DM 2020	CAZ 2020	Change	%age change
Torre Rd	590	233	265	262	622	619	-3	0%
Lincoln Green Rd	770	393	470	468	847	845	-2	0%
Woodhouse St	820	731	797	798	886	887	1	0%
Hyde Park Rd	500	571	623	626	552	555	3	1%
Woodsley Rd	370	471	512	515	411	414	3	1%
Canal Rd	980	1134	1297	1297	1143	1143	0	0%
Town St	890	978	1098	1103	1010	1015	5	0%
Upper Wortley Rd	1030	1216	1357	1358	1171	1172	1	0%

Note: 2015 observed AADT estimated from 2017 MCC

Table A2 – Forecast Changes in HGV volumes – minor roads to N and W of city centre

Road	Observed	Modelled AADT			Estimated 2020 AADT			
	Est AADT 2015	Base 2015	DM 2020	CAZ 2020	DM 2020	CAZ 2020	Change	%age change
Torre Rd	170	29	35	35	176	176	0	0%
Lincoln Green Rd	170	56	64	64	178	178	0	0%
Woodhouse St	140	99	103	102	144	143	-1	-1%
Hyde Park Rd	100	90	93	95	103	105	2	2%
Woodsley Rd	80	78	79	79	81	81	0	0%
Canal Rd	310	312	323	322	321	320	-1	0%
Town St	220	263	276	276	233	233	0	0%
Upper Wortley Rd	290	301	314	312	303	301	-2	-1%

Note: 2015 observed AADT estimated from 2017 MCC

Table A3 – Forecast Changes in LGV volumes – routes attracting more traffic

Road	Observed	Modelled AADT			Estimated 2020 AADT			
	Est AADT 2015	Base 2015	DM 2020	CAZ 2020	DM 2020	CAZ 2020	Change	%age change
A6120 Ring Rd Farsley	3738	1904	2157	2154	3991	3988	-3	0%
Gildersome La	970	638	747	742	1079	1074	-5	0%
Tong Rd	1200	1042	1150	1141	1308	1299	-9	-1%
M62 Jn 27-28	19786	11317	13546	13524	22015	21993	-22	0%
M62 Jn 28-29	17596	13001	15970	15964	20565	20559	-6	0%

Note: 2015 observed AADT estimated from 2015 MCC

Table A4 – Forecast Changes in HGV volumes – routes attracting more traffic

Road	Observed	Modelled AADT			Estimated 2020 AADT			
	Est AADT 2015	Base 2015	DM 2020	CAZ 2020	DM 2020	CAZ 2020	Change	%age change
A6120 Ring Rd Farsley	579	270	251	280	560	589	29	5%
Gildersome La	250	262	278	314	266	302	36	14%
Tong Rd	340	338	349	368	351	370	19	5%
M62 Jn 27-28	20818	9067	9411	9540	21162	21291	129	1%
M62 Jn 28-29	19690	10609	10996	11059	20077	20140	63	0%

Note: 2015 observed AADT estimated from 2015 MCC

Table A5 – Modelled changes in traffic volumes – routes attracting more traffic

2020 estimated AADT with ORR CAZ B										
Road				Compliant		Non compliant			Total	
	Anode Bnode	AADT	Cars	LGV	OGV	LGV	OGV	PSV	LGV	OGV
A6120 Ring Rd Farsley		24269	21835	1307	226	847	54	0	2154	280
Gildersome La		6747	5589	450	258	292	56	102	742	314
Tong Rd		11812	10149	693	332	448	36	154	1141	368
M62 Jn 27-28		136250	113186	8209	7563	5315	1977	0	13524	9540
M62 Jn 28-29		154765	127742	9690	8965	6274	2094	0	15964	11059
Change from 2020 DM										
Road				Compliant		Non compliant			Total	
	Anode Bnode	AADT	Cars	LGV	OGV	LGV	OGV	PSV	LGV	OGV
A6120 Ring Rd Farsley		-19	-45	13	25	-16	4	0	-3	29
Gildersome La		4	-27	2	36	-7	0	0	-5	36
Tong Rd		-10	-20	3	53	-12	-34	0	-9	19
M62 Jn 27-28		5	-102	81	34	-103	95	0	-22	129
M62 Jn 28-29		-17	-74	108	168	-114	-105	0	-6	63
Percentage change from 2020 DM										
Road				Compliant		Non compliant			Total	
	Anode Bnode	AADT	Cars	LGV	OGV	LGV	OGV	PSV	LGV	OGV
A6120 Ring Rd Farsley		0%	0%	1%	12%	-2%	8%	0%	0%	12%
Gildersome La		0%	0%	0%	16%	-2%	0%	0%	-1%	13%
Tong Rd		0%	0%	0%	19%	-3%	-49%	0%	-1%	5%
M62 Jn 27-28		0%	0%	1%	0%	-2%	5%	0%	0%	1%
M62 Jn 28-29		0%	0%	1%	2%	-2%	-5%	0%	0%	1%

Note: Model flow validation is variable across these routes and the results must be taken as indicative only.

