

SALDEN CHASE  
OUTLINE PLANNING APPLICATION

# Air Quality

### Appendix 11.1: NO<sub>2</sub> Monitoring Locations

Location (on Figure 11.1)	Description	Nearest road	Distance from road (m)	Height (m)	OS Grid reference	Type <sup>(a)</sup>
D1	On A421 at Rhoscolyn Drive	A421	2.9	1.8	484150, 233715	Roadside
D2	On Snelshall Street	Snelshall Street	2.1	1.8	483073, 233375	Roadside
D3	On Buckingham Rd after Whaddon Way Junction	B4034	0.7	2.1	484865, 233076	Kerbside
D4	On Buckingham Rd 250m from the A421 Roundabout	B4034	1.9	2.1	483740, 232934	Roadside
D5	On A421 300m east from Buckingham Rd Roundabout	A421	3	2	483316, 232882	Roadside
D6	On A421 Next to Steinbeck Crescent Junction	A421	2.7	1.9	482816, 232822	Roadside
D7	On A421 250m From Steinbeck Crescent Junction to the East	A421	3.5	2	482533, 232750	Roadside
D8	On A421 700m to the East from Whaddon Rd Roundabout	A421	1.3	1.9	481338, 232578	Roadside
D9	On Whaddon Rd next to Preparation School	Whaddon Road	2	2	482544, 232405	Background
D10	On Whaddon Rd 600m From east-west rail bridge	Whaddon Road	1.3	1.9	483035, 232145	Background
D11	On Whaddon Road on the south-west end of Rail Bridge	Whaddon Road	1.5	1.7	483460, 231780	Background

Notes: (a) K = kerbside (within 1m of kerb of busy road), R = roadside (within 1-5m of kerb of busy road), B = background (these locations are close to Whaddon Road, however low traffic volumes mean the data is likely to be representative of background concentrations)

**Appendix 11.2: NO<sub>2</sub> Diffusion Tube Monitoring Results (µg/m<sup>3</sup>) and Bias Adjustment Calculation**

Location (on Figure 11.1)	Monitoring Period													Un- adjusted 13 period mean	Bias adjusted 13 period mean (0.8)
	1	2	3	4	5	6	7	8	9	10	11	12	13		
	04/09/08 to 02/10/08	02/10/08 to 31/10/08	31/10/08 to 28/11/08	28/11/08 to 06/01/09	06/01/09 to 06/02/09	06/02/09 to 06/03/09	06/03/09 to 03/04/09	03/04/09 to 30/04/09	30/04/09 to 28/05/09	28/05/09 to 01/07/09	01/07/09 to 27/07/09	27/07/09 to 24/08/09	24/08/09 to 24/09/09		
Co-located	17	31	34	34	43	43	28	28	19	22	17	23	20	28	22
Co-located	18	34	35	35	45	45	29	32	19	23	18	23	20	29	23
Co-located	18	29	33	33	48	48	28	28	19	24	16	20	21	28	22
D1	42	45	37	37	56	28	36	42	34	46	32	35	29	38	31
		45	45	45	62	18	35	46	30	40	30	36	33	39	31
		43	37	37	67	30	35	45	missing	43	33	37	31	40	32
D2	23	26	27	27	38	22	25	32	21	28	19	17	21	25	20
		24	30	30	42	22	25	25	21	29	18	19	21	25	20
		24	27	27	38	32	25	26	20	26	18	19	20	25	20
D3	14	29	28	28	42	39	28	26	21	27	18	19	20	26	21
		27	29	29	43	17	26	28	20	27	19	21	20	25	20
		28	32	32	40	36	29	missing	19	24	19	21	20	26	21
D4	20	23	29	29	39	35	24	24	15	25	15	17	20	24	19
		22	30	30	35	21	28	25	13	26	15	18	20	23	19
		24	29	29	40	39	27	23	16	22	15	18	19	25	20
D5	39	43	51	51	missing	49	46	41	16	59	41	42	47	44	35
		43	45	45	missing	45	45	43	43	55	38	47	41	44	35
		51	55	55	missing	45	45	missing	47	70	missing	43	43	49	39
D6	18	50	38	38	59	27	34	39	38	31	29	38	27	36	29
		40	38	38	51	26	29	39	34	35	34	32	31	34	27
		40	32	32	56	35	33	33	33	missing	36	32	28	34	27
D7	24	27	36	36	36	45	31	31	22	32	17	18	23	29	23
		23	36	36	37	27	30	30	12	21	17	19	26	26	21

