

Appendix 19.2

Traffic CO2 Emissions, Updated Methodology

APPENDIX 19.2: TRAFFIC CO₂ EMISSIONS, UPDATED METHODOLOGY (MARCH 2017).

Methodology

The s73 ES used operational traffic flows from the 2007 BXC-TM model and calculated the carbon emission using DMRB tools to determine the potential operational impacts of emissions from transport in the 'Do-Minimum' and 'Do-Something' scenarios. The CO₂ emissions have been updated to reflect the current 2012 BXC-DDM model.

The Transport Consultants for the project (AECOM) have provided peak hour highway trip generation data for differing modes of transport within the development area, for the 2012 Base Year, 2031 'Do-Minimum' and 'Do-Something' scenarios. Trips were categorised by user class as follows:

1. Car non-Business;
2. Car Business;
3. Taxi;
4. LGV; and
5. HGV (excluding buses).

This data, provided by AECOM, for the updated 2012 traffic model BXC-DDM is provided in Annex 1.

The data did not include buses. Therefore, hourly trip bus data, provided by AECOM for the AQ assessment, was used for the purpose of the CO₂ emissions assessment (see Chapter 14: Air Quality Assessment). This was based on the number of buses entering and leaving the existing Brent Cross bus station and the predicted number of buses entering and leaving the future bus station. The hourly bus trips were added to the traffic data set, to be consistent with the s73 assessment.

CO₂ emissions for the Development were calculated using the latest Emissions Factors Toolkit (EFT) (version 7.0 published in July 2016, Defra). The EFT allows users to calculate road vehicle pollutant emission rates for CO₂ (and other ambient pollutants). Traffic Format Detailed Option 1 was used in the EFT and includes the hourly trips rates for the total number of vehicles split into the percentage of the traffic composition (as bulleted above) for Outer London in 2013 (the earliest EFT year and to represent the base year of 2012) and 2030 (the latest EFT year and to represent the opening year of 2031). An average speed of 40.5kph and a link length of 8km was used based on the average distance and average speed of vehicles on A-Roads in the UK as follows:

- Average speed:
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/594013/travel-time-measures-local-a-roads-england-2016.pdf
- Average distance:
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/514912/road-use-statistics.pdf

Results

The results of the updated CO₂ assessment, based on the 2012 DDM model data, is set out in Table 1.

Table 1: 2017 FIR CO₂ emissions

Phase 1B (North) Further Information

Source Name	CO ₂ emissions (kilo-Tonnes/annum)		
	All LDVs	All HDVs / Buses	All Vehicles
2012 Base	68.68107813	5.656451294	74.33752881
2031 Do Minimum	53.33216797	6.32356543	59.65573291
2031 Do Something	80.18885938	8.643641357	88.83250171
Percentage change from the do minimum	50.36%	36.69%	48.81%

Discussion on Results / Limitations

The S73 ES traffic data for the CO₂ emissions assessment was sourced from the BXC-TM. The traffic data for the purpose of the CO₂ assessment of the Phase 1B (North), was updated using the DDM model.

The two models were built completely independently. The BXC-TM model was a bespoke model built to assess the BXC Scheme, with a base year of 2007. The DDM is based on TfL's Highway Assignment Model (HAM) which covers all of Greater London in much greater detail than the TM. It is also linked to a demand model (the LTS model) which uses future development assumptions to generate trip demand for assignment in the HAM models. The HGV demand in the HAM (DDM) model was developed by TfL and calibrated to a 2012 base year using observed flows to a high standard, ensuring HGV movements reflected reality. This is the approach adopted with most strategic models. The differences come down to the data used to develop the demand profile and the observed count dataset used to calibrate it. Even for models covering the same geographic area these can vary significantly. There is at least a 5 year interval (which included a recession) between the datasets used for the TM and DDM so it is inevitable that there are differences in the model results.

