

Appendix 9.1

- 1.1 This appendix displays results based on modelling which includes the CHP unit's operation and an operational profile for the CHP and both boilers of 16 hours per day at full load.

Road Traffic and Gas boiler and CHP unit Emissions – Nitrogen Dioxide

- 1.2 Dispersion modelling was undertaken of the road traffic, gas boilers and CHP units emissions. This includes traffic from committed developments. It should be noted that emissions from the Aquatics Centre CHP units and gas boilers have been included in all modelled scenarios. Predicted annual mean NO₂ concentrations at the identified receptor locations are summarised in Table 9.19, exceedences of the annual mean objective are highlighted in bold.

Table 9.19 Off-Site Predicted NO₂ concentrations

	Receptor	Hourly mean NO ₂ (99.8 th percentile) DS*	Annual Mean NO ₂ (µg/m ³)**			Impact descriptor Annual Mean
			Base	DM	DS	
1	Oxford Road/Grosvenor Street (ground)	99.6	44.7	43.2	43.3	Negligible
2	Oxford Road north (ground)	99.5	43.9	42.9	43.0	Negligible
3	York Street (ground)	103.5	38.5	37.7	38.1	Slight adverse
4	Grosvenor Street (ground)	106.4	38.9	37.4	37.8	Negligible
5	Grosvenor Street east (ground)	119.4	38.2	37.2	38.2	Moderate adverse
6	Oxford Road south (ground)	102.7	33.3	32.5	32.9	Negligible
7	Booth Street East (ground)	81.5	30.1	30.6	30.7	Negligible
8	Oxford Road /Grosvenor Street	79.5	35.8	35.6	35.7	Negligible
9	Oxford Road north	84.7	38.4	38.0	38.1	Negligible
10	York Street	101.9	36.0	35.9	36.3	Negligible
11	Grosvenor Street	104.4	37.1	36.6	36.9	Negligible
12	Grosvenor Street east	118.8	36.5	36.3	37.2	Slight adverse
13	Oxford Road south	75.3	26.9	26.8	27.3	Negligible
14	Booth Street East	62.6	25.5	25.5	25.6	Negligible

* Air Quality Objective: 200µg/m³ not to be exceeded more than 18 times a year (99.8th percentile)

** Air Quality Objective: 40 µg/m³

- 1.3 As shown in Table 9.19, the predicted impact of annual mean NO₂ concentrations is moderate adverse at one receptor, slight adverse at two receptors and negligible at the remaining locations. The moderate adverse impact is due to an increase of 0.9µg/m³ but predicted concentrations at that location are below the air quality objective in all scenarios. The slight adverse impacts on York Street are due to the emissions from the gas boilers and CHP units due to the location of these receptors and the low amount of development traffic. However, the air quality objective is predicted to be achieved at these two close to the stacks, slight adverse locations. The relevant air quality limit value is predicted to be exceeded at R1 and R2, however, these exceedences exist in the base and DM scenarios as well as the DS scenario.
- 1.4 Overall the scheme's impact on air quality is judged to be not significant. At R5 where a moderate adverse impact is predicted, the future year concentration with the development in place are the same as baseline concentration, which is below the air quality objective. The two exceedences predicted in the DS scenario are also present in the base and DM scenario which means the development is not responsible for any new exceedences. Considering the scheme as a whole the impacts negligible at the majority of receptor locations as such the scheme is considered to be not significant.
- 1.5 The hourly mean NO₂ objective is predicted to be met at all receptor locations. Therefore, the significance of the gas boiler and CHP unit will be negligible for hourly mean NO₂ concentrations at all assessed receptors.

Road Traffic Emissions – Particulate Matter

- 1.6 To determine PM₁₀ concentrations, dispersion modelling was undertaken of the road traffic emissions. Predicted annual mean PM₁₀ concentrations at the identified receptor locations are summarised in Table 9.20. It should be noted that due to the nature of operation, there are no PM₁₀ emissions from the gas boiler and CHP unit.

