Appendix I Summary of Traffic Changes Arising from Reduced Area ORR CAZ B in 2020 and 2022 (FINAL 17/05/18)

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 a reduced area of 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. Since the original analysis a number of elements within the transport modelling have been refined or updated to reflect the latest information. Specifically this includes:

- Updating traffic growth from Tempro NTEM 7.0 to 7.2
- Use of local vehicle fleet proportions rather than national
- Use of updated behavioural change assumptions
- Use of an updated transport model network
- Use of the 'car' version of the LTM

3. The principal assumptions are shown below:

- 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

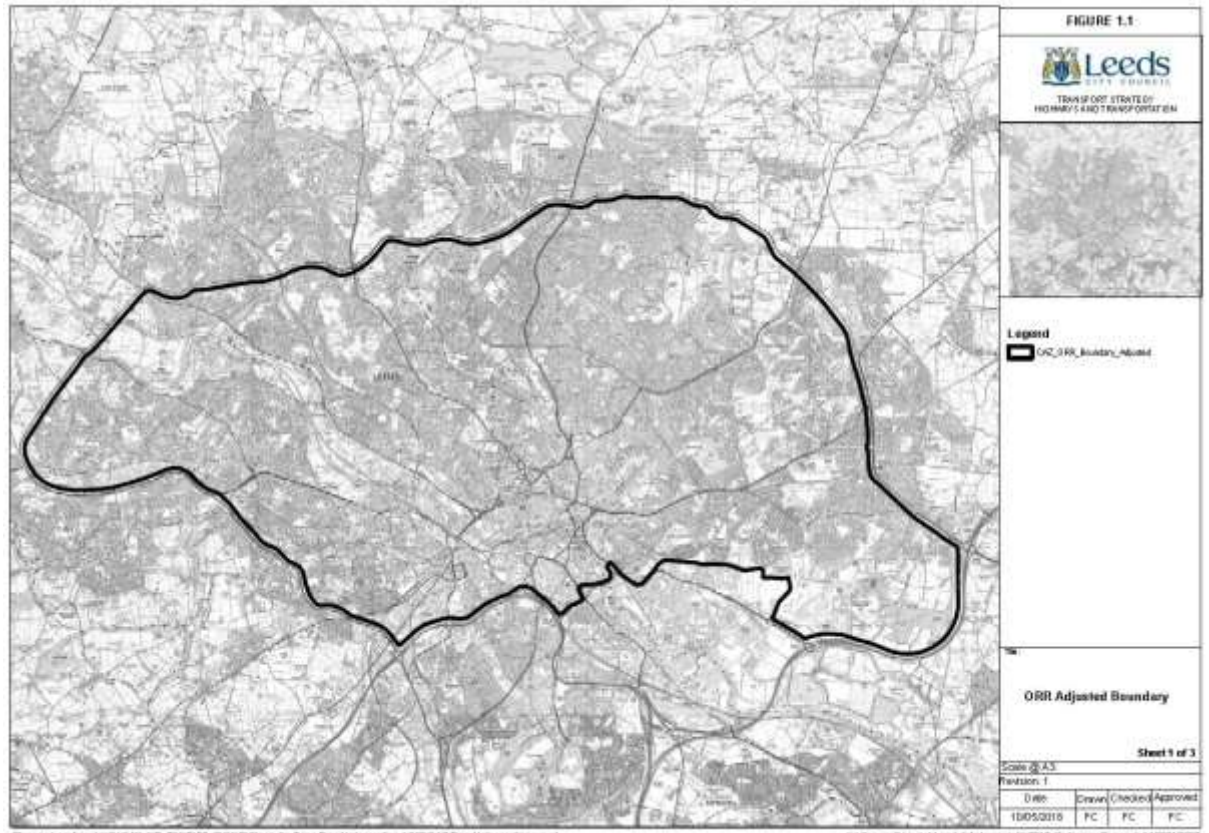
2020	Car	LGV	HGV
Within CAZ	89.85	86.19	94.27
Outside CAZ	71.82	61.64	66.30

4. The proposed boundary is shown in Figure 1. In figures and tables this boundary is referred to as ORR1. The boundary has been defined as (clockwise from Colton): M1, A63, A61, 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. Within the Aire Valley the boundary has been adjusted to exclude the Enterprise Zone from the CAZ.

5. 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.)

[1] Annual Average Daily Traffic

Figure 1 – Reduced Area ORR CAZ Boundary (ORR1)



6. 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.

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 2 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 western outer ring road (A6120, A647, A6110); the M621, the eastern section of Leeds inner ring road and the M1 east of Leeds.

10. Few of these roads are affected by a greater increase than 50 LGVs (1way) - see Figure 3. This is concentrated on the western outer ring road and the M606. The latter however, reflects a local reassignment of traffic between the A638 and M606 and is likely to be linked to small journey time changes in the model.

Figure 2 - HGV – increase of 25 or more vehicles (12 hour)

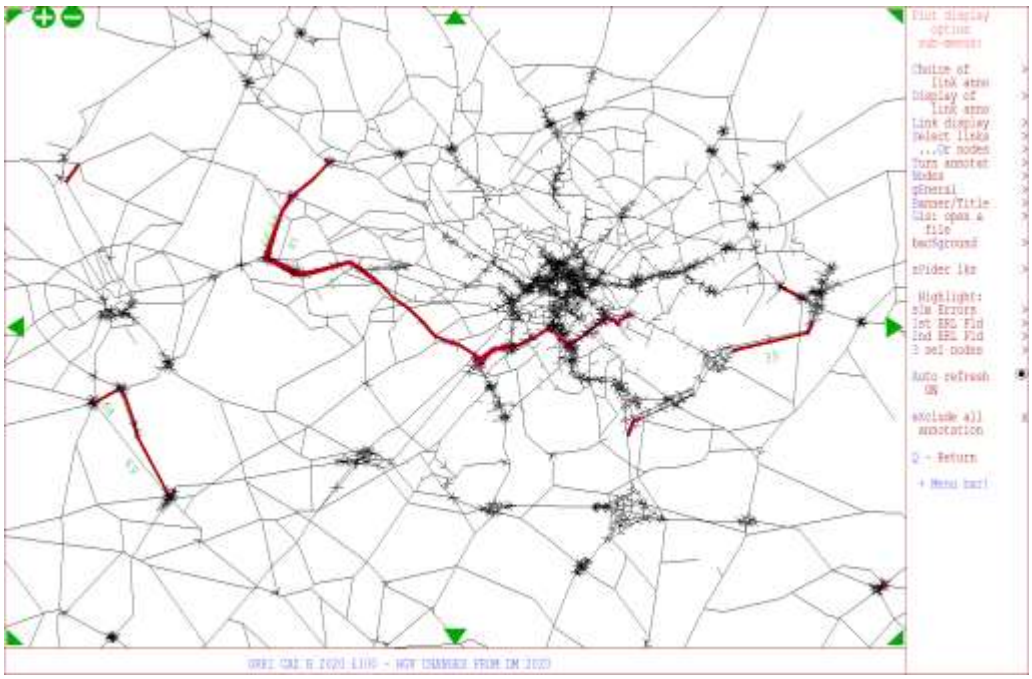


Figure 3 - HGV – increase of 50 or more vehicles (12 hour)