The 2007 data used link flows, which includes every trip that begins, terminates or passes through the study area. The data provided in 2017 was trip ends, i.e. demand data for trips that either start or end in the study area. This dataset does not include any trips that start and end outside of the study but pass through it, e.g. a trip that starts in Hampstead and finishes in Watford, travelling through the study area via the North Circular and the M1 would be included in the 2007 dataset but not the 2017 dataset. Given that the majority of the study area land use is either residential or retail the quantity of HGV trips starting or finishing in the study area is going to be small, however, with the North Circular, M1, A5, etc being in the study area, the number of HGV through trips is likely to be high. Therefore the s73 ES would have over estimated the HGV CO₂ emissions resulting from the Development.

The s73 ES shows the 'with Development' future scenario resulting in a reduction in transport CO₂ emissions of 185.04kilo-Tonnes/annum. The justification related to the trend in reduction of emissions intensity which was only applied to the future scenario with the Development in place. However, based on our professional judgement, the same emissions reduction factors should be

applied for both the without and with scenario (i.e. the trend would related to both future scenarios). Therefore, the S73 ES is likely to present an under estimated the impacts (i.e. there is likely to be an overall increase in emissions if the reduction trend was applied to both scenarios).

Overall, the updated CO₂ emissions show a decrease in traffic emissions, significantly from the s73 ES results. Therefore, the s73 ES results are considered to be overly conservative in relation to the total CO₂ emissions.

The S73 ES reported that the overall impacts are negative in relation to the increase in CO₂ emissions as a result of the Development. Notwithstanding the above, it is considered that the updated assessment would also result in negative impact and it is therefore for consistent with the overall conclusions of the s73 ES.

