Air Quality and Action Plan Progress Report

May 2007

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Executive Summary

This is the Air Quality and Action Plan Progress Report 2007 for the London Borough of Redbridge ("the Council"). This report fulfils this part of the Council's commitment to the continuing Local Air Quality Management (LAQM) process. This Report provides an annual update of recent air quality issues in Redbridge, including an update on recent air quality in the Borough, obtained from its monitoring results as well as a focus on the Council's progress on reducing air pollution through its Air Quality Action Plan.

The Council's earlier Review and Assessments of air quality confirmed that there were locations across the Borough with relevant public exposure where the Government's air quality objectives might be exceeded.

The more up to date monitoring of nitrogen dioxide and PM_{10} in this report confirms that the Government's air quality objectives are still being exceeded widely at locations with relevant public exposure. The Council will therefore maintain its AQMA for these two pollutants.

The Council's monitoring results for carbon monoxide, benzene and sulphur dioxide however indicate that the objectives for these pollutants are not being exceeded. The report also includes a section on the Council's ozone monitoring. The monitored results confirm that this objective has also been exceeded in the Borough.

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1 Introduction to Air Quality and Action Plan Progress Report

1.1 Overview

This is the Air Quality and Action Plan Progress Report 2005 for the London Borough of Redbridge (the Council). This report fulfils this part of the Council's continuing commitment towards the Local Air Quality Management (LAQM) process.

1.2 Background

The LAQM process forms a key part of the Government's Air Quality Strategy to achieve the air quality objectives prescribed in the Air Quality (England) Regulations 2000 and 2002. Air quality progress reports were introduced following a detailed evaluation of the first round of local authority Review and Assessment. This evaluation identified a need both to develop a longer-term vision for LAQM and encourage the integration of air quality into the routine work of local authorities.

Local Authorities are required by section 88 (2) of the Environment Act 1995 to have regard to the government's guidance documents when carrying out their LAQM duties. To assist local authorities and provide guidance for the overall LAQM process, the Department for Environment, Food and Rural Affairs (DEFRA) issued the following policy and technical guidance documents: LAQM PG (03), LAQM PG (S) (03), LAQM TG (03) and LAQM.PGA (05).

In earlier rounds of review and assessment (R&A) of local air quality management, the Council identified areas where objectives were exceeded and where there was relevant public exposure. As a consequence, it designated its area an Air Quality Management Area (AQMA) for the annual mean nitrogen dioxide objective and daily mean PM_{10} objective and produced a draft Action Plan.

The Council also completed its second USA of the seven LAQM pollutants in 2006. The conclusion of that work was that the Council did not need to undertake a Detailed Assessment and should maintain its AQMA.

LAQM PRG (03) supplemented the above guidance and assists in the production of air quality progress reports. Based on this, local authorities are required to produce Progress Reports in those years when they are not carrying out an Updating and Screening Assessment (USA) or a Detailed Assessment of air quality.

The guidance also advises that the Progress Report is not designed to represent a further USA, although it states that, if at any time a risk is identified that an air quality objective might be exceeded, a Detailed Assessment should be carried out without delay.

The overall aim of the Progress report is to report on progress on implementing LAQM and report progress in achieving, or maintaining concentrations below the air quality objectives. The guidance considers that these aims can be best achieved by reporting on new results and on progress with implementation of the Action Plan.

The guidance further suggests that those local authorities monitoring ozone use this report to outline the results. (Note – ozone is not one of the identified seven LAQM pollutants, although it is included within the Government's Air Quality Strategy).

2 New monitoring results in the LB of Redbridge

2.1 Outline of monitoring undertaken

The Council continued monitoring carbon monoxide (CO), nitrogen dioxide (NO_2), sulphur dioxide (SO_2), particles (PM_{10}) and ozone in its area. The Government's adopted air quality objectives for each of these pollutants as shown in Table 1 below.

Table 1 Air quality strategy objectives for benzene, CO, NO_2, SO_2, PM_{10} and ozone

Pollutant	Objective		Date to be achieved by
	Concentration	Measured as	
Benzene	16.25 μg m^{-3}	Running Annual Mean	31 Dec 2003
	5 μg m^{-3}	Annual Mean	31 Dec 2010
Carbon Monoxide	10 mg m^{-3}	Daily Maximum Running 8 hour mean	31 Dec 2003
Nitrogen Dioxide (provisional)	200 μg m^{-3} not to be exceeded more than 18 times a year	1 hour mean	31 Dec 2005
	40 μg m^{-3}	Annual Mean	31 Dec 2005
Sulphur Dioxide (SO_2)	350 μg m^{-3} not to be exceeded more than 24 times a year	1 hour mean	31 Dec 2004
	125 μg m^{-3} not to be exceeded more than 3 times a year	24 hour mean	31 Dec 2004
	266 μg m^{-3} not to be exceeded more than 35 times a year	15 minute mean	31 Dec 2005
Particles (PM_{10})	50 μg m^{-3} not to be exceeded more than 35 times a year	Daily Mean	31 Dec 2003
	40 μg m^{-3}	Annual Mean	31 Dec 2004
Ozone (O_3)	100 μg m^{-3} not to be exceeded more than 10 times a year	Daily maximum of 8 hour running mean	31 Dec 2005

The Council undertakes continuous monitoring at four fixed long-term sites:

- Perth Terrace (RB1) - an urban background site in Ilford (this site has been operating since 1999)

- Fullwell Cross (RB3) - a kerbside site close to the roundabout in Fulwell Cross (this site started operating since 1999)

- Gardner Close (RB4) - a roadside site close to the A12 in Wanstead (monitoring at this site commenced in 1999)

- Grove Road (RB5) - a roadside site close to the A406 (this site has been operating since 2003).

The above sites are also representative of relevant exposure. All the sites are part of the London Air Quality Network and therefore the standards of QA/QC are similar to those of the government's AURN sites. Regular calibrations are carried out, with subsequent data ratification undertaken by the ERG at King's College London. In all cases the data are fully ratified unless reported otherwise. Details of the sites can be found at www.londonair.org.uk

The Council also previously operated a kerbside site on Ilford Broadway (RB2) from 1999 to June 2003. The results were reported in earlier Redbridge reports and are not reported again here. Unlike the above sites, the RB2 site did not fully represent relevant exposure.

