2012 Air Quality Updating and Screening Assessment for London Borough of Camden

In fulfillment of Part IV of the Environment Act 1995
Local Air Quality Management

April 2012

Local Authority Officer	Katie Watson Poppy Lyle
Department	Corporate Sustainability
Address	London Borough of Camden Town Hall Extension Argyle Street WC1H 8EQ
Telephone	020 7974 2260 020 7974 6801
e-mail	Katie.watson@camden.gov.uk Poppy.lyle@camden.gov.uk
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Executive Summary

Since the submission of the fourth round of the Updating and Screening Assessment in 2009 LB Camden has continued to comply with the air quality objectives for particulate matter (PM_{10}), sulphur dioxide (SO_2), ozone and carbon monoxide. Benzene, butadiene and lead concentrations are not monitored in Camden.

Camden continues to fail to meet the long and short term air quality objectives for nitrogen dioxide. The annual mean levels of NO_2 continue to be exceeded at all of our automatic monitoring sites and the vast majority of our nitrogen dioxide diffusion tube sites, and the short term NO_2 objective has been exceeded at 2 of the 4 automatic monitoring stations.

There have been no new local developments, traffic sources or domestic and commercial sources which have had a negative impact on air quality. The Council is carefully monitoring the adoption of CHP and biomass boilers in the borough in order to mitigate potential cumulative impacts on air quality.

As the whole of the borough has been designated an Air Quality Management Area since 2001 there is no need to carry out a Detailed Assessment at this time. We will therefore proceed to the Progress Report 2013.

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1 Introduction

1.1 Description of Local Authority Area

The London Borough of Camden is an urban area located in central London. It is approximately 22km^2 in size and is situated north of the River Thames. The main sources of air pollution are road transport, in particular heavy goods vehicle (HGV) and buses, and gas boilers with lesser contributions from diesel trains and small industrial processes. A large proportion of emissions which contribute to poor air quality arise from sources outside of Camden including the heavily trafficked road network surrounding the borough, and from sources much further afield including continental Europe. The south of the borough experiences the highest volumes of traffic and congestion and most intense levels of development. The north of the borough, in contrast, is generally less congested, and there are more open spaces and parks, of which particular areas have been designated as Sites of Special Scientific Interest (SSSI). Air pollution in these open areas is generally lower. However a number of busy roads which dissect through the north of the borough are associated with high levels of traffic, especially HGVs, and therefore experience elevated air pollution levels.

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 previously in 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 microgrammes per cubic metre $\mu g/m^3$ (milligrammes 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 $\mu g/m^3$	Running annual mean	31.12.2003
	5.00 $\mu g/m^3$	Running annual mean	31.12.2010
1,3-Butadiene	2.25 $\mu g/m^3$	Running annual mean	31.12.2003
Carbon monoxide	10.0 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.5 $\mu g/m^3$	Annual mean	31.12.2004
	0.25 $\mu g/m^3$	Annual mean	31.12.2008
Nitrogen dioxide	200 $\mu g/m^3$ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 $\mu g/m^3$	Annual mean	31.12.2005
Particles (PM_{10}) (gravimetric)	50 $\mu g/m^3$, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 $\mu g/m^3$	Annual mean	31.12.2004
Sulphur dioxide	350 $\mu g/m^3$, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 $\mu g/m^3$, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 $\mu g/m^3$, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

1.4 Summary of Previous Review and Assessments

Between 1998 and 2001, the London Borough of Camden undertook its first round of review and assessment of air quality (the 'First Round'), including Stages 1, 2 and 3, which concluded that it was necessary to declare the whole borough as an Air Quality Management Area (AQMA) for the long term objective for nitrogen dioxide (NO_2) and the short and long term objectives for particulate matter (PM_{10}).

The second, third and fourth rounds of review and assessment, the Updating and Screening Assessment (USA), were completed in August 2003, 2006 and 2009. Each assessment provided an update with respect to air quality issues within the London Borough of Camden. The second, third and fourth rounds concluded that no 'Detailed Assessment' was required for Camden with respect to air quality.

The fourth round identified that Camden no longer exceeded the short and long term objectives for PM_{10} at our three automatic monitoring sites. This was attributed to a change in the method used to measure PM_{10} concentrations rather than improvements in emissions. The fourth round of review and assessment additionally indicated that a number of diffusion tube sites and one automatic site at roadside locations exceeded the short term NO_2 objective. Further modelling work has been carried out to understand the spatial distribution of long and short term PM_{10} and NO_2 exceedences across the borough. Modelling work undertaken in 2009 revealed that a number of roads in Camden which experience high volumes of traffic and a large proportion of HGV vehicles exceed the short and long term PM_{10} and NO_2 objectives.

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

LB Camden currently operates four automatic monitoring sites. Details of these sites are presented in Table 2.1 below and the locations of these sites are outlined in Figure 2.1 below.

On the 29th January 2011, LB Camden installed a new automatic monitoring site on the Euston Road, opposite Euston station. This site currently monitors NO_2 only. The Council felt that is was important to install an automatic monitoring station in this location as monitoring provided by diffusion tubes over several years has indicated that the concentrations of NO_2 in this area are extremely. The information from this site will be used to provide live air quality updates which will be disseminated to the public via an LED sign which will be installed on the Camden Town Hall Extension, which is situated on Euston Road, in June 2012.

Details of the QA/QC for each of the monitoring sites can be found in Appendix A.