Location (on Figure 11.1)	Monitoring Period													Un- adjusted 13 period mean	Bias adjusted 13 period mean (0.8)
	1	2	3	4	5	6	7	8	9	10	11	12	13		
	04/09/08 to 02/10/08	02/10/08 to 31/10/08	31/10/08 to 28/11/08	28/11/08 to 06/01/09	06/01/09 to 06/02/09	06/02/09 to 06/03/09	06/03/09 to 03/04/09	03/04/09 to 30/04/09	30/04/09 to 28/05/09	28/05/09 to 01/07/09	01/07/09 to 27/07/09	27/07/09 to 24/08/09	24/08/09 to 24/09/09		
		27	38	38	37	27	27	31	21		17	18	23	27	22
D8	55	62	50	50	63	45	40	54	51	52	54	55	37	51	41
		52	52	52	61	32	44	57	47	51	57	57	44	51	41
		58	50	50	74	36	42	50	missing	42	56	54	42	51	41
D9	19	19	24	24	29	16	21	18	12	20	12	10	13	18	15
		18	23	23	32	30	20	20	11	21	7	11	13	19	15
		16	24	24	33	19	19	20	11	21	11	12	13	19	15
D10	18	17	25	25	34	20	19	19	12	17	12	14	13	19	15
		21	26	26	36	30	19	19	11	17	10	13	14	20	16
		18	25	25	35	23	19	19	12	17	11	14	12	19	15
D11	20	15	23	23	31	15	18	20	11	21	10	11	13	18	14
		16	24	24	34	26	20	21	11	19	10	11	13	19	15
		16	25	25	32	15	18	18	10	18	9	11	13	18	14

### Appendix 11.3: Bias Adjustment Calculation

Diffusion tube mean* ( $\mu\text{g}/\text{m}^3$ )	MKC's Civic Centre continuous monitor period mean* ( $\mu\text{g}/\text{m}^3$ )	Bias adjustment factor (B/A)
A	B	C
28	23	0.8

- Monitoring period from 4<sup>th</sup> September 2008 to 24<sup>th</sup> September 2009

#### Appendix 11.4: Method for Calculating the NO<sub>x</sub> Verification Factor

A model verification factor for NO<sub>x</sub> was calculated using the methodology in LAQM.TG(09) Annex 3.

Table 11.4.1 shows the percentage difference between the modelled and monitored NO<sub>2</sub>. The percentage differences at nine sites are within  $\pm 25\%$  and at the other two are greater -25%. In general the model underappreciated the concentrations.

LAQM.TG(09) requires that adjustment of the modelled results is necessary.

Monitoring Site	Monitor Type	Background NO <sub>2</sub>	Monitored Total NO <sub>2</sub> (µg/m <sup>3</sup> )	Modelled Total NO <sub>2</sub> (µg/m <sup>3</sup> )	% Difference
D1	DT	13.5	32.1	26.4	-18
D2	DT	12.7	20.2	17.9	-11
D3	DT	13.4	20.2	16.7	-17
D4	DT	12.4	18.7	15.8	-16
D5	DT	12.0	36.9	25.4	-31
D6	DT	11.6	27.7	25.3	-9
D7	DT	11.6	22.3	24.9	12
D8	DT	11.3	40.8	25.6	-37
D9	DT	12.4	15.4	14.7	-5
D10	DT	12.4	15.5	14.7	-5
D11	DT	11.3	14.4	13.6	-6

Table 11.4.2 shows the monitored and modelled road contributions, and their ratio.