The Council also undertakes non-continuous monitoring across its area.

2.2 Benzene Monitoring

The Council previously undertook monitoring of benzene using diffusion tubes only at four kerbside sites in its area. This monitoring ended in 2005. The annual mean results for the period 2000 to 2005 are given in Table 2. The highest concentrations were observed at the Chigwell Road kerbside site, with the Seven Kings site slightly lower.

The results however indicated for all sites that the 2003 AQS objectives were not exceeded during the period of monitoring. The benzene monitoring also confirmed that the stricter 2010 annual mean objective (of 5 μg m^{-3}) was also not exceeded.

The situation in Redbridge reflects the national picture, in that concentrations of benzene have been decreasing over time as a result of stricter emission controls, particularly with regard to road transport sources.

Table 2 Benzene monitoring (μg m^{-3}) in the LB of Redbridge (2000 to 2005)

LOCATION	2000	2001	2002	2003	2004	2005
Grove Road E18	2.32	2.50	2.23	2.10	1.36	1.43
Chigwell Road	4.73	4.36	3.16	3.32	3.25	2.57
High Road, Seven Kings	3.82	3.42	2.94	3.01	1.91	2.27
Cranbrook Road, Ilford	3.28	3.31	2.71	2.39	1.57	1.28

2.3 CO Monitoring

The Council undertook continuous monitoring of CO at its roadside sites, RB4 at Gardner Close and RB5 on the A406. There were no periods exceeding the CO objective (i.e. a maximum daily mean of 10 mg m^{-3}) at these sites over the period 2002 to 2006 (note - 2006 includes provisional data).

The data capture for all years exceeded 90% at the RB4 site (see Appendix 1). At RB5, the data capture in 2004 and 2006 was reduced to 47% and 59% respectively. (The RB5 site was set up in 2003 and hence there was also reduced data capture (11%) for that year too).

As with benzene above, CO concentrations have decreased over time as a result of stricter emission controls on road vehicles.

Table 3 CO monitoring (mg m^{-3}) in the LB of Redbridge (2002 to 2006 inclusive)

	2002	2003	2004	2005	2006
Redbridge 4					
Max 8 Hour	4.0	4.3	2.4	3.5	3.0
Redbridge 5					
Max 8 Hour	-	4.0	2.8	2.9	3.0

2.4 NO_2 Monitoring

The Council monitor of NO_2 in its area using both continuous chemiluminescence analysers and diffusion tubes.

2.4.1 Continuous NO_2 and NOx monitoring in LB of Redbridge

The annual mean results for the continuous sites are presented in Table 4 and Figure 1. The data capture exceeded 90% for all years (see Appendix 1), other than 2006 at RB1 (63%) and RB5 in 2003 (10%). In all cases the data were fully ratified, apart from the 2006, which included some provisional data.

Table 4 Annual mean NO_2 concentrations for the LB of Redbridge (2002 – 2006 inclusive)(µg m^{-3})

LAQN site	Type	2002	2003	2004	2005	2006
Redbridge 1 (background)	U	36	**40**	38	37	34
Redbridge 3 (kerbside)	K	**66**	**63**	**66**	**63**	**55**
Redbridge 4 (roadside)	R	**47**	**55**	**47**	**47**	**44**
Redbridge 5 (roadside)	R		56	**51**	**54**	**60**

(Note- italics indicates < 90% data capture; bold indicates > annual mean objective)

The monitoring results for the long-term sites consistently exceeded the annual mean objective, for all years at all sites, other than the RB1 background site at Perth Terrace in Ilford.

Figure 1 highlights the inter annual variability for the sites which arose as a result of the varying meteorological conditions, as well as the changes in atmospheric emissions. These confirmed that the annual mean objective continue to be exceeded close to roads where there was relevant exposure in the Borough.