Figure 2.1 Map of Automatic Monitoring Sites

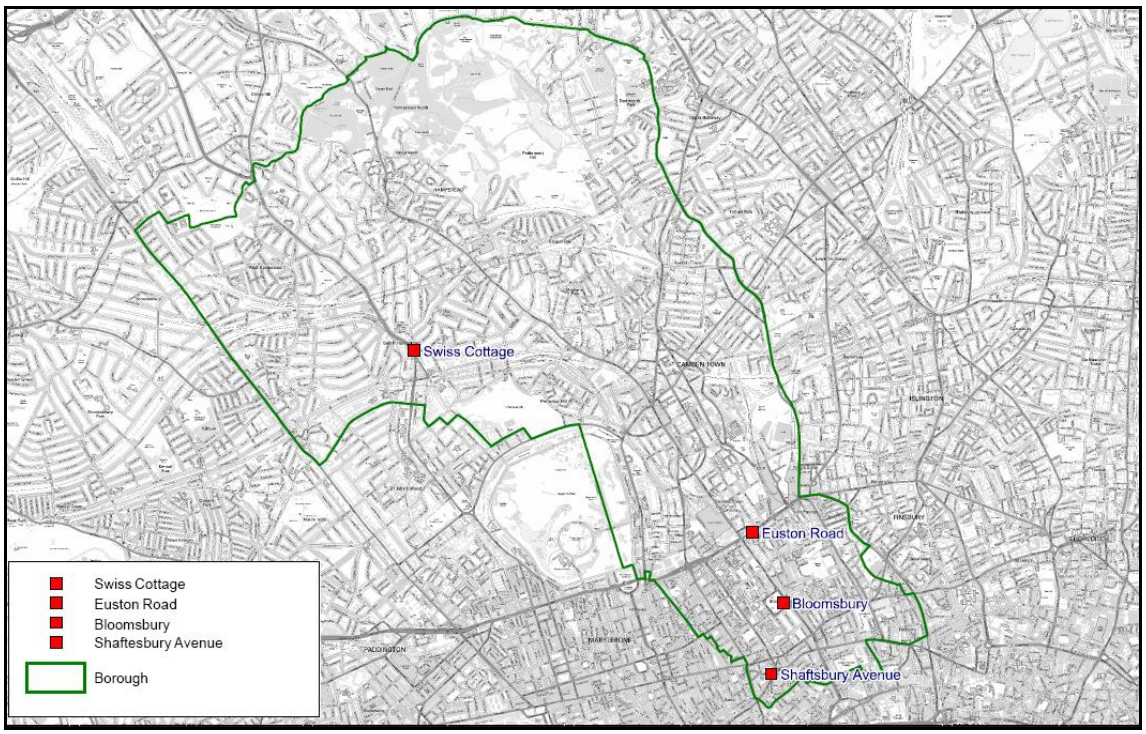


Table 2.1 Details of Automatic Monitoring Sites

Site Name	Site Type	X OS GridRef	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 *(N/A if not applicable)*	Does this location represent worst-case exposure?
London Bloomsbury	Urban background	X 530120	Y 182034	NO_2, PM_{10}, $PM_{2.5}$, SO_2, CO, O_3	Y	FDMS	Y (40m)	27m	Y
Swiss Cottage	Kerbside	X 526633	Y 184392	NO_2, PM_{10}, $PM_{2.5}$,	Y	FDMS	Y (7m)	3m	Y
Shaftesbury Avenue	Roadside	X 530060	Y 181290	NO_2, PM_{10},	Y	TEOM	Y (1m)	<1m	Y
Euston Road	Roadside	X 529878	Y 182648	NO_2	Y	N/A	Y (1m)	0.5m	Y

2.1.2 Non-Automatic Monitoring Sites

Diffusion tubes are deployed across the borough to monitor nitrogen dioxide concentrations. At the end of 2010 LB Camden monitored NO_2 at 26 sites using diffusion tubes, however in January 2011 this was reduced to sixteen sites, in order to reduce costs. The sixteen remaining sites were chosen as they were considered the most important sites for monitoring purposes. The location of these sites can be seen in Figure 2.2. Details of all of the non-automatic monitoring sites are presented in Table 2.2.

The diffusion tube results have been bias corrected on the basis of triplicate tubes co-located with a chemi-luminescent analyser at Swiss Cottage. The bias adjustment factor was calculated in accordance with the methodology stated in TG09 using the Local Bias Adjustment Tool. The calculations can be found in Appendix B.

Gradko Environmental supplies, prepares (50% TEA and acetone method) and analyses Camden's diffusion tubes. This laboratory participates in the UK National Diffusion Tube Network and the Workplace Analysis Scheme for Efficiency. Gradko currently holds UKAS accreditation for analysis of diffusion tubes and participates in the Health and Safety Laboratory's Workplace Analysis Scheme for Proficiency (WASP). Certificates of these accreditations are included in Appendix B along with details of the QA/QC for the diffusion tubes.

