

**2012 Air Quality
Updating and Screening
Assessment:
London Borough of Ealing**



Document Control

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Executive Summary

This report fulfils the requirements of the Local Air Quality Management process as set out in Part IV of the Environment Act (1995), the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 and the relevant Policy and Technical Guidance documents.

This document is Ealing Council's fifth Updating and Screening Assessment (USA). Results from monitoring by the Council are presented and sources of air pollution are identified. The USA determines those changes since the last assessment, which could lead to the risk of an air quality objective being exceeded.

The USA 2012 report for the London Borough of Ealing identifies that:

- For carbon monoxide, benzene, 1,3-butadiene, lead and sulphur dioxide there is not a significant risk of the objectives being exceeded in the Council's area.
- For nitrogen dioxide (NO₂) and particles PM₁₀ the Council has previously designated an AQMA across the whole of the Borough of Ealing. The findings from this report indicate that this AQMA should be maintained.

Little has changed in terms of sources of emissions in Ealing since the fourth USA was undertaken in 2009. The results derived from this work will contribute to the next Progress Report and will add to subsequent Updating and Screening Assessments. They will also help inform planning applications for new developments.

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1 Introduction

1.1. Description of Local Authority Area

The London Borough of Ealing, located in west London, is home to over 300,000 people and covers approximately 55 square kilometres. The Borough consists of seven main areas: Acton, Ealing, Greenford, Hanwell, Northolt, Perivale and Southall. It comprises of both urban and rural areas, has a large number of parks and open spaces, as well as large amounts of housing, commercial and industrial areas.

The Borough contains more than 13,000 businesses and includes half of the largest industrial and business park in London, Park Royal. The Council regulates 84 Part B industrial and other minor processes. There are two Part A installations within the Borough; Vale Europe Ltd and GW Neale Ltd. The main source of air pollution comes from busy and congested roads, including the A40, A406, A4020, A4127 and A4000 that run through the Borough. The whole Borough has been declared an Air Quality Management Area (AQMA) for nitrogen dioxide and PM₁₀.

1.2. Purpose of Report

This report fulfils the requirements of the Local Air Quality Management process as set out in Part IV of the Environment Act (1995), the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 and the relevant Policy and Technical Guidance documents. The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where exceedences are considered likely, the local authority must then declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives.

The objective of this Updating and Screening Assessment is to identify any matters that have changed which may lead to risk of an air quality objective being exceeded. A checklist approach and screening tools are used to identify significant new sources or changes and whether there is a need for a Detailed Assessment. The USA report should provide an update of any outstanding information requested by Defra during the appraisals of previous Review and Assessment reports.

1.3. Air Quality Objectives

The air quality objectives applicable to LAQM in England are set out in the Air Quality (England) Regulations (2000) (SI 928), The Air Quality (England) (Amendment) Regulations (2002) (SI 3043), and are shown in Table 1.1. This table shows the objectives in units of micrograms per cubic metre $\mu\text{g}/\text{m}^3$ (milligrams per cubic metre, mg/m^3 for carbon monoxide) with the number of exceedences in each year that are permitted (where applicable).

Table 1.1: Air Quality Objectives included in Regulations for the purpose of LAQM in England

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene	16.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
	5.00 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2010
1,3-Butadiene	2.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
Carbon monoxide	10.0 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.5 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2004
	0.25 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2008
Nitrogen dioxide	200 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2005
Particles (PM ₁₀) (gravimetric)	50 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2004
Sulphur dioxide	350 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

1.4. Summary of Previous Review and Assessments

A Borough-wide Air Quality Management Area (AQMA) was declared for exceedences of the nitrogen dioxide and PM₁₀ objectives (London Borough of Ealing, 2003) in 2000. An Air Quality Action Plan (AQAP) (London Borough of Ealing, 2003) was subsequently published, in 2003.

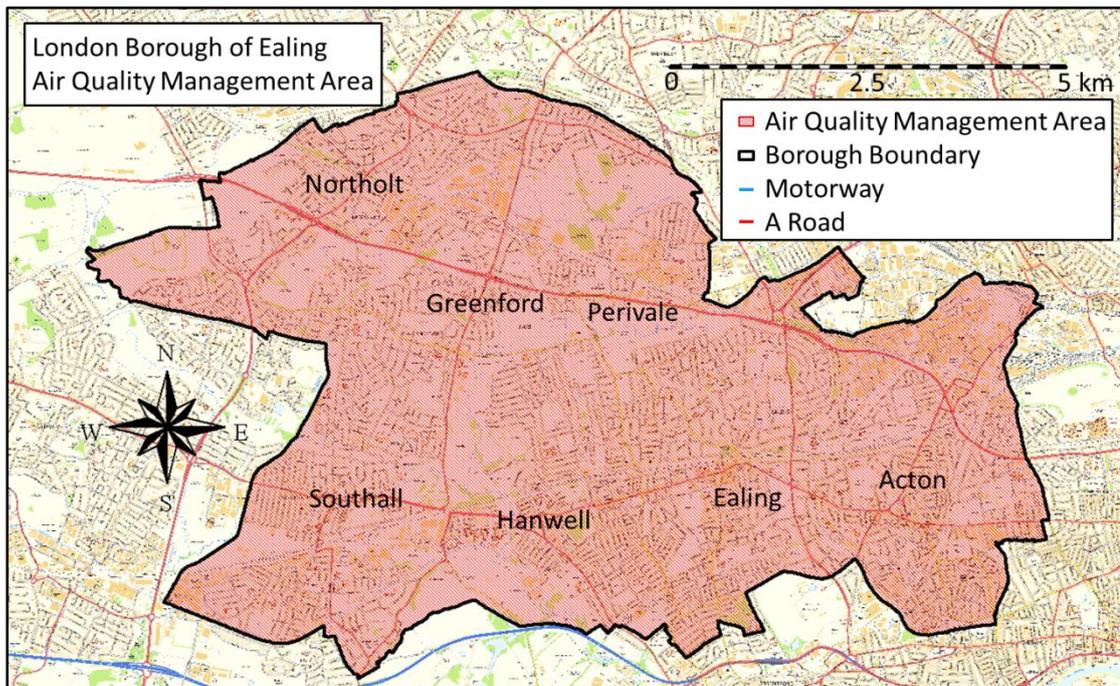


Figure 1.1: Map of AQMA Boundary

Actions on previous rounds of review and assessment are summarised in Table 1.2. The latest Updating and Screening Assessment report produced by the London Borough of Ealing (London Borough of Ealing, 2009) highlighted the need to maintain the AQMA and continue monitoring of nitrogen dioxide and PM₁₀ concentrations within the Borough.

Table 1.2: Previous rounds of review and assessment.

Report	Date produced	Outcome
Stage 1 and 2	May 1999	Need for Stage 3 for NO ₂ , PM ₁₀ , SO ₂ , CO and Pb.
Stage 3	January 2000	Need to declare AQMA for NO ₂ and PM ₁₀ .
Stage 4	December 2000	Declaration of whole Borough AQMA for NO ₂ and PM ₁₀ .
Air Quality Action Plan	April 2003	Action Plan adopted.
USA 2004	April 2004	Detailed assessment for PM ₁₀ required for EWS Goods Yard, Horn Lane.
USA 2006	April 2006	AQMA retained for whole Borough.
Detailed Assessment of PM	May 2006	AQMA retained for whole Borough.
Progress Report 2007	April 2007	No other sources require detailed assessment.
Progress Report 2008	April 2008	No other sources require detailed assessment.
USA 2009	June 2009	AQMA retained and additional monitoring required.
Further Assessment of NO ₂	February 2011	Extend monitoring close to rail line at sites with relevant exposure.

2 New Monitoring Data

2.1. Summary of Monitoring Undertaken

2.1.1. Automatic Monitoring Sites

In 2011 the London Borough of Ealing operated seven automatic monitoring stations and they are situated at four roadside sites, one industrial site and two urban background locations. During 2011, all sites were operated within the London Air Quality Network (LAQN, 2012). Details of QA/QC procedures are provided in Appendix A.2. Table 2.1 and Table 2.2 provide details of the automatic monitoring sites located in the Borough.

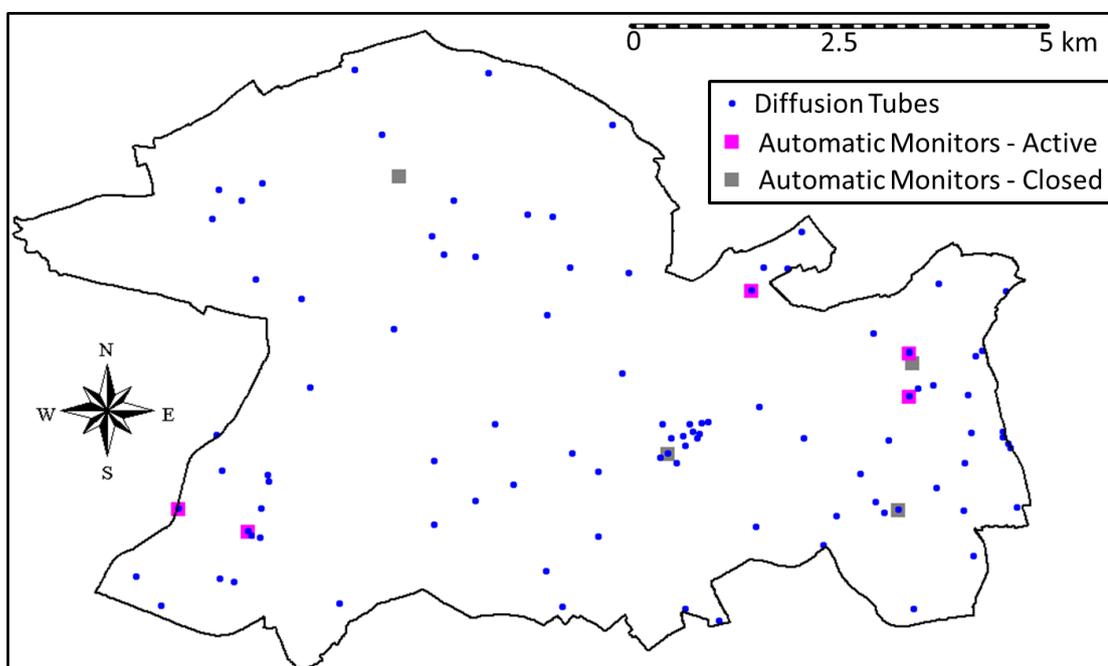


Figure 2.1: Map of Automatic Monitoring Sites

Table 2.1: Details of Automatic Monitoring Sites

Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Monitoring Technique	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (m) (N/A if not applicable)	Does this location represent worst-case exposure?	Status
Acton Town Hall	Roadside	520304	180054	NO ₂ , PM ₁₀ , PM _{2.5} , O ₃ , CO	Y	Chemiluminescence, TEOM ¹ , FDMS ²	Y (4)	3	Y	Closed (2012)
Ealing Town Hall	Urban Background	517541	180738	NO ₂ , O ₃ , CO, SO ₂	Y	Chemiluminescence	Y (0)	N/A	Y	Closed (2012)
Hanger Lane Gyratory	Roadside	518537	182708	NO ₂ , PM ₁₀	Y	Chemiluminescence, TEOM	Y (4)	3	Y	Active
Horn Lane	Industrial	520432	181428	NO ₂ , PM ₁₀	Y	Chemiluminescence, TEOM	Y (8)	2.5	Y	Active
Southall	Urban Background	511677	180071	NO ₂ , PM ₁₀ , PM _{2.5} , O ₃	Y	Chemiluminescence, TEOM, FDMS	Y (17)	N/A	N	Active
Southall Railway	Near road	512514	179795	NO ₂ , PM ₁₀	Y	Chemiluminescence, TEOM	Y (22)	1	Y	Active
Western Avenue	Roadside	520430	181950	NO ₂ , PM ₁₀	Y	Chemiluminescence, TEOM	Y (4)	4	Y	Active

¹ TEOM = Tapered Element Oscillating Microbalance

² FDMS = Filter Dynamics Measurement System

2.1.2. Non-Automatic Monitoring Sites

2.1.3. Nitrogen Dioxide

The London Borough of Ealing also monitors annual mean nitrogen dioxide concentrations using passive diffusion tubes at 126 sites located throughout the Borough. Nine of these sites (which have triplicate tubes) are co-located with automatic monitoring sites, namely Southall, Horn Lane and Western Avenue. Table 2.2 provides details of the diffusion tube sites within the Borough, during 2011. In 2012 there were 98 diffusion tube sites with four triplicate sites co-located with four air quality monitoring stations. In 2013 there will be 94 diffusion tubes with four triplicate sites co-located with four air quality monitoring stations.

2.1.4. Benzene

In 2011 the London Borough of Ealing monitored annual mean benzene concentrations using passive diffusion tubes at three roadside sites located across the borough. In 2012 two sites were discontinued and in 2013 all of the sites will be discontinued. Table 2.3 provides details of the diffusion tube sites within the Borough during 2011.

Table 2.2: Details of Non-Automatic Monitoring Sites – NO₂

Site ID	Site Location	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Co-located with a Continuous Analyser? (Y/N)	Relevant Exposure? (Y/N with distance to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)*	Worst-case exposure?
1	39 Old Oak Lane	Roadside	521587	182684	NO ₂	Y	N	Y (F)	5.0	N
2	99 Wells House Road	Roadside	521224	181913	NO ₂	Y	N	Y (F)	5.0	N
3	36 Wales Farm Road	Roadside	520724	181552	NO ₂	Y	N	Y (F)	No info	Y
4	5 Leamington Park	Near Road	520532	181517	NO ₂	Y	N	Y (F)	11.0	N
5	92 Long Drive	Near Road	521139	181436	NO ₂	Y	N	Y (L)	7.0	N
6	Wendover Court (3rd Floor)	Near Road	519997	182178	NO ₂	Y	N	Y (F)	11.0	N
7	Wendover Court (2nd Floor)	Near Road	519997	182178	NO ₂	Y	N	Y (F)	11.0	N
8	Wendover Court (1st Floor)	Near Road	519997	182178	NO ₂	Y	N	Y (F)	11.0	N
9	Wendover Court (Ground Floor)	Near Road	519997	182178	NO ₂	Y	N	Y (F)	11.0	Y
10	25 Waverley Gardens	Roadside	518680	182979	NO ₂	Y	N	Y (F)	1.8	Y
11	6 Brentmead Gardens	Near Road	518976	182963	NO ₂	Y	N	Y (F)	33.0	N
12	3 Iveagh Terrace	Near Road	519142	183399	NO ₂	Y	N	Y (F)	2.1	Y
13	57 Old Oak Common Lane	Near Road	521557	180996	NO ₂	Y	N	Y (F)	11.0	Y
14	4 St Andrews Road	Kerbside	512138	180953	NO ₂	Y	N	Y (F)	0.6	N