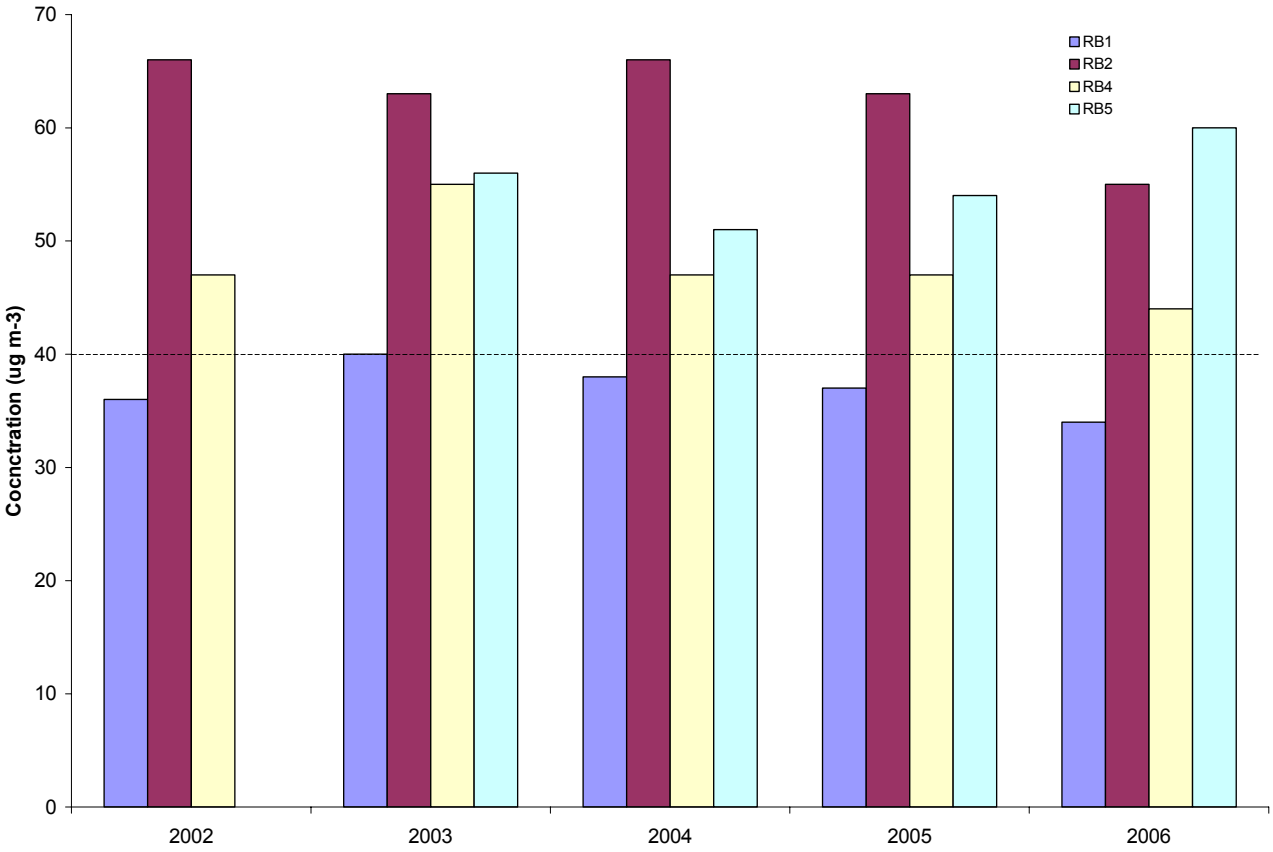

Figure 1 Annual mean NO_2 concentrations in the LB of Redbridge (2002 – 2006)

The RB3 and RB5 sites recorded periods that were above the hourly standard of 200 μg m^{-3} in 2006. The RB3 site recorded 2 hours above this standard, whereas the RB5 site recorded 52 periods, thereby exceeding the government's hourly objective of not more than 18 such periods. It is particularly notable that this site, although at a roadside close to the A406 had not recorded any hourly mean concentrations greater than 200 μg m^{-3} in previous years. Elsewhere in London there was also an increase in the number of sites exceeding this objective, compared to 2002, when there was only one London site that exceeded (Fuller G. and Green D., 2006). This rise may be linked to rises in direct emissions of NO_2 as indicated by recent research (Carslaw D.C and Beevers, S. D, 2005).

The annual mean concentration for the RB5 site also increased over previous years, in contrast to the other Redbridge sites. The monitoring results for the hourly objective are given in Table 5.

Table 5 Hourly mean NO_2 periods > 200µg m^{-3} for the LB of Redbridge (2002 – 2006 inclusive)

LAQN site	Type	2002	2003	2004	2005	2006
Redbridge 1	U	0	1	0	0	*0*
Redbridge 3	K	5	15	17	8	2
Redbridge 4	R	0	1	0	0	0
Redbridge 5	R	-	*0*	0	0	**52**

(Note- italics indicates < 90% data capture; bold indicates > hourly mean objective)

2.4.2 NO_2 and NOx trends in the LB of Redbridge

Rolling annual mean plots can be used to indicate changing annual concentrations over time. The use of rolling annual mean concentrations, based on averaged hourly means, largely removes seasonal influences and provides a guide to changing trends. NO_2 is a mainly secondary pollutant formed by chemical reactions in atmosphere from NOx emissions produced by combustion sources. These reactions also involve ozone, which is scavenged by NO. The relationship between NOx and NO_2 is non linear and it is also further complicated by changes in direct emissions of NO_2 from some road vehicles.

The rolling annual mean plots of both NOx and NO_2 concentrations of the LB of Redbridge sites are shown in Figure 2. This analysis is for the period from 2000 through to the end of 2006 (including some provisional data for part of 2006).

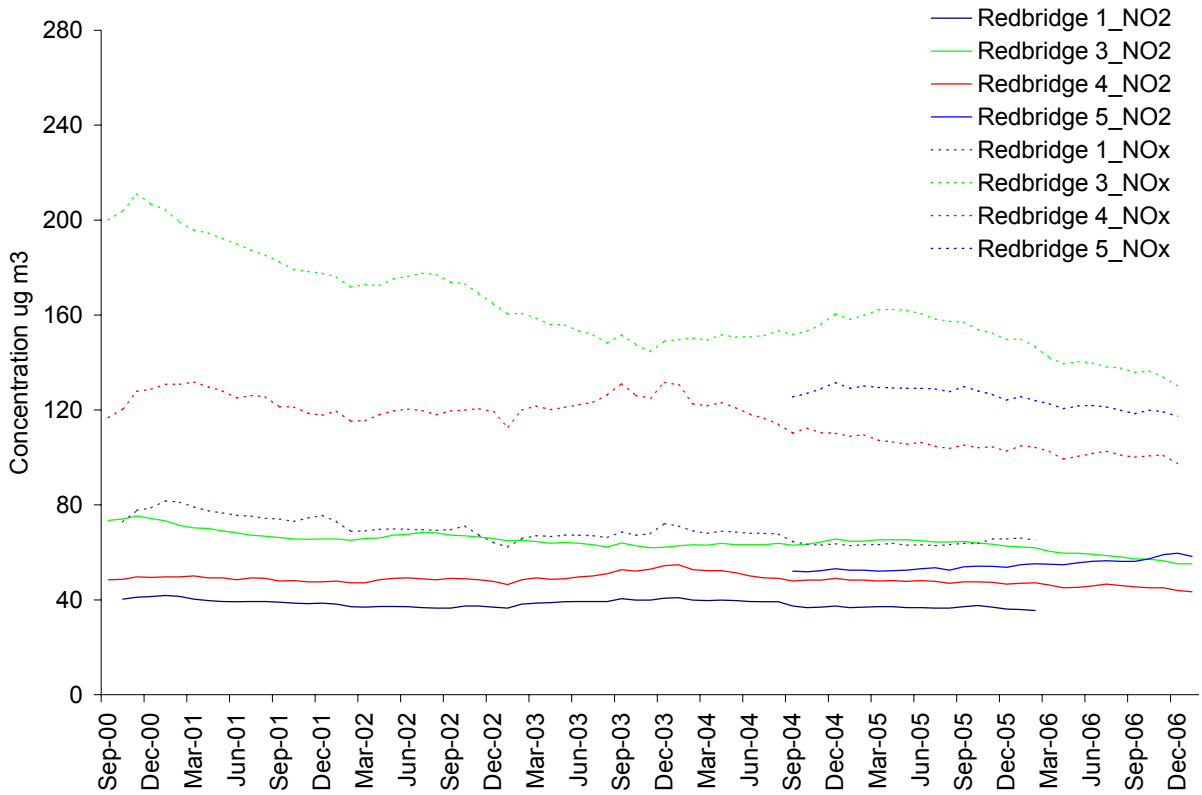

Figure 2 Rolling annual mean concentrations for continuous monitoring sites in LB of Redbridge