Monitoring Site	Monitored Road NO <sub>2</sub> (µg/m <sup>3</sup> )	Monitored Road NO <sub>x</sub> (µg/m <sup>3</sup> )	Modelled Road NO <sub>x</sub> (µg/m <sup>3</sup> )	Ratio
D1	18.5	45.1	29.4	1.5
D2	7.5	16.0	11.2	1.4
D3	6.8	14.9	7.1	2.1
D4	6.3	13.0	7.1	1.8
D5	24.8	62.7	30.4	2.1
D6	16.2	36.5	31.1	1.2
D7	10.7	22.8	30.2	0.8
D8	29.5	77.6	32.6	2.4
D9	3.0	5.8	4.7	1.2

D10	3.1	6.1	4.7	1.3
D11	3.1	5.4	4.7	1.1

The monitored and modelled road contributions to NO<sub>x</sub> have been plotted on a graph (Graph 11.4.1). The gradient of the linear trend line forced through the origin represents the verification factor. A NO<sub>x</sub> verification factor of 1.6 was used.

**Graph 11.4.1: Determination of Verification Factor**

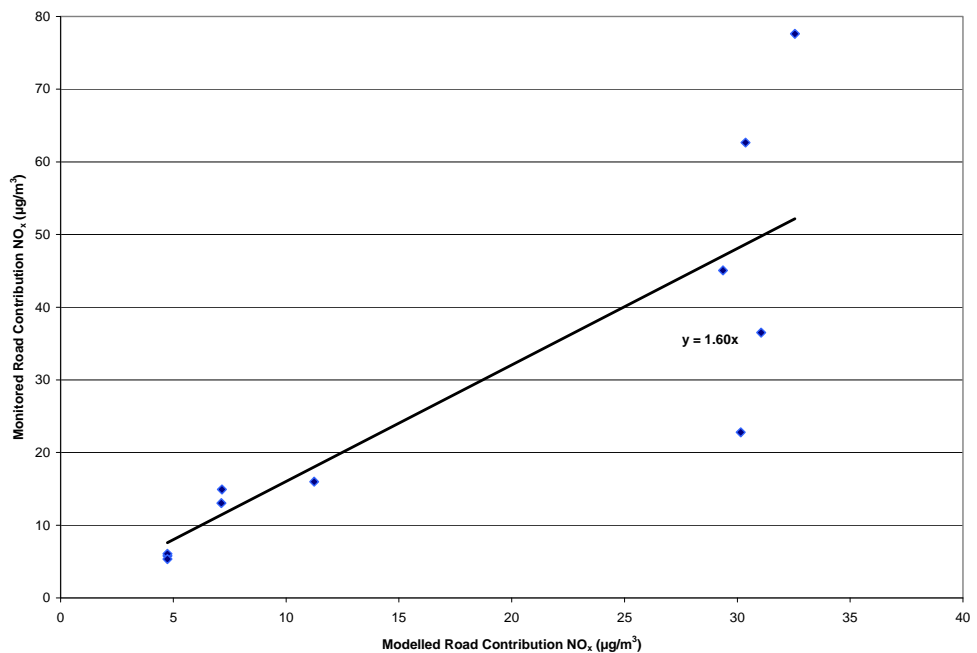


Table 11.4.3 applies the verification factor to the modelled data. The monitored NO<sub>2</sub> is compared to the adjusted modelled NO<sub>2</sub> concentrations.

**Table 11.4.3: Comparison of Monitored NO<sub>2</sub> and Adjusted NO<sub>2</sub> Concentrations**

Monitoring Site	Adjusted Modelled Road NO <sub>x</sub> (µg/m <sup>3</sup> )	Adjusted Modelled Total NO <sub>x</sub> (µg/m <sup>3</sup> )	Adjusted Modelled Total NO <sub>2</sub> (µg/m <sup>3</sup> )	Monitored Total NO <sub>2</sub> (µg/m <sup>3</sup> )	% Difference
D1	47.1	65.2	32.8	32.1	2
D2	18.0	34.8	20.9	20.2	4
D3	11.5	29.3	18.7	20.2	-7
D4	11.4	27.7	17.7	18.7	-5
D5	48.7	64.5	32.1	36.9	-13
D6	49.8	64.9	32.1	27.7	16
D7	48.3	63.4	31.6	22.3	42

D8	52.2	66.9	32.7	40.8	-20
D9	7.6	24.0	16.0	15.4	4
D10	7.6	23.9	16.0	15.5	3
D11	7.6	22.4	15.0	14.4	4

Table 11.4.3 shows that the percentage difference between the adjusted modelled NO<sub>2</sub> and monitored NO<sub>2</sub> is lower at most diffusion tubes. The percentage differences at ten sites are within plus and minus 25% and one is greater than plus and minus 25%.

