Appendix 12.1 – Road Traffic Model Verification Exercise

A model verification exercise was undertaken to minimise any disparity between the modelling and monitoring results obtained by SMDC and to provide a higher level of confidence in the predicted concentrations in the vicinity of the roads assessed. Any disparities are likely to be a combination of uncertainties in traffic flows, speeds, emissions estimates, background concentrations, meteorological data, model input parameters such as surface roughness and the overall limitations of the dispersion model.

- **Table A12.1.1 Model verification traffic inputs**

Road	Road Link	Existing (2012)		
		AADT	LDV	HDV
Cresswell Road	CWS1, CWS2, CWS3, CWS4	3709	3612	97
	CWN1, CWN2, CWN3, CWN4, CWN5	3709	3612	97
A50 South	A50_S1, A50_S2, A50_S3	40521	35168	5353
A50 West	A50_W1	24912	22099	2813
	A50_W2, A50_W3, A50_W4	50896	45331	5565
A521	A521_W1.1	30099	27180	2919
	A521_W1.2, A521_W2, A521_W3	9303	9030	273
Uttoxeter Road	UR1, UR2	3904	3656	249
A50/A521 Roundabout	A50_N	45709	40249	5459

LDV = Light Duty Vehicle (motorcycles, cars, taxis, light goods vehicles <3.5 tonnes)
HDV = Heavy Duty Vehicle (Lorries and buses/coaches >3.5 tonnes)

This verification study was conducted in line with the guidance set out in LAQM.TG(09)**Error! Bookmark not defined.**. The 2012 annual mean nitrogen dioxide measurement recorded at Chestnut Crescent, Blythe diffusion tube was used in the verification exercise. The model was run using the 2012 meteorological data set and using 2013 traffic data (see Table A12.1.1) – it was assumed that there was minimal traffic growth between 2012 and 2013 and that 2013 traffic data were broadly representative of traffic flows in 2012.

The Defra background air quality map values for nitrogen dioxide and oxides of nitrogen were used (see Table A12.1.3).

The initial assessment of the model results at the diffusion tube location indicated that the model was slightly under-estimating the nitrogen dioxide concentrations. This result is outlined in Table A12.1.2.

- **Table A12.1.2 Comparison of modelled and monitored nitrogen dioxide concentrations**

Site ID	Monitor Type	Site Type /Description	Back-ground NO_2 ($\mu g/m^3$)	Monitored total NO_2 ($\mu g/m^3$)	Modelled total NO_2 ($\mu g/m^3$)	% Difference
DT5	DT	Roadside	15.3	29.8	29.2	-1.9%

Note: DT = Diffusion tube; NO_2 = nitrogen dioxide,

A verification study was conducted to minimise any disparity between the modelling and monitoring results obtained by SMDC. The outcome of the verification study at the assessed monitoring location is set out in Table A1.3.

- **Table A12.1.3 Nitrogen dioxide verification study model results**

Site ID	Monitored total NO_2 ($\mu g/m^3$)	Monitored total NO_x ($\mu g/m^3$)	Back-ground NO_2 ($\mu g/m^3$)	Back-ground NO_x ($\mu g/m^3$)	Monitored road contribution NO_2 ($\mu g/m^3$)	Monitored road contribution NO_x ($\mu g/m^3$)	Modelled road contribution NO_x ($\mu g/m^3$)
DT5	29.8	51.0	15.3	21.3	14.5	29.7	28.4

Note: NO_2 = nitrogen dioxide; NOx = oxides of nitrogen

The ratio of the monitored road contribution of oxides of nitrogen to the modelled road contribution of oxides of nitrogen was plotted and determined to be a factor of 1.044, this verification factor was applied to the modelled NOx contributions.