Figure 2.2 Map of Non-Automatic Monitoring Sites

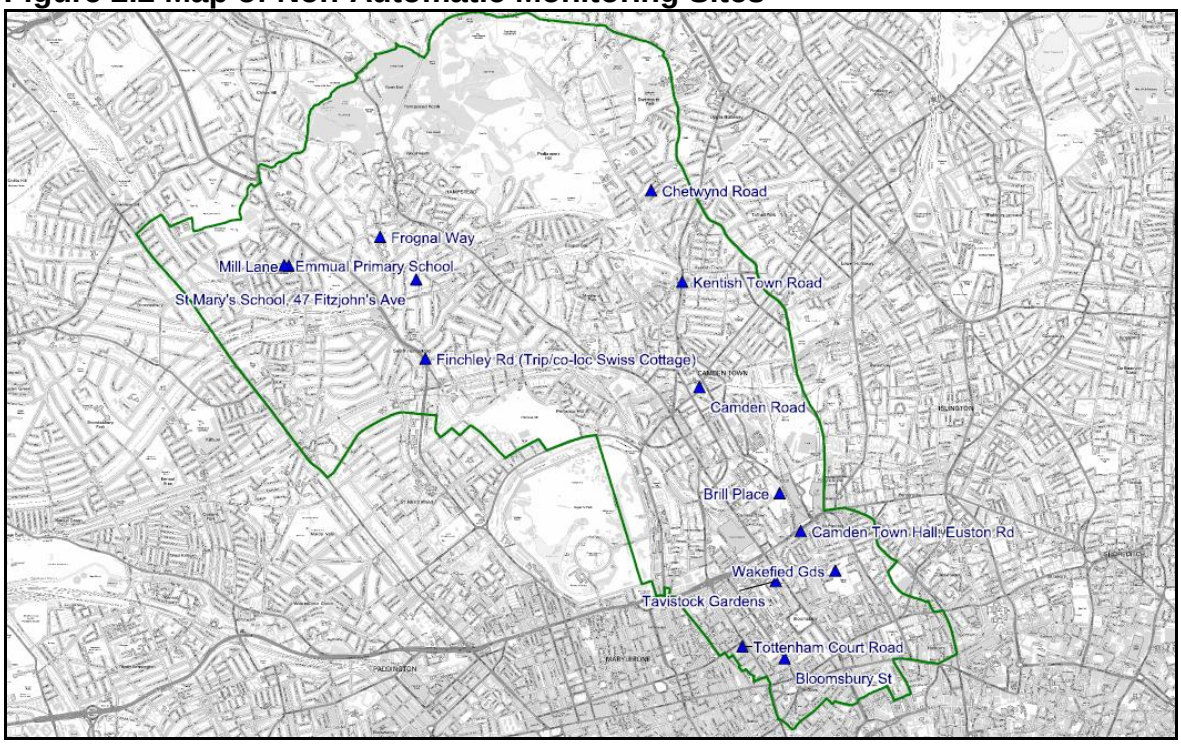


Table 2.2 Details of Non-Automatic Monitoring Sites

Site Code	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA ?	Is monitoring collocated with a Continuous Analyser (Y/N)	Relevant Exposure? *(Y/N with distance (m) to relevant exposure)*	Distance to kerb of nearest road *(N/A if not applicable)*	Does this location represent worst-case exposure?
CA1*	Argyle School	Roadside	X 530210	Y 182762	NO_2	Y		Y (1m)	10m	Y
CA2*	Robert Street	Roadside	X 529133	Y 182695	NO_2	Y		Y (m)	15m	Y
CA3*	Gospel Oak School	Roadside	X 528215	Y 185637	NO_2	Y		Y (2m)	5m	Y
CA4	Euston Road	Roadside	X 530110	Y 182795	NO_2	Y		Y (1m)	5m	Y
CA5 *	Drummond Street	Roadside	X 529395	Y 182567	NO_2	Y		Y (4m)	1m	Y
CA6	Wakefield Gardens	Urban background	X 530430	Y 182430	NO_2	Y		Y (18m)	30m	Y
CA7	Frognal Way	Urban background	X 526213	Y 185519	NO_2	Y		Y (6m)	30m	Y
CA8 *	La Sainte School	Urban background	X 528588	Y 186249	NO_2	Y		Y (m)	25m	Y
CA9 *	63 Gower Street	Roadside	X 529671	Y 181970	NO_2	Y		Y (4m)	2m	Y
CA10	Tavistock Gardens	Urban background	X 529880	Y 182334	NO_2	Y		Y (35m)	25m	Y
CA11	Tottenham Court Road	Kerbside	X 529568	Y 181728	NO_2	Y		Y (4m)	<1m	Y
CA13 *	British Library	Urban background	X 529977	Y 182809	NO_2	Y		Y (3m)	20m	Y
CA14 *	Russell Square	Urban background	X 530120	Y 182034	NO_2	Y		Y (40m)	20m	Y
CA15	Swiss Cottage	Kerbside	X 526633	Y 184392	NO_2	Y	Y	Y (7m)	<1m	Y
CA16	Kentish Town Road	Roadside	X 529013	Y 185102	NO_2	Y		Y (1m)	1m	Y
CA17	47 Fitzjohn's Road	Roadside	X 526547	Y 185125	NO_2	Y		Y (5m)	5m	Y
CA18 *	Gloucester Ave	Kerbside	X 528672	Y 183642	NO_2	Y		Y (4.5m)	<1m	Y
CA19 *	Inverness Street	Roadside	X 528815	Y 183909	NO_2	Y		Y (4m)	15m	Y
CA20	Brill Place	Roadside	X 529914	Y 183147	NO_2	Y		Y (9m)	<5m	Y
CA21	Bloomsbury Street	Roadside	X 529962	Y 181620	NO_2	Y		Y (4m)	<1m	Y
CA22 *	Goodge Street	Roadside	X 529488	Y 181719	NO_2	Y		Y (4m)	<1m	Y
CA23	Camden Road	Roadside	X 529173	Y 184129	NO_2	Y		Y (5m)	<1m	Y
CA24	Chetwynd Road	Roadside	X 528722	Y 185950	NO_2	Y		Y (2m)	1m	Y
CA25	Emmanuel Primary	Roadside	X 525325	Y 185255	NO_2	Y		Y	1m	Y
CA26	Mill Lane/West End Lane	Roadside	X 525366	Y 185253	NO_2	Y		Y	1m	Y

* Monitoring ceased at these sites at end of 2010.

2.2 Comparison of Monitoring Results with AQ Objectives

2.2.1 Nitrogen Dioxide

Automatic Monitoring Data

The annual NO_2 mean objective was exceeded at all of LB Camden's four automatic monitoring sites in 2011. During this year the period of valid data was less than 90% at Shaftesbury Avenue (due to complications with the equipment) and Euston Road (which was installed on the 29th January 2011).

The annual mean concentration of NO_2 at the Euston Road site in 2011 was significant. As this is the first year that monitoring has taken place at this site using an automatic monitoring station it is impossible to benchmark these results, however the annual mean concentration at the Marlyebone Road site, in the City of Westminster, which is located close by, is also very high. Going forward LB Camden will closely monitor the readings from this site.

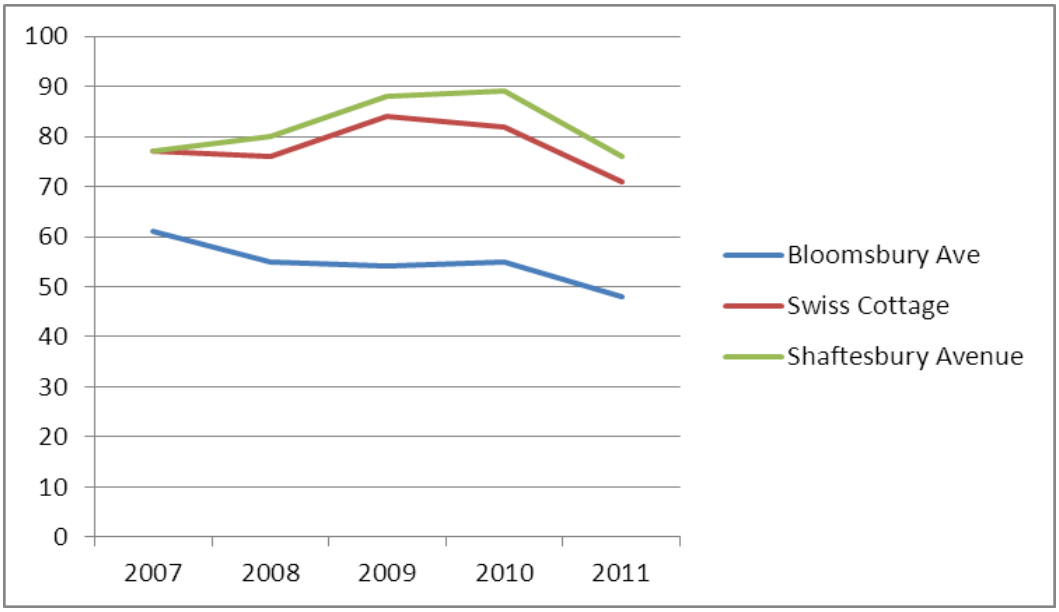
Table 2.3 below outlines the annual mean concentrations of NO_2 for the last five years and the trends are displayed in Figure 2.3. This shows that the annual mean concentrations of NO_2 reduced slightly at all three monitoring sites from the previous year. This trend is also observed in the number of exceedences of the hourly mean at the three sites, as displayed in Table 2.4 below.

Table 2.3 Results of Automatic Monitoring of Nitrogen Dioxide: Comparison with Annual Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for period of monitoring %[a]	Valid Data Capture 2011 %[b]	Annual Mean Concentration μg/m^3				
					2007*[c]	2008*[c]	2009*[c]	2010*[c]	2011[c]
LB	Urban Background	Y	97	97	61	55	54	55	50
SC	Kerbside	Y	97	97	77	76	84	82	72
SA	Roadside	Y	89	89	77	80	88	89	76
ER	Roadside	Y	88	88	-	-	-	-	122*

*Calculation included provisional data. Data after 23 Aug 2011 have not been fully ratified.

Figure 2.3 Trends in the Annual Mean NO_2 Concentrations Measured at LB Camden's Automatic Monitoring Sites



The hourly objective for NO_2 was breached at both Swiss Cottage and Euston Road monitoring sites in 2011. Table 2.4 below outlines the results for the last five years. The number of hourly exceedences at Euston Road in 2011 was significant. LB Camden will closely monitor the readings from this site.

Table 2.4 Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for period of monitoring %[a]	Valid Data Capture 2011 % [b]	Number of Exceedences of Hourly Mean (200 µg/m^3)				
					2007*[c]	2008* [c]	2009* [c]	2010* [c]	2011 [c]
LB	Urban Background	Y	97	97	6	0	2	1	0
SC	Kerbside	Y	97	97	113	70	217	128	79
SA	Roadside	Y	89	89	22	9	13	21	15
ER	Roadside	Y	88	88	-	-	-	-	722

The monitoring site locations are representative of relevant public exposure.