Table A6 – Modelled changes in traffic volumes – city centre cordons

Two way flow changes from DM 2020										
				Compliant		Non compliant			Total	
Summary		AADT	Cars	LGV	OGV	LGV	OGV	PSV	LGV	OGV
Cordon on approaches to IRR										
DM 2020		663808	563136	42011	16230	28000	4058	10373	70011	20288
ORR CAZ B 2020		663793	563330	42498	19557	27509	528	10371	70007	20085
IRR Cordon Changes		-15	194	487	3327	-491	-3530	-2	-4	-203
Percentage change		0.0%	0.0%	1.2%	20.5%	-1.8%	-87.0%	0.0%	0.0%	-1.0%
Cordon within IRR										
DM 2020		336622	288318	18790	5945	12519	1487	9563	31309	7432
ORR CAZ B 2020		336619	288373	19006	7182	12291	205	9562	31297	7387
Within IRR Changes		-3	55	216	1237	-228	-1282	-1	-12	-45
Percentage change		0.0%	0.0%	1.1%	20.8%	-1.8%	-86.2%	0.0%	0.0%	-0.6%

Table A7 – Modelled changes in traffic volumes – IRR

2022 estimated AADT with ORR CAZ B										
Road				Compliant		Non compliant			Total	
	Anode Bnode	AADT	Cars	LGV	OGV	LGV	OGV	PSV	LGV	OGV
IRR Lovell Park Br		59517	52476	3393	1356	2256	36	0	5649	1392
IRR Woodhouse tunnel		76936	66989	5154	1374	3383	36	0	8537	1410
IRR Wellington Br		89098	75078	6333	2390	4112	61	1124	10445	2451
A643 Ingram		58565	48586	4856	1946	3111	66	0	7967	2012
M621 Jn 2-2a		73564	60694	5468	3598	3499	76	229	8967	3674
M621 Jn 2a-3		89770	73459	6967	4537	4469	109	229	11436	4646
M621 Jn 3-4		72787	58662	6222	3855	3954	94	0	10176	3949
John Smeaton Viaduct		34066	28973	2152	1509	1394	38	0	3546	1547
IRR East Street		31381	27760	1649	750	1100	20	102	2749	770
Change from 2020 DM										
Road				Compliant		Non compliant			Total	
	Anode Bnode	AADT	Cars	LGV	OGV	LGV	OGV	PSV	LGV	OGV
IRR Lovell Park Br		-7	4	40	233	-40	-244	0	0	-11
IRR Woodhouse tunnel		-20	-5	62	232	-59	-250	0	3	-18
IRR Wellington Br		-20	11	81	394	-68	-438	0	13	-44
A643 Ingram		-19	20	49	314	-60	-342	0	-11	-28
M621 Jn 2-2a		-13	68	59	599	-65	-674	0	-6	-75
M621 Jn 2a-3		-31	38	80	765	-79	-835	0	1	-70
M621 Jn 3-4		9	75	78	633	-66	-711	0	12	-78
John Smeaton Viaduct		-22	-6	21	263	-26	-274	0	-5	-11
IRR East Street		3	18	14	129	-23	-135	0	-9	-6
Percentage change from 2020 DM										
Road				Compliant		Non compliant			Total	
	Anode Bnode	AADT	Cars	LGV	OGV	LGV	OGV	PSV	LGV	OGV
IRR Lovell Park Br		0%	0%	1%	21%	-2%	-87%	0%	0%	-1%
IRR Woodhouse tunnel		0%	0%	1%	20%	-2%	-87%	0%	0%	-1%
IRR Wellington Br		0%	0%	1%	20%	-2%	-88%	0%	0%	-2%
A643 Ingram		0%	0%	1%	19%	-2%	-84%	0%	0%	-1%
M621 Jn 2-2a		0%	0%	1%	20%	-2%	-90%	0%	0%	-2%
M621 Jn 2a-3		0%	0%	1%	20%	-2%	-88%	0%	0%	-1%
M621 Jn 3-4		0%	0%	1%	20%	-2%	-88%	0%	0%	-2%
John Smeaton Viaduct		0%	0%	1%	21%	-2%	-88%	0%	0%	-1%
IRR East Street		0%	0%	1%	21%	-2%	-87%	0%	0%	-1%

Note: Model flow validation is variable across these routes and the results must be taken as indicative only.