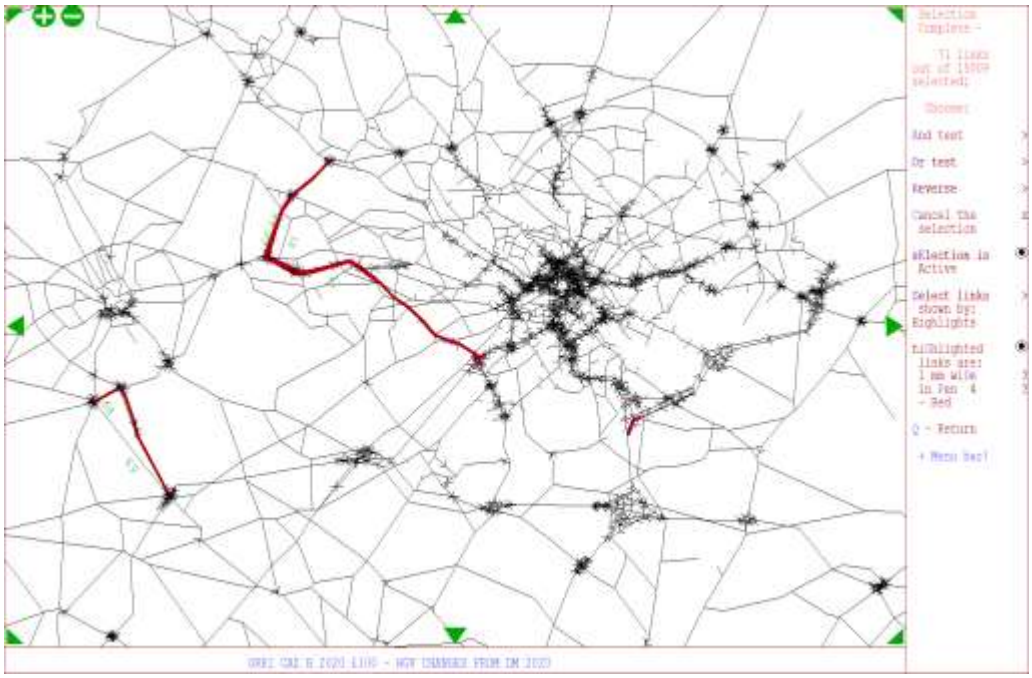
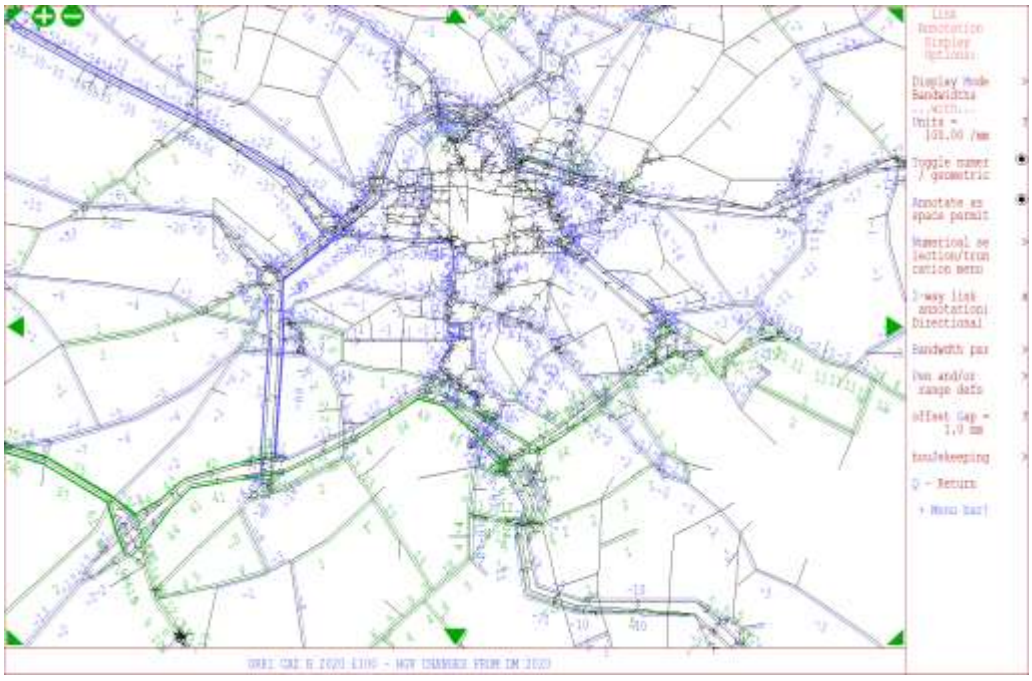


Figure 4 - HGV – changes in 12 hr weekday flows



Note: Green = increase, blue = decrease

11. Aside from a few elements of rerouting between parallel routes (which is unlikely to be related to the CAZ) there is no evidence of any significant reassignment of LGVs, which is as expected.

12. 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 60 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].

13. 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. In addition, the reassignment forecast with the wider ORR CAZ that affected Gildersome La and the M62 is not apparent with the reduced area.

14. As a comparator with the IRR CAZ C, Table 2 shows the impact of the ORR1 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 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	4072	4229	4225	7157	7153	-4	0%
Lincoln Green Rd	9900	6671	7388	7331	10617	10560	-57	-1%
Woodhouse St	8400	8404	8706	8709	8702	8705	3	0%
Hyde Park Rd	5800	8092	8176	8181	5884	5889	5	0%
Woodsley Rd	5800	6661	6800	6855	5939	5994	55	1%
Canal Rd	13100	18324	19186	19204	13962	13980	18	0%
Town St	10300	12621	13437	13435	11116	11114	-2	0%
Upper Wortley Rd	10700	13389	13721	13740	11032	11051	19	0%