Diffusion Tube Monitoring Data

NO_2 concentrations were measured at sixteen sites in the borough using nitrogen dioxide diffusion tubes. The 2011 results are displayed in Table 2.5 below.

The annual mean concentrations in excess of the 40 µg/m^3 objective are highlighted in bold. The objective was exceeded at all sites other than Frognal Road. The highest diffusion tube NO_2 concentrations were measured at the Euston Road (93.12 µg/m^3) and Tottenham Court Road sites (91.67µg/m^3).

100% data capture was achieved for all of the sites with the exception of Brill Place, where capture was 75%.

The results have been bias corrected. The full dataset and bias adjustment calculations can be found in Appendix B.

Table 2.5 Results of Nitrogen Dioxide Diffusion Tubes in 2011

Site ID	Location	Site Type	Within AQMA?	Triplicate or Collocated Tube	Data Capture 2011 Months or %	Data with less than 9 months has been annualised (Y/N)	Confirm if data has been distance corrected (Y/N)	Annual mean concentration Bias: 1.01 2011 ($\mu g/m^3$)
CA4	Euston Road	Roadside	Y		100%	N/A	N	**93.12**
CA6	Wakefield Gdns	Urban background	Y		100%	N/A	N	**45.61**
CA7	Frognal Way	Urban background	Y		100%	N/A	N	31.46
CA10	Tavistock Gdns	Urban background	Y		100%	N/A	N	**47.56**
CA11	Tottenham Court Road	Kerbside	Y		100%	N/A	N	**91.67**
CA15	Finchley Rd	Kerbside	Y	Triplicate	100%	N/A	N	**73.17**
CA16	Kentish Town Rd	Roadside	Y		100%	N/A	N	**57.19**
CA17	47 Fitzjohn's Ave	Roadside	Y		100%	N/A	N	**58.39**
CA20	Brill Place	Roadside	Y		**75%**	N/A	N	**50.79**
CA21	Bloomsbury St	Roadside	Y		100%	N/A	N	**76.73**
CA23	Camden Rd	Roadside	Y		100%	N/A	N	**72.21**
CA24	Chetwynd Rd	Roadside	Y		100%	N/A	N	**44.12**
CA25	Emmanuel Primary School	Roadside	Y		100%	N/A	N	**50.01**
CA26	Mill Lane/West End Lane	Roadside	Y		100%	N/A	N	**57.12**

Table 2.6 displays the results from the Nitrogen Dioxide Diffusion Tubes from 2007 to 2011. Figure 2.4 presents the trends over the last five years. NO_2 concentrations observed from long term diffusion tube locations show no clear upward or down trend between

2007 and 2011. NO_2 concentrations at some sites have increased marginally over the last five years, while others have decreased marginally.

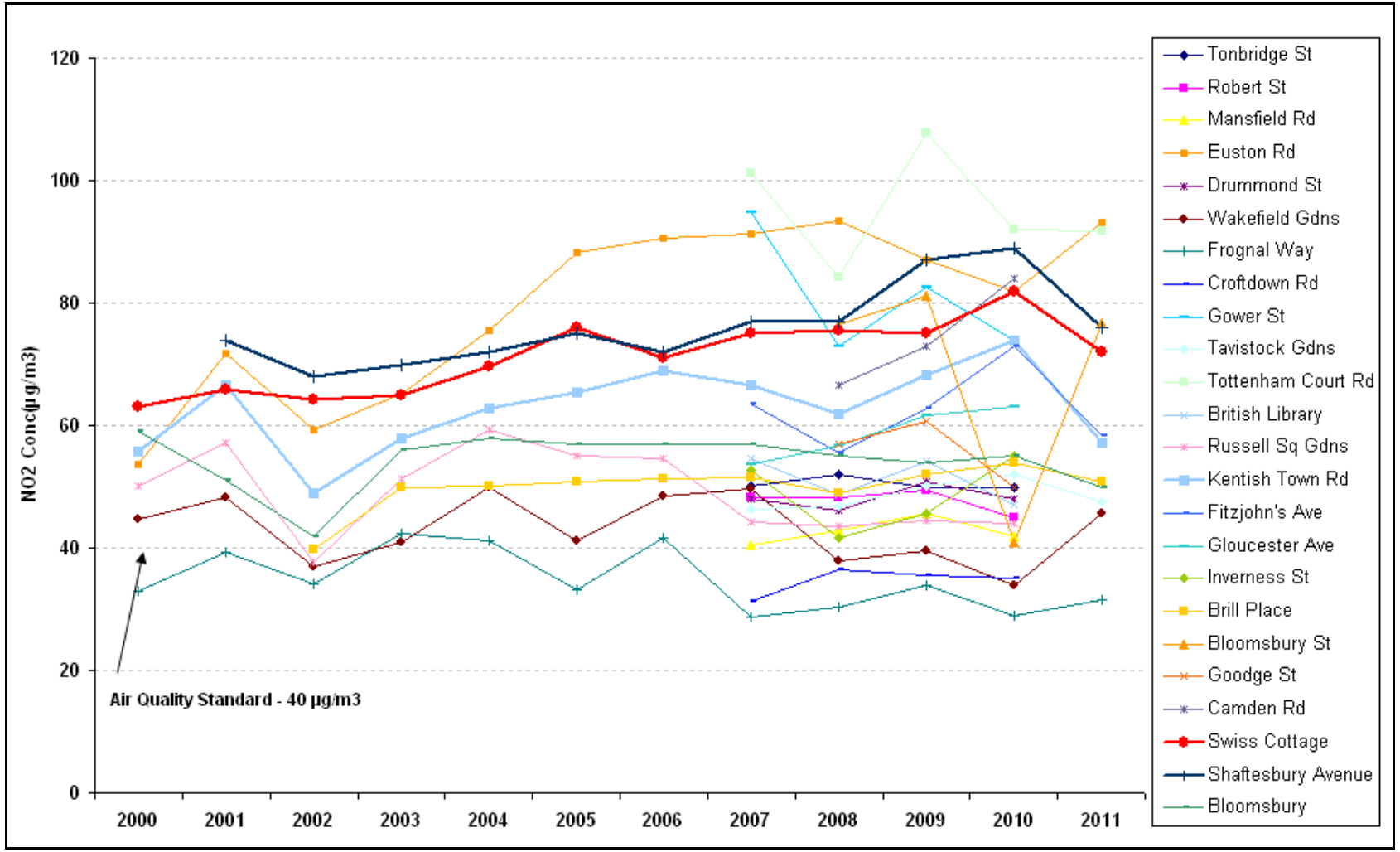
Table 2.6 Results of Nitrogen Dioxide Diffusion Tubes (2007 to 2011)