The rolling annual mean concentrations of NOx indicated a downward trend at the Redbridge 1 urban background site over time in line with reductions in emissions. The downward trend for NOx as the primary emission was approximately 15 $\mu g\ m^{-3}$, from 2000 to 2006. It was greater than that for NO_2 (approximately 5 $\mu g\ m^{-3}$).

Similarly the Redbridge 3, 4 and 5 sites showed differing reductions with NOx reducing more than NO_2. For roadside sites concentrations of both pollutants were higher and the reduction of NOx at the Redbridge 3 site was about 70 $\mu g\ m^{-3}$ and for NO_2 (approximately 18 $\mu g\ m^{-3}$)

This illustrates the difficulty in reducing NO_2 concentration, which is mostly a secondary pollutant that is largely determined by the oxidising capacity of the atmosphere. The effect of the increased direct NO_2 emissions was also more pronounced at the roadside sites and consequently the reduction was less than 10 $\mu g\ m^{-3}$ for these. The Redbridge 5 site started operating in 2003 and it showed an increase in concentrations of approximately 6 $\mu g\ m^{-3}$, although the short period of operation meant that it is too soon to fully determine any trend. The average change in rolling annual mean concentrations of NO_2 over this period at Redbridge 1 was in line with the average for outer London sites operating over this length of time (ERG, 2006). These graphs indicate that the annual mean objective is likely to continue to be exceeded into the near future at roadside sites unless additional actions are undertaken.

2.4.3 Diffusion tube monitoring of NO_2 in LB of Redbridge

The Council also undertook monitoring using diffusion tubes at sites across the Borough. For 2006 the diffusion tube monitoring was re-organised, with monitoring focussed on triplicate studies at fewer sites and also co-location studies at some of the Council's continuous sites. The diffusion tubes were sited at 13 roadside and 3 background locations across the Borough (see Appendix 1). There was more than 75% data capture for all the sites reported and these sites mostly represented locations relevant for public exposure. The biased results of diffusion tube monitoring for 2006 are given below.

The diffusion tubes were supplied by Bureau Veritas and analysed by Gradko International. The method of preparation was 50% TEA in acetone. The unbiased results of the diffusion tube monitoring monitored in the Borough, with the location of the sites and reference number are given in Appendix 1 (see Table 15).

The results at Fullwell Cross (RB3) were adjusted for bias using default bias factors from the triplicate co-location study. There was reduced continuous monitoring data available due to instrument problems at the Perth Terrace RB1 site and hence a default bias adjustment factor was used for this site (this was obtained from the DEFRA helpdesk v6). The adjusted results are presented in Figure 3. The factors used were:

2006 background - 1.04 (default value from 10 studies)

2006 roadside - from Fullwell Cross study see below

	2006
Cm	55
Dm	53.58
	50.78
	54.66
Mean	53.00
Bias factor = Cm/Dm	1.03766

Both factors indicate that the diffusion tube results under read slightly in comparison with continuous monitoring in 2006.

The 2006 bias adjusted results indicated that all the roadside sites (shown in mauve) exceeded the 40 μg m^{-3} standard. The 2006 bias adjusted results for background sites (shown in light purple) met the objective at the Mayfield and Ethal Davis Schools. The objective was just exceeded at Perth Terrace, although in previous years the objective was not exceeded at this site (apart from 2003 when the concentration was 40 μg m^{-3}). The unbiased results for Perth Terrace were however just less than the 40 μg m^{-3} standard.