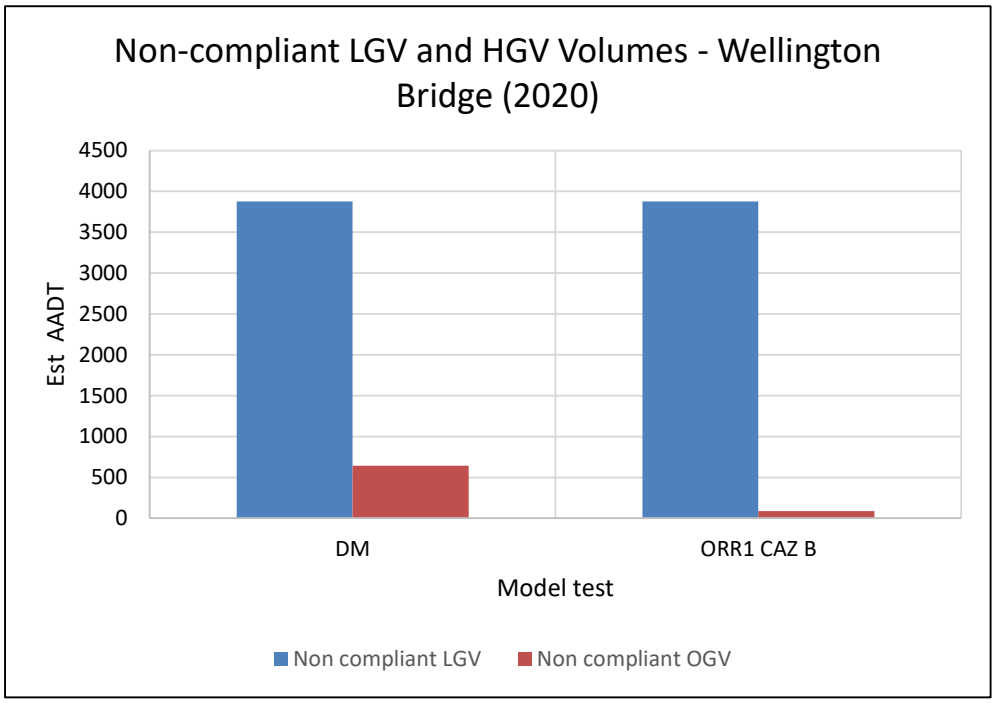
15. Forecast changes in LGV and HGV flows on these roads are equally minimal – see Appendix A.

16. 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.

17. Figure 5 shows the modelled changes in non-compliant LGV and HGV on the inner ring road at Wellington Bridge. The ORR CAZ B delivers a substantial reduction in non-compliant HGVs of around 85%. There is no real change in non-compliant LGVs.

[2] CP 73112 2016 AADF

Figure 5 – Modelled Levels of Non-compliant Vehicles – Leeds IRR



18. Table 3 shows the modelled changes in traffic on the Leeds routes affected by diverted traffic under the ORR1 CAZ B.

19. 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 marginal.

20. Overall HGV levels are forecast to rise by 24% on the A6120 outer ring road at Farsley – Table 4. This is linked to a marked rise in non-compliant vehicles (Appendix A) alongside a smaller increase in compliant HGVs. Elsewhere the level of non-compliant vehicles is forecast to fall but this is balanced by an increase in compliant HGVs.

Table 3 – Forecast Change in Traffic Levels on Routes with Diverted Traffic under ORR1 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	21846	22995	23059	24162	24226	64	0%
A6110 Ring Road	31092	40121	40761	40698	31732	31669	-63	0%
M621 Jn 1-2	78696	79979	84187	84243	82904	82960	56	0%
John Smeaton Viaduct	30100	32488	35059	35039	32671	32651	-20	0%

Table 4 – Forecast Change in HGVs on Routes with Diverted Traffic under ORR1 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	285	279	414	573	708	135	24%
A6110 Ring Road	1477	2178	2228	2350	1527	1649	122	8%
M621 Jn 1-2	4541	3730	3830	3906	4641	4717	76	2%
John Smeaton Viaduct	1361	1541	1531	1569	1351	1389	38	3%

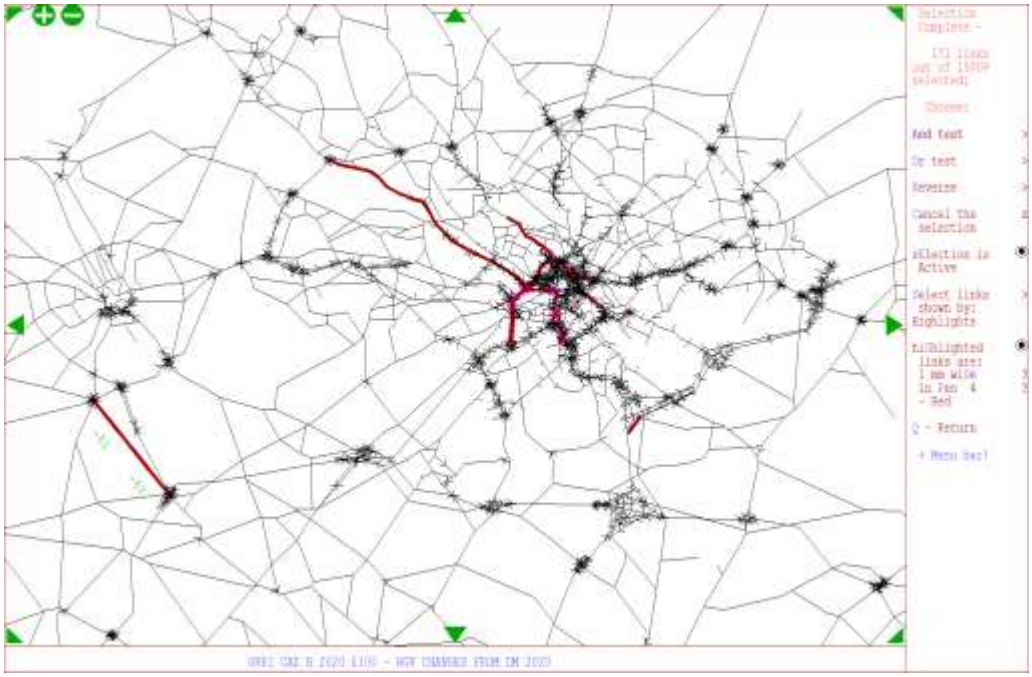
Review of roads with reduced traffic

21. Figure 6 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 A660, A65, inner ring road and routes through the city centre.

22. The scale of change here is relatively modest, with falls typically in the range of 40-100 HGVs, (2 way 12 hr). The higher reductions occurring on the A65 and western section of the inner ring road.

23. In Bradford there is an apparent transfer of traffic between the A638 and M606 (see also Figure 2). This is probably the result of small changes in journey times within the model and is not considered a likely impact of the proposed CAZ.

Figure 6 - HGV – decrease of 25 or more vehicles (12 hour)



Conclusions

24. In summary, a reduced area 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, there is no evidence of any significant traffic diversion, however, the boundary routes of the A6120, A6110, M621 and the eastern section of the inner ring road are forecast to attract some additional HGV traffic.

26. The changes on most of these routes are small, however, the A6120 at Farsley is forecast to attract an additional 24% HGVs primarily due to an increase in non-compliant vehicles.