Site ID	Site type	Within AQMA	Annual mean concentrations (μg/m^3)				
			2007 (Bias Adjustment Factor: 1.01)	2008 (Bias Adjustment Factor: 1.01)	2009 (Bias Adjustment Factor: 1.03)	2010 (Bias Adjustment Factor: 0.96)	2011(Bias Adjustment Factor:1.01)
CA1	Roadside	Y	50.2	51.9	49.9	50	*
CA2	Roadside	Y	48.2	48.2	49.4	45	*
CA3	Roadside	Y	40.4	42.9	45.6	42	*
CA4	Roadside	Y	91.2	93.3	87.1	82	93.12
CA5	Roadside	Y	48.1	46.2	50.9	48	*
CA6	Urban background	Y	49.6	37.8	39.4	34	45.61
CA7	Urban background	Y	28.7	30.5	33.9	29	31.46
CA8	Urban background	Y	31.4	36.4	35.5	35	*
CA9	Roadside	Y	94.9	73	82.6	74	*
CA10	Urban background	Y	46.3	46.8	50.1	52	47.56
CA11	Kerbside	Y	101.1	84.2	107.7	92	91.67
CA13	Urban background	Y	54.5	48.7	54.1	47	*
CA14	Urban background	Y	44.3	43.6	44.5	44	*
CA15	Kerbside	Y	81.5	68.1	87.5	71	73.17
CA16	Roadside	Y	66.6	61.8	68.3	74	57.19
CA17	Roadside	Y	63.6	55.6	62.9	73	58.39
CA18	Kerbside	Y	53.6	56.7	61.7	63	*

CA19	Roadside	Y	52.6	41.5	45.7	55	*
CA20	Roadside	Y	51.5	49	51.9	54	50.79
CA21	Roadside	Y		76.5	81.3	41	76.73
CA22	Roadside	Y		56.8	60.6	50	*
CA23	Roadside	Y		66.5	73	84	72.21
CA24	Roadside	Y			50	68	44.12
CA25	Roadside	Y					50.01
CA26	Roadside	Y					57.12

* Sites where monitoring ceased in January 2011

Figure 2.4 Trends in Annual Mean Nitrogen Dioxide Concentrations measured at Diffusion Tube Monitoring Sites and automatic monitoring sites (2000 – 2011)



2.2.2 PM_{10}

The concentrations of PM_{10} recorded in the Borough at Shaftesbury Avenue, Bloomsbury and Swiss Cottage, continue to meet the 2004 objective of less than 40 µg/m^3. The annual mean concentrations for the last five years are presented in Table 2.7, while the trends are presented in Figure 2.5. These show that concentrations of PM_{10} increased marginally at each of the three sites between 2010 – 2011.

The monitoring site locations are representative of relevant public exposure and data have been adjusted to gravimetric equivalent.

Figure 2.5 Trends in Annual Mean PM_{10} Concentrations

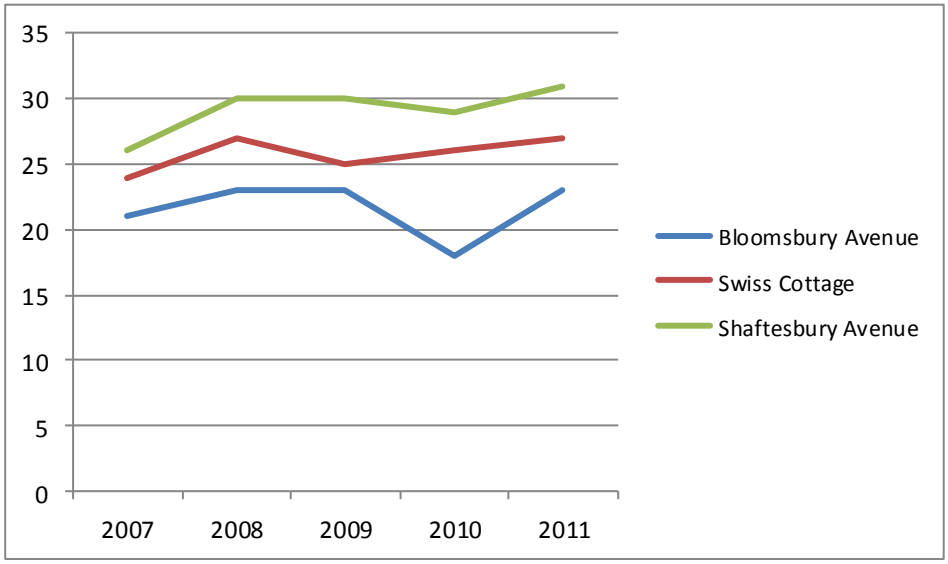


Table 2.7 Results of Automatic Monitoring of PM_{10}: Comparison with Annual Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for monitoring Period %[a]	Valid Data Capture 2011 %[b]	Confirm Gravimetric Equivalent (Y or NA)	Annual Mean Concentration μg/m^3				
						2007*[c]	2008* [c]	2009* [c]	2010* [c]	2011 [c]
LB	Urban Background	Y	97	97	Y	21	23	23	18	22
SC	Kerbside	Y	94	94	Y	24	27	25	26	27
SA	Roadside	Y	92	92	Y	26	30	30	29	31

The number of exceedences of 24 hour mean over 50 μg/m^3 also meet the 2004 objective at LB Camden's three monitoring sites. The number of exceedences increased between 2010 – 2011 at Bloomsbury and Swiss Cottage but reduced slightly at Shaftesbury Avenue.

Table 2.8 Results of Automatic Monitoring for PM_{10}: Comparison with 24-hour mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for monitoring Period %[a]	Valid Data Capture 2011 %[b]	Confirm Gravimetric Equivalent	Number of Exceedences of 24-Hour Mean (50 μg/m^3)				
						2007*	2008*	2009*	2010*	2011
LB	Urban Background	Y	97	97	Y	0	13	15	2	17
SC	Kerbside	Y	94	94	Y	24	27	25	26	31
SA	Roadside	Y	92	92	Y	26	30	30	29	24

2.2.3 Sulphur Dioxide

Sulphur dioxide is only monitored at the automatic monitoring site at Bloomsbury. There have been no exceedences of the SO_2 objectives over the past twelve years, as shown in Tables 2.9 and 2.10 below. The trend shows the concentrations of SO_2 continue to fall in the borough, as presented in Figure 2.6.