Site ID	Site Location	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Co-located with a Continuous Analyser? (Y/N)	Relevant Exposure? (Y/N with distance to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)*	Worst-case exposure?
15	205 Old Oak Road (Tri)	Roadside	521614	180852	NO ₂	Y	N	Y (F)	4.7	Y
16	205 Old Oak Road (Tri)	Roadside	521614	180852	NO ₂	Y	N	Y (F)	4.7	Y
17	205 Old Oak Road (Tri)	Roadside	521614	180852	NO ₂	Y	N	Y (F)	4.7	Y
18	East Acton Primary School	Near Road	521093	180613	NO ₂	Y	N	Y (F)	11.6	Y
19	17 The Vale	Near Road	521720	180084	NO ₂	Y	N	Y (F)	19.4	Y
20	177A The Vale	Kerbside	521088	180046	NO ₂	Y	N	Y (L)	0.6	Y
21	Maples Nursery	Near Road	520754	180316	NO ₂	Y	N	Y (F)	8.0	N
22	15 Lantry Court	Background	519849	180485	NO ₂	Y	N	Y (F)	N/A	N
23	Dexters, 182 High Street	Roadside	520026	180141	NO ₂	Y	N	Y (F)	4.0	Y
24	Acton Health Centre	Near Road	520128	180016	NO ₂	Y	N	Y (F)	10.0	N
25	Acton Care Centre	Near Road	519562	179977	NO ₂	Y	N	Y (F)	0.5	Y
26	Horn Lane Surgery	Near Road	520180	180896	NO ₂	Y	N	Y (F)	6.0	Y
27	1-4 Peal Gardens	Roadside	516089	182400	NO ₂	Y	N	Y (F)	5.0	N
28	19 Runnymede Gardens	Kerbside	515240	183102	NO ₂	Y	N	Y (F)	1.2	Y
29	14 Blenheim Close	Roadside	514866	183116	NO ₂	Y	N	Y (L)	2.5	N

Site ID	Site Location	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Co-located with a Continuous Analyser? (Y/N)	Relevant Exposure? (Y/N with distance to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)*	Worst-case exposure?
30	205 Windmill Lane	Near Road	514259	182234	NO ₂	Y	N	Y (F)	8.0	N
31	Greenford High School	Background	513158	182600	NO ₂	Y	N	Y (F)	N/A	Y
32	2 Shadwell Drive	Kerbside	512603	182837	NO ₂	Y	N	Y (L)	28.5	N
33	Northolt Library	Roadside	512089	183545	NO ₂	Y	N	Y (F)	0.5	Y
34	213 Church Road	Near Road	512442	183769	NO ₂	Y	N	Y(F)	12.4	Y
35	West London Academy	Background	512168	183907	NO ₂	Y	N	Y (F)	113.0	Y
36	Opposite 8 Broadway Buildings	Kerbside	517887	180914	NO ₂	Y	N	Y (O)	0.6	N
37	Acton Medical Centre	Roadside	519404	179620	NO ₂	Y	N	N (L)	8.9	Y
38	Hanwell Nursery	Near Road	515242	180158	NO ₂	Y	N	Y (F)	12.0	Y
39	Ealing Hospital	Background	514740	179876	NO ₂	Y	N	Y (F)	200.0	N
40	Hobbayne First School	Background	515477	181081	NO ₂	Y	N	Y (F)	43.0	N
41	1 Shaftesbury Gardens	Roadside	512206	180522	NO ₂	Y	N	Y (F)	5.0	N
42	Hambrough Primary School (Tri)	Near Road	512673	180069	NO ₂	Y	N	Y (F)	10.0	Y
43	Hambrough Primary School (Tri)	Near Road	512673	180069	NO ₂	Y	N	Y (F)	10.0	Y

Site ID	Site Location	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Co-located with a Continuous Analyser? (Y/N)	Relevant Exposure? (Y/N with distance to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)*	Worst-case exposure?
44	Hambrough Primary School (Tri)	Near Road	512673	180069	NO ₂	Y	N	Y (F)	10.0	Y
45	Maypole Court	Near Road	512657	179712	NO ₂	Y	N	Y (F)	12.0	Y
46	Perivale Wood	Background	516160	183582	NO ₂	Y	N	Y (L)	44.7	Y
47	Perivale Wood	Background	515855	183597	NO ₂	Y	N	Y (L)	N/A	N
48	55 King Street	Roadside	512341	179186	NO ₂	Y	N	Y(L)	3.3	N
49	149 Church Road	Roadside	512690	183983	NO ₂	Y	N	Y (F)	3.0	Y
50	Jubilee Gardens Library	Roadside	513263	181526	NO ₂	Y	N	N(L)	N/A	N
51	Visitor Centre, Brent Lodge	Background	514740	180643	NO ₂	Y	N	Y (L)	30.0	N
52	Health Centre	Near Road	515680	180360	NO ₂	Y	N	Y (F)	6.0	N
53	11 Uxbridge Road	Roadside	512768	180400	NO ₂	Y	N	Y (F)	4.0	N
54	Ealing Town Hall (Tri)	Background	517534	180737	NO ₂	Y	Y	Y (F)	38.0	N
55	Ealing Town Hall (Tri)	Background	517534	180737	NO ₂	Y	Y	Y (F)	38.0	N
56	Ealing Town Hall (Tri)	Background	517534	180737	NO ₂	Y	Y	Y (F)	38.0	N
57	Perceval House	Near Road	517440	180677	NO ₂	Y	N	Y (F)	14.0	N
58	14/16 Bond Street	Roadside	517644	180613	NO ₂	Y	N	Y (F)	2.7	N
59	South Ealing Cemetery	Background	517750	178860	NO ₂	Y	N	Y (F)	32.0	N

Site ID	Site Location	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Co-located with a Continuous Analyser? (Y/N)	Relevant Exposure? (Y/N with distance to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)*	Worst-case exposure?
60	Acton Town Hall (Tri)	Roadside	520306	180055	NO ₂	Y	Y	Y (F)	5.0	N
61	Acton Town Hall (Tri)	Roadside	520306	180055	NO ₂	Y	Y	N (O)	5.0	N
62	Acton Town Hall (Tri)	Roadside	520306	180055	NO ₂	Y	Y	N (O)	5.0	N
63	53-61 St Pauls Close	Near Road	518594	179848	NO ₂	Y	N	N (O)	11.0	N
64	44 Acton Lane	Roadside	520480	178854	NO ₂	Y	N	Y (F)	0.7	N
65	Clayponds Hospital	Background	518153	178709	NO ₂	Y	N	Y (F)	138.0	Y
66	53 Old Oak Common Lane	Near Road	521573	180932	NO ₂	Y	N	Y (F)	9.0	N
67	16 Balfour Road	Roadside	516703	179728	NO ₂	Y	N	Y (F)	0.4	Y
68	1 Kirn Road	Roadside	516699	180509	NO ₂	Y	N	Y (L)	2.0	N
69	St David's Home	Background	516992	181698	NO ₂	Y	N	Y (L)	20.0	Y
70	4 Thirlmere Avenue	Background	517072	182912	NO ₂	Y	N	Y (F)	46.5	N
71	2 Horsenden Lane South	Roadside	516368	182978	NO ₂	Y	N	Y (F)	5.0	N
72	64 Hanger Lane	Near Road	518635	181288	NO ₂	Y	N	Y (F)	0.7	Y
73	Oldfield Primary School (Tri)	Background	514722	183345	NO ₂	Y	N	Y (F)	64.0	Y
74	Oldfield Primary School (Tri)	Background	514722	183345	NO ₂	Y	N	Y (F)	64.0	N
75	Oldfield Primary	Background	514722	183345	NO ₂	Y	N	Y (F)	64.0	N

Site ID	Site Location	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Co-located with a Continuous Analyser? (Y/N)	Relevant Exposure? (Y/N with distance to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)*	Worst-case exposure?
	School (Tri)									
76	1504 Greenford Road	Near Road	515402	185313	NO ₂	Y	N	Y (F)	5.3	N
77	79 Whitton Avenue East	Near Road	516867	184689	NO ₂	Y	N	Y (F)	5.0	Y
78	126 Petts Hill	Near Road	513794	185348	NO ₂	Y	N	Y (F)	9.0	Y
79	169 Castle Road	Near Road	514125	184562	NO ₂	Y	N	Y (F)	No info	Y
80	4 Minterne Avenue	Roadside	513606	178917	NO ₂	Y	N	Y (F)	2.0	Y
81	Featherstone Primary School (Tri)	Background	511475	178899	NO ₂	Y	N	Y(F)	20.0	Y
82	Featherstone Primary School (Tri)	Background	511475	178899	NO ₂	Y	N	Y (L)	20.0	Y
83	Featherstone Primary School (Tri)	Background	511475	178899	NO ₂	Y	N	Y (L)	20.0	Y
84	150 Brent Road	Near Road	511170	179251	NO ₂	Y	N	Y (L)	7.7	Y
85	6 Boston Gardens	Near Road	516277	178882	NO ₂	Y	N	Y (F)	10.0	Y
86	255 Boston Road	Roadside	516080	179318	NO ₂	Y	N	Y (F)	9.3	Y
87	7 Greenford Avenue	Near Road	512753	180478	NO ₂	Y	N	Y(L)	7.0	Y
88	Oakley House	Near Road	519167	180915	NO ₂	Y	N	Y (F)	20.5	N
89	Belmont Health Centre	Near Road	512181	179219	NO ₂	Y	N	Y (F)	7.5	Y

Site ID	Site Location	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Co-located with a Continuous Analyser? (Y/N)	Relevant Exposure? (Y/N with distance to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)*	Worst-case exposure?
90	6 Western Avenue	Roadside	521549	180923	NO ₂	Y	N	Y (F)	4.0	Y
91	Martin Court, Southbridge Way	Near Road	512560	179739	NO ₂	Y	N	Y (F)	30.5	Y
92	98 Western Avenue	Near Road	521173	180981	NO ₂	Y	N	Y (F)	10.0	Y
93	171 Old Oak Road	Roadside	521646	180800	NO ₂	Y	N	Y (F)	4.0	Y
94	Southfields First & Middle School	Background	521200	179500	NO ₂	Y	N	Y (F)	8.0	Y
95	Fernlea House (Tri)	Roadside	518541	182707	NO ₂	Y	Y	Y (F)	4.0	N
96	Fernlea House (Tri)	Roadside	518541	182707	NO ₂	Y	Y	Y (F)	4.0	Y
97	Fernlea House (Tri)	Roadside	518541	182707	NO ₂	Y	Y	Y (F)	4.0	Y
98	Fernlea House	Roadside	518540	182700	NO ₂	Y	N	Y (F)	2.5	Y
99	27 Wells House Road	Roadside	521305	181966	NO ₂	Y	N	Y(K)	5.0	Y
100	94 North Acton Road	Near Road	520780	182775	NO ₂	Y	N	Y (F)	6.0	N
101	914 Greenford Road	Roadside	514985	183770	NO ₂	Y	N	Y (F)	2.3	Y
102	Blair Peach School (Tri)	Background	511680	180071	NO ₂	Y	Y	Y (F)	50.0	Y
103	Blair Peach School (Tri)	Background	511680	180071	NO ₂	Y	Y	Y (O)	50.0	N
104	Blair Peach School (Tri)	Background	511680	180071	NO ₂	Y	Y	Y (O)	50.0	N

Site ID	Site Location	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Co-located with a Continuous Analyser? (Y/N)	Relevant Exposure? (Y/N with distance to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)*	Worst-case exposure?
105	Jctn of The Straight & The Crescent (Tri)	Roadside	512514	179795	NO ₂	Y	Y	Y (O)	1.5	N
106	Jctn of The Straight & The Crescent (Tri)	Roadside	512514	179795	NO ₂	Y	Y	Y (L-10M)	1.5	N
107	Jctn of The Straight & The Crescent (Tri)	Roadside	512514	179795	NO ₂	Y	Y	Y (L-10M)	1.5	N
108	41 Manor Road (Tri)	Near Road	516387	180738	NO ₂	Y	N	Y (L-10M)	4.0	N
109	41 Manor Road (Tri)	Near Road	516387	180738	NO ₂	Y	N	Y (F)	4.0	Y
110	41 Manor Road (Tri)	Near Road	516387	180738	NO ₂	Y	N	Y (F)	4.0	Y
111	317 Horn Lane (Tri)	Roadside	520432	181428	NO ₂	Y	Y	Y(F)	3.0	Y
112	317 Horn Lane (Tri)	Roadside	520432	181428	NO ₂	Y	Y	Y	3.0	Y
113	317 Horn Lane (Tri)	Roadside	520432	181428	NO ₂	Y	Y	Y	3.0	Y
114	322 & 324 Western Avenue (Tri)	Roadside	520430	181950	NO ₂	Y	Y	Y	5.0	Y
115	322 & 324 Western Avenue (Tri)	Roadside	520430	181950	NO ₂	Y	Y	Y	5.0	Y
116	322 & 324 Western Avenue (Tri)	Roadside	520430	181950	NO ₂	Y	Y	Y	5.0	Y
117	326 Western Avenue	Near Road	520426	181958	NO ₂	Y	N	Y	11.4	Y
118	Patels Newsagents	Near Road	518022	181114	NO ₂	Y	N	Y(F)	2.4	Y

Site ID	Site Location	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Co-located with a Continuous Analyser? (Y/N)	Relevant Exposure? (Y/N with distance to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)*	Worst-case exposure?
119	Gordon Road	Kerbside	517718	180944	NO ₂	Y	N	Y(F)	1.0	Y
120	Middle of Haven Green	Near Road	517834	181000	NO ₂	Y	N	Y(L)	N/A	Y
121	27 Haven Green	Roadside	517940	181092	NO ₂	Y	N	Y(L)	1.0	N
122	31 Castlebar Road	Near Road	517472	181088	NO ₂	Y	N	Y(F)	19.3	Y
123	Beech Haven	Roadside	517578	180917	NO ₂	Y	N	Y(F)	10.0	N
124	Haven Green Court	Background	517803	181082	NO ₂	Y	N	Y(F)	16.9	N
125	Sinton Andrews	Roadside	517745	180827	NO ₂	Y	N	Y(F)	3.0	Y
126	Montague Lambert	Roadside	517909	180971	NO ₂	Y	N	Y(F)	3.0	Y

* Diffusion tubes located on residential façades are marked with an F in brackets, on lampposts are marked with an L in brackets and on other street furniture are marked with an O in brackets.

Table 2.3: Details of Non-Automatic Monitoring Sites – Benzene

Site ID	Site Location	Site Type	X OS Grid Ref	Y OS Grid Ref	Distance to kerb of nearest road (m)
55	Acton Town Hall	Roadside	517534	180737	38.0
46	Church Road, Northolt	Roadside	512657	179712	44.7
89	Hanger Lane Gyratory	Roadside	519167	180915	7.5

2.2. Comparison of Monitoring Results with AQ Objectives

2.2.1. Nitrogen Dioxide

2.2.2. Automatic Monitoring Data

Table 2.4 shows most monitoring sites exceed the 40 µg/m³ annual mean nitrogen dioxide objective, including the Ealing Town Hall background site. There have been major exceedences at most roadside and industrial sites throughout the last seven years, especially at the Hanger Lane Gyratory roadside site with values twice the objective. The Hanger Lane Gyratory site also exceeded the 1-hour nitrogen dioxide objective in 2011, as it had in previous years, with 66 exceedences out of the 18 permitted. At the new Southall Railway roadside site concentrations were slightly below the annual mean objective in 2011. Background concentrations at the Southall site have been below the annual mean objective for the last seven years. Data capture was less than 90% at Horn Lane, Southall Railway and Western Avenue in 2011, and data have been annualised in accordance with the Box 3.2 in LAQM TG (09). Further details on annualisation are provided in Appendix A1.

Figure 2.2 shows the trends in concentrations at each of the nitrogen dioxide automatic monitoring sites over the last seven years. It is not possible to identify a robust trend if fewer than five years' data are available. Measured concentrations have been stable over the seven year period between 2005 and 2011 at the four long term sites (Acton Town Hall, Ealing Town Hall, Hanger Lane Gyratory and Southall), and no discernible trend is identifiable.