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

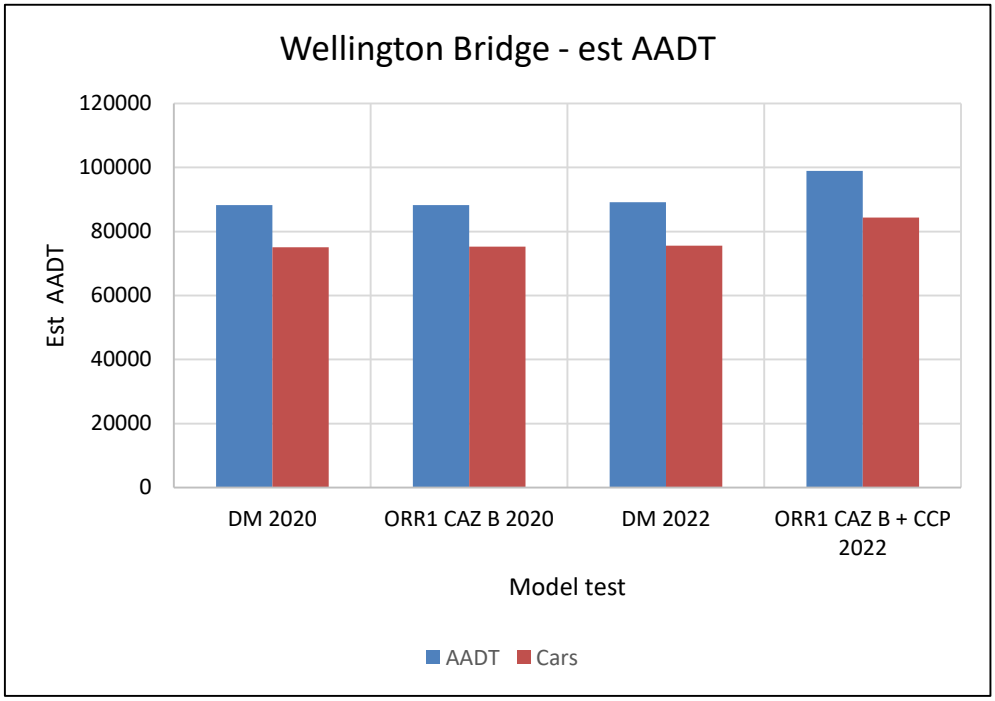
Review of roads with increased traffic

27. 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.

28. In particular the CCP increases traffic levels on the western IRR, the section where air quality is of most concern. Figure 7 shows the modelled changes in overall traffic on A58 Wellington Bridge in 2020 and 2022.

29. 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 traffic volumes by 12% compared with the 2020 DM (modelled flows).

Figure 7 – Wellington Bridge Modelled Traffic Changes 2020 and 2022 (AADT)



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

31. The overall levels of non-compliant LGVs and HGVs on Wellington Bridge are modelled to be 4% and 29% lower respectively in 2022 (with the ORR1 CAZ B and CCP) than with the ORR1 CAZ B in 2020 – see Figures 8 and 9.

Figure 8 – Wellington Bridge Modelled LGV/HGV Traffic Changes 2020 and 2022 (AADT)

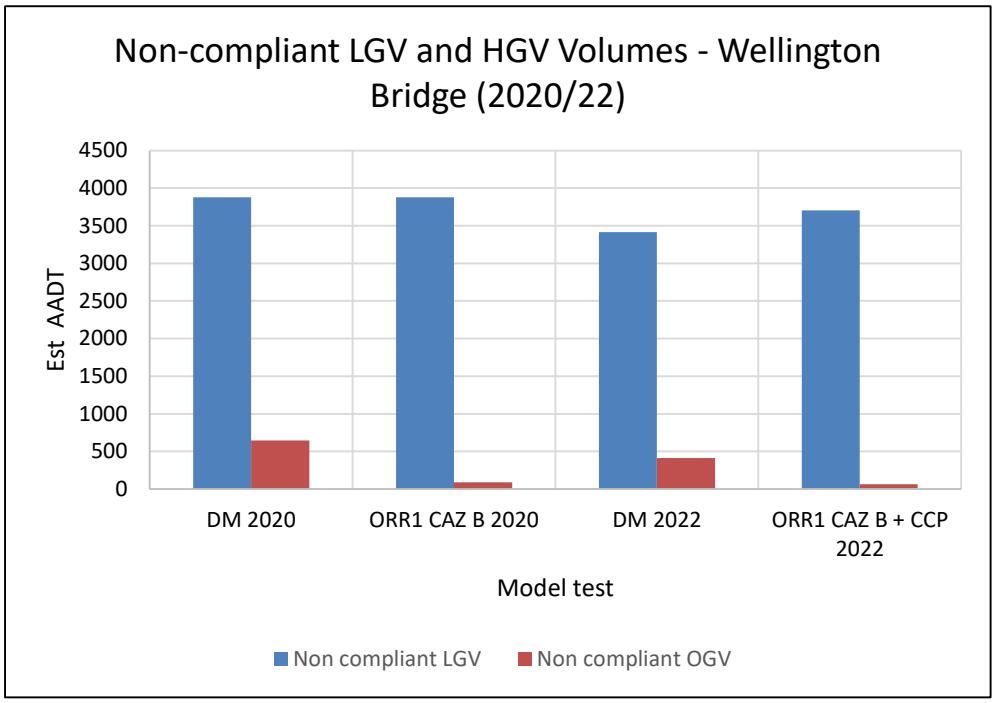
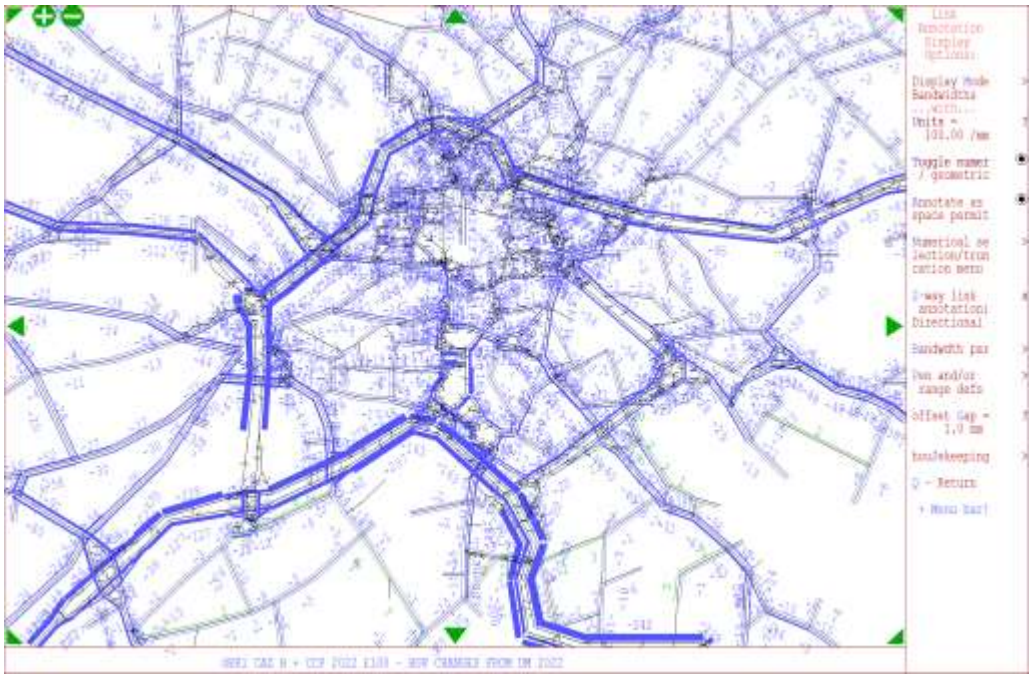


Figure 9 – Non-compliant HGV changes (12 hour) 2022



Note: Green = increase, blue = decrease

32. 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.