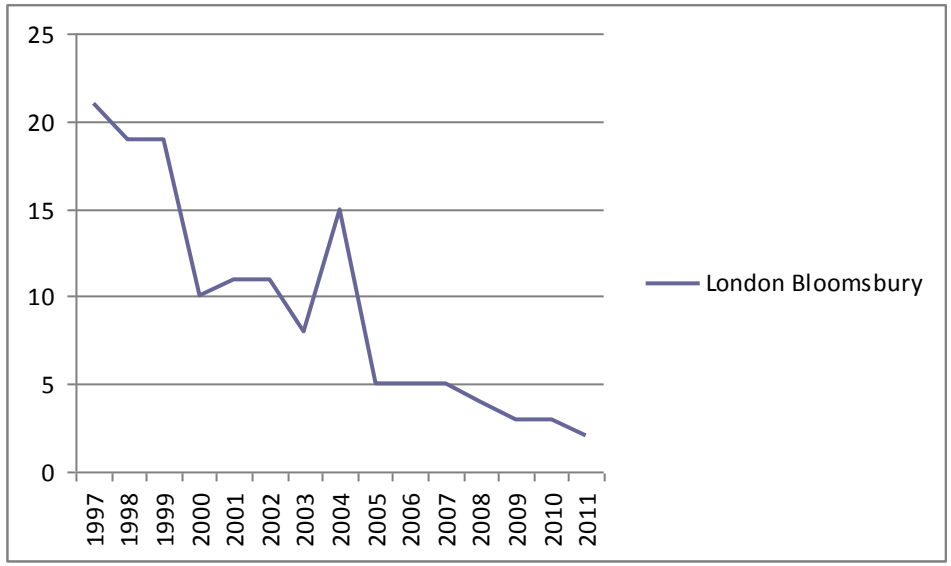
Table 2.9: Annual SO_2 monitoring data

Year	Data Capture (%)	Exceedences of the 15 minute mean*	Exceedences of the 1hr mean*	Exceedences of the 24hr mean*	Annual mean
1997	94	0	0	0	21
1998	96	0	0	0	19
1999	96	0	0	1	19
2000	97	0	0	0	10
2001	92	0	0	0	11
2002	90	0	0	0	11
2003	94	0	0	0	8
2004	98	0	0	0	15
2005	94	0	0	0	5
2006	95	0	0	0	5
2007	82	0	0	0	5
2008	99	0	0	0	4
2009	99	0	0	0	3
2010	99	0	0	0	3
2011	99	0	0	0	2

Table 2.10 Results of Automatic Monitoring of SO_2: Comparison with Annual Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for monitoring Period %[a]	Valid Data Capture 2011 %[b]	Number of Exceedences (percentile in bracket μg/m^3)[c]		
					15-minute Objective (266 μg/m^3)	1-hour Objective (350 μg/m^3)	24-hour Objective (125 μg/m^3)
LB	Urban Background	Y	99	99	0	0	0

Figure 2.6 Trends in SO_2 Concentrations



2.2.4 Benzene

Benzene is not currently monitored in the Borough as historic monitoring has revealed benzene levels to be well below the air quality objective for this pollutant.

2.2.5 Other pollutants monitored

2.2.5a Ozone

Ozone levels are only monitored at the automatic monitoring site at Bloomsbury. Concentrations have been gradually rising since monitoring began in 1997. Between 1997 and 2002, annual mean ozone concentrations fluctuated at around 23µg/m^3. Over the next six years, annual mean ozone concentrations increased by approximately 5%, peaking in 2003, 2006 and 2008. The highest annual mean ozone levels were measured in 2003, 2006 and 2008 when very sunny and hot weather conditions promoted the formation of ozone. Before 2008, the hourly objective was exceeded twice, once in 2003 and then again in 2006. Since 2008, the hourly objective has been exceeded at least once a year and it was exceeded three times in 2011.

Table 2.11: Annual mean ozone monitoring data

Year	Data Capture (%)	Annual Mean	Exceedences of the 8hr mean
1993	96	18	0
1994	96	22	0
1995	93	20	0
1996	98	18	0
1997	96	20	0
1998	96	20	0
1999	98	24	0
2000	97	22	0
2001	97	24	0
2002	89	22	0
2003	82	30	6
2004	97	24	0
2005	91	23	0
2006	96	29	5
2007	85	24	0
2008	98	28	1
2009	99	26	1
2010	93	23	1
2011	99	27	3

2.2.5b Carbon Monoxide

Carbon monoxide is only monitored at the automatic monitoring site at Bloomsbury. The air quality objective for carbon monoxide has been achieved since monitoring began in 1993. Annual mean CO concentrations display a downward trend over the last twelve years with concentrations stabilising to their lowest long term concentration between 2007 and 2011.

Table 2.12: Annual Carbon Monoxide monitoring data

Year	Data Capture (%)	Annual Mean	Exceedences of the rolling 8hr mean
1993	82	0.6	0
1994	97	0.6	0
1995	90	0.7	0
1996	94	0.7	0
1997	96	0.7	0
1998	96	0.7	0
1999	85	0.6	0
2000	95	0.6	0
2001	94	0.6	0
2002	88	0.3	0
2003	93	0.4	0
2004	97	0.3	0
2005	92	0.5	0
2006	95	0.4	0
2007	84	0.3	0
2008	99	0.3	0
2009	91	0.3	0
2010	97	0.2	0
2011	99	0.2	0

2.2.6 Summary of Compliance with AQ Objectives

The London Borough of Camden has examined the results from monitoring in the borough. We continue to meet objectives for all of the pollutants we monitor with the exception of NO_2.

The concentrations of NO_2 continue to be exceeded at all of our automatic monitoring sites and the vast majority of our nitrogen dioxide diffusion tube sites.

As the whole of the borough has been designated an Air Quality Management Area there is no need to carry out a Detailed Assessment at this time. We will therefore proceed to the 2013 Progress Report.

3 Road Traffic Sources

3.1 Narrow Congested Streets with Residential Properties Close to the Kerb

The London Borough of Camden 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. The general picture is that traffic volumes are falling, according to traffic count results that are reported in the Annual Parking Reports www.camden.gov.uk/pep.

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

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

3.4 Junctions

The London Borough of Camden 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 London Borough of Camden confirms that there are no new roads. However, in the next few years there will likely be construction of new sections of private highway associated with the King's Cross Lands Development.

3.6 Roads with Significantly Changed Traffic Flows

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

3.7 Bus and Coach Stations

The London Borough of Camden confirms that there are no new relevant bus or coach stations in the Local Authority area.

There are several bus termini in Camden, such as South End Green where up to six buses may stand at one time, but there is only one bus station at Euston train station. This is managed by London buses, who keep records of planned movements of buses entering and leaving the station. During a 24-hour period there are approximately 5,000 buses moving in and out of the bus station, which is above the criteria of 2,500 movements in the USA checklist. However, it is very unlikely that people will be exposed to bus emissions over a one-hour period at this station. This is because the nearest offices and green spaces are further away than the recommended exposure threshold of 20 metres from the bus stands. Therefore, it can be concluded that as this will not lead to relevant air quality exceedences, a detailed assessment is not required for this specific source.

4 Other Transport Sources

4.1 Airports

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

4.2 Railways (Diesel and Steam Trains)

4.2.1 Stationary Trains

The London Borough of Camden 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 London Borough of Camden confirms that there are no locations with a large number of movements of diesel locomotives, and potential long-term relevant exposure within 30m.

4.3 Ports (Shipping)

London Borough of Camden confirms that there are no ports or shipping that meets 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 London Borough of Camden confirms that there are no new or proposed industrial installations for which planning approval has been granted within its area or nearby in a neighbouring authority.

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

The London Borough of Camden 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 London Borough of Camden confirms that there are no new or proposed industrial installations for which planning approval has been granted within its area or nearby in a neighbouring authority.

5.2 Major Fuel (Petrol) Storage Depots

The London Borough of Camden confirms that there are no major fuel (petrol) storage depots within the Local Authority area.

5.3 Petrol Stations

The London Borough of Camden confirms that there are three petrol stations meeting the specified criteria in the borough. These are listed below. All of these stations are equipped with the stage II vapour recovery system, so we do not need to proceed to a detailed assessment.