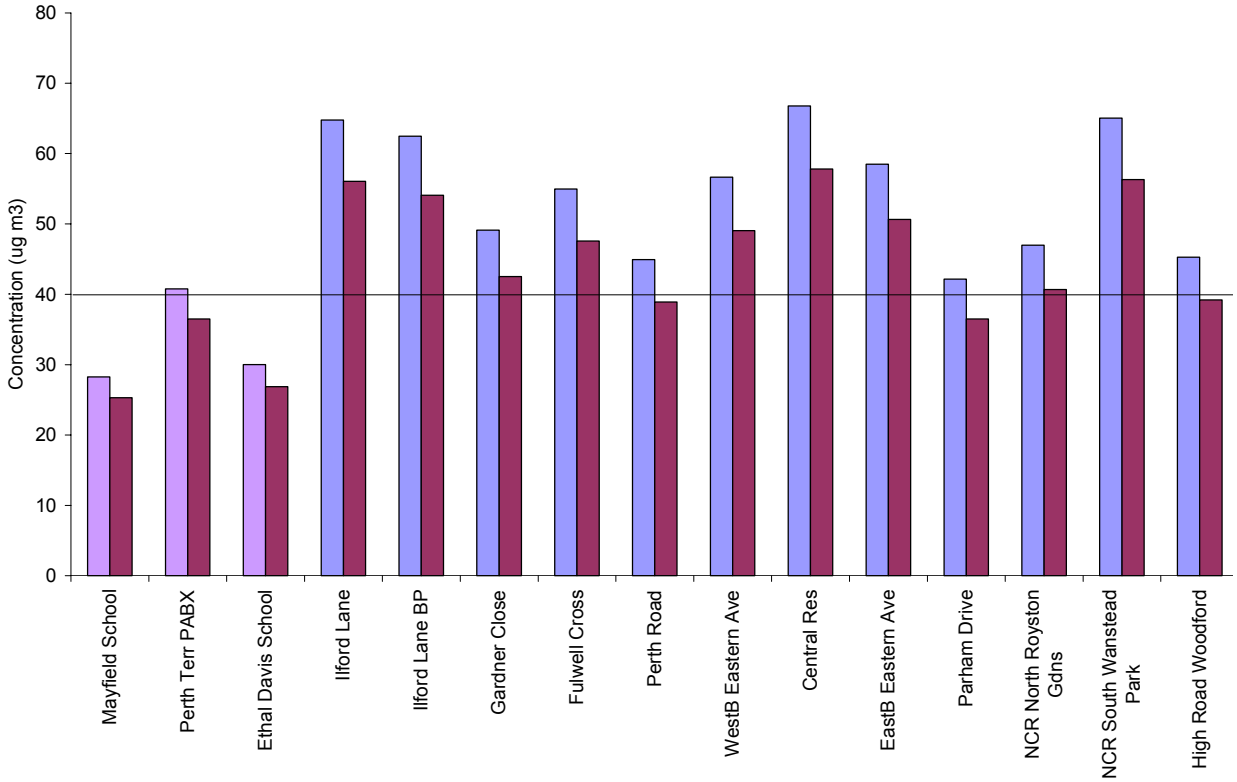

Figure 3 NO_2 diffusion tube results for sites in LB of Redbridge (2006)

Predictions of concentrations in 2010 were made using the DEFRA year adjustment factors, based on 2006 measurements (in purple). These estimates indicate that despite the predicted reduction in emissions all but three of the roadside locations will still exceed the objective in the Borough.

2.5 PM_{10} monitoring

The Council undertook continuous monitoring of PM_{10} at all four of its sites. These included three sites close to roads (Redbridge 3, 4 and 5) plus one at a background location (Redbridge 1). The Redbridge 5 site was opened in late 2003 and the Redbridge 3 was non operational in 2004. The Council uses BAM instruments for monitoring PM_{10}; the results are therefore presented as a gravimetric equivalent, i.e. BAM times 0.83 (in accordance with TG03 guidance).

The monitoring results for the sites are given in Table 6. Full details of data capture are given in Appendix 1.

Table 6 PM_{10} monitoring at the long-term LB of Redbridge sites (2002 - 2006)

Site		2002	2003	2004	2005	2006
RB1	No. of days	16	35	10	*14*	15
RB3		20	***43***	-	*35*	26
RB4		29	**59**	24	33	19
RB5		-	*6*	*23*	21	21
RB1	Annual	27	29	24	*24*	26
RB3		30	*37*	-	*35*	30
RB4		31	34	29	32	29
RB5		-	*33*	*34*	27	30

(Note- italics indicates < 90% data capture; bold exceed objective)

The results confirmed that for each year of monitoring there were days when the daily mean standard of 50 µg m^{-3} was exceeded. The current (i.e. 2004) daily mean objective was exceeded during 2003 at the RB3 and RB4 sites, and 35 days of exceedence were also measured in 2003 at RB1 and RB3 in 2005. The latter was measured despite only 67% data capture for the year. This suggests that the objective would have been exceeded with greater data capture.

The current annual mean objective was not exceeded over this period at any of the sites. In line with other LAQN monitoring sites the highest annual mean concentrations arose during 2003, although concentrations in 2006 were also higher at two Redbridge sites (RB1 and RB5) than 2005. Across London, 28 sites had increased 2006 annual mean concentrations when compared to 2005 (Fuller G. and Green D., 2006).

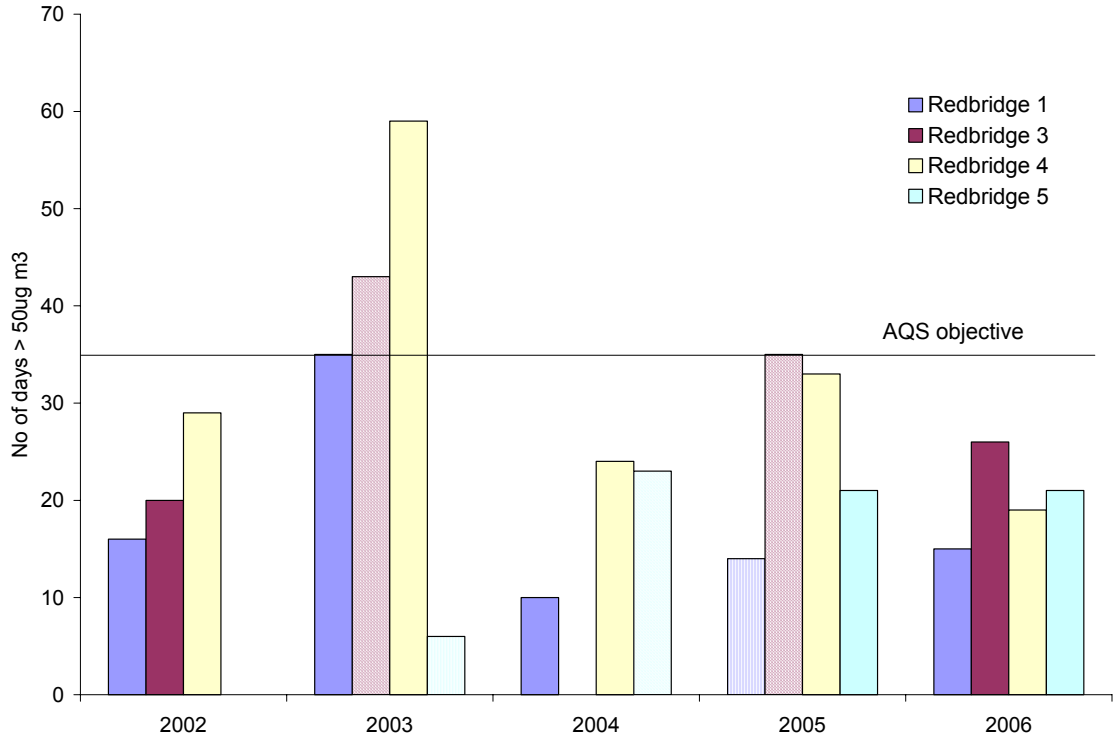

Figure 4 Number of days PM_{10} greater than 50 μg m^{-3} at the LB of Redbridge sites (2002 to 2006)