Year	Month	Day	Hour	Minute	Second	Temperature (°C)	Humidity (%)	Wind Speed (km/h)	Wind Direction	Pressure (hPa)	Cloud Cover (%)	Visibility (km)	UV Index	Precipitation (mm)	Soil Temp (°C)	Plant Growth	Animal Activity	Human Activity	Weather Description
2023	Jan	1	0	0	0	5.0	95	10	N	1013	100	0.5	1	0.5	5.0	Low	Low	Low	Clear, cold with light snow.
2023	Jan	1	1	0	0	5.5	90	15	NE	1012	95	0.5	1	0.5	5.5	Low	Low	Low	Clear, cold with light snow.
2023	Jan	1	2	0	0	6.0	85	20	E	1011	90	0.5	1	0.5	6.0	Low	Low	Low	Clear, cold with light snow.
2023	Jan	1	3	0	0	6.5	80	25	SE	1010	85	0.5	1	0.5	6.5	Low	Low	Low	Clear, cold with light snow.
2023	Jan	1	4	0	0	7.0	75	30	S	1009	80	0.5	1	0.5	7.0	Low	Low	Low	Clear, cold with light snow.
2023	Jan	1	5	0	0	7.5	70	35	SW	1008	75	0.5	1	0.5	7.5	Low	Low	Low	Clear, cold with light snow.
2023	Jan	1	6	0	0	8.0	65	40	W	1007	70	0.5	1	0.5	8.0	Low	Low	Low	Clear, cold with light snow.
2023	Jan	1	7	0	0	8.5	60	45	WNW	1006	65	0.5	1	0.5	8.5	Low	Low	Low	Clear, cold with light snow.
2023	Jan	1	8	0	0	9.0	55	50	W	1005	60	0.5	1	0.5	9.0	Low	Low	Low	Clear, cold with light snow.
2023	Jan	1	9	0	0	9.5	50	55	WNW	1004	55	0.5	1	0.5	9.5	Low	Low	Low	Clear, cold with light snow.
2023	Jan	1	10	0	0	10.0	45	60	W	1003	50	0.5	1	0.5	10.0	Low	Low	Low	Clear, cold with light snow.
2023	Jan	1	11	0	0	10.5	40	65	WNW	1002	45	0.5	1	0.5	10.5	Low	Low	Low	Clear, cold with light snow.
2023	Jan	1	12	0	0	11.0	35	70	W	1001	40	0.5	1	0.5	11.0	Low	Low	Low	Clear, cold with light snow.
2023	Jan	1	13	0	0	11.5	30	75	WNW	1000	35	0.5	1	0.5	11.5	Low	Low	Low	Clear, cold with light snow.
2023	Jan	1	14	0	0	12.0	25	80	W	999	30	0.5	1	0.5	12.0	Low	Low	Low	Clear, cold with light snow.
2023	Jan	1	15	0	0	12.5	20	85	WNW	998	25	0.5	1	0.5	12.5	Low	Low	Low	Clear, cold with light snow.
2023	Jan	1	16	0	0	13.0	15	90	W	997	20	0.5	1	0.5	13.0	Low	Low	Low	Clear, cold with light snow.
2023	Jan	1	17	0	0	13.5	10	95	WNW	996	15	0.5	1	0.5	13.5	Low	Low	Low	Clear, cold with light snow.
2023	Jan	1	18	0	0	14.0	5	100	W	995	10	0.5	1	0.5	14.0	Low	Low	Low	Clear, cold with light snow.
2023	Jan	1	19	0	0	14.5	0	105	WNW	994	5	0.5	1	0.5	14.5	Low	Low	Low	Clear, cold with light snow.
2023	Jan	1	20	0	0	15.0	0	110	W	993	0	0.5	1	0.5	15.0	Low	Low	Low	Clear, cold with light snow.
2023	Jan	1	21	0	0	15.5	0	115	WNW	992	0	0.5	1	0.5	15.5	Low	Low	Low	Clear, cold with light snow.
2023	Jan	1	22	0	0	16.0	0	120	W	991	0	0.5	1	0.5	16.0	Low	Low	Low	Clear, cold with light snow.
2023	Jan	1	23	0	0	16.5	0	125	WNW	990	0	0.5	1	0.5	16.5	Low	Low	Low	Clear, cold with light snow.
2023	Jan	1	24	0	0	17.0	0	130	W	989	0	0.5	1	0.5	17.0	Low	Low	Low	Clear, cold with light snow.
2023	Jan	1	25	0	0	17.5	0	135	WNW	988	0	0.5	1	0.5	17.5	Low	Low	Low	Clear, cold with light snow.
2023	Jan	1	26	0	0	18.0	0	140	W	987	0	0.5	1	0.5	18.0	Low	Low	Low	Clear, cold with light snow.
2023	Jan	1	27	0	0	18.5	0	145	WNW	986	0	0.5	1	0.5	18.5	Low	Low	Low	Clear, cold with light snow.
2023	Jan	1	28	0	0	19.0	0	150	W	985	0	0.5	1	0.5	19.0	Low	Low	Low	Clear, cold with light snow.
2023	Jan	1	29	0	0	19.5	0	155	WNW	984	0	0.5	1	0.5	19.5	Low	Low	Low	Clear, cold with light snow.
2023	Jan	1	30	0	0	20.0	0	160	W	983	0	0.5	1	0.5	20.0	Low	Low	Low	Clear, cold with light snow.