- BP Hampstead Connect (Harmony) Filling Station
  104A Finchley Road, Swiss Cottage, London, NW3 5EY

- Tesco Express Filling Station
  196 Camden Road, London NW1 9HG

- Wm Morrisons Supermarket Petrol Filling Station
  Chalk Farm Road, London NW1 8AG

5.4 Poultry Farms

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

6 Commercial and Domestic Sources

6.1 Biomass Combustion – Individual Installations

Since the submission of the last Updating and Screening Assessment in 2009 LB Camden has received three planning applications which included biomass combustion. Two of these applications were withdrawn and the third was approved with the omission of the biomass plant.

5.2 Biomass Combustion – Combined Impacts

The London Borough of Camden has assessed the biomass combustion plant, and concluded that it will not be necessary to proceed to a Detailed Assessment.

5.3 Domestic Solid-Fuel Burning

Information in the LAEI 2006, which is the most current version with actual data, states that there are no particulate matter emissions from domestic coal burning in Camden, which is likely to be because the whole of the borough is a smoke free zone. Smokeless fuel burning is not included as a source in the LAEI, but there may be a few households burning smokeless fuels on open fireplaces (as a secondary source of heating). However, this does not occur on the significant scale as classed in the guidance, posing no risk to exceeding the PM_{10} objectives.

7 Fugitive or Uncontrolled Sources

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

8 Conclusions and Proposed Actions

8.1 Conclusions from New Monitoring Data

The concentrations of NO_2 continue to exceed short term and long term air quality objectives at all of our automatic monitoring sites and the vast majority of our nitrogen dioxide diffusion tube sites. As a result it would not be appropriate to revoke the AQMA. The air quality objective has been met for all of the other pollutants monitored including PM_{10}.

8.2 Conclusions from Assessment of Sources

There have been no new or significantly changed sources which have the potential to impact on the air quality objectives. The Council is carefully monitoring the number of biomass boilers and Combined Heat and Power plants in the borough and assessing the impact of NO_x and PM_{10} emissions to avoid any potential negative impacts on air quality.

8.3 Proposed Actions

The concentrations of nitrogen dioxide in the London Borough of Camden continue to exceed the long and short term air quality objectives.
As the whole of the borough has been designated an Air Quality Management Area, since 2001, there is no need to carry out a Detailed Assessment at this time. We will therefore proceed to the 2013 Progress Report.

9 References

Local Air Quality Management: Technical Guidance Note, LAQM, TG (09)

Appendices

Appendix A: QA:QC Data for LB Camden's Automatic monitoring sites

Euston Road is an LAQN (London Air quality Network) site. Data management/validation and ratification is done by King's College London. The audits are carried out by the National Physical Laboratory. Calibrations are carried out by King's College. SupportingU have the service contract.

Bloomsbury is an AURN (Automatic Urban and Rural Network) site. Data management and validation is carried out by Bureau Veritas. Audits and ratification are carried out by AEA.

Swiss Cottage is an LAQN site which is affiliated to the AURN. Data management and validation are carried out by King's College London and audits and ratification are carried out by AEA. Calibrations are by King's College. SupportingU have the service contract for the NO_2 and EnviroTechnology have the service contract for the two FDMS instruments.

Shaftesbury Avenue is an LAQN site. Data management/validation and ratification is done by King's College. The audits are done by National Physical Laboratory. Calibrations are by King's College. SupportingU have the service contract.

Bloomsbury and Swiss Cottage use FDMS (Filter Dynamic Measurement System) instruments to measure particulate matter which have been shown to be equivalent to the reference method. Shaftesbury Avenue uses a TEOM (Tapered Element Oscillating Microbalance) which is a corrected to give reference equivalent measurements using the Volatile Correction Method.

Appendix B: QA:QC Data for LB Camden's Nitrogen Dioxide Diffusion Tube Sites

Laboratory and preparation method

Gradko Environmental supplies, prepares (50% TEA and acetone method) and analyses Camden's diffusion tubes. This laboratory participates in the UK National Diffusion Tube Network and the Workplace Analysis Scheme for Efficiency. Gradko currently holds UKAS accreditation for analysis of diffusion tubes and participates in the Health and Safety Laboratory's Workplace Analysis Scheme for Proficiency (WASP).

Figure B.1: Gradko's WASP results summary

gradko environmental

St. Martins House, 77 Wales Street Winchester, Hampshire SO23 0RH
tel.: 01962 860331 fax: 01962 841339 e-mail:diffusion@gradko.co.uk

Nitrogen Dioxide WASP Results 2011 - 2012

Camspec M550 & QuAAtro										
WASP Round No:-	R112A Feb-11	R112B Feb-11	R113A May-11	R113B May-11	R114A Aug-11	R114B Aug-11	R115A Nov-11	R115B Nov-11	R116A Feb-12	R116B Feb-12
Assigned Value	0.94	2.10	1.532	2.304	1.20	0.89	1.70	1.44	1.79	0.84
Camspec Value	0.977	2.100	1.525	2.196	1.113	0.917	1.667	1.415	1.779	0.858
Camspec Value	0.969	2.049	1.586	2.288	1.202	0.918	1.424	1.448	1.708	0.841
Average	0.973	2.075	1.556	2.242	1.158	0.918	1.546	1.432	1.744	0.850
Z Score	0.5	-0.2	0.2	-0.3	0.4	-0.5	-0.3,-2.2	-0.2, 0.1	-0.1, -0.6	0.3, 0
QuAAtro Value	0.901	1.926	1.503	2.229	1.247	0.939	1.957	1.812	1.854	0.872
QuAAtro Value	0.890	2.018	1.471	2.277	1.244	0.937	2.141	1.675	1.846	0.868
Average	0.896	1.972	1.487	2.253	1.246	0.938	2.049	1.744	1.850	0.870
Z Score	-0.6	-0.8	-0.4	-0.3	0.7	0.5	2.0 , 3.4	3.4, 2.1	0.5, 0.4	0.5, 0.5

Note: Round 115 QuAAtro results were poor due to contamination of samples during analysis. This was an isolated incident. No other samples were affected.

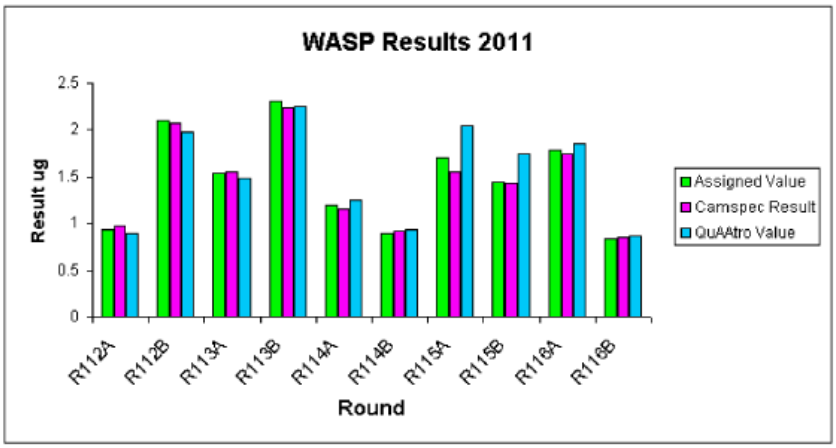


Figure B.2: Gradko's UKAS Accreditation certificate for analysis of diffusion tubes

United Kingdom Accreditation Service

ACCREDITATION CERTIFICATE

UKAS
UNITED KINGDOM ACCREDITATION SERVICE

TESTING LABORATORY
No. 2187

Gradko Environmental
(a division of Gradko International Ltd)

is accredited in accordance with the recognised International Standard ISO/IEC 17025:2005
General Requirements for the competence of testing and calibration laboratories.