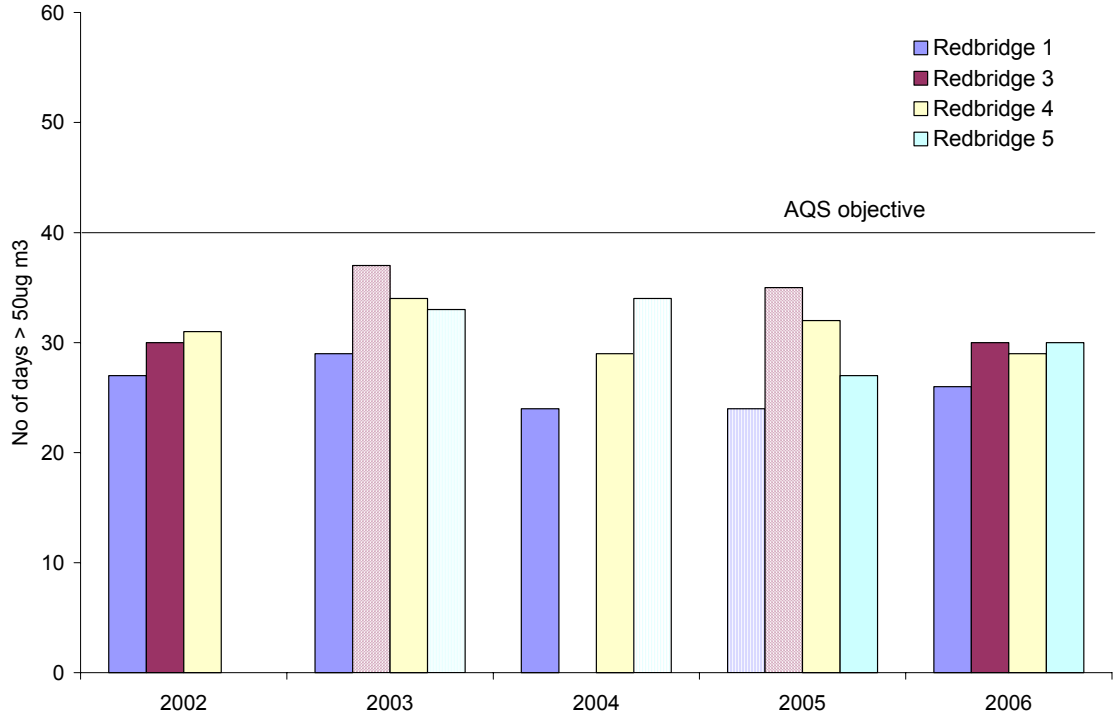

Figure 5 Annual mean PM_{10} (μg m^{-3}) at the LB of Redbridge sites (2002 to 2006)

An analysis of rolling annual mean PM_{10} concentrations and daily mean PM_{10} exceedences is provided for the Redbridge monitoring sites to indicate possible trends over time. The analysis is for the period from 2000 through to 2006 (and includes some provisional data for 2006). Figure 6 illustrates changing concentrations over time the rolling daily mean PM_{10} exceedences and Figure 7 changing rolling annual mean PM_{10} concentrations. The use of rolling data in this

way largely removes seasonal influences and thus provides a guide to changing trends over time.

Figure 6 Rolling number of days PM_{10} > 50 µg m^{-3} for Redbridge monitoring sites (2000 to 2006)

The data for the Redbridge 5 site were short term and this reflected the start of operations at the site in 2003. The data for the Redbridge 1 and 3 sites also indicated breaks in data capture during 2003 and 2004.

The rolling trend of PM_{10} exceedences showed the effect of the pollution episodes in 2003. Otherwise levels, although fluctuating, appear not to have decreased markedly over the period of time since 2001 for these sites. Averages based on London sites for the period from 1995 to 2000 show of downward trend from around 50 days above 50 µg m^{-3} to 10 days in 2002. By the end of 2004 the number of days exceeding the standard at background sites was comparable to that measured at the start of 2001, whereas inner London roadside sites had a higher number of days exceeding in 2004 than 2001 (ERG, 2006).