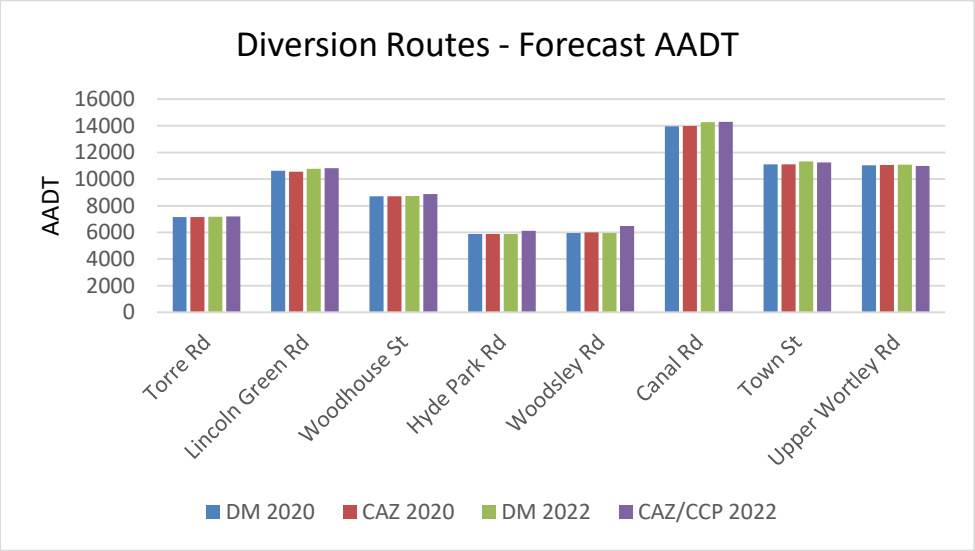
Table 5 – Forecast Change in Traffic Levels on Leeds IRR/M621 (2022)

Road	Observed	Modelled AADT			Estimated 2022 AADT			
	Est AADT 2015	Base 2015	DM 2022	CAZ 2022	DM 2022	CAZ 2022	Change	%age change
IRR Lovell Park Br	44200	44122	49959	55794	50037	55872	5835	12%
IRR Woodhouse tunnel	71000	70067	74944	81956	75877	82889	7012	9%
IRR Wellington Br	86700	85627	89174	98998	90247	100071	9824	11%
A643 Ingram	53300	54434	58301	80023	57167	78889	21722	38%
M621 Jn 2 - 2a	70000	69108	76340	85915	77232	86807	9575	12%
M621 Jn 2a - 3	n/a	84041	92267	94945	92267	94945	2678	3%
M621 Jn 3 - 4	69100	67401	75463	70071	77162	71770	-5392	-7%
John Smeaton Viaduct	30100	32488	35539	38235	33151	35847	2696	8%
IRR East Street	28700	29468	33319	38430	32551	37662	5111	16%
B6154 Wellington Rd	18000	12961	13759	18528	18798	23567	4769	25%

33. These increases include higher levels of LGVs and HGVs on Ingram Distributor, the IRR to the north and east of the city centre, M621 2-2a and East Street. However, the level of non-compliant HGVs is forecast to fall by around 80% on most these links compared with the 2022 DM – see Appendix B – the exceptions being the M621 and John Smeaton Viaduct where the forecast fall is 40-50% on the former and 25% on the latter.

34. The changes in overall traffic forecast for the minor roads to the north and west of the city centre is marginal – see Figure 10, with the greatest forecast increase being just 9% 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.

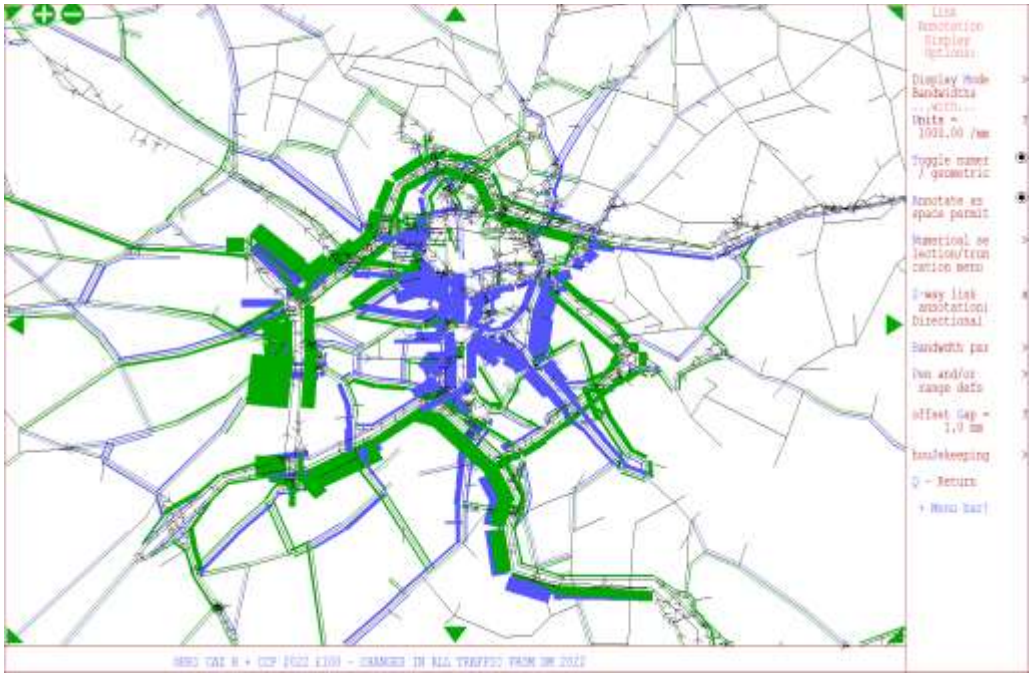
Figure 10 – Minor Road Diversion Routes – Forecast Traffic Changes 2020 and 2022 (AADT)



Review of roads with reduced traffic

35. Figure 11 shows the changes in total traffic around the city centre resulting from the combination of the reduced area 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. (Note: due to network coding changes the increase in traffic on the southern section on A643 Ingram Distributor is not shown).