This accreditation demonstrates technical competence for a defined scope as detailed in and at the locations specified in the schedule to this certificate, and the operation of a laboratory quality management system (refer joint ISO-ILAC-IAF Communiqué dated 18 June 2005).

The schedule to this certificate is an essential accreditation document and from time to time may be revised and reissued by the United Kingdom Accreditation Service. The most recent issue of the schedule of accreditation, which bears the same accreditation number as this certificate, is available from the UKAS website www.ukas.org.

This accreditation is subject to continuing conformity with United Kingdom Accreditation Service requirements. The absence of a schedule on the UKAS website indicates that the accreditation is no longer in force.

Accreditation Manager, United Kingdom Accreditation Service

Initial Accreditation date
31 January 2001

This certificate issued on
26 September 2006

The Department of Trade and Industry (DTI) has entered into a memorandum of understanding with the United Kingdom Accreditation Service (UKAS) through which UKAS is recognised as the national body responsible for assessing and accrediting the competence of organisations in the fields of calibration, testing, inspection and certification of systems, products and persons

Bias adjustment factor

The diffusion tube results have been bias corrected on the basis of triplicate tubes co-located with a chemi-luminescent analyser at Swiss Cottage. The bias adjustment factor was calculated in accordance with the methodology stated in TG (09). To calculate the bias adjustment factor the Local Bias Adjustment Spreadsheet was used. The results are displayed below.

Figure B.3: Local Bias Adjustment Spreadsheet

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 μgm^{-3}	Tube 2 μgm^{-3}	Tube 3 μgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	04/01/2011	04/02/2011	114.4	109.0	70.1	98	24.2	25	60.2	81.09	100	Poor Precision	Good
2	04/02/2011	02/03/2011	104.9	71.7	75.4	84	18.2	22	45.1	69.85	99	Poor Precision	Good
3	02/03/2011	01/04/2011	73.8	76.4	74.8	75	1.3	2	3.2	83.73	99	Good	Good
4	01/04/2011	04/05/2011	70.2	76.4	74.8	74	3.2	4	8.0	90.64	100	Good	Good
5	04/05/2011	30/05/2011	61.0	59.9	61.2	61	0.7	1	1.7	62.83	91	Good	Good
6	30/05/2011	30/06/2011	64.8	69.7	62.4	66	3.7	6	9.3	58.77	98	Good	Good
7	30/06/2011	05/08/2011	90.7	93.4	83.9	89	4.9	5	12.2	70.42	99	Good	Good
8	05/08/2011	01/09/2011	51.3	55.5	52.3	53	2.2	4	5.4	55.67	100	Good	Good
9	01/09/2011	28/09/2011	74.0	66.3	63.7	68	5.3	8	13.3	59.33	100	Good	Good
10	28/09/2011	04/11/2011	68.6	67.4	70.5	69	1.6	2	3.9	73.51	100	Good	Good
11	04/11/2011	29/11/2011	82.0	88.9	70.2	80	9.5	12	23.5	84.64	100	Good	Good
12	29/11/2011	04/01/2012	51.2	56.8	54.1	54	2.8	5	7.0	55.58	88	Good	Good
13													
											Overall survey -->	Good precision	Good Overall DC

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

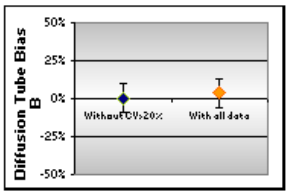
(Check average CV & DC from Accuracy calculations)

Site Name/ ID:

Precision: 10 out of 12 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 10 periods of data	
Bias factor A	1.01 (0.92 - 1.12)
Bias B	-1% (-11% - 9%)
Diffusion Tubes Mean:	69 μgm^{-3}
Mean CV (Precision):	5
Automatic Mean:	70 μgm^{-3}
Data Capture for periods used:	98%
Adjusted Tubes Mean:	70 (63 - 77) μgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 12 periods of data	
Bias factor A	0.97 (0.89 - 1.07)
Bias B	3% (-7% - 12%)
Diffusion Tubes Mean:	73 μgm^{-3}
Mean CV (Precision):	8
Automatic Mean:	71 μgm^{-3}
Data Capture for periods used:	98%
Adjusted Tubes Mean:	70 (65 - 78) μgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

Table B.1 LB Camden Diffusion Tube Monitoring Site 2011 Full Dataset

Site ID	Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
CA4	Euston Road	70.73	94.95	90.57	92.58	96.99	85.7	134.17	74.09	99.92	99.68	110.32	56.65
CA6	Wakefield Gdns	47.59	44.19	42.38	34.15	33.95	30.67	29.76	79.62	35.55	79.74	43.48	40.88
CA7	Frognal Way	36.4	35.62	34.93	28.87	22.69	24.31	23.67	22.28	30.37	35.17	43.27	36.15
CA10	Tavistock Gdns	50.15	49.72	55.21		45.19	42.26	43.25	39.16	42.47	51.93	52.44	46.24
CA11	Tottenham Court Road	105.35	117.64	39.09	98.04	110.91	86.03	103.68	80.36	86.47	82.12	95.13	84.38
CA15	Finchley Rd	114.44	104.87	73.83	70.15	60.95	64.75	90.65	51.3	73.98	68.57	82.02	51.15
CA15	Finchley Rd	109.04	71.71	76.36	75.64	59.89	69.7	93.39	55.45	66.34	67.39	88.89	56.76
CA15	Finchley Rd	70.05	75.42	74.83	72.44	61.17	62.38	83.88	52.26	63.7	70.49	70.2	54.08
CA16	Kentish Town Rd	50.55	34.47	72.45	71.38	60.14	60.41	72.48	48.57	54.41	68.61	36.42	49.57
CA17	47 Fitzjohn's Ave	65.17	58.92	56.66	59.31	56.72	52.17	60.45	42.77	51.35	65.86	69.75	54.66
CA20	Brill Place	51.42	56.49	30.65	59.53	36.91		47.56		50.97	53.13	65.91	
CA21	Bloomsbury St	60.72	87.26	86.5	101.13	77.26	74.99	94.83	61.29	60.39	72.91	84.06	50.26
CA23	Camden Rd	71.05	75.79	81.93	60.4	72.16	71.29	71.59	60.05	71.52	66.17	105.63	50.37
CA24	Chetwynd Rd	51.5	46.25	48.16	46.14	42.61	38.78	40.98	35.63	40.6	43.66	56.51	33.38
CA25	Emmanuel Primary School	60.75	57.39	56.66	50.99	44.38	42.96	47.73	34.74	42.17	47.65	66.69	42.08
CA26	Mill Lane/West End Lane	61.7	70.35	63.75	60.14	60.38	54.11	57.88	47.66	54.62	59.68	41.2	47.14