Table 2.4: Results of Automatic Monitoring of Nitrogen Dioxide: Comparison with Annual Mean Objective (2005 – 2011)

Site ID	Site Type	Within AQMA?	Valid Data Capture 2011 % ^b	Annual Mean Concentration $\mu\text{g}/\text{m}^3$						
				2005 ^{*b}	2006 ^{*b}	2007 ^{*b}	2008 ^{*b}	2009 ^{*b}	2010 [*]	2011 [*]
Acton Town Hall	Roadside	Y	93.8	58.0	63.0	57.0	59.0	62.0	55.4	53.8
Ealing Town Hall	Urban Background	Y	95.5	39.0	40.0	39.0	39.0	40.0	43.8	41.9
Hanger Lane Gyrotory	Roadside	Y	92.8	93.0	95.0	90.0	103.0	93.0	91.5^b	79.2
Horn Lane	Industrial	Y	88.8	-	-	-	-	-	54.2^b	58.1^b
Southall	Urban Background	Y	98.9	34.0	33.0	31.0	31.0	31.0	30.8	28.6
Southall Railway	Near road	Y	72.9	-	-	-	-	-	-	37.2 ^b
Western Avenue	Roadside	Y	86.7	-	-	-	-	-	67.7^b	61.7^b
Objective				40						

^a Exceedences of the objective level are shown in bold.

^b Where data captures are less than 90%, data have been annualised. For 2005 to 2009, no annualisation is presented in previous Review and Assessment reports. For 2010 and 2011, the annualisation methodology is presented in Appendix A1.

* All data have been fully ratified.

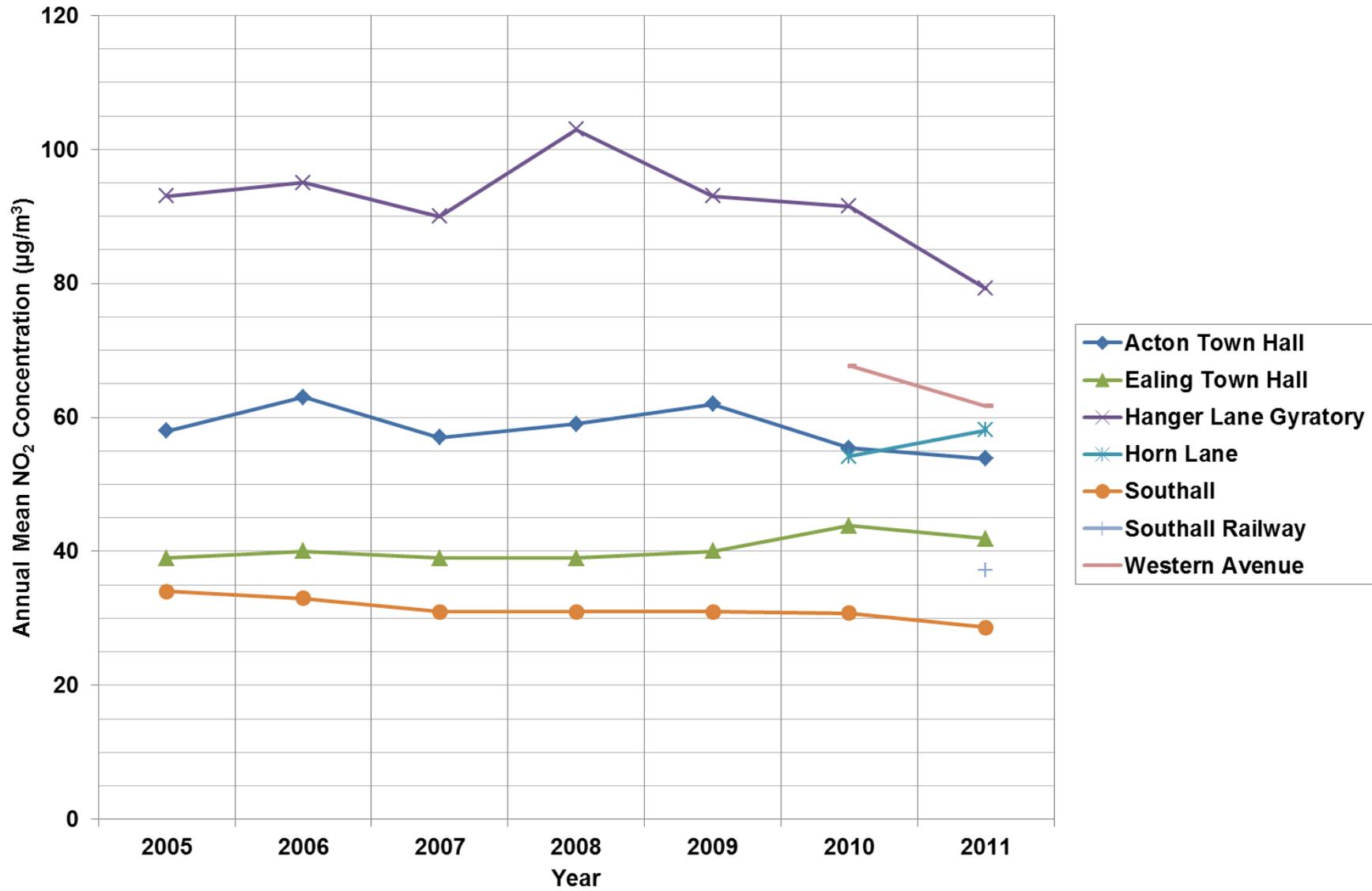


Figure 2.2: Annual Mean Nitrogen Dioxide Concentrations, 2005 – 2011.

Table 2.5: Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour mean Objective (2005 – 2011) ^a

Site ID	Site Type	Within AQMA?	Valid Data Capture 2011 %	Number of Exceedences of Hourly Mean (200 µg/m ³)						
				2005*	2006*	2007*	2008*	2009*	2010 ^{b*}	2011 ^{b*}
Acton Town Hall	Roadside	Y	93.8	6	29	31	45	13	4	2
Ealing Town Hall	Urban Background	Y	95.5	0	0	8	1	0	1	0
Hanger Lane Gyratory	Roadside	Y	92.8	157	244	64	84	166	134 (231)	66
Horn Lane	Industrial	Y	88.8	-	-	-	-	-	0 (138)	14 (192)
Southall	Urban Background	Y	98.9	0	0	0	0	0	0	0
Southall Railway	Near road	Y	72.9	-	-	-	-	-	-	0 (126)
Western Avenue	Roadside	Y	86.7	-	-	-	-	-	9 (185)	2 (168)
Objective				18						

^a Exceedences of the objective are shown in bold.

^b Values in brackets are 99.8th percentiles, which are presented where data capture was <90%. The 99.8th percentile should not exceed 200 µg/m³.

* All data has been fully ratified.

2.2.3. Diffusion Tube Monitoring Data

The nitrogen dioxide diffusion tube data are summarised in Table 2.6. The full dataset for 2011 (monthly mean values) is included in Appendix B. The diffusion tubes are prepared and analysed by Gradko (using the 20% Triethanolamine in acetone method). The monitoring results show that the annual mean nitrogen dioxide objective was exceeded at 75 of the diffusion tube sites during 2011. Table 2.7 shows nitrogen dioxide concentrations at the diffusion tube sites between 2009 and 2011.

Table 2.6: Results of Nitrogen Dioxide Diffusion Tubes in 2011

Site ID	Site Type	Within AQMA?	Triplicate or Co-located Tube?	Data capture 2011 (%)	Data with less than 9 months has been annualised (Y/N)	Annual mean concentration (Bias Adjustment factor = 1.01)
						2011 ($\mu\text{g}/\text{m}^3$)
1	Roadside	Y	N	100.0	-	54.1
2	Roadside	Y	N	100.0	-	38.9
3	Roadside	Y	N	100.0	-	48.5
4	Near Road	Y	N	100.0	-	48.6
5	Near Road	Y	N	100.0	-	38.4
6	Near Road	Y	N	75.0	-	57.8
7	Near Road	Y	N	91.7	-	59.3
8	Near Road	Y	N	91.7	-	57.2
9	Near Road	Y	N	66.7	Y	38.9
10	Roadside	Y	N	100.0	-	54.9
11	Near Road	Y	N	100.0	-	36.3
12	Near Road	Y	N	100.0	-	44.5
13	Near Road	Y	N	100.0	-	53.2
14	Kerbside	Y	N	100.0	-	43.4
15	Roadside	Y	Y	100.0	-	59.7
16	Roadside	Y	Y	100.0	-	62.8
17	Roadside	Y	Y	91.7	-	65.7
18	Near Road	Y	N	100.0	-	40.4
19	Near Road	Y	N	100.0	-	50.1
20	Kerbside	Y	N	100.0	-	50.2
21	Near Road	Y	N	100.0	-	36.1

Site ID	Site Type	Within AQMA?	Triplicate or Co-located Tube?	Data capture 2011 (%)	Data with less than 9 months has been annualised (Y/N)	Annual mean concentration (Bias Adjustment factor = 1.01)
						2011 ($\mu\text{g}/\text{m}^3$)
22	Background	Y	N	100.0	-	30.5
23	Roadside	Y	N	83.3	-	67.4
24	Near Road	Y	N	100.0	-	32.9
25	Near Road	Y	N	100.0	-	37.0
26	Near Road	Y	N	91.7	-	46.6
27	Roadside	Y	N	100.0	-	38.8
28	Kerbside	Y	N	100.0	-	43.3
29	Roadside	Y	N	100.0	-	39.9
30	Near Road	Y	N	100.0	-	40.9
31	Background	Y	N	100.0	-	35.0
32	Kerbside	Y	N	100.0	-	32.9
33	Roadside	Y	N	100.0	-	41.8
34	Near Road	Y	N	100.0	-	45.3
35	Background	Y	N	100.0	-	35.1
36	Kerbside	Y	N	100.0	-	69.3
37	Roadside	Y	N	100.0	-	38.1
38	Near Road	Y	N	100.0	-	47.9
39	Background	Y	N	100.0	-	28.6
40	Background	Y	N	100.0	-	33.3
41	Roadside	Y	N	100.0	-	42.1
42	Near Road	Y	Y	100.0	-	47.2
43	Near Road	Y	Y	100.0	-	47.8

Site ID	Site Type	Within AQMA?	Triplicate or Co-located Tube?	Data capture 2011 (%)	Data with less than 9 months has been annualised (Y/N)	Annual mean concentration (Bias Adjustment factor = 1.01)
						2011 ($\mu\text{g}/\text{m}^3$)
44	Near Road	Y	Y	100.0	-	48.4
45	Near Road	Y	N	100.0	-	43.1
46	Background	Y	N	100.0	-	28.2
47	Background	Y	N	83.3	-	26.9
48	Roadside	Y	N	100.0	-	63.3
49	Roadside	Y	N	100.0	-	65.4
50	Roadside	Y	N	100.0	-	36.0
51	Background	Y	N	100.0	-	27.2
52	Near Road	Y	N	100.0	-	36.0
53	Roadside	Y	N	100.0	-	64.7
54	Background	Y	Y	100.0	-	42.6
55	Background	Y	Y	100.0	-	42.6
56	Background	Y	Y	100.0	-	42.8
57	Near Road	Y	N	91.7	-	40.8
58	Roadside	Y	N	75.0	-	57.0
59	Background	Y	N	100.0	-	30.2
60	Roadside	Y	Y	100.0	-	53.3
61	Roadside	Y	Y	100.0	-	51.2
62	Roadside	Y	Y	100.0	-	50.3
63	Near Road	Y	N	91.7	-	29.1
64	Roadside	Y	N	100.0	-	41.8
65	Background	Y	N	100.0	-	31.5

Site ID	Site Type	Within AQMA?	Triplicate or Co-located Tube?	Data capture 2011 (%)	Data with less than 9 months has been annualised (Y/N)	Annual mean concentration (Bias Adjustment factor = 1.01)
						2011 ($\mu\text{g}/\text{m}^3$)
66	Near Road	Y	N	100.0	-	61.5
67	Roadside	Y	N	100.0	-	29.3
68	Roadside	Y	N	75.0	-	52.1
69	Background	Y	N	100.0	-	33.0
70	Background	Y	N	100.0	-	38.5
71	Roadside	Y	N	100.0	-	61.9
72	Near Road	Y	N	91.7	-	42.7
73	Background	Y	Y	100.0	-	39.7
74	Background	Y	Y	100.0	-	39.8
75	Background	Y	Y	100.0	-	41.0
76	Near Road	Y	N	91.7	-	39.5
77	Near Road	Y	N	100.0	-	30.3
78	Near Road	Y	N	100.0	-	40.1
79	Near Road	Y	N	75.0	-	29.6
80	Roadside	Y	N	100.0	-	30.2
81	Background	Y	Y	100.0	-	45.2
82	Background	Y	Y	100.0	-	45.6
83	Background	Y	Y	100.0	-	45.0
84	Near Road	Y	N	83.3	-	42.8
85	Near Road	Y	N	100.0	-	37.1
86	Roadside	Y	N	91.7	-	33.7
87	Near Road	Y	N	91.7	-	38.8

Site ID	Site Type	Within AQMA?	Triplicate or Co-located Tube?	Data capture 2011 (%)	Data with less than 9 months has been annualised (Y/N)	Annual mean concentration (Bias Adjustment factor = 1.01)
						2011 ($\mu\text{g}/\text{m}^3$)
88	Near Road	Y	N	100.0	-	33.6
89	Near Road	Y	N	100.0	-	38.6
90	Roadside	Y	N	100.0	-	70.4
91	Near Road	Y	N	100.0	-	42.3
92	Near Road	Y	N	100.0	-	51.4
93	Roadside	Y	N	100.0	-	46.5
94	Background	Y	N	100.0	-	33.9
95	Roadside	Y	Y	100.0	-	77.1
96	Roadside	Y	Y	100.0	-	80.6
97	Roadside	Y	Y	100.0	-	78.5
98	Roadside	Y	N	100.0	-	90.3
99	Roadside	Y	N	100.0	-	39.9
100	Near Road	Y	N	100.0	-	39.8
101	Roadside	Y	N	100.0	-	41.8
102	Background	Y	Y	100.0	-	30.8
103	Background	Y	Y	100.0	-	28.7
104	Background	Y	Y	100.0	-	29.4
105	Roadside	Y	Y	100.0	-	41.9
106	Roadside	Y	Y	100.0	-	42.5
107	Roadside	Y	Y	100.0	-	42.1
108	Near Road	Y	Y	100.0	-	35.7
109	Near Road	Y	Y	100.0	-	35.9

Site ID	Site Type	Within AQMA?	Triplicate or Co-located Tube?	Data capture 2011 (%)	Data with less than 9 months has been annualised (Y/N)	Annual mean concentration (Bias Adjustment factor = 1.01)
						2011 ($\mu\text{g}/\text{m}^3$)
110	Near Road	Y	Y	100.0	-	33.8
111	Roadside	Y	Y	100.0	-	54.0
112	Roadside	Y	Y	100.0	-	59.6
113	Roadside	Y	Y	100.0	-	56.8
114	Roadside	Y	Y	100.0	-	77.8
115	Roadside	Y	Y	100.0	-	73.5
116	Roadside	Y	Y	100.0	-	72.8
117	Near Road	Y	N	100.0	-	62.5
118	Near Road	Y	N	100.0	-	41.4
119	Kerbside	Y	N	91.7	-	45.7
120	Near Road	Y	N	83.3	-	53.9
121	Roadside	Y	N	100.0	-	39.6
122	Near Road	Y	N	100.0	-	38.1
123	Roadside	Y	N	75.0	-	36.1
124	Background	Y	N	100.0	-	39.5
125	Roadside	Y	N	91.7	-	71.8
126	Roadside	Y	N	100.0	-	60.8
Objective						40

- ^a Values in bold exceed the annual mean objective level.
- ^b Concentrations greater than $60 \mu\text{g}/\text{m}^3$ indicate a risk of the 1-hour nitrogen dioxide objective being exceeded.
- ^c Where data captures are less than 9 months, data have been annualised. The annualisation methodology is presented in Appendix A1.
- ^d Data was locally bias adjusted using a factor of 1.01. The decision for the use of a local bias adjustment method is discussed in Appendix A1.