2023	Jan	1	31	0	0	20.5	0	165	WNW	982	0	0.5	1	0.5	20.5	Low	Low	Low	Clear, cold with light snow.
2023	Jan	2	0	0	0	21.0	0	170	W	981	0	0.5	1	0.5	21.0	Low	Low	Low	Clear, cold with light snow.
2023	Jan	2	1	0	0	21.5	0	175	WNW	980	0	0.5	1	0.5	21.5	Low	Low	Low	Clear, cold with light snow.
2023	Jan	2	2	0	0	22.0	0	180	W	979	0	0.5	1	0.5	22.0	Low	Low	Low	Clear, cold with light snow.
2023	Jan	2	3	0	0	22.5	0	185	WNW	978	0	0.5	1	0.5	22.5	Low	Low	Low	Clear, cold with light snow.
2023	Jan	2	4	0	0	23.0	0	190	W	977	0	0.5	1	0.5	23.0	Low	Low	Low	Clear, cold with light snow.
2023	Jan	2	5	0	0	23.5	0	195	WNW	976	0	0.5	1	0.5	23.5	Low	Low	Low	Clear, cold with light snow.
2023	Jan	2	6	0	0	24.0	0	200	W	975	0	0.5	1	0.5	24.0	Low	Low	Low	Clear, cold with light snow.
2023	Jan	2	7	0	0	24.5	0	205	WNW	974	0	0.5	1	0.5	24.5	Low	Low	Low	Clear, cold with light snow.
2023	Jan	2	8	0	0	25.0	0	210	W	973	0	0.5	1	0.5	25.0	Low	Low	Low	Clear, cold with light snow.
2023	Jan	2	9	0	0	25.5	0	215	WNW	972	0	0.5	1	0.5	25.5	Low	Low	Low	Clear, cold with light snow.
2023	Jan	2	10	0	0	26.0	0	220	W	971	0	0.5	1	0.5	26.0	Low	Low	Low	Clear, cold with light snow.
2023	Jan	2	11	0	0	26.5	0	225	WNW	970	0	0.5	1	0.5	26.5	Low	Low	Low	Clear, cold with light snow.
2023	Jan	2	12	0	0	27.0	0	230	W	969	0	0.5	1	0.5	27.0	Low	Low	Low	Clear, cold with light snow.
2023	Jan	2	13	0	0	27.5	0	235	WNW	968	0	0.5	1	0.5	27.5	Low	Low	Low	Clear, cold with light snow.
2023	Jan	2	14	0	0	28.0	0	240	W	967	0	0.5	1	0.5	28.0	Low	Low	Low	Clear, cold with light snow.
2023	Jan	2	15	0	0	28.5	0	245	WNW	966	0	0.5	1	0.5	28.5	Low	Low	Low	Clear, cold with light snow.
2023	Jan	2	16	0	0	29.0	0	250	W	965	0	0.5	1	0.5	29.0	Low	Low	Low	Clear, cold with light snow.
2023	Jan	2	17	0	0	29.5	0	255	WNW	964	0	0.5	1	0.5	29.5	Low	Low	Low	Clear, cold with light snow.
2023	Jan	2	18	0	0	30.0	0	260	W	963	0	0.5	1	0.5	30.0	Low	Low	Low	Clear, cold with light snow.
2023	Jan	2	19	0	0	30.5	0	265	WNW	962	0	0.5	1	0.5	30.5	Low	Low	Low	Clear, cold with light snow.
2023	Jan	2	20	0	0	31.0	0	270	W	961	0	0.5	1	0.5	31.0	Low	Low	Low	Clear, cold with light snow.
2023	Jan	2	21	0	0	31.5	0	275	WNW	960	0	0.5	1	0.5	31.5	Low	Low	Low	Clear, cold with light snow.
2023	Jan	2	22	0	0	32.0	0	280	W	959	0	0.5	1	0.5	32.0	Low	Low	Low	Clear, cold with light snow.
2023	Jan	2	23	0	0	32.5	0	285	WNW	958	0	0.5	1	0.5	32.5	Low	Low	Low	Clear, cold with light snow.
2023	Jan	2	24	0	0	33.0	0	290	W	957	0	0.5	1	0.5	33.0	Low	Low	Low	Clear, cold with light snow.
2023	Jan	2	25	0	0	33.5	0	295	WNW	956	0	0.5	1	0.5	33.5	Low	Low	Low	Clear, cold with light snow.
2023	Jan	2	26	0	0	34.0	0	300	W	955	0	0.5	1	0.5	34.0	Low	Low	Low	Clear, cold with light snow.
2023	Jan	2	27	0	0	34.5	0	305	WNW	954	0	0.5	1	0.5	34.5	Low	Low	Low	Clear, cold with light snow.
2023	Jan	2	28	0	0	35.0	0	310	W	953	0	0.5	1	0.5	35.0	Low	Low	Low	Clear, cold with light snow.
2023	Jan	2	29	0	0	35.5	0	315	WNW	952	0	0.5	1	0.5	35.5	Low	Low	Low	Clear, cold with light snow.
2023	Jan	2	30	0	0	36.0	0	320	W	951	0	0.5	1	0.5	36.0	Low	Low	Low	Clear, cold with light snow.
2023	Jan	2	31	0	0	36.5	0	325	WNW	950	0	0.5	1	0.5	36.5	Low	Low	Low	Clear, cold with light snow.
2023	Jan	31	23	59	59	37.0	0	330	W	949	0	0.5	1	0.5	37.0	Low	Low	Low	Clear, cold with light snow.