Table 9.1 Predicted PM₁₀ concentrations

	Receptor	Annual Mean PM ₁₀ (µg/m ³)*			Impact descriptor Annual Mean
		Base	DM	DS	
1	Oxford Street/Grosvenor Street	20.0	19.7	19.7	Negligible
2	Oxford Street north	19.9	19.7	19.7	Negligible
3	York Street	19.6	19.4	19.4	Negligible
4	Grosvenor Street	19.6	19.4	19.4	Negligible
5	Grosvenor Street east	19.6	19.5	19.5	Negligible
6	Oxford Street south	16.9	16.7	16.7	Negligible
7	Booth Street East	16.7	16.7	16.7	Negligible
8	Oxford Street/Grosvenor Street (ground)	19.3	19.3	19.3	Negligible
9	Oxford Street north (ground)	19.5	19.4	19.4	Negligible

10	York Street (ground)	19.3	19.3	19.3	Negligible
11	Grosvenor Street (ground)	19.4	19.3	19.3	Negligible
12	Grosvenor Street east (ground)	19.4	19.4	19.4	Negligible
13	Oxford Street south (ground)	16.3	16.3	16.3	Negligible
14	Booth Street East (ground)	16.2	16.2	16.2	Negligible

- 1.7 As indicated in Table 9.20, there are no exceedences of the PM₁₀ air quality objective predicted. The predicted magnitude of change of annual mean PM₁₀ concentrations is predicted to be negligible at all.

Operation – On-Site Results

- 1.8 Dispersion modelling was undertaken of the road traffic, gas boilers and CHP units emissions, as well as the Aquatics Centre boilers and CHP unit emissions. Short term concentrations were modelled at on-site receptor locations and results are summarised in Table 9.19.

Table 9.2 On-Site Predicted NO₂ concentrations

Receptor		No. of exceedences of 200µg/m ³ - 10% Nox to NO ₂ conversion rate
1	York Street Building	0
2	York Street Building	0
3	Building A - Roof	0
4	Building A - Roof	0
5	Building A - Roof	0
6	Building A - Roof	0
7	Building A - Roof	0
8	Building A - Roof	0
9	Building A - Level 7	0
10	Building A - Level 7	0
11	Building A - Level 7	0
12	Building A - Level 7	13
13	Building A - Level 7	0
14	Building A - Level 7	0
15	Building D	0
16	Building C	0
17	Building C	0
18	Building B	0
19	Building A - Level 6	0
20	Building A - Level 6	0
21	Building A - Level 6	0
22	Building A - Level 6	0

23	Building A - Level 6	0
24	Building A - Level 6	0
25	Building A - Level 5	0
26	Building A - Level 5	0
27	Building A - Level 5	0
28	Building A - Level 5	0
29	Building A - Level 5	0
30	Building A - Level 5	0
31	Building A - Level 4	0
32	Building A - Level 4	0
33	Building A - Level 4	0
34	Building A - Level 4	0
35	Building A - Level 4	0
36	Building A - Level 4	0
37	Building A - Level 3	0
38	Building A - Level 3	0
39	Building A - Level 3	0
40	Building A - Level 3	0
41	Building A - Level 3	0
42	Building A - Level 3	0

- 1.9 As shown in Table 9.19, no exceedences of the short term air quality objective are predicted using the Environment Agency's case-specific conversion rate approach. A 10% conversion was used due to the proximity of the on-site receptors to the stack exhausts which are likely to contain 5% NO₂. A conversion rate of 10% is a realistic, but still pessimistic, conversion rate for these receptors. The maximum number of exceedences of the 200 µgm⁻³ threshold is 13 exceedences, predicted at receptor R12, which is located at Level 7 of Building A. This number of exceedences is under the 18 exceedences per year permitted and therefore the short term air quality objective is predicted not to be exceeded.

- 1.10 Figure 9.8 shows a contour plot of predicted annual mean roof level NO₂ concentrations, which includes road emissions and energy emission from the MECD site and the aquatics centre in the DS scenario. Figure 9.8 shows a contour plot of predicted short term roof level NO₂ concentrations. Both figures show that the relevant air quality objectives are achieved across the roof in the DS scenario. As such, the air intake inlet for ventilation purposes can be located at any point on the development - except the lower levels near the road links.

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