Table 2.7: Results of Nitrogen Dioxide Diffusion Tubes (2009 to 2011) ^{a b}

Site ID	Site Type	Within AQMA?	Annual mean concentration (adjusted for bias) $\mu\text{g}/\text{m}^3$		
			2009 ^c	2010 ^c	2011 ^d
1	Roadside	Y	52.1	56.7	54.1
2	Roadside	Y	43.0	36.9	38.9
3	Roadside	Y	48.9	52.9	48.5
4	Near Road	Y	44.7	47.5	48.6
5	Near Road	Y	52.6	41.1	38.4
6	Near Road	Y	55.7	69.0	57.8
7	Near Road	Y	58.0	68.4	59.3
8	Near Road	Y	58.0	68.8	57.2
9	Near Road	Y	58.5	67.4	38.9
10	Roadside	Y	73.0	49.6	54.9
11	Near Road	Y	43.0	40.5	36.3
12	Near Road	Y	42.8	49.5	44.5
13	Near Road	Y	53.5	56.5	53.2
14	Kerbside	Y	48.0	50.7	43.4
15	Roadside	Y	67.2	76.9	59.7
16	Roadside	Y	60.3	75.2	62.8
17	Roadside	Y	61.2	76.0	65.7
18	Near Road	Y	35.8	37.8	40.4
19	Near Road	Y	-	-	50.1
20	Kerbside	Y	49.5	61.6	50.2
21	Near Road	Y	34.2	38.1	36.1
22	Background	Y	67.0	33.4	30.5

Site ID	Site Type	Within AQMA?	Annual mean concentration (adjusted for bias) $\mu\text{g}/\text{m}^3$		
			2009 ^c	2010 ^c	2011 ^d
23	Roadside	Y	55.9	64.9	67.4
24	Near Road	Y	33.4	39.6	32.9
25	Near Road	Y	50.8	52.0	37.0
26	Near Road	Y	45.6	49.4	46.6
27	Roadside	Y	37.3	39.1	38.8
28	Kerbside	Y	71.2	79.3	43.3
29	Roadside	Y	37.9	48.3	39.9
30	Near Road	Y	40.3	44.3	40.9
31	Background	Y	-	44.6	35.0
32	Kerbside	Y	48.4	42.1	32.9
33	Roadside	Y	-	48.0	41.8
34	Near Road	Y	-	42.1	45.3
35	Background	Y	42.1	51.6	35.1
36	Kerbside	Y	68.1	66.4	69.3
37	Roadside	Y	44.5	51.1	38.1
38	Near Road	Y	54.5	49.4	47.9
39	Background	Y	46.8	46.3	28.6
40	Background	Y	34.2	33.6	33.3
41	Roadside	Y	-	-	42.1
42	Near Road	Y	46.7	53.7	47.2
43	Near Road	Y	47.6	54.3	47.8
44	Near Road	Y	48.4	52.2	48.4
45	Near Road	Y	40.9	45.7	43.1

Site ID	Site Type	Within AQMA?	Annual mean concentration (adjusted for bias) $\mu\text{g}/\text{m}^3$		
			2009 ^c	2010 ^c	2011 ^d
46	Background	Y	31.1	25.7	28.2
47	Background	Y	-	-	26.9
48	Roadside	Y	-	-	63.3
49	Roadside	Y	61.1	65.8	65.4
50	Roadside	Y	39.2	36.6	36.0
51	Background	Y	29.9	29.4	27.2
52	Near Road	Y	37.1	41.9	36.0
53	Roadside	Y	71.4	70.5	64.7
54	Background	Y	52.5	44.2	42.6
55	Background	Y	59.1	43.4	42.6
56	Background	Y	55.9	43.4	42.8
57	Near Road	Y	36.0	43.1	40.8
58	Roadside	Y	51.0	54.3	57.0
59	Background	Y	34.8	32.6	30.2
60	Roadside	Y	48.3	54.9	53.3
61	Roadside	Y	49.4	53.9	51.2
62	Roadside	Y	47.4	52.8	50.3
63	Near Road	Y	35.6	40.3	29.1
64	Roadside	Y	50.7	57.2	41.8
65	Background	Y	34.7	36.1	31.5
66	Near Road	Y	57.9	56.3	61.5
67	Roadside	Y	38.6	35.9	29.3
68	Roadside	Y	50.0	57.9	52.1

Site ID	Site Type	Within AQMA?	Annual mean concentration (adjusted for bias) $\mu\text{g}/\text{m}^3$		
			2009 ^c	2010 ^c	2011 ^d
69	Background	Y	35.1	32.3	33.0
70	Background	Y	45.9	41.4	38.5
71	Roadside	Y	58.0	60.1	61.9
72	Near Road	Y	-	-	42.7
73	Background	Y	48.9	41.8	39.7
74	Background	Y	48.3	41.3	39.8
75	Background	Y	47.6	38.5	41.0
76	Near Road	Y	45.3	52.0	39.5
77	Near Road	Y	40.8	44.1	30.3
78	Near Road	Y	38.5	42.3	40.1
79	Near Road	Y	35.7	35.9	29.6
80	Roadside	Y	34.4	42.8	30.2
81	Background	Y	50.2	54.6	45.2
82	Background	Y	50.5	56.6	45.6
83	Background	Y	50.8	52.3	45.0
84	Near Road	Y	48.9	52.2	42.8
85	Near Road	Y	49.7	39.5	37.1
86	Roadside	Y	48.0	46.9	33.7
87	Near Road	Y	35.8	39.2	38.8
88	Near Road	Y	-	-	33.6
89	Near Road	Y	40.9	43.0	38.6
90	Roadside	Y	72.1	79.8	70.4
91	Near Road	Y	-	-	42.3

Site ID	Site Type	Within AQMA?	Annual mean concentration (adjusted for bias) $\mu\text{g}/\text{m}^3$		
			2009 ^c	2010 ^c	2011 ^d
92	Near Road	Y	51.9	57.1	51.4
93	Roadside	Y	45.2	51.8	46.5
94	Background	Y	38.9	36.1	33.9
95	Roadside	Y	71.6	77.9	77.1
96	Roadside	Y	73.2	78.6	80.6
97	Roadside	Y	74.5	76.1	78.5
98	Roadside	Y	-	82.8	90.3
99	Roadside	Y	40.9	43.4	39.9
100	Near Road	Y	39.0	42.9	39.8
101	Roadside	Y	40.8	43.2	41.8
102	Background	Y	33.8	31.3	30.8
103	Background	Y	31.2	30.5	28.7
104	Background	Y	33.9	28.0	29.4
105	Roadside	Y	50.4	44.3	41.9
106	Roadside	Y	51.6	43.9	42.5
107	Roadside	Y	50.8	44.6	42.1
108	Near Road	Y	40.9	40.8	35.7
109	Near Road	Y	39.9	39.1	35.9
110	Near Road	Y	40.5	39.8	33.8
111	Roadside	Y	-	59.6	54.0
112	Roadside	Y	-	57.1	59.6
113	Roadside	Y	-	58.6	56.8
114	Roadside	Y	-	72.4	77.8

Site ID	Site Type	Within AQMA?	Annual mean concentration (adjusted for bias) $\mu\text{g}/\text{m}^3$		
			2009 ^c	2010 ^c	2011 ^d
115	Roadside	Y	-	73.1	73.5
116	Roadside	Y	-	67.9	72.8
117	Near Road	Y	51.4	62.6	62.5
118	Near Road	Y	36.3	40.1	41.4
119	Kerbside	Y	-	45.8	45.7
120	Near Road	Y	-	51.0	53.9
121	Roadside	Y	40.8	42.7	39.6
122	Near Road	Y	-	57.3	38.1
123	Roadside	Y	-	-	36.1
124	Background	Y	-	42.4	39.5
125	Roadside	Y	-	68.2	71.8
126	Roadside	Y	-	-	60.8
Objective				40	

^a Values in bold exceed the annual mean objective level.

^b Concentrations greater than $60 \mu\text{g}/\text{m}^3$ indicate a risk of the 1-hour nitrogen dioxide objective being exceeded.

^d 2009 data bias adjusted using national factors of 0.89 for roadside and kerbside sites, 0.90 for near road sites and 1.02 for urban background sites. Similarly, 2010 data bias adjusted using local factors of 1.02, 1.06 and 1.01. The bias adjustment methods for 2009 and 2010 are presented in previous Council reports.

^d 2011 data locally bias adjusted using a factor of 1.01. The decision for the use of a local bias adjustment method is discussed in Appendix A1.

2.2.4. *PM*₁₀

Table 2.8 shows that there were no exceedences of the annual mean objective (40µg/m³) for PM₁₀ at any of the automatic monitoring sites across the London Borough of Ealing in 2011, although the Horn Lane site has in previous years shown exceedences. Figure 2.3 shows the annual mean concentrations reduced significantly at the Horn Lane site between 2005 and 2008, and have since remained fairly constant at around the objective level. All other sites are well below the annual mean objective level and show no clear trends between 2005 and 2011.

In 2011, most concentrations were within the 24-hour mean objective (50 µgm³), which permits a maximum of 35 days of exceedences. At the Horn Lane site, there were exceedences of the 24-hour objective level in every year between 2005 and 2011. There is relevant exposure close to this site. The objective was not exceeded at any other sites between 2005 and 2011.

Table 2.8: Results of Automatic Monitoring of PM₁₀: Comparison with Annual Mean Objective (2005 – 2011)

Site ID	Site Type	Within AQMA?	Reference Equivalent?	Valid Data Capture 2011 % ^b	Annual Mean Concentration µg/m ³						
					2005*	2006*	2007*	2008*	2009*	2010*	2011
Acton Town Hall	Roadside	Y	Y	97.3	29.0	30.0	30.0	26.0	25.5	24.1 ^b	25.7
Acton Town Hall FDMS	Roadside	Y	Y	84.1	28.0	26.0	26.0	23.0	21.5 ^b	23.3 ^b	24.2 ^b
Hanger Lane Gyratory	Roadside	Y	Y	85.2	-	-	-	-	-	-	30.8 ^b
Horn Lane	Industrial	Y	Y	97.8	84.0	74.0	63.0	42.0	38.6 ^b	41.5	36.3
Southall	Urban Background	Y	Y	98.1	23.0	25.0	24.0	20.0	19.9	20.0	21.7
Southall Railway	Near road	Y	Y	70.4	-	-	-	-	-	-	23.3 ^b
Western Avenue	Roadside	Y	Y	83.8	-	-	-	-	-	-	31.2 ^b
Objective					40						

^a Exceedences of the objective level are shown in bold.

^b Where data captures are less than 90%, data have been annualised. For 2005 to 2008, no annualisation is presented in previous Review and Assessment reports. For 2009 to 2011, the annualisation methodology is presented in Appendix A1.

* All data have been fully ratified.

Table 2.9: Results of Automatic Monitoring for PM₁₀: Comparison with 24-hour mean Objective (2005 – 2011)

Site ID	Site Type	Within AQMA?	Reference Equivalent?	Valid Data Capture 2011 % ^b	Number of Exceedences of 24-Hour Mean (50 µg/m ³)						
					2005*	2006*	2007*	2008*	2009* ^c	2010* ^c	2011* ^c
Acton Town Hall	Roadside	Y	Y	97.3	20	20	26	22	13	7 (24)	23
Acton Town Hall FDMS	Roadside	Y	Y	84.1	11	24	27	14	8 (30)	6 (31)	22 (41)
Hanger Lane Gyratory	Roadside	Y	Y	85.2	-	-	-	-	-	-	29 (47)
Horn Lane	Industrial	Y	Y	97.8	230	224	173	103	71 (60)	91	59
Southall	Urban Background	Y	Y	98.1	5	4	15	4	4	2	9
Southall Railway	Near road	Y	Y	70.4	-	-	-	-	-	-	5 (31)
Western Avenue	Roadside	Y	Y	83.8	-	-	-	-	-	-	23 (45)
Objective					35						

^a Exceedences of the objective level are shown in bold.

^b Where data captures are less than 90%, data have been annualised. For 2005 to 2008, no annualisation is presented in previous Review and Assessment reports. For 2009 to 2011, the annualisation methodology is presented in Appendix A1.

^c Values in brackets are 90th percentiles, which are presented where data capture was <90%. The 90th percentile should not exceed 50 µg/m³.

* All data have been fully ratified.

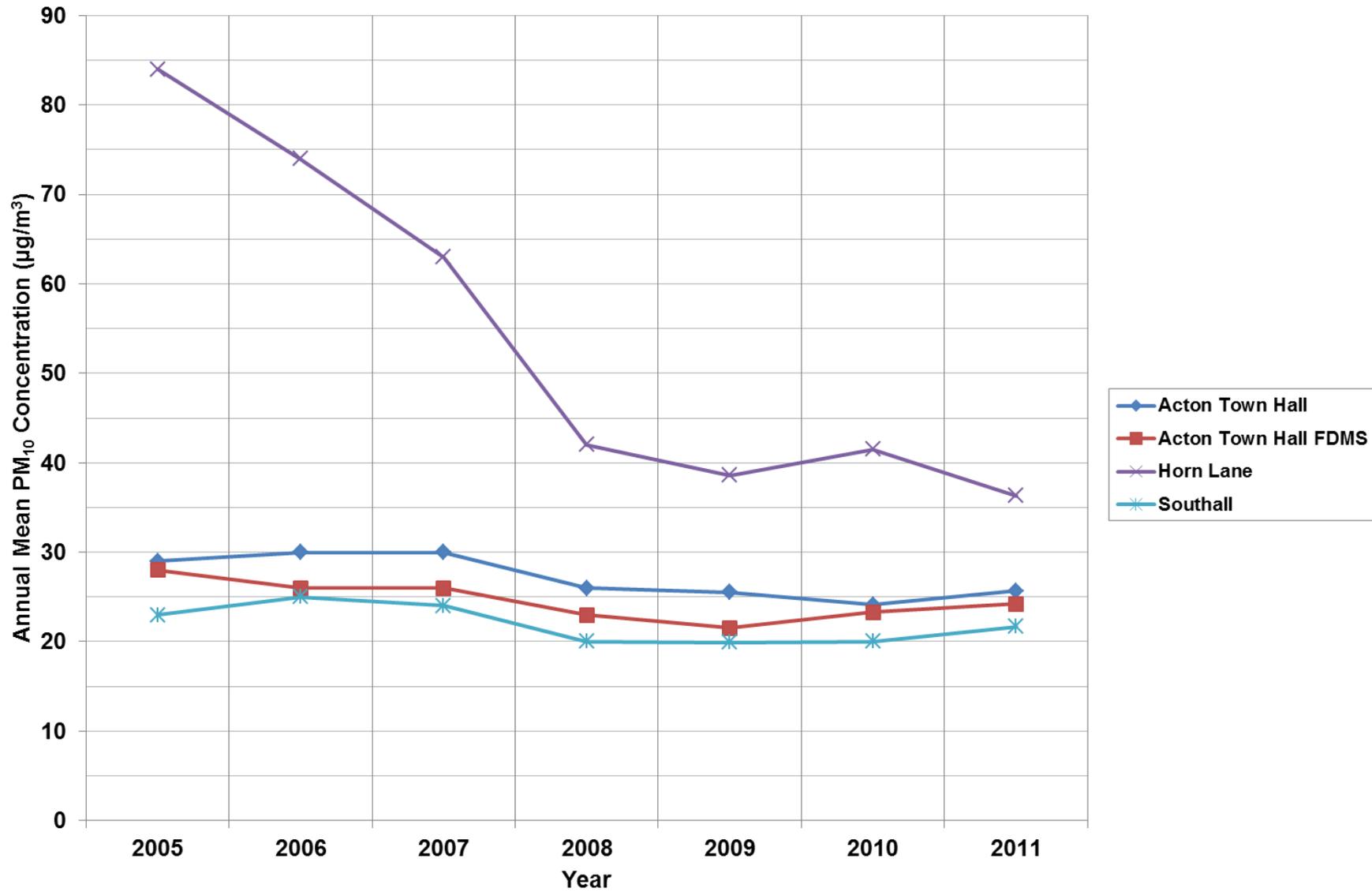


Figure 2.3: Annual Mean PM₁₀ Concentrations, 2005 – 2011.