APPENDIX B

Table B1 – Forecast Changes in LGV volumes – minor roads to N and W of city centre 2022

Road	Observed	Modelled AADT			Estimated 2022 AADT			
	Est AADT 2015	Base 2015	DM 2022	CAZ/CCP 2022	DM 2022	CAZ/CCP 2022	Change	%age change
Torre Rd	590	233	285	288	642	645	3	0%
Lincoln Green Rd	770	393	498	487	875	864	-11	-1%
Woodhouse St	820	731	834	852	923	941	18	2%
Hyde Park Rd	500	571	634	646	563	575	12	2%
Woodsley Rd	370	471	536	581	435	480	45	10%
Canal Rd	980	1134	1387	1394	1233	1240	7	1%
Town St	890	978	1166	1286	1078	1198	120	11%
Upper Wortley Rd	1030	1216	1402	1394	1216	1208	-8	-1%

Note: 2015 observed AADT estimated from 2017 MCC

Table B2 – Forecast Changes in HGV volumes – minor roads to N and W of city centre 2022

Road	Observed	Modelled AADT			Estimated 2022 AADT			
	Est AADT 2015	Base 2015	DM 2022	CAZ/CCP 2022	DM 2022	CAZ/CCP 2022	Change	%age change
Torre Rd	170	29	35	36	176	177	1	1%
Lincoln Green Rd	170	56	65	65	179	179	0	0%
Woodhouse St	140	99	103	110	144	151	7	5%
Hyde Park Rd	100	90	94	101	104	111	7	7%
Woodsley Rd	80	78	81	90	83	92	9	11%
Canal Rd	310	312	334	261	332	259	-73	-22%
Town St	220	263	285	262	242	219	-23	-10%
Upper Wortley Rd	290	301	318	301	307	290	-17	-6%

Note: 2015 observed AADT estimated from 2017 MCC

Table B3 – Forecast Changes in LGV volumes – routes attracting more traffic 2022

Road	Observed	Modelled AADT			Estimated 2020 AADT			
	Est AADT 2015	Base 2015	DM 2022	CAZ 2022	DM 2022	CAZ 2022	Change	%age change
A6120 Ring Rd Farsley	3738	1904	2324	2225	4158	4059	-99	-2%
Gildersome La	970	638	792	791	1124	1123	-1	0%
Tong Rd	1200	1042	1234	1184	1392	1342	-50	-4%
M62 Jn 27-28	19786	11317	14347	14294	22816	22763	-53	0%
M62 Jn 28-29	17596	13001	16834	16484	21429	21079	-350	-2%

Note: 2015 observed AADT estimated from 2015 MCC

Table B4 – Forecast Changes in HGV volumes – routes attracting more traffic 2022

Road	Observed	Modelled AADT			Estimated 2020 AADT			
	Est AADT 2015	Base 2015	DM 2022	CAZ 2022	DM 2022	CAZ 2022	Change	%age change
A6120 Ring Rd Farsley	579	270	254	272	563	581	18	3%
Gildersome La	250	262	283	303	271	291	20	7%
Tong Rd	340	338	355	363	357	365	8	2%
M62 Jn 27-28	20818	9067	9594	9629	21345	21380	35	0%
M62 Jn 28-29	19690	10609	11208	11191	20289	20272	-17	0%

Note: 2015 observed AADT estimated from 2015 MCC

Table B5 – Modelled changes in traffic volumes – routes attracting more traffic 2022

2022 estimated AADT with ORR CAZ B										
Road				Compliant		Non compliant			Total	
	Anode Bnode	AADT	Cars	LGV	OGV	LGV	OGV	PSV	LGV	OGV
A6120 Ring Rd Farsley		24385	21888	1700	242	525	30	0	2225	272
Gildersome La		6983	5787	604	271	187	32	102	791	303
Tong Rd		12007	10306	904	343	280	20	154	1184	363
M62 Jn 27-28		139459	115536	10920	8539	3374	1090	0	14294	9629
M62 Jn 28-29		157006	129331	12594	10038	3890	1153	0	16484	11191
Change from 2022 DM										
Road				Compliant		Non compliant			Total	
	Anode Bnode	AADT	Cars	LGV	OGV	LGV	OGV	PSV	LGV	OGV
A6120 Ring Rd Farsley		-262	-181	-66	13	-33	5	0	-99	18
Gildersome La		47	28	2	17	-3	3	0	-1	20
Tong Rd		-231	-189	-34	24	-16	-16	0	-50	8
M62 Jn 27-28		-551	-533	16	-96	-69	131	0	-53	35
M62 Jn 28-29		-1359	-992	-200	-49	-150	32	0	-350	-17
Percentage change from 2022 DM										
Road				Compliant		Non compliant			Total	
	Anode Bnode	AADT	Cars	LGV	OGV	LGV	OGV	PSV	LGV	OGV
A6120 Ring Rd Farsley		-1%	-1%	-4%	6%	-6%	20%	0%	-4%	7%
Gildersome La		1%	0%	0%	7%	-2%	10%	0%	0%	7%
Tong Rd		-2%	-2%	-4%	8%	-5%	-44%	0%	-4%	2%
M62 Jn 27-28		0%	0%	0%	-1%	-2%	14%	0%	0%	0%
M62 Jn 28-29		-1%	-1%	-2%	0%	-4%	3%	0%	-2%	0%

Note: Model flow validation is variable across these routes and the results must be taken as indicative only.