Figure 11 – Total Traffic Changes (12 hour pcus) 2022



Note: Green = increase, blue = decrease

36. Traffic levels on Crown Point Bridge are forecast to fall by around a third compared with the 2022 DM and on Bishopgate St by 85% - 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 2022	DM 2022	CAZ 2022	Change	%age change
Duke Street	35790	33538	31599	30900	33851	33152	-699	-2%
The Calls	11000	12028	11684	9188	10656	8160	-2496	-23%
Bishopgate St	24000	20936	22920	744	25984	3808	-22176	-85%
Crown Point Br	31700	25647	29095	18401	35148	24454	-10694	-30%
Great Wilson St	32300	24557	26936	16660	34679	24403	-10276	-30%

37. The volume of traffic entering the city centre (inside the IRR) is forecast to fall by 9.0% overall, with an 11% reduction in LGVs and 12% in HGVs – see Table 7. The fall in non-compliant vehicles is much more variable, with an 11% fall in LGVs but a substantial 86% fall in HGVs, reflecting the differential impact of the CAZ.

38. Overall traffic levels on the approach to the IRR, however, are only forecast to change marginally (up around 1%), with a marginal change in non-compliant LGVs (up 1.9%) but a very substantial 61% 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	Cars	LGV	OGV	PSV	Cars	LGV	OGV
Cordon on approaches to IRR												
DM 2022		657,496	448,937	49,096	15,392	105,894	23,631	4,222	10,324	554,831	72,727	19,614
ORR1 CAZ B + CCP 2022		664,028	452,940	50,009	18,191	106,824	24,085	1,636	10,343	559,764	74,094	19,827
IRR Cordon Changes		6,532	4,003	913	2,799	930	454	-2,586	19	4,933	1,367	213
Percentage change		1.0%	0.9%	1.9%	18.2%	0.9%	1.9%	-61.3%	0.2%	0.9%	1.9%	1.1%
Cordon within IRR												
DM 2022		333,261	229,666	22,338	5,460	54,005	10,760	1,499	9,533	283,671	33,098	6,959
ORR1 CAZ B + CCP 2022		303,537	209,211	19,817	5,903	49,298	9,545	215	9,548	258,509	29,362	6,118
Within IRR Changes		-29,724	-20,455	-2,521	443	-4,707	-1,215	-1,284	15	-25,162	-3,736	-841
Percentage change		-8.9%	-8.9%	-11.3%	8.1%	-8.7%	-11.3%	-85.7%	0.2%	-8.9%	-11.3%	-12.1%

Conclusions

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

40. 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 38% 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%.

41. Traffic levels on A58 Wellington St, the IRR to the north of the city centre, M621 Jn 2-2a and East Street are forecast to rise by around 10-15%, although the volumes of non-compliant HGVs are forecast to fall by around 80% (40% on M621).

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	242	280	277	628	625	-3	0%
Lincoln Green Rd	770	478	557	558	849	850	1	0%
Woodhouse St	820	785	905	902	940	937	-3	0%
Hyde Park Rd	500	532	601	599	569	567	-2	0%
Woodsley Rd	370	450	506	505	426	425	-1	0%
Canal Rd	980	1481	1665	1665	1164	1164	0	0%
Town St	890	1030	1186	1184	1046	1044	-2	0%
Upper Wortley Rd	1030	1415	1636	1631	1251	1246	-5	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	20	21	21	171	171	0	0%
Lincoln Green Rd	170	47	54	53	177	176	-1	-1%
Woodhouse St	140	113	120	120	147	147	0	0%
Hyde Park Rd	100	90	95	96	105	106	1	1%
Woodsley Rd	80	124	128	128	84	84	0	0%
Canal Rd	310	448	462	464	324	326	2	1%
Town St	220	297	316	313	239	236	-3	-1%
Upper Wortley Rd	290	344	357	357	303	303	0	0%

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	1881	2076	2065	3933	3922	-11	0%
A6110 Ring Road	4803	4806	5057	5069	5054	5066	12	0%
M621 Jn 1-2	9177	8430	9215	9268	9962	10015	53	1%
John Smeaton Viaduct	4924	3448	3896	3873	5372	5349	-23	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	285	279	414	573	708	135	24%
A6110 Ring Road	1477	2178	2228	2350	1527	1649	122	8%
M621 Jn 1-2	4541	3730	3830	3906	4641	4717	76	2%
John Smeaton Viaduct	1361	1541	1531	1569	1351	1389	38	3%

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 revised boundary												
Road			Compliant			Non compliant				Total		
	Anode Bnode	AADT	Cars	LGV	OGV	Cars	LGV	OGV	PSV	Cars	LGV	OGV
A6120 Ring Rd Farsley		23059	14777	1272	219	5803	793	195	0	20580	2065	414
A6110 Ring Road		40698	23826	3125	1856	9351	1944	494	102	33177	5069	2350
M621 Jn 1-2		84243	51045	5711	3142	20024	3557	764	0	71069	9268	3906
John Smeaton Viaduct		35039	21271	2379	1177	8326	1494	392	0	29597	3873	1569
Change from 2020 DM												
Road			Compliant			Non compliant				Total		
	Anode Bnode	AADT	Cars	LGV	OGV	Cars	LGV	OGV	PSV	Cars	LGV	OGV
A6120 Ring Rd Farsley		64	-43	-7	34	-17	-4	101	0	-60	-11	135
A6110 Ring Road		-63	-141	8	379	-56	4	-257	0	-197	12	122
M621 Jn 1-2		56	-53	33	603	-20	20	-527	0	-73	53	76
John Smeaton Viaduct		-20	-23	-14	162	-12	-9	-124	0	-35	-23	38
Percentage change from 2020 DM												
Road			Compliant			Non compliant				Total		
	Anode Bnode	AADT	Cars	LGV	OGV	Cars	LGV	OGV	PSV	Cars	LGV	OGV
A6120 Ring Rd Farsley		0%	0%	-1%	18%	0%	-1%	107%	0%	0%	-1%	48%
A6110 Ring Road		0%	-1%	0%	26%	-1%	0%	-34%	0%	-1%	0%	5%
M621 Jn 1-2		0%	0%	1%	24%	0%	1%	-41%	0%	0%	1%	2%
John Smeaton Viaduct		0%	0%	-1%	16%	0%	-1%	-24%	0%	0%	-1%	2%

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	Cars	LGV	OGV	PSV	Cars	LGV	OGV
Cordon on approaches to IRR												
DM 2020		646,940	393,096	43,022	12,824	154,342	26,809	6,519	10,328	547,438	69,831	19,343
ORR1 CAZ B 2020		646,771	393,085	43,051	16,672	154,337	26,825	2,472	10,329	547,422	69,876	19,144
IRR Cordon Changes		-169	-11	29	3,848	-5	16	-4,047	1	-16	45	-199
Percentage change		0.0%	0.0%	0.1%	30.0%	0.0%	0.1%	-62.1%	0.0%	0.0%	0.1%	-1.0%
Cordon within IRR												
DM 2020		325,954	199,475	19,656	4,597	78,100	12,253	2,334	9,539	277,575	31,909	6,931
ORR1 CAZ B 2020		325,884	199,622	19,615	6,345	78,160	12,230	373	9,539	277,782	31,845	6,718
Within IRR Changes		-70	146	-41	1,748	61	-23	-1,961	0	207	-64	-213
Percentage change		0.0%	0.1%	-0.2%	38.0%	0.1%	-0.2%	-84.0%	0.0%	0.1%	-0.2%	-3.1%