2.2.5. Sulphur Dioxide

London Borough of Ealing operated one site (Ealing Town Hall) that measured sulphur dioxide in the Borough until 31 December 2011. The site was closed in January 2012. Table 2.10 shows that there were no measured exceedences of the sulphur dioxide objectives at the Ealing Town Hall monitoring site. There is no clear trend in the annual mean concentration between 2005 and 2011 (Figure 2.4).

Table 2.10: Results of Automatic Monitoring of Sulphur Dioxide: Comparison with Annual Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture 2011 %	Number of Exceedences (percentile in bracket $\mu\text{g}/\text{m}^3$) ^a		
				15-minute Objective (266 $\mu\text{g}/\text{m}^3$)	1-hour Objective (350 $\mu\text{g}/\text{m}^3$)	24-hour Objective (125 $\mu\text{g}/\text{m}^3$)
Ealing Town Hall	Urban Background	Y	68	0 (36)	0 (31)	0 (33)
Objective				35	24	3

^a Values in brackets are 99th percentile for the 24-hour objective, 99.7th percentile for the 1-hour objective and 99.9th percentile for the 15-minute objective, which are presented where data capture was <90%.

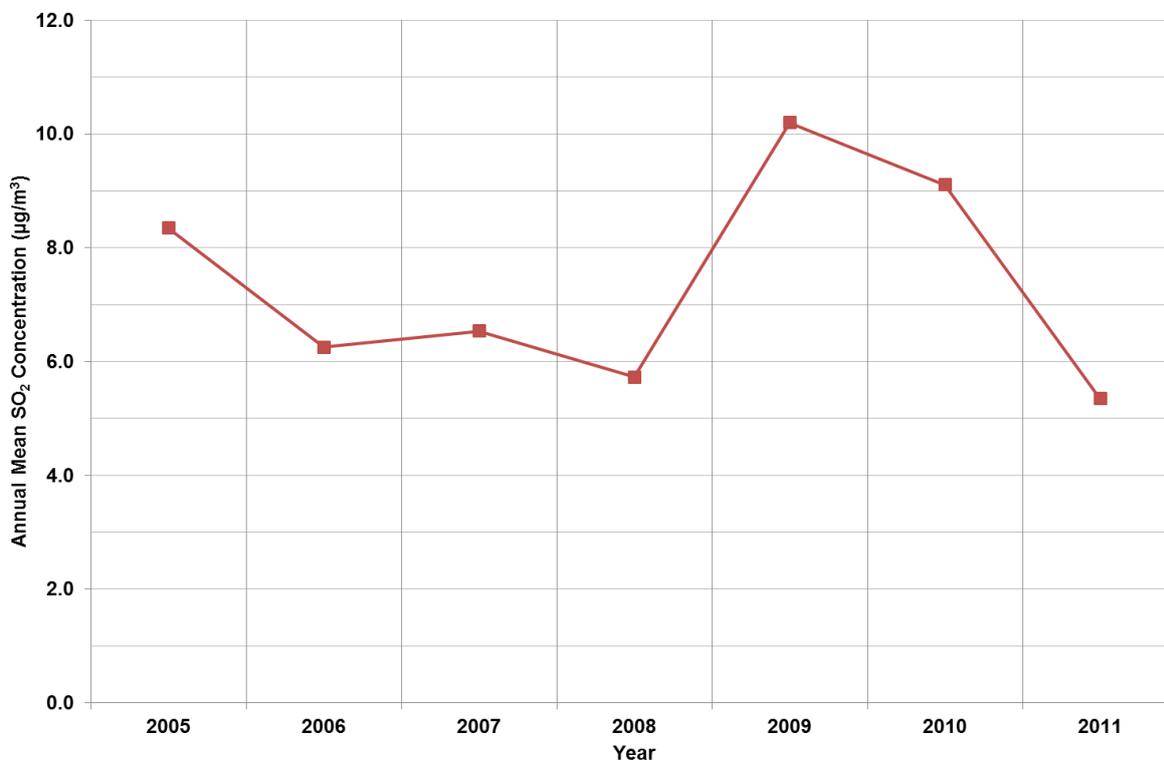


Figure 2.4: Annual Mean Sulphur Dioxide Concentrations, 2005 – 2011.

2.2.6. Carbon Monoxide

The London Borough of Ealing operated one site (Acton Town Hall) that measured carbon monoxide in the Borough until 31 December 2011. The site was closed in January 2012. Table 2.11 shows that there were no measured exceedences of the carbon monoxide objectives at the Acton Town Hall automatic monitoring site during 2011. Figure 2.5 shows that there were no exceedences of the maximum daily running 8-hour mean concentration objective between 2005 and 2011.

Table 2.11: Results of Automatic Monitoring of Carbon Monoxide in 2011

Site ID	Site Type	Within AQMA?	Valid Data Capture 2011 %	Maximum Daily Running 8-Hour Mean Concentration (mg/m ³)	Number of exceedences
Acton Town Hall	Roadside	Y	97.9	0.3	0
Objective				10	

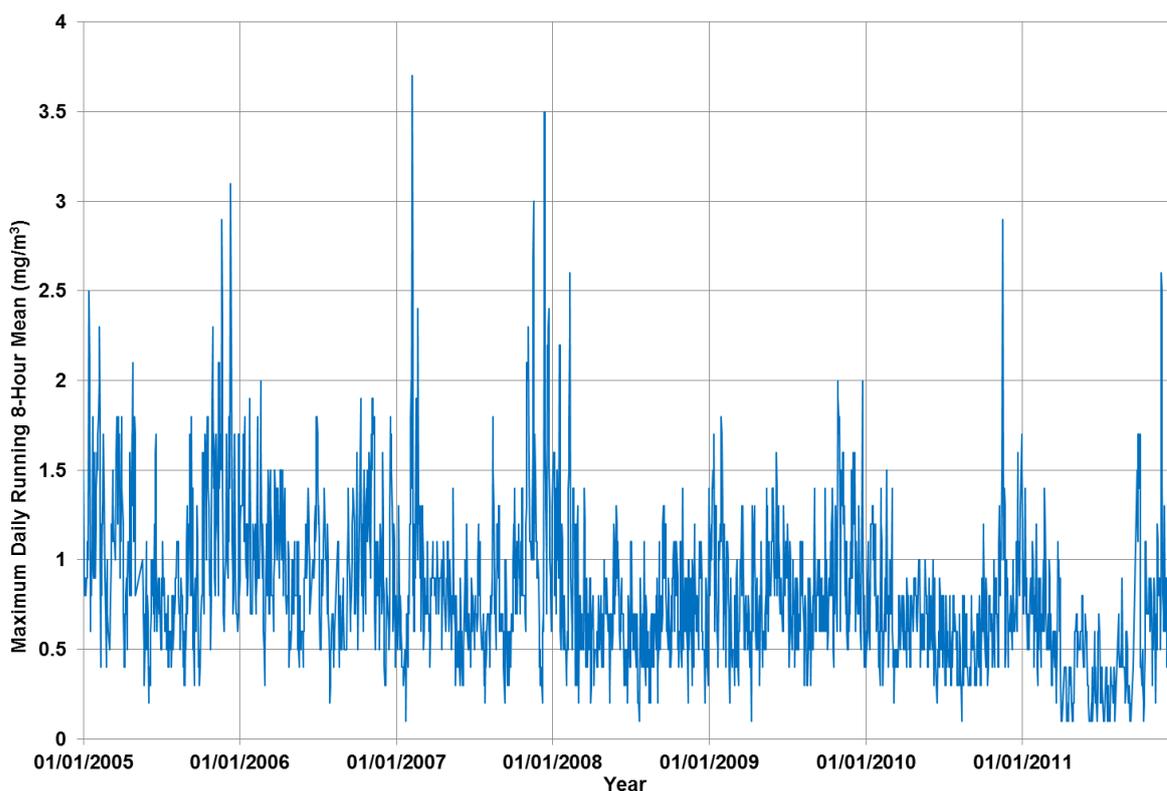


Figure 2.5: Maximum Daily Running 8-Hour Mean Carbon Monoxide Concentrations, 2005 – 2011.

2.2.7. Benzene

The London Borough of Ealing during 2011 operated three roadside passive diffusion tube sites that measured benzene within the Borough. The diffusion tubes are prepared and analysed by Gradko and the concentrations are given in Table 2.12 and shown in Figure 2.6. Between 2003 and 2010 concentrations have declined steadily and are well below the objective level.

Table 2.12: Results of Benzene Diffusion Tubes between 2009 and 2011

Site ID	Site Type	Within AQMA?	Data capture 2011 (Number of Months)	Annual Mean Concentration ($\mu\text{g}/\text{m}^3$)		
				2009	2010	2011
55	Roadside	Y	12	1.6	1.3	1.2
46	Roadside	Y	12	1.7	1.4	1.0
89	Roadside	Y	12	2.1	1.6	1.9
Objective				5		

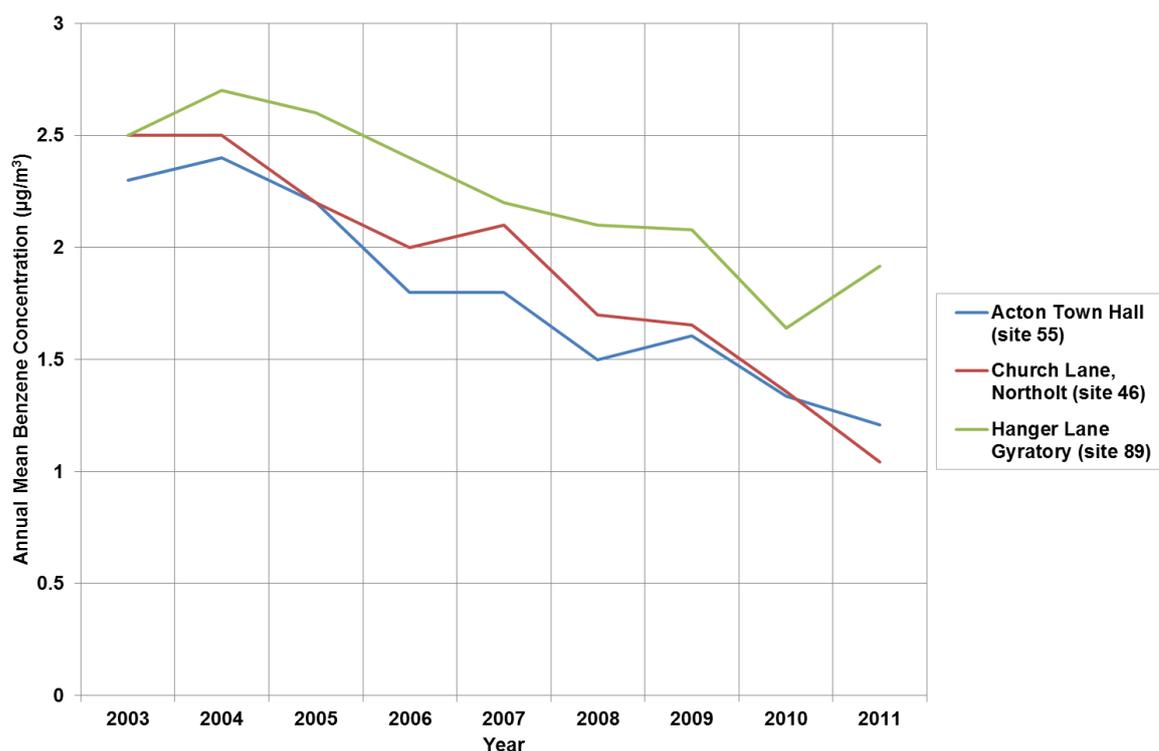


Figure 2.6: Annual Mean Benzene Concentrations, 2003 – 2011.

2.2.8. Other Pollutants Monitored

The London Borough of Ealing measured $\text{PM}_{2.5}$ at the Acton Town Hall automatic monitoring station in 2011. The annual mean $\text{PM}_{2.5}$ concentration was $13.1 \mu\text{g}/\text{m}^3$, with 95% data capture.

There are no LAQM objectives for PM_{2.5} that apply during this year, however the European Union limit value of 25 µg/m³ is to be met by 2015. The measured concentration was well below the objective.

Ozone concentrations have been recorded at the Acton Town Hall and Ealing Town Hall automatic monitoring sites, with over 94% data capture in 2011. There were no exceedences of the daily maximum rolling 8-hour mean objective level of 100 µg/m³. Ozone is a trans-boundary pollutant and so is not covered by LAQM.

No other monitoring was undertaken by the London Borough of Ealing in 2011.

2.2.9. Summary of Compliance with AQS Objectives

The London Borough of Ealing has examined the results from air quality monitoring in the Borough. Annual mean concentrations of nitrogen dioxide remain in exceedence of the AQS objectives level within the AQMA. The 1-hour nitrogen dioxide objective level is currently being met, except at the Hanger Lane Gyrotory site which continues to exceed the objective level. The basis for declaration of the AQMA remains unchanged.

Measured PM₁₀ concentrations are all below the annual mean objective level. The 24-hour objective level was met at sites except for the Horn Lane site, which has continued to exceed the objective level and has nearby relevant exposure. The basis for declaration of the AQMA remains unchanged.

All objectives for sulphur dioxide concentrations were met at the Ealing Town Hall site. Carbon monoxide concentrations were well below the objective level at the Acton Town Hall site. The Benzene concentrations were well below the objective level at all three monitoring locations.

3 Road Traffic Sources

3.1. Narrow Congested Streets with Residential Properties Close to the Kerb

The criteria for assessing narrow congested streets are set out in Box 5.3, section A1 of TG(09) (Defra, 2009). Narrow congested streets were considered in previous Updating and Screening Assessments and no such locations were identified.