Table B6 – Modelled changes in traffic volumes – city centre cordons 2022

Two way flow changes from DM 2022										
				Compliant		Non compliant			Total	
Summary		AADT	Cars	LGV	OGV	LGV	OGV	PSV	LGV	OGV
Cordon on approaches to IRR										
DM 2022		670664	567073	55335	18372	17477	2042	10365	72812	20414
ORR CAZ B + CCP 2022		676288	571211	56671	20254	17505	288	10359	74176	20542
IRR Cordon Changes		5624	4138	1336	1882	28	-1754	-6	1364	128
Percentage change		0.8%	0.7%	2.4%	10.2%	0.2%	-85.9%	-0.1%	1.9%	0.6%
Cordon within IRR										
DM 2022		340435	291219	24521	6652	7745	740	9558	32266	7392
ORR CAZ B + CCP 2022		311406	266343	22223	6336	6866	89	9549	29089	6425
Within IRR Changes		-29029	-24876	-2298	-316	-879	-651	-9	-3177	-967
Percentage change		-8.5%	-8.5%	-9.4%	-4.8%	-11.3%	-88.0%	-0.1%	-9.8%	-13.1%

Table B7 – Modelled changes in traffic volumes – IRR

2022 estimated AADT with ORR CAZ B + CCP										
Road				Compliant		Non compliant			Total	
	Anode Bnode	AADT	Cars	LGV	OGV	LGV	OGV	PSV	LGV	OGV
IRR Lovell Park Br		64182	56159	4962	1507	1533	21	0	6495	1528
IRR Woodhouse tunnel		84228	73083	7299	1569	2255	22	0	9554	1591
IRR Wellington Br		102644	86639	9348	2613	2888	34	1122	12236	2647
A643 Ingram		81834	68447	8226	2573	2542	46	0	10768	2619
M621 Jn 2-2a		86668	71391	8277	4164	2557	50	229	10834	4214
M621 Jn 2a-3		95458	78356	9372	4549	2895	57	229	12267	4606
M621 Jn 3-4		70299	56884	7482	3576	2312	45	0	9794	3621
John Smeaton Viaduct		36415	30586	3231	1579	998	21	0	4229	1600
IRR East Street		37231	32464	2887	874	892	12	102	3779	886
Change from 2022 DM										
Road				Compliant		Non compliant			Total	
	Anode Bnode	AADT	Cars	LGV	OGV	LGV	OGV	PSV	LGV	OGV
IRR Lovell Park Br		3762	3042	508	209	126	-123	0	634	86
IRR Woodhouse tunnel		6541	5735	556	250	125	-125	0	681	125
IRR Wellington Br		12866	11405	1081	325	277	-221	-1	1358	104
A643 Ingram		22336	19397	1863	705	532	-161	0	2395	544
M621 Jn 2-2a		12421	10500	1136	806	302	-323	0	1438	483
M621 Jn 2a-3		4684	4436	304	325	31	-412	0	335	-87
M621 Jn 3-4		-3306	-2041	-593	-73	-238	-361	0	-831	-434
John Smeaton Viaduct		2086	1611	380	137	97	-139	0	477	-2
IRR East Street		5327	4375	659	171	188	-66	0	847	105
Percentage change from 2022 DM										
Road				Compliant		Non compliant			Total	
	Anode Bnode	AADT	Cars	LGV	OGV	LGV	OGV	PSV	LGV	OGV
IRR Lovell Park Br		6%	6%	11%	16%	9%	-85%	0%	11%	6%
IRR Woodhouse tunnel		8%	9%	8%	19%	6%	-85%	0%	8%	9%
IRR Wellington Br		14%	15%	13%	14%	11%	-87%	0%	12%	4%
A643 Ingram		38%	40%	29%	38%	26%	-78%	0%	29%	26%
M621 Jn 2-2a		17%	17%	16%	24%	13%	-87%	0%	15%	13%
M621 Jn 2a-3		5%	6%	3%	8%	1%	-88%	0%	3%	-2%
M621 Jn 3-4		-4%	-3%	-7%	-2%	-9%	-89%	0%	-8%	-11%
John Smeaton Viaduct		6%	6%	13%	10%	11%	-87%	0%	13%	0%
IRR East Street		17%	16%	30%	24%	27%	-85%	0%	29%	13%

Note: Model flow validation is variable across these routes and the results must be taken as indicative only.