Table A7 – Modelled changes in traffic volumes – IRR

2020 estimated AADT with ORR CAZ B revised boundary												
Road			Compliant			Non compliant				Total		
	Anode Bnode	AADT	Cars	LGV	OGV	Cars	LGV	OGV	PSV	Cars	LGV	OGV
IRR Lovell Park Br		48960	30589	3234	916	12136	2037	48	0	42725	5271	964
IRR Woodhouse tunnel		74311	46303	5169	1266	18268	3237	68	0	64571	8406	1334
IRR Wellington Br		88291	54061	6207	1721	21222	3878	89	1113	75283	10085	1810
A643 Ingram		57563	34630	4567	1879	13556	2834	97	0	48186	7401	1976
M621 Jn 2 - 2a		74824	44498	5416	3196	17411	3360	714	229	61909	8776	3910
M621 Jn 2a - 3		90600	53513	6951	3856	20938	4316	797	229	74451	11267	4653
M621 Jn 3 - 4		73989	43014	6364	3375	16666	3918	652	0	59680	10282	4027
John Smeaton Viaduct		35039	21271	2379	1177	8326	1494	392	0	29597	3873	1569
IRR East Street		32480	20853	1708	506	8201	1085	25	102	29054	2793	531
Change from 2020 DM												
Road			Compliant			Non compliant				Total		
	Anode Bnode	AADT	Cars	LGV	OGV	Cars	LGV	OGV	PSV	Cars	LGV	OGV
IRR Lovell Park Br		12	35	8	243	13	7	-294	0	48	15	-51
IRR Woodhouse tunnel		40	62	3	347	24	3	-399	0	86	6	-52
IRR Wellington Br		42	104	-1	453	42	-1	-555	0	146	-2	-102
A643 Ingram		39	103	-5	504	41	-3	-601	0	144	-8	-97
M621 Jn 2 - 2a		0	-30	15	615	-10	8	-598	0	-40	23	17
M621 Jn 2a - 3		-12	-17	-4	784	-6	-4	-765	0	-23	-8	19
M621 Jn 3 - 4		8	4	-4	710	2	-2	-702	0	6	-6	8
John Smeaton Viaduct		-20	-23	-14	162	-12	-9	-124	0	-35	-23	38
IRR East Street		-12	1	15	131	-2	9	-166	0	-1	24	-35
Percentage change from 2020 DM												
Road			Compliant			Non compliant				Total		
	Anode Bnode	AADT	Cars	LGV	OGV	Cars	LGV	OGV	PSV	Cars	LGV	OGV
IRR Lovell Park Br		0%	0%	0%	36%	0%	0%	-86%	0%	0%	0%	-5%
IRR Woodhouse tunnel		0%	0%	0%	38%	0%	0%	-85%	0%	0%	0%	-4%
IRR Wellington Br		0%	0%	0%	36%	0%	0%	-86%	0%	0%	0%	-5%
A643 Ingram		0%	0%	0%	37%	0%	0%	-86%	0%	0%	0%	-5%
M621 Jn 2 - 2a		0%	0%	0%	24%	0%	0%	-46%	0%	0%	0%	0%
M621 Jn 2a - 3		0%	0%	0%	26%	0%	0%	-49%	0%	0%	0%	0%
M621 Jn 3 - 4		0%	0%	0%	27%	0%	0%	-52%	0%	0%	0%	0%
John Smeaton Viaduct		0%	0%	-1%	16%	0%	-1%	-24%	0%	0%	-1%	2%
IRR East Street		0%	0%	1%	35%	0%	1%	-87%	0%	0%	1%	-6%

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

APPENDIX B – Reduced area ORR CAZ plus City Centre Package

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 2022	DM 2022	CAZ 2022	Change	%age change
Torre Rd	590	242	293	291	641	639	-2	0%
Lincoln Green Rd	770	478	584	570	876	862	-14	-2%
Woodhouse St	820	785	960	981	995	1016	21	2%
Hyde Park Rd	500	532	642	662	610	630	20	3%
Woodsley Rd	370	450	542	592	462	512	50	11%
Canal Rd	980	1481	1748	1723	1247	1222	-25	-2%
Town St	890	1030	1242	1310	1102	1170	68	6%
Upper Wortley Rd	1030	1415	1723	1627	1338	1242	-96	-7%

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 2022	DM 2022	CAZ 2022	Change	%age change
Torre Rd	170	20	22	22	172	172	0	0%
Lincoln Green Rd	170	47	55	53	178	176	-2	-1%
Woodhouse St	140	113	122	123	149	150	1	1%
Hyde Park Rd	100	90	93	96	103	106	3	3%
Woodsley Rd	80	124	126	138	82	94	12	15%
Canal Rd	310	448	477	448	339	310	-29	-9%
Town St	220	297	327	313	250	236	-14	-6%
Upper Wortley Rd	290	344	369	363	315	309	-6	-2%

Note: 2015 observed AADT estimated from 2017 MCC

Table B3 – Forecast Changes in LGV volumes – routes attracting more traffic with ORR1 CAZ 2022

Road	Observed	Modelled AADT			Estimated 2022 AADT			
	Est AADT 2015	Base 2015	DM 2022	CAZ 2022	DM 2022	CAZ 2022	Change	%age change
A6120 Ring Rd Farsley	3738	1881	2194	2083	4051	3940	-111	-3%
A6110 Ring Road	4803	4806	5324	5093	5321	5090	-231	-4%
M621 Jn 1-2	9177	8430	9655	9836	10402	10583	181	2%
John Smeaton Viaduct	4924	3448	4000	4779	5476	6255	779	14%

Note: 2015 observed AADT estimated from 2015 MCC

Table B4 – Forecast Changes in HGV volumes – routes attracting more traffic with ORR1 CAZ 2022

Road	Observed	Modelled AADT			Estimated 2022 AADT			
	Est AADT 2015	Base 2015	DM 2022	CAZ 2022	DM 2022	CAZ 2022	Change	%age change
A6120 Ring Rd Farsley	579	285	281	371	575	665	90	16%
A6110 Ring Road	1477	2178	2258	2305	1557	1604	47	3%
M621 Jn 1-2	4541	3730	3905	4010	4716	4821	105	2%
John Smeaton Viaduct	1361	1541	1592	1665	1412	1485	73	5%

Note: 2015 observed AADT estimated from 2015 MCC

Table B5 – Modelled changes in traffic volumes – routes attracting more traffic with ORR1 CAZ 2022