The London Borough of Ealing confirms that there are no new/newly identified congested streets with a flow above 5,000 vehicles per day and residential properties close to the kerb, that have not been adequately considered in previous rounds of Review and Assessment.

3.2. Busy Streets Where People May Spend 1-hour or More Close to Traffic

The criteria for assessing busy streets relevant for the hourly nitrogen dioxide objective are set out in Box 5.3, section A2 of TG(09). Busy streets where people may spend 1-hour or more close to traffic were considered in the previous USA.

The London Borough of Ealing confirms that there are no new/newly identified busy streets where people may spend 1 hour or more close to traffic.

3.3. Roads with a High Flow of Buses and/or HGVs.

The criteria for assessing roads with high flows of buses and/ or HGVs are set out in Box 5.3, section A3 of TG(09). Roads with a high flow of buses and/or HGVs were considered in previous USAs and no such locations identified.

The London Borough of Ealing confirms that there are no new/newly identified roads with high flows of buses/HDVs.

3.4. Junctions

The criteria for assessing junctions are set out in Box 5.3, section A4 of TG(09). Junctions were considered in detail in previous USAs and where relevant have been included in Detailed Assessments and subsequent AQMA declarations.

The London Borough of Ealing confirms that there are no new/newly identified busy junctions/busy roads.

3.5. New Roads Constructed or Proposed Since the Last Round of Review and Assessment

The criteria for assessing new roads are set out in Box 5.3, section A5 of TG(09) and are unchanged from previous rounds of Review and Assessment. There have been no new roads identified within the London Borough of Ealing.

The London Borough of Ealing confirms that there are no new/proposed roads.

3.6. Roads with Significantly Changed Traffic Flows

The criteria for assessing roads with significantly changed traffic flows are set out in Box 5.3, section A6 of TG(09). The predictions of increased traffic do not approach 25% on roads with more than 10,000 vpd.

The London Borough of Ealing confirms that there are no new/newly identified roads with significantly changed traffic flows.

3.6.1. Bus and Coach Stations

The criteria for assessing roads with significantly changed traffic flows are set out in Box 5.3, section A7 of TG(09). Bus and coach stations were considered in previous USAs and no such locations identified.

The London Borough of Ealing confirms that there are no relevant bus stations in the Local Authority area.

4 Other Transport Sources

4.1. Airports

The criteria for assessing airports are set out in Box 5.4, section B1 of TG(09). Airports were considered in previous USAs and no such locations identified.

The London Borough of Ealing confirms that there are no airports in the Local Authority area.

4.2. Railways (Diesel and Steam Trains)

4.2.1. Stationary Trains

The criteria for assessing stationary locomotives are set out in Box 5.4, section B2 of TG(09) (Approach 1). There are no locations in the London Borough of Ealing where trains are stationary for 15 minutes or more, more than three times a day.

There will be stationary diesel trains at Southall Station, Acton Goods Yard rail terminal and Greenford Railway Station. The Great Western Railway Preservation Group in Southall may also have steam engines in the sidings at Southall Railway Station. Although these trains can remain stationary for periods of more than 15 minutes, there are no relevant exposures within 15 m.

The London Borough of Ealing confirms that there are no locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m.

4.2.2. Moving Trains

The criteria for assessing moving locomotives are set out in Box 5.4, section B2 of TG(09) (Approach 2). The London Paddington to Swansea rail line listed in Table 5.1 of the Technical Guidance LAQM.TG(09) passes through the London Borough of Ealing. A detailed assessment of this rail line is currently being undertaken by a Defra funded project 'Emissions from Trains in London'.

The London Borough of Ealing has identified locations with a large number of movements of diesel locomotives, and potential long-term relevant exposure within 30m, and is currently undertaking a detailed assessment with Defra.

4.3. Ports (Shipping)

The criteria for assessing ports are set out in Box 5.4, section B3 of TG(09) and are unchanged from previous rounds of Review and Assessment. There is no shipping activity in the London Borough of Ealing.

The London Borough of Ealing confirms that there are no ports or shipping that meet the specified criteria within the Local Authority area.

5 Industrial Sources

5.1. Industrial Installations

5.1.1. New or Proposed Installations for which an Air Quality Assessment has been Carried Out

The criteria for assessing industrial installations are set out in Box 5.5, section C1 of TG(09). There are no new or proposed industrial installations within the London Borough of Ealing since the last USA.

The London Borough of Ealing has assessed new/proposed industrial installations, and concluded that it will not be necessary to proceed to a Detailed Assessment.

5.1.2. Existing Installations where Emissions have Increased Substantially or New Relevant Exposure has been Introduced

None of the industrial installations identified in previous USAs have substantially increased emissions and no new exposure has been introduced nearby.

The London Borough of Ealing confirms that there are no industrial installations with substantially increased emissions or new relevant exposure in their vicinity within its area or nearby in a neighbouring authority.

5.1.3. New or Significantly Changed Installations with No Previous Air Quality Assessment

The criteria for assessing industrial installations are set out in Box 5.5, section C1 of TG(09). There are two new industrial installations within the London Borough of Ealing in 2011. On the 1st November a permit was issued for White Rose Laundries Ltd at Units 5 & 6, School Road, Park Royal. On the 15th November 2011 a permit was given to Mr N. Muhunthakumar T/A Kensington Dry Cleaners, 12A Gorst Road, Park Royal.

On the 15th January 2009 a permit was given to Quattro Construction Ltd T/A Seven Dry Cleaners, 17 Leeland Road, West Ealing, London W13 9HH. On the 6th January 2010 a permit was given to Mr G. Ahmadi, Horn Lane Dry Cleaners, 146 Horn Lane, Acton, London, W3 6PG.

A permit was given on the 15th January 2009 for a small waste oil burner (<0.4 MW) of Jetpoint Services Ltd, Unit 6A, 23-35 Gorst Road, Park Royal, London NW10 6LA. However, this installation was destroyed in a fire and the permit was surrendered with effect from the 13th

September 2012. A permit was also given on the 23rd April 2009 for a small waste oil burner (<0.4 MW) of Shine Motors Ltd, 7A Coronation Road, Park Royal, London NW10 7PQ.

The new industrial installations have been assessed, and it is concluded that it will not be necessary to proceed to a Detailed Assessment.

5.2. Major Fuel (Petrol) Storage Depots

The criteria for assessing major fuel (petrol) storage depots are set out in Box 5.5, section C2 of TG(09). Major petrol storage depots were considered in the previous USAs and no such locations identified.

There are no major fuel (petrol) storage depots within the Local Authority area.

5.3. Petrol Stations

The criteria for assessing petrol stations are set out in Box 5.5, section C3 of TG(09). There are no petrol stations within the London Borough of Ealing that fulfil the criteria.

The London Borough of Ealing confirms that there are no petrol stations meeting the specified criteria.

5.4. Poultry Farms

The criteria for assessing poultry farms are set out in Box 5.5, section C4 of TG(09). No farms exceeding the relevant criteria (turkey units with greater than 100,000 birds, naturally ventilated units with greater than 200,000 birds or mechanically ventilated units with greater than 400,000) have been identified.

The London Borough of Ealing confirms that there are no poultry farms meeting the specified criteria.

6 Commercial and Domestic Sources

6.1. Biomass Combustion – Individual Installations

The criteria for assessing biomass combustion (individual installations) are set out in Box 5.8, section D1 of TG(09). Ealing Council has identified two biomass boilers between 50kW and 20MW for further investigation. The first is a 85 kW biomass boiler at 50-54 Broadway, West Ealing. Given that the stack height is 60 m, emissions of NO_x and PM₁₀ are well below the threshold emission rates stated in TG(09). Thus, this biomass boiler will have a negligible effect on air quality and no detailed assessment is required. The second includes a 75 kW biomass boiler as well as 400 kW and 500kW gas boilers at the South Acton Estate, with a proposed 60 kW CHP boiler to replace these at a later stage of development.

The London Borough of Ealing has assessed a number of biomass boilers in the Borough and concluded it will not be necessary to proceed to a Detailed Assessment for NO_x and PM₁₀.

6.2. Biomass Combustion - Combined Impacts

The criteria for assessing biomass combustion (combined impacts) are set out in Box 5.8, section D2 of TG(09). The likelihood of areas of combined biomass combustion exceeding the criteria is considered highly unlikely.

The London Borough of Ealing confirms that there are no biomass combustion plants, with combined impacts, in the Local Authority area.

6.3. Domestic Solid-Fuel Burning

The criteria for assessing domestic solid-fuel burning are set out in Box 5.8, section D2 of TG(09). Ealing Council has not identified any areas where significant coal burning takes place.

The London Borough of Ealing confirms that there are no areas of significant domestic fuel use in the Local Authority area.

7 Fugitive or Uncontrolled Sources

The criteria for assessing fugitive or uncontrolled sources are set out in Box 5.10, section E1 of TG(09). There are no quarries, landfill sites or other dusty operations in the London Borough of Ealing that have the potential to have a significant effect on PM₁₀ concentrations at residential properties that have not been previously assessed.

The London Borough of Ealing confirms that there are no new potential sources of fugitive particulate matter emissions in the Local Authority area.

8 Conclusions and Proposed Actions

8.1. Conclusions from New Monitoring Data

Monitoring during 2011 has identified a number of exceedences of the annual mean nitrogen dioxide objective level at relevant locations in the London Borough of Ealing. All of these are within the existing AQMA, confirming the continuing need for the AQMA for annual mean and 1-hour mean nitrogen dioxide. Additionally, monitoring during 2011 has identified an exceedence of the 24-hour objective level for PM₁₀ at the Horn Lane site. There is relevant exposure close to this site, confirming the continuing need for the AQMA for 24-hour mean PM₁₀.

8.2. Conclusions from Assessment of Sources

The Updating and Screening Assessment has not identified any significant changes in emissions sources within the London Borough of Ealing. There have not been any new relevant industrial installations and any new nor substantially altered roads within the London Borough of Ealing. There are also no new significant fugitive sources of emissions.

8.3. Proposed Actions

A Progress Report will be undertaken in 2013.

9 References

Defra (2009) *Review & Assessment: Technical Guidance LAQM.TG(09)*, Defra.

Environment Act (1995), HMSO.

LAQN (2012) *London Air Quality Network*, [Online], Available: www.londonair.org.uk.

London Borough of Ealing (2003) *London Borough of Ealing Air Quality Action Plan*.

London Borough of Ealing (2009) *Fourth Round Updating and Screening Assessment for London Borough of Ealing*.

The Air Quality (England) (Amendment) Regulations, 2002, Statutory Instrument 3043 (2002), HMSO.

The Air Quality Regulations, 2000, Statutory Instrument 928 (2000), HMSO, London.

10 Appendices

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A1 Appendix A: Data Handling

QA/QC

Automatic Monitoring

QA/QC for Ealing's automatic monitoring stations is provided by ERG King's College London. These stations are calibrated fortnightly by LSO, with audits every 6 months. Calibrations are carried out by the Local Authority. Audits are carried out by the National Physics Laboratory. Audits are UKAS accredited.

A final measurement data set was produced by King's College following retrospective ratification of the measurements using procedures which exceed the requirements given by LAQM TG(09) (Defra, 2009). During ratification, information from regular calibrations, audits and daily manual validation were used to establish an operational and calibration history of the instruments. The pollution measurements were then corrected to establish traceability to National Meteorological Standards. Details of the monitoring site and the final dataset can be found at www.londonair.org.uk.

Diffusion Tube Monitoring

The diffusion tubes deployed by the London Borough of Ealing are supplied and analysed by AECOM (tubes provided by Gradko International Ltd.) using a preparation mixture of 20% Triethanolamine (TEA) in Acetone.

Gradko is assessed as part of the Workplace Analysis Scheme for Proficiency (WASP) operated by the Health and Safety Laboratory (HSL) and demonstrated satisfactory performance in the WASP Summary of Laboratory Performance, Rounds 112-114 (Jan 2011 - September 2011), scoring 100%, with performance reducing in Round 115 (October to December 2011) to 37.5% satisfactory results.

Diffusion Tube Bias Adjustment Factor

Local Factor

The London Borough of Ealing has triplicate diffusion tube co-location studies at five of their automatic monitoring sites, in 2011. The Horn Lane and Western Avenue sites had low data capture in 2011 so were excluded from this calculation. It is considered more appropriate to exclude sites from the bias-adjustment calculations that have a data capture of less than 90%. Data from Acton Town Hall, Ealing Town Hall and Southall was used to produce a combined local bias adjustment factor of 1.01 (Figures A1.1, A1.2, and A1.3, and Table A1.1).

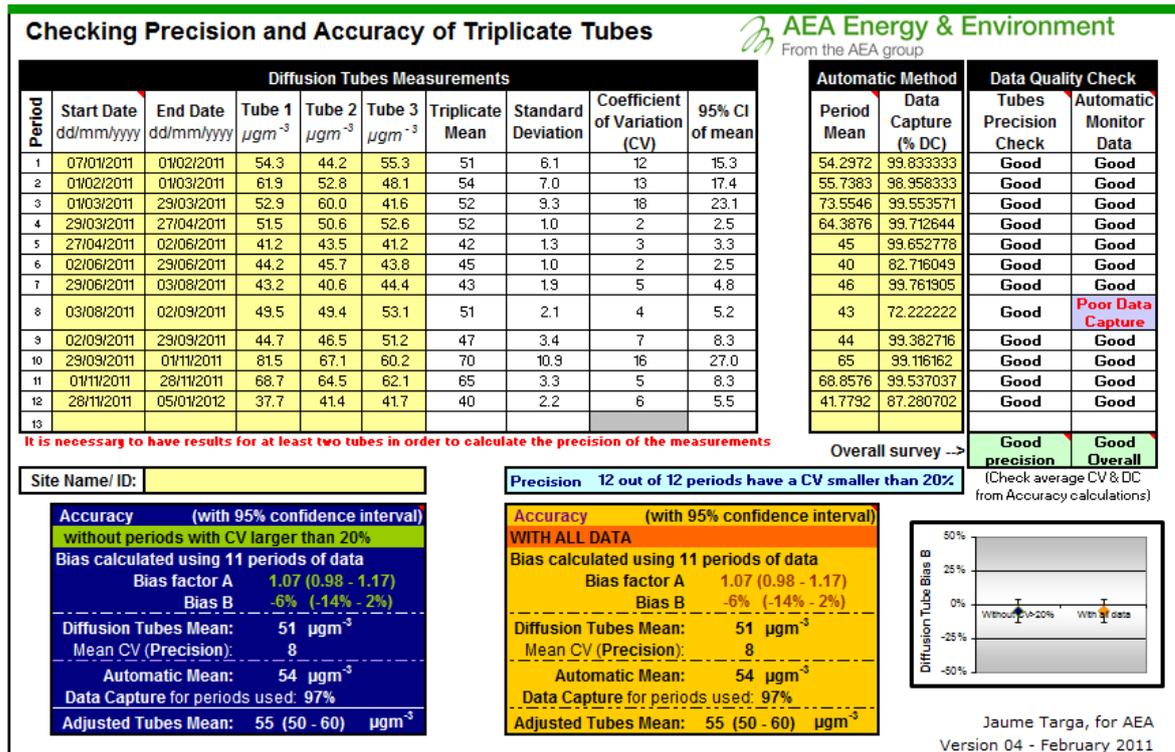


Figure A.1: Bias Adjustment Calculation for Co-located Triplicate Diffusion Tubes at the Acton Town Hall Automatic Monitoring Station