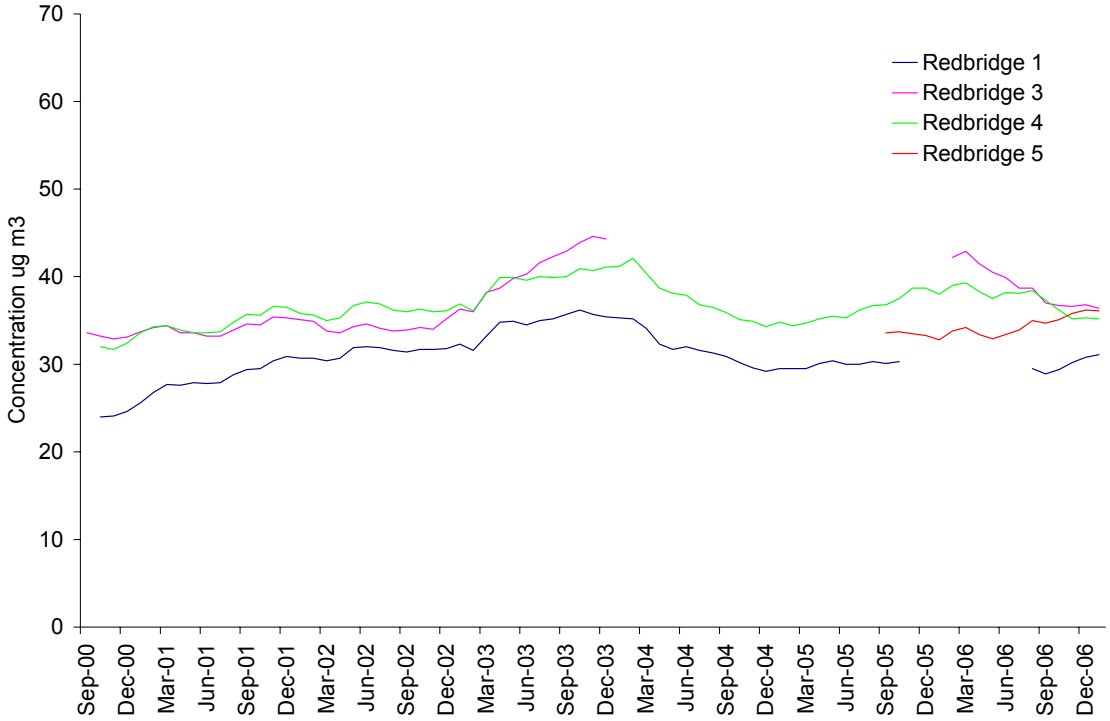

Figure 7 Rolling annual mean PM_{10} trends for Redbridge monitoring sites (2000 to 2006)

The rolling annual mean trends for the Redbridge 1 and 4 sites provided the longest datasets. The sites showed similar trends, although concentrations at the Redbridge 4 were higher due to the site's location near the A406.

The use of trends in this way highlights that although concentrations dropped slightly in 2004, this was mainly as a result of the pollution incidents in 2003 not being repeated in 2004. Levels since dropped to pre 2003 levels and did not appear to be reducing; indeed for the Redbridge 1 and 5 sites there may be a slight increase, possibly as a result of increasing primary PM_{10} emissions (ERG, 2006) rather than the predicted decrease in emissions.

A source apportionment of annual mean concentrations of PM_{10} in London was carried out by Fuller and Green (2006b). This analysis showed increases in the concentration of primary PM_{10} in London between 1999 and 2003 and that it was highly likely that these increases were due to increases in road transport emissions. It was less clear however if these increases are due to increases in tail pipe or non-tail pipe emissions.

Estimates of 2010 concentrations and the number of days exceeding 50 $\mu g\ m^{-3}$ were made in the Council's 2006 Updating and Screening Assessment using TG03 methods. These indicated the 2004 objective might be exceeded at the RB3 site only despite the predicted reduction resulting from future emission changes. This suggests that other busy roadside sites within Redbridge may also exceed is objective.

2.6 SO_2 monitoring

The Council undertook SO_2 monitoring using a continuous analyser at its Redbridge 4 site close to the A12 in South Wanstead. Details of data capture for the period 2002 to 2006 are given in Appendix 1. The results indicated that the 15-minute mean standard of 266 µg m^{-3} was not exceeded at the site over this period, although this standard was approached in 2006. The maximum 15-minute mean for each year of monitoring is shown in Table 7.

Table 7 Maximum 15 minute mean concentrations of SO_2 monitoring (µg m^{-3}) (2002-2006)

LAQN Site	2002	2003	2004	2005	2006
RB4	94	183	124	80	232

(Note - italics indicates < 90% data capture)

The 15-minute mean objective is the most stringent of the three SO_2 objectives; accordingly there were no recorded periods where the hourly and daily mean standards were exceeded.

The results confirmed that the SO_2 objectives were met at the Redbridge 4 monitoring site in the Borough.

2.7 Ozone monitoring

The Council undertook the continuous measurement of ozone at its Redbridge 1 background monitoring site in Ilford.

The results for the period 2002 – 2006 are given in Table 8. The data capture for all years exceeded 90%; full details for the site are given in Table 14 in Appendix 1.

Table 8 Number of daily maxima exceeding 100 µg m^{-3} based on 8-hour running mean (2002-2006)

Objective	2002	2003	2004	2005	2006
Number of periods	**12**	**29**	**19**	**12**	**27**

The Government's air quality objective, not to exceed 10 periods in a calendar year, was exceeded for all years in Redbridge. 2003 was the most notable year had a very hot dry summer conducive to the formation of ozone; hence the much higher of periods during this particular year. In 2004 the weather was less conducive to the formation of ozone as was 2005. The 2003 total was however approached during 2006.

3 New local developments

This section outlines those local developments that may take place and may affect air quality. These are not for consideration now but are listed for a more thorough assessment during the next round of Review and Assessment. The guidance identifies the following developments that should be considered:

- New industrial processes included in the list of Appendix 2 of LAQM. TG 03.
- New developments with an impact on air quality, especially those that will significantly change traffic flows. Only include those developments with planning permission granted.
- New landfill sites, quarries, etc with planning permission granted and nearby relevant exposure.

Table 9 New Local Developments since 2006

Development	Location
New Part A or B industrial processes	None
New retail or mixed residential/ commercial development	See below
New road scheme	None
New mineral or landfill development	None

Prospective major development sites within the LB of Redbridge

1) Claybury Hospital site

2) Five Oaks Lane, Chigwell

3) Chadwell Heath Hospital Site

4) Loxford Lane Allotments

5) Odeon site, Gants Hill

6) Fenchurch House, South Woodford

7) Queen Mary's Gate, High Street, South Woodford

8) Fairlop Plain (mineral extraction)

9) Pioneer Market, Ilford

10) Centreway, Ilford

11) Spectrum 67, Ilford

12) Hainault Bridge Parade

3.1 Redbridge Local development framework (LDF)

The Planning & Compulsory Purchase Act 2004 introduced a new development plan system. This is intended to streamline the local planning process and enable a Local Development Framework (LDF) to replace previous Unitary Development Plans (UDP).

The documents, which will make up the LB of Redbridge LDF, were published as Submission Development Plan Documents. These are to help shape the future of the Borough, making it a better place to live and work.

The Development Plan Documents are the:

- Core Strategy
- Borough Wide Primary Policies
- Development Sites with Housing Capacity
- Development Opportunity Sites

The four Development Plan Documents (DPDs), starting with the Core Strategy, are to be assessed in an Examination by an independent Inspector, appointed by the Secretary of State. All comments received as part of the recent consultation will be considered by the Inspector and taken into account when making his/her decision. The hearings are scheduled for June/July 2007.