**Appendix 11.5: Background Concentrations Used in this Assessment**

Grid reference	Road contribution removed*	Predicted background concentration ( $\mu\text{g}/\text{m}^3$ )								
		NO <sub>x</sub>			NO <sub>2</sub>			PM <sub>10</sub>		
		2008	2011	2026	2008	2011	2026	2008	2011	2026
480_232	Primary A	14.5	13.0	10.2	11.1	10.1	8.1	16.1	15.7	15.3
481_232	Primary A	14.8	13.2	10.4	11.3	10.3	8.2	16.2	15.8	15.4
484_233	Primary A	18.1	15.9	12.2	13.5	12.1	9.6	17.1	16.7	16.2
486_236	Primary A	23.4	20.4	15.6	16.8	15.0	11.9	18.7	18.1	17.5
484_233	Minor road	17.8	15.8	12.1	13.4	12.1	9.5	17.1	16.7	16.2
484_231	Minor road	15.6	14.0	11.0	11.9	10.8	8.7	16.3	15.9	15.5
483_231	Minor road	14.8	13.3	10.5	11.3	10.3	8.3	16.2	15.8	15.4

\*These contributions from within the grid were removed.

**Appendix 11.6: Traffic Data Used in this Assessment**

Link	Link	Average speed m/h		% HDVs <sup>(a)</sup>					Annual average daily traffic (AADT)				
				2008	2011		2026		2008	2011		2026	
		Without	With		Without	With	Without	With		Without	With	Without	With
1	Whaddon Road (immediately west of NL crossroads)	48	48	4.9	3.9	3.9	3.9	3.9	3646	3774	4835	4806	5867
2	Whaddon Road (south of Bottledump Rbt)	96	48	3.8	3.9	3.9	3.9	3.9	3661	3774	7754	4806	8786
3	Bletchley Road	48	48	7.1	3.9	3.9	3.9	3.9	3641	3899	3899	4633	4601
4	Stoke Road	48	48	7.7	3.9	3.9	3.9	3.9	2960	3903	4940	4677	5714
5	Drayton Road	48	48	4.1	3.9	3.9	3.9	3.9	2909	3702	3790	4105	4194
6	A421 (W) of Bottledump Rbt	96	97	6.9	8.9	8.9	8.9	8.9	20959	22417	24608	29428	31618
7	A421 (E) of Bottledump Rbt	112	113	6.9	9.7	9.7	9.7	9.7	20925	26657	35168	30082	38594
8	A421 Standing Way (North-east of Tattenhoe Rbt)	112	113	7.6	9.7	9.7	9.7	9.7	18176	18278	18278	25304	17617
9	Snelshall Street (North-west of Tattenhoe Rbt)	64	64	2.7	3.1	3.1	3.1	3.1	11384	12175	25466	15983	29273
10	B4034 Buckingham Road (East of Tattenhoe Rbt)	48	64	2.7	3.1	3.1	3.1	3.1	7706	8242	16235	5445	13438
11	A421 Standing Way (South-west of Bleak Hall Rbt)	112	113	7.6	9.7	9.7	9.7	9.7	27723	26829	35490	19861	28522
12	A421 Standing Way (North-east of Bleak Hall Rbt)	112	113	7.6	9.7	9.7	9.7	9.7	24835	23042	27112	25374	29444
13	Grafton Street (North-west of Bleak Hall Rbt)	112	113	7.6	9.7	9.7	9.7	9.7	22309	24141	24141	29044	23520
14	Grafton Street (South-east of Bleak Hall Rbt)	112	113	7.6	9.7	9.7	9.7	9.7	19555	20965	20965	26301	22442
15	Grafton Street (NW of Redmoor Rbt)	112	113	7.6	9.7	9.7	9.7	9.7	19483	23303	23303	28611	25008
16	Grovelway (NE of Redmoor Rbt)	112	113	2.7	3.1	3.1	3.1	3.1	10760	22143	22143	21889	21816
17	Grafton Street (S of Redmoor Rbt)	96	97	2.7	3.1	3.1	3.1	3.1	12289	25914	25914	25316	24177
18	A5 East of Redmoor Roundabout	112	113	7.6	9.7	9.7	9.7	9.7	35186	30332	30332	43352	42347
19	A5 West of Redmoor Roundabout	112	113	7.6	9.7	9.7	9.7	9.7	38223	56467	59698	65834	69065
20	Coddimoor Lane	96	97	3.8	3.9	3.9	3.9	3.9	2532	2708	2770	3555	3617
21	Whaddon Road (S of Coddimoor Lane / A421)	96	97	3.8	3.9	3.9	3.9	3.9	4097	4382	4444	5752	5815
22	A421 Buckingham Road (W of Coddimoor Lane)	96	97	6.9	8.9	8.9	8.9	8.9	19206	20542	21079	26966	27503
23	Winslow Road	96	97	3.8	3.9	3.9	3.9	3.9	1109	1186	1190	1557	1560
24	A421 Buckingham Road (E of Winslow Road)	96	97	6.9	8.9	8.9	8.9	8.9	18695	19995	20452	26248	26705
25	B4033 - Nash Road	96	97	3.8	3.9	3.9	3.9	3.9	3472	3713	3819	4874	4980
26	A421 - Buckingham Road (W of Winslow Road)	96	97	6.9	8.9	8.9	8.9	8.9	16865	18037	18365	23678	24006