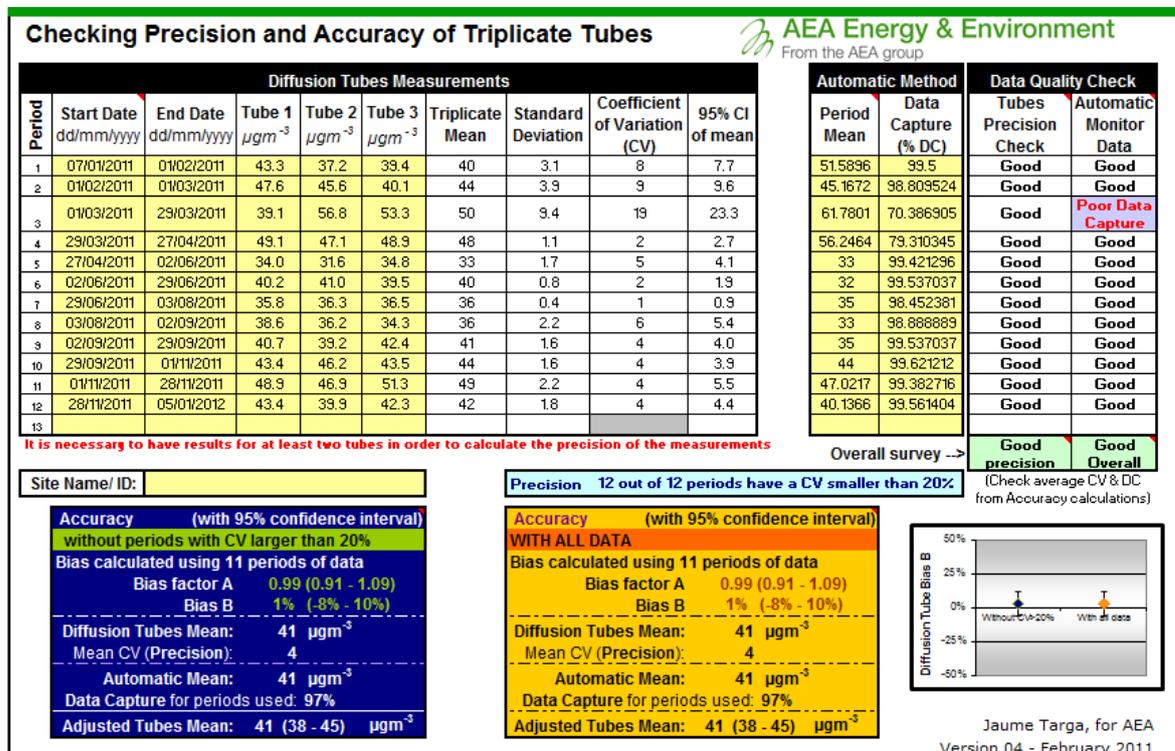


Figure A.2: Bias Adjustment Calculation for Co-located Triplicate Diffusion Tubes at the Ealing Town Hall Automatic Monitoring Station

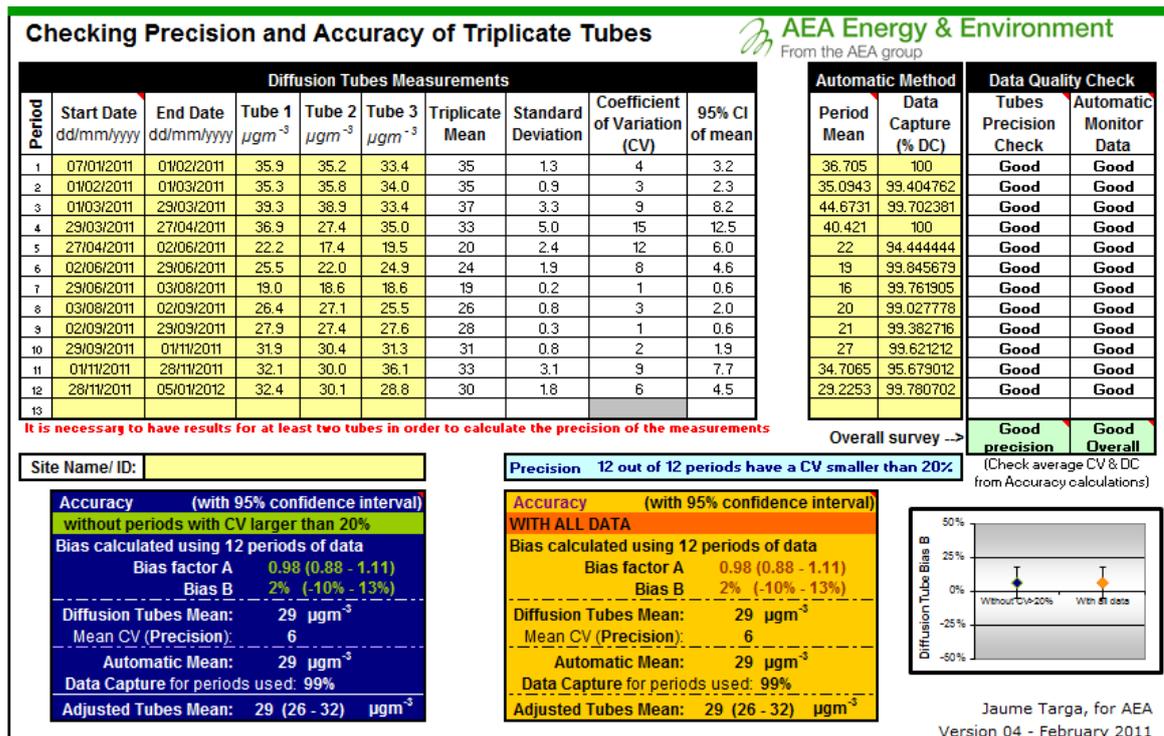


Figure A.3: Bias Adjustment Calculation for Co-located Triplicate Diffusion Tubes at the Southall Automatic Monitoring Station

Table A1.1: Local Bias Adjustment Calculations

Site ID	Bias Adjustment Factor
Acton Town Hall	1.07
Ealing Town Hall	0.99
Southall	0.98
Average BAF (excluding sites with low data capture)	1.01

National Factor

The bias adjustment factor for Gradko International Limited, for the 20% TEA in Acetone preparation method, in 2011, taken from the national bias adjustment factor spreadsheet, is 0.91.

Discussion of Choice of Factor to Use

The national bias adjustment factor is lower than the local bias adjustment factor, and when applied to the diffusion tube annual mean concentrations the values are less representative of the co-located automatic monitor concentrations than if the local bias adjustment is used. The local bias adjustment factor results in higher nitrogen dioxide concentrations but they are not inconsistent with those from previous years. It is considered most appropriate to apply the local bias adjustment factor to the 2011 diffusion tube results.

PM Monitoring Adjustment

The Volatile Correction Model (VCM) has been applied to the TEOM data through the London Air web site (LAQN, 2012).

Short-term to Long-term Data Adjustment

Nitrogen Dioxide

There are three automatic monitoring stations (Horn Lane, Southall Railway and Western Avenue), for which there is low data capture (<90% for automatic sites) in 2011. Additionally, there are three automatic monitoring stations (Hanger Lane Gyratory, Horn Lane and Western Avenue), for which there is low data capture in 2010. Data for these sites have been annualised (adjusted to represent the annual mean) following the guidance set out in Box 3.2 of TG(09).

The annual mean for three Automatic Urban Monitoring Network (AURN) urban background sites was compared to a “period mean” for the Ealing sites for which there was low data capture. The “period mean” is the mean for the period for which there is data. For each urban background site, a ratio is then calculated between the annual mean and the period mean. The average ratio is used to adjust the short-term Ealing results to represent annual means.

The three AURN sites chosen for use in the calculations are North Kensington, Teddington and Bloomsbury. These are all urban background sites within London with high data capture for 2010 and 2011 (>90% for each). Details of the sites used and the ratios calculated are provided in Table A1.1 for 2010 and Table A1.2 for 2011.

Table A1.2: Nitrogen Dioxide - Short-term to Long-term Data Adjustment for 2010 ($\mu\text{g}/\text{m}^3$)

Site	AURN Site	Site Type	Annual Mean	Period Mean	Ratio	Average
Hanger Lane Gyratory	N. Kensington	Urban Background	36.8	36.2	1.02	1.01
	Teddington	Urban Background	24.0	23.6	1.02	
	Bloomsbury	Urban Background	58.5	58.3	1.00	
Horn Lane	N. Kensington	Urban Background	36.8	32.6	1.13	1.10
	Teddington	Urban Background	24.0	21.9	1.10	
	Bloomsbury	Urban Background	58.5	55.1	1.06	
Western Avenue	N. Kensington	Urban Background	36.8	37.2	0.99	1.05
	Teddington	Urban Background	24.0	21.3	1.13	
	Bloomsbury	Urban Background	58.5	57.3	1.02	

Table A1.3: Nitrogen Dioxide - Short-term to Long-term Data Adjustment for 2011 ($\mu\text{g}/\text{m}^3$)

Site	AURN Site	Site Type	Annual Mean	Period Mean	Ratio	Average
Horn Lane	N. Kensington	Urban Background	36.1	35.4	1.02	1.02
	Teddington	Urban Background	21.4	20.8	1.03	
	Bloomsbury	Urban Background	50.1	49.6	1.01	
Southall Railway	N. Kensington	Urban Background	36.1	33.7	1.07	1.09
	Teddington	Urban Background	21.4	18.6	1.15	
	Bloomsbury	Urban Background	50.1	48.4	1.03	
Western Avenue	N. Kensington	Urban Background	36.1	37.2	0.97	0.97
	Teddington	Urban Background	21.4	22.6	0.95	
	Bloomsbury	Urban Background	50.1	51.3	0.98	

PM₁₀

There are four automatic monitoring stations (Acton Town Hall, Hanger Lane Gyratory, Southall Railway and Western Avenue), for which there is low data capture (<90% for automatic sites) in 2011. There are two automatic monitoring stations (Acton Town Hall and Acton Town Hall FDMS), for which there is low data capture in 2010. Also, there are three automatic monitoring stations (Acton Town Hall FDMS, Greenford and Horn Lane), for which there is low data capture in 2009. Data for these sites have been annualised (adjusted to represent the annual mean) following the guidance set out in Box 3.2 of TG(09).

The annual mean for three Automatic Urban Monitoring Network (AURN) urban background sites was compared to a "period mean" for the Ealing sites for which there was low data capture. The

“period mean” is the mean for the period for which there is data. For each urban background site, a ratio is then calculated between the annual mean and the period mean. The average ratio is used to adjust the short-term Ealing results to represent annual means.

The three AURN sites chosen for use in the calculations are North Kensington, Marylebone Road and Bloomsbury. These are all urban background sites within London with high data capture for 2009, 2010 and 2011 (>90% for each). Details of the sites used and the ratios calculated are provided in Table A1.4 for 2009, A1.5 for 2010 and Table A1.6 for 2011.

Table A1.4: PM₁₀ - Short-term to Long-term Data Adjustment for 2009 (µg/m³)

Site	AURN Site	Site Type	Annual Mean	Period Mean	Ratio	Average
Acton Town Hall FDMS	N. Kensington	Urban Background	19.6	19.5	0.99	0.99
	Marylebone Road	Urban Background	34.0	34.4	0.99	
	Bloomsbury	Urban Background	19.4	20.5	0.99	
Horn Lane	N. Kensington	Urban Background	19.6	19.3	1.01	1.01
	Marylebone Road	Urban Background	34.0	33.7	1.01	
	Bloomsbury	Urban Background	19.4	19.1	1.01	

Table A1.5: PM₁₀ - Short-term to Long-term Data Adjustment for 2010 (µg/m³)

Site	AURN Site	Site Type	Annual Mean	Period Mean	Ratio	Average
Acton Town Hall	N. Kensington	Urban Background	21.4	21.7	0.99	1.01
	Marylebone Road	Urban Background	31.6	31.2	1.01	
	Bloomsbury	Urban Background	17.9	17.5	1.02	
Acton Town Hall FDMS	N. Kensington	Urban Background	21.4	21.1	1.01	1.03
	Marylebone Road	Urban Background	31.6	30.6	1.03	
	Bloomsbury	Urban Background	17.9	17.4	1.03	

Table A1.6: PM₁₀ - Short-term to Long-term Data Adjustment for 2011 ($\mu\text{g}/\text{m}^3$)

Site	AURN Site	Site Type	Annual Mean	Period Mean	Ratio	Average
Acton Town Hall FDMS	N. Kensington	Urban Background	23.7	24.1	0.99	0.99
	Marylebone Road	Urban Background	38.4	38.3	1.00	
	Bloomsbury	Urban Background	22.5	23.1	0.98	
Hanger Lane Gyrotory	N. Kensington	Urban Background	23.7	24.6	0.97	0.98
	Marylebone Road	Urban Background	38.4	38.5	1.00	
	Bloomsbury	Urban Background	22.5	22.8	0.99	
Southall Railway	N. Kensington	Urban Background	23.7	23.0	1.03	1.07
	Marylebone Road	Urban Background	38.4	36.0	1.07	
	Bloomsbury	Urban Background	22.5	20.3	1.11	
Western Avenue	N. Kensington	Urban Background	23.7	24.4	0.97	0.98
	Marylebone Road	Urban Background	38.4	38.2	1.00	
	Bloomsbury	Urban Background	22.5	23.1	0.97	

A2 Appendix B: Raw Nitrogen Dioxide Diffusion Tube Data

Table A 2.1: Unadjusted Results of Nitrogen Dioxide Diffusion Tubes (2011)