2022 estimated AADT with ORR1 CAZ B and CCP												
Road			Compliant			Non compliant				Total		
	Anode Bnode	AADT	Cars	LGV	OGV	Cars	LGV	OGV	PSV	Cars	LGV	OGV
A6120 Ring Rd Farsley		23267	16837	1406	241	3976	677	130	0	20813	2083	371
A6110 Ring Road		40321	26549	3438	1977	6272	1655	328	102	32821	5093	2305
M621 Jn 1-2		87405	59519	6639	3498	14040	3197	512	0	73559	9836	4010
John Smeaton Viaduct		38235	25731	3226	1409	6060	1553	256	0	31791	4779	1665
Change from 2022 DM												
Road			Compliant			Non compliant				Total		
	Anode Bnode	AADT	Cars	LGV	OGV	Cars	LGV	OGV	PSV	Cars	LGV	OGV
A6120 Ring Rd Farsley		-63	-35	-75	20	-7	-36	70	0	-42	-111	90
A6110 Ring Road		-572	-319	-157	205	-69	-74	-158	0	-388	-231	47
M621 Jn 1-2		1902	1297	121	433	319	60	-328	0	1616	181	105
John Smeaton Viaduct		2696	1484	531	159	360	248	-86	0	1844	779	73
Percentage change from 2022 DM												
Road			Compliant			Non compliant				Total		
	Anode Bnode	AADT	Cars	LGV	OGV	Cars	LGV	OGV	PSV	Cars	LGV	OGV
A6120 Ring Rd Farsley		0%	0%	-5%	9%	0%	-5%	117%	0%	0%	-5%	32%
A6110 Ring Road		-1%	-1%	-4%	12%	-1%	-4%	-33%	0%	-1%	-4%	2%
M621 Jn 1-2		2%	2%	2%	14%	2%	2%	-39%	0%	2%	2%	3%
John Smeaton Viaduct		8%	6%	20%	13%	6%	19%	-25%	0%	6%	19%	5%

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	Cars	LGV	OGV	PSV	Cars	LGV	OGV
Cordon on approaches to IRR												
DM 2022		657,496	448,937	49,096	15,392	105,894	23,631	4,222	10,324	554,831	72,727	19,614
ORR1 CAZ B + CCP 2022		664,028	452,940	50,009	18,191	106,824	24,085	1,636	10,343	559,764	74,094	19,827
IRR Cordon Changes		6,532	4,003	913	2,799	930	454	-2,586	19	4,933	1,367	213
Percentage change		1.0%	0.9%	1.9%	18.2%	0.9%	1.9%	-61.3%	0.2%	0.9%	1.9%	1.1%
Cordon within IRR												
DM 2022		333,261	229,666	22,338	5,460	54,005	10,760	1,499	9,533	283,671	33,098	6,959
ORR1 CAZ B + CCP 2022		303,537	209,211	19,817	5,903	49,298	9,545	215	9,548	258,509	29,362	6,118
Within IRR Changes		-29,724	-20,455	-2,521	443	-4,707	-1,215	-1,284	15	-25,162	-3,736	-841
Percentage change		-8.9%	-8.9%	-11.3%	8.1%	-8.7%	-11.3%	-85.7%	0.2%	-8.9%	-11.3%	-12.1%

Table B7 – Modelled changes in traffic volumes – IRR

2022 estimated AADT with ORR1 CAZ B and CCP												
Road			Compliant			Non compliant				Total		
	Anode Bnode	AADT	Cars	LGV	OGV	Cars	LGV	OGV	PSV	Cars	LGV	OGV
IRR Lovell Park Br		55794	39277	4168	1045	9261	2006	37	0	48538	6174	1082
IRR Woodhouse tunnel		81956	57485	6378	1409	13562	3072	50	0	71047	9450	1459
IRR Wellington Br		98998	68345	7697	1948	16124	3706	63	1115	84469	11403	2011
A643 Ingram		80023	54485	6878	2415	12857	3312	76	0	67342	10190	2491
M621 Jn 2 - 2a		85915	57220	7107	3925	13500	3422	512	229	70720	10529	4437
M621 Jn 2a - 3		94945	63084	8065	4268	14883	3883	533	229	77967	11948	4801
M621 Jn 3 - 4		70071	45816	6496	3399	10806	3128	426	0	56622	9624	3825
John Smeaton Viaduct		38235	25731	3226	1409	6060	1553	256	0	31791	4779	1665
IRR East Street		38430	27380	2593	641	6445	1248	21	102	33825	3841	662
B6154 Wellington Rd		18528	12530	1344	279	2957	647	10	761	15487	1991	289
Change from 2022 DM												
Road			Compliant			Non compliant				Total		
	Anode Bnode	AADT	Cars	LGV	OGV	Cars	LGV	OGV	PSV	Cars	LGV	OGV
IRR Lovell Park Br		5835	4210	462	238	904	205	-184	0	5114	667	54
IRR Woodhouse tunnel		7012	5107	479	312	1146	219	-251	0	6253	698	61
IRR Wellington Br		9824	7129	622	440	1688	292	-350	3	8817	914	90
A643 Ingram		21722	15304	1613	753	3643	788	-379	0	18947	2401	374
M621 Jn 2 - 2a		9575	6289	877	795	1525	435	-346	0	7814	1312	449
M621 Jn 2a - 3		2678	1892	117	582	495	69	-477	0	2387	186	105
M621 Jn 3 - 4		-5392	-3382	-779	200	-647	-333	-451	0	-4029	-1112	-251
John Smeaton Viaduct		2696	1484	531	159	360	248	-86	0	1844	779	73
IRR East Street		5111	3322	640	192	761	298	-102	0	4083	938	90
B6154 Wellington Rd		4769	3502	255	104	825	123	-38	-2	4327	378	66
Percentage change from 2022 DM												
Road			Compliant			Non compliant				Total		
	Anode Bnode	AADT	Cars	LGV	OGV	Cars	LGV	OGV	PSV	Cars	LGV	OGV
IRR Lovell Park Br		12%	12%	12%	29%	11%	11%	-83%	0%	12%	12%	5%
IRR Woodhouse tunnel		9%	10%	8%	28%	9%	8%	-83%	0%	10%	8%	4%
IRR Wellington Br		11%	12%	9%	29%	12%	9%	-85%	0%	12%	9%	5%
A643 Ingram		37%	39%	31%	45%	40%	31%	-83%	0%	39%	31%	18%
M621 Jn 2 - 2a		13%	12%	14%	25%	13%	15%	-40%	0%	12%	14%	11%
M621 Jn 2a - 3		3%	3%	1%	16%	3%	2%	-47%	0%	3%	2%	2%
M621 Jn 3 - 4		-7%	-7%	-11%	6%	-6%	-10%	-51%	0%	-7%	-10%	-6%
John Smeaton Viaduct		8%	6%	20%	13%	6%	19%	-25%	0%	6%	19%	5%
IRR East Street		15%	14%	33%	43%	13%	31%	-83%	0%	14%	32%	16%
B6154 Wellington Rd		35%	39%	23%	59%	39%	23%	-79%	0%	39%	23%	30%

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