Salden Chase, North East Aylesbury Vale  
Environmental Assessment  
Part 3: Appendices

Link	Link	Average speed v/h)		% HDVs <sup>(a)</sup>						Annual average daily traffic (AADT)				
				2008	2011		2026		2008	2011		2026		
		Without	With		Without	With	Without	With		Without	With	Without	With	
27	B4033 - Nash Road, Great Horwood	48	48	3.8	3.9	3.9	3.9	3.9	3500	3743	3817	4914	4988	
28	Little Horwood Road	48	48	3.8	3.9	3.9	3.9	3.9	911	975	977	1279	1282	
29	B4033 - High Street	48	48	3.8	3.9	3.9	3.9	3.9	3540	3787	3788	4971	4972	
30	B4033 to Gt Horwood	96	97	3.8	3.9	3.9	3.9	3.9	3383	3618	3618	4750	4750	
31	A413 Winslow	48	48	6.9	8.9	8.9	8.9	8.9	11313	12100	12104	15884	15888	
32	A413 to Buckingham	48	48	6.9	8.9	8.9	8.9	8.9	7985	8540	8540	11211	11211	
33	A421 E to Milton Keynes	96	97	6.9	8.9	8.9	8.9	8.9	15189	16245	16574	21325	21655	
34	A421 W to Aylesbury	96	97	6.9	8.9	8.9	8.9	8.9	20092	21489	21708	28210	28428	
35	A413 Town centre	96	97	6.9	8.9	8.9	8.9	8.9	13955	14925	15034	19593	19702	
36	Page Hill Avenue	48	48	3.8	3.9	3.9	3.9	3.9	1794	1919	1920	2519	2520	
37	A422 - Stratford Road (East)	96	97	6.9	8.9	8.9	8.9	8.9	12397	13259	13306	17405	17453	
38	A413 - Bypass	96	97	6.9	8.9	8.9	8.9	8.9	13225	14145	14256	18568	18679	
39	A422 - Stratford Road (West)	96	97	6.9	8.9	8.9	8.9	8.9	9871	10558	10623	13860	13925	
40	Internal link - approach to Buckingham Rd	-	32	-	-	-	-	3.1	-	-	14239	-	14239	
41	Internal link - SE area of the site	-	32	-	-	-	-	3.1	-	-	9137	-	9137	
42	Internal link - SW area of the site	-	32	-	-	-	-	3.1	-	-	8201	-	8201	
43	Internal link - N area of the site	-	32	-	-	-	-	3.1	-	-	3448	-	3448	
107	A421 between LILO access and Tattenhoe Rbt	112	113	6.9	9.7	9.7	9.7	9.7	20925	26657	35168	30082	39699	
110	B4034 Buckingham Road (East of Site access)	48	64	2.7	3.1	3.1	3.1	3.1	7706	8242	16235	5445	9787	

Notes: (a) HDV is defined as heavy duty vehicles over 3.5 tonnes