Site ID	Monthly concentration (not adjusted for bias) ($\mu\text{g}/\text{m}^3$)												Annual mean
	1	2	3	4	5	6	7	8	9	10	11	12	
1	56.6	62.7	40.7	65.0	47.8	47.7	47.4	51.6	51.8	66.1	58.1	45.2	53.4
2	41.4	33.1	66.1	40.0	29.5	29.0	26.9	37.7	33.1	41.7	46.9	34.6	38.3
3	56.2	42.0	50.7	52.7	43.0	43.9	38.3	45.4	45.1	54.5	51.3	51.3	47.9
4	45.7	34.2	57.0	55.8	43.1	48.2	40.7	41.3	43.0	55.9	59.7	50.7	47.9
5	39.8	35.3	46.3	39.8	28.4	29.5	26.4	37.9	34.2	46.6	53.1	37.4	37.9
6	-	-	67.3	-	53.2	50.8	50.9	55.8	52.6	60.6	76.9	45.6	57.1
7	46.2	54.0	72.9	74.2	57.0	49.3	59.7	58.2	-	52.9	72.0	47.1	58.5
8	56.6	54.6	35.9	67.9	50.7	55.4	56.1	60.3	-	57.3	74.6	52.0	56.5
9	58.4	51.9	72.1	67.8	51.1	52.2	28.4	55.0	-	-	-	-	54.6
10	41.5	51.5	38.3	51.1	44.2	55.9	50.3	102.8	49.7	61.4	54.9	48.6	54.2
11	37.5	33.7	53.3	37.1	23.7	29.8	27.2	33.2	31.2	48.6	38.9	35.9	35.9
12	44.4	42.4	35.1	46.7	33.2	42.2	39.1	38.5	42.3	65.8	51.0	46.1	43.9
13	45.0	44.0	52.5	57.6	54.3	50.5	41.0	56.7	42.5	69.6	58.1	58.5	52.5
14	50.5	33.2	37.5	40.9	33.9	44.5	34.9	45.6	41.7	52.7	51.7	47.1	42.9
15	75.3	48.1	59.1	55.8	51.8	52.5	63.2	57.6	56.7	71.0	59.8	55.5	58.9
16	74.3	53.2	70.0	65.8	51.8	57.3	58.3	78.3	55.6	67.9	55.5	55.7	62.0
17	81.0	52.6	74.2	79.6	56.8	54.1	56.8	63.8	58.5	72.5	63.2	-	64.8
18	41.8	32.4	56.0	34.3	29.6	30.0	27.5	34.7	33.3	80.0	43.2	35.0	39.8
19	47.7	44.2	58.2	48.2	32.8	43.8	43.0	51.1	43.4	72.5	56.7	51.6	49.4
20	56.4	51.2	37.7	54.0	50.7	48.1	47.0	53.0	50.1	57.8	54.0	34.4	49.5
21	39.4	33.0	46.2	37.2	29.2	29.2	28.2	18.4	31.6	71.7	30.0	32.9	35.6
22	46.1	29.8	33.3	29.5	21.3	25.2	23.1	27.7	24.7	30.3	38.7	31.9	30.1
23	67.0	58.5	83.6	70.6	67.0	-	-	73.9	49.0	71.7	78.5	45.2	66.5
24	34.3	32.5	41.8	35.5	24.6	26.0	26.7	32.0	27.1	32.1	44.6	32.1	32.5
25	40.6	41.6	37.6	38.0	27.9	32.8	25.5	35.0	36.1	43.5	43.5	36.1	36.5
26	55.3	40.0	-	49.6	36.5	43.4	42.1	39.9	42.0	58.1	51.2	47.2	45.9
27	39.6	41.7	40.8	44.5	32.6	34.5	27.9	35.8	35.8	44.6	45.2	36.5	38.3
28	43.5	47.7	39.3	48.2	35.0	40.4	31.8	43.2	45.9	47.6	49.5	40.8	42.7
29	61.7	33.7	48.4	44.0	30.3	33.5	35.6	38.7	30.0	32.5	48.8	36.1	39.4
30	52.7	44.9	44.6	40.0	31.6	34.5	34.3	35.9	35.3	43.4	53.1	34.5	40.4
31	41.3	37.9	43.0	37.0	22.7	27.3	25.9	34.2	32.5	37.3	40.8	34.8	34.6

Site ID	Monthly concentration (not adjusted for bias) ($\mu\text{g}/\text{m}^3$)												Annual mean
	1	2	3	4	5	6	7	8	9	10	11	12	
32	45.3	12.7	33.8	34.1	23.7	30.1	25.6	41.5	34.2	36.0	39.6	33.2	32.5
33	41.6	45.0	40.3	44.5	28.9	37.4	33.9	33.0	48.7	52.2	52.5	37.3	41.3
34	54.1	39.9	47.3	45.3	34.0	43.8	47.0	44.5	47.1	43.1	48.7	41.8	44.7
35	35.1	39.6	43.7	33.6	22.9	28.6	25.5	30.9	35.8	48.9	44.0	26.9	34.6
36	59.1	34.4	73.1	92.5	60.0	68.2	60.7	76.7	77.9	75.7	76.3	66.1	68.4
37	46.0	38.6	41.3	41.6	25.5	33.4	27.4	36.2	38.8	39.6	44.3	38.8	37.6
38	44.8	54.9	50.1	45.6	33.4	44.2	34.9	39.6	54.9	54.2	58.5	52.1	47.3
39	48.8	24.1	33.7	27.3	21.4	21.9	20.0	22.8	25.1	29.6	36.0	27.7	28.2
40	39.9	22.6	41.0	42.0	23.3	26.9	23.5	28.4	31.0	41.5	40.4	34.3	32.9
41	44.1	43.0	45.9	42.2	35.5	36.4	31.5	39.2	39.2	51.1	48.6	41.4	41.5
42	42.4	45.1	49.1	54.3	37.3	51.4	39.5	48.7	45.4	47.9	57.5	40.2	46.6
43	48.4	47.7	44.8	52.8	38.1	47.5	41.1	46.4	44.4	51.4	63.6	40.6	47.2
44	38.6	52.3	47.5	55.3	38.0	44.6	37.4	48.7	48.0	55.4	64.6	42.7	47.8
45	52.5	42.8	43.3	43.7	36.1	37.4	33.2	47.4	40.4	43.2	51.4	38.5	42.5
46	31.3	31.0	31.6	31.1	21.2	23.4	14.6	25.0	26.7	30.0	36.5	31.5	27.8
47	26.6	30.6	28.3	30.5	19.5	23.8	-	-	22.9	24.7	32.1	26.1	26.5
48	47.9	51.4	57.6	75.3	52.2	65.6	53.9	74.9	66.0	91.1	62.7	51.2	62.5
49	52.4	57.9	62.2	66.4	53.4	64.3	59.0	62.1	84.8	62.7	80.9	68.7	64.6
50	41.6	40.1	47.1	38.0	26.3	27.6	24.0	33.7	34.3	36.9	40.9	36.1	35.6
51	27.3	26.4	29.5	20.1	18.5	23.6	20.8	24.3	29.3	35.3	36.8	30.7	26.9
52	35.3	36.2	40.0	40.9	29.5	35.4	28.6	34.6	38.7	22.1	45.2	39.9	35.5
53	38.5	63.9	52.6	74.6	62.4	70.6	54.7	80.2	68.2	36.2	97.4	66.5	63.8
54	43.3	47.6	39.1	49.1	34.0	40.2	35.8	38.6	40.7	43.3	48.9	43.4	42.0
55	37.2	45.6	56.8	47.1	31.6	41.0	36.3	36.2	39.2	46.2	46.9	39.9	42.0
56	39.4	40.1	53.3	48.9	34.8	39.5	36.5	34.3	42.4	43.5	51.3	42.3	42.2
57	48.5	31.4	51.4	49.6	28.8	34.7	28.9	-	37.9	43.6	49.8	38.2	40.3
58	57.9	54.9	60.0	78.8	-	-	-	48.1	53.6	52.2	46.1	54.8	56.3
59	30.5	29.3	36.4	32.4	17.3	25.5	23.0	29.6	29.6	34.0	36.6	33.2	29.8
60	54.3	61.9	52.9	51.5	41.2	44.2	43.2	49.5	44.7	81.5	68.7	37.7	52.6
61	44.2	52.8	60.0	50.6	43.5	45.7	40.6	49.4	46.5	67.1	64.5	41.4	50.5
62	55.3	48.1	41.6	52.6	41.2	43.8	44.4	53.1	51.2	60.2	62.1	41.7	49.6
63	40.5	27.1	37.7	28.8	19.5	21.4	20.1	26.2	23.8	-	41.6	29.3	28.7
64	50.3	40.9	45.8	43.6	33.9	35.1	31.8	29.7	35.4	59.4	47.3	41.3	41.2
65	34.7	29.5	35.7	34.0	23.3	27.6	20.7	30.6	26.5	35.7	38.6	36.0	31.1
66	77.1	62.2	49.9	52.6	81.2	57.2	50.2	66.9	62.2	76.7	60.6	31.7	60.7
67	34.7	25.4	42.2	34.7	18.0	24.4	21.8	25.9	25.8	29.8	38.4	26.4	28.9

Site ID	Monthly concentration (not adjusted for bias) (µg/m ³)												Annual mean
	1	2	3	4	5	6	7	8	9	10	11	12	
68	40.6	59.4	56.3	63.9	-	51.6	47.7	52.2	52.6	-	-	38.7	51.4
69	33.1	33.5	44.3	36.8	24.1	26.4	20.7	28.7	31.8	38.2	40.4	32.9	32.6
70	39.0	44.9	41.6	45.3	28.0	33.1	26.5	34.4	38.5	43.0	41.7	39.9	38.0
71	45.3	63.6	55.7	60.0	56.0	64.7	48.8	70.5	75.1	72.9	56.2	64.8	61.1
72	45.7	47.2	45.8	16.4	36.4	42.4	39.9	36.6	44.5	49.0	51.7	49.7	42.1
73	42.1	43.0	38.8	42.5	28.6	37.6	30.3	37.6	39.0	42.6	45.2	42.9	39.2
74	40.0	31.2	37.4	45.5	33.9	37.7	35.7	37.3	43.7	45.8	46.7	36.7	39.3
75	40.9	44.1	38.3	44.0	35.3	34.7	32.8	37.1	43.4	47.7	46.1	41.2	40.5
76	64.2	48.4	42.4	44.5	1.9	34.7	32.6	37.3	40.4	40.1	45.4	35.6	39.0
77	37.9	31.2	34.3	35.0	18.9	22.2	23.0	25.1	27.8	32.3	44.7	26.6	29.9
78	47.2	40.9	37.5	36.7	30.8	36.9	34.5	39.0	43.7	40.6	46.5	40.2	39.5
79	43.1	32.4	22.6	-	-	9.3	23.3	28.9	31.3	29.6	39.7	31.6	29.2
80	41.0	32.2	31.9	28.1	20.5	27.4	21.4	25.4	28.2	35.0	36.0	30.3	29.8
81	41.1	43.2	41.1	43.6	39.7	41.8	32.2	45.0	50.3	52.1	54.5	50.7	44.6
82	40.0	44.5	44.6	44.3	33.5	43.2	32.4	46.0	44.3	49.9	56.9	60.1	45.0
83	51.0	49.0	39.5	42.4	32.0	40.4	31.9	45.6	45.6	55.5	53.3	46.5	44.4
84	54.9	39.5	43.5	42.2	34.6	37.0	-	-	39.4	47.1	47.7	36.5	42.3
85	36.1	38.8	40.3	38.2	25.1	30.7	30.0	33.2	31.4	55.3	41.2	38.6	36.6
86	44.0	24.6	41.1	36.3	25.9	29.0	26.7	31.6	33.9	-	39.4	33.0	33.2
87	52.1	37.6	39.4	36.4	-	31.8	25.4	35.0	36.0	42.2	53.5	32.1	38.3
88	52.3	32.9	45.8	35.9	23.2	25.2	24.7	26.9	27.3	35.7	29.7	37.8	33.1
89	64.3	34.4	44.1	43.1	30.5	34.8	31.5	5.2	38.7	44.5	49.1	37.2	38.1
90	45.1	50.8	78.6	82.5	72.2	45.0	75.2	79.9	70.4	82.7	84.0	67.0	69.5
91	60.9	45.4	44.0	42.3	34.7	36.5	31.1	34.8	36.5	46.6	51.6	36.5	41.7
92	58.8	47.7	50.5	52.4	44.9	49.5	37.4	57.0	47.9	55.3	58.6	48.8	50.7
93	53.0	48.1	53.2	49.1	35.7	40.9	40.3	46.0	40.7	52.6	52.1	39.2	45.9
94	31.8	24.8	45.9	35.0	21.6	26.5	24.8	27.4	29.4	44.8	46.9	42.8	33.5
95	70.0	70.6	70.1	79.7	60.6	91.6	73.3	82.2	78.6	91.3	75.8	69.4	76.1
96	45.5	83.7	58.5	102.2	77.0	96.8	78.0	103.0	76.1	94.7	70.9	68.1	79.5
97	55.7	65.6	86.8	110.5	75.7	85.5	72.9	92.7	68.0	81.0	72.9	62.3	77.5
98	77.1	72.5	67.2	91.4	82.1	107.8	97.9	104.1	92.0	97.7	110.4	69.6	89.2
99	42.6	30.3	50.1	54.0	35.1	33.8	29.2	37.9	35.7	42.5	49.2	31.5	39.3
100	30.3	35.5	44.8	40.2	32.0	36.8	32.0	41.3	41.8	49.2	49.8	38.1	39.3
101	55.7	45.6	42.4	39.2	31.5	38.3	36.8	39.5	38.6	38.0	45.3	44.3	41.3
102	35.9	35.3	39.3	36.9	22.2	25.5	19.0	26.4	27.9	31.9	32.1	32.4	30.4
103	35.2	35.8	38.9	27.4	17.4	22.0	18.6	27.1	27.4	30.4	30.0	30.1	28.4

Site ID	Monthly concentration (not adjusted for bias) ($\mu\text{g}/\text{m}^3$)												Annual mean
	1	2	3	4	5	6	7	8	9	10	11	12	
104	33.4	34.0	33.4	35.0	19.5	24.9	18.6	25.5	27.6	31.3	36.1	28.8	29.0
105	39.3	37.0	41.7	52.2	32.0	35.2	29.0	40.4	40.8	50.3	55.8	42.7	41.4
106	46.5	45.1	48.2	43.8	31.3	36.6	27.5	41.4	34.9	49.0	57.4	41.8	42.0
107	46.4	50.3	40.7	44.9	31.4	39.4	26.9	39.3	41.2	39.9	54.1	43.9	41.5
108	47.7	30.7	41.6	41.5	25.0	31.2	24.5	29.8	36.5	40.7	40.4	32.9	35.2
109	32.9	34.4	40.4	41.9	28.1	32.7	25.0	34.7	38.0	40.2	42.4	34.0	35.4
110	40.0	34.3	33.0	44.5	26.7	33.3	24.3	32.8	34.5	21.4	43.3	32.6	33.4
111	56.1	27.5	67.6	74.6	60.4	68.9	25.9	53.5	48.0	55.8	56.7	44.4	53.3
112	59.7	51.1	79.8	74.3	59.8	51.7	34.3	61.5	52.1	69.5	57.7	54.1	58.8
113	61.3	57.9	60.6	67.3	55.0	52.3	50.9	56.8	49.9	42.6	62.6	55.8	56.1
114	63.3	57.0	72.0	90.4	67.5	87.5	72.2	79.8	67.4	90.1	85.1	89.4	76.8
115	64.3	53.6	56.1	84.6	62.1	75.7	69.8	71.1	68.6	81.5	91.0	92.4	72.6
116	60.2	66.6	73.9	88.0	58.2	71.4	71.7	59.9	65.9	92.2	83.3	71.1	71.9
117	59.5	51.5	67.4	78.3	55.4	54.3	31.9	80.9	52.8	60.7	72.8	74.5	61.7
118	38.5	48.0	55.2	44.7	30.3	36.5	28.9	34.4	45.1	41.1	43.5	44.8	40.9
119	46.6	-	59.4	52.9	34.3	42.0	37.6	38.8	45.2	47.6	51.2	40.1	45.1
120	61.3	56.8	60.7	66.6		44.9	37.9	44.3	50.3	-	56.7	52.5	53.2
121	56.8	30.8	46.9	45.6	30.0	36.0	26.9	32.6	38.3	41.4	40.3	43.1	39.1
122	61.2	27.5	51.0	39.1	29.8	30.7	27.2	30.4	34.2	39.3	41.4	38.9	37.6
123	38.6	32.8	45.6	45.8	28.0	32.4	28.4	32.7	36.7	-	-	-	35.7
124	38.1	37.2	45.9	45.7	33.0	35.8	31.8	32.4	39.1	42.8	44.6	41.9	39.0
125	65.0	74.1	74.0	98.4	63.0	74.9	61.7	-	66.6	68.6	57.7	75.0	70.8
126	58.6	54.8	61.4	75.5	48.7	62.0	48.9	55.4	63.2	67.6	53.4	70.2	60.0