4 Action Plan Progress Report

4.1 Introduction

The LB of Redbridge Air Quality Action Plan was published in draft form in 2006. Initial consultation was with statutory consultees. It was subsequently sent out for public consultation purposes between February and the end of April 2007. The final Action Plan will be published later this year.

The draft plan focused on measures to reduce traffic flow and vehicle emissions that are consistent with other Council wide policies, principally in relation to both transport and planning. The main aim is to reduce NO_X and PM_{10} emissions. Other actions include reducing emissions from buildings and industry, measures to raise public awareness of air pollution and greener travel. The Council through its Action Plan, and other policies, also supports other initiatives proposed and undertaken by other authorities to reduce emissions in the Borough.

4.2 Achievement of objectives

The Council's Action Plan (when finalised) applies to the Air Quality Management Area, which covers the whole of Redbridge. This recognises that, although not everyone in the Borough will be exposed to concentrations that exceed the air quality objectives, it is the intention of the Action Plan is to reduce pollution levels, wherever possible, in pursuit of the achievement of the objectives.

4.3 Summary of key measures

This section provides a brief summary of some of the key measures to be included in the Action Plan and also the Council's progress on these actions.

4.3.1 Monitoring air quality

The Council has maintained its commitment to monitoring air quality in the Borough and reporting to other bodies, including DEFRA and GLA since release of its draft plan. As reported earlier the Council monitors air quality using 4 real-time monitoring static stations, as well as with nitrogen dioxide passive diffusion tubes which are located around the Borough. The Council is part of the London Air Quality Network and current monitoring data and historic data for the sites can be viewed on the www.londonair.org.uk site.

4.3.2 Planning Policy and Control

The Council is using the planning system to bring air quality benefits, through imposing planning conditions and through using section 106 agreements for new developments for car free developments.

The Council also supports the APPLE working group (Air Pollution Planning and the Local Environment) that is producing guidance to be used across London.

4.3.3 Traffic control and management

Actions include reducing speed limits and the introduction of 20mph zones, supporting roadside emissions testing in the Borough and working with Transport for London (TfL).

The Council also allocated £5.87m for the current year in its Local Implementation Programme (LIP) towards highways and transport improvements, including bus priority, support for road renewal, bus priority, walking, cycling and the London Cycle Network and other improvements.

4.3.4 Travel Plans in Redbridge

The Council's LIP includes provision for School Travel plans and Work travel plans. The Council also has a dedicated Travel Plan Co-ordinator to give advice and information specifically on travel plans.

4.3.5 Redbridge fleet

The Council took delivery of 11 Plaxton Beaver buses in February 2007. These buses are the first mobility vehicles of this type on London's streets and are fitted with the latest Euro IV engines, which make them compliant with the proposed LEZ.

4.3.6 Low Emission Zone

The Council in its draft Action Plan recognised that the London-wide Low Emission Zone (LEZ) would play an important part in benefiting air quality in the Borough. Since the draft was produced, the Mayor of London in May 2007 approved plans from TfL for the implementation of a LEZ, to cut harmful emissions from the most polluting lorries, coaches and buses. It will launch in February 2008, with the aim of improving air quality across the capital. From February 2008 the LEZ will apply to lorries over 12 tonnes. From July 2008 the LEZ will also apply to lighter lorries, buses and coaches.

5 Conclusion

This Air Quality and Action Plan Progress Report for 2007 fulfils the requirements of the DEFRA PRG 03 guidance and has updated monitoring results in the Borough and noted new relevant local developments and other initiatives. It also advises on the Council's progress in implementing its Action Plan, the final version of which will be published later this year.

The up to date monitoring results continue to indicate that the Government's current air quality objectives for NO_2 and PM_{10} are exceeded widely at locations across the Borough where there is relevant public exposure. Based on the findings in this report there is no need for the Council to progress to a Detailed Assessment, either to revoke its existing AQMA or determine whether any new AQMAs are required.

The Council will continue its air quality monitoring programme and prepare for its next Air Quality and Action Plan Progress Report in 2008.

References

Carslaw D.C and Beevers S.D, 2005. Evidence of an increasing NO_2/NOx emissions ratio from road traffic emissions. Atmospheric Environment 39, 2049-2059.

DEFRA, 2000. Air Quality Strategy for England, Scotland, Wales and Northern Ireland. DEFRA, London. Cm 4548.

DEFRA, 2003a. Local Air Quality Management, Technical guidance LAQM.TG03. DEFRA, London.

DEFRA, 2003b. Air Quality Strategy Addendum for England, Scotland, Wales and Northern Ireland. DEFRA, London.

Fuller G. and Green D (2006). Air Quality In London 2005 and mid 2006 – Briefing. http://www.londonair.org.uk/london/asp/reportdetail.asp?ReportID=aq05_06&ReportType=Latest_Report

Fuller, G.W., and Green, D., 2006. Evidence for increasing primary PM_{10} in London. Atmospheric Environment 40, 6134 - 6145.

LB of Redbridge (2002) Stage 4 Further Assessment of air quality. 2002

LB of Redbridge (2006). Local Air Quality Management – Updating and Screening Assessment October 2006

LB of Redbridge (2005) Local Air Quality Management – Air Quality Progress Report. 2005

Airborne Particles Expert Group (APEG), 1999. Source apportionment of particulate matter in the United

ERG, 2006. Air Quality in London 2004. London Air Quality Network Report 12. ERG, King's College London 2006.

Appendix 1

Table 10 CO data capture for year (%)

LAQN site	Type	2002	2003	2004	2005	2006
RB4	R	94.0	94.0	95.0	94.0	92.0
RB5	R	11.0	47.0	97.0	59.0	11.0

Table 11 NO_2 data capture for year (%)

LAQN site	Type	2002	2003	2004	2005	2006
RB1	U	96	99	99	96	63
RB3	R	95	87	95	94	87
RB4	R	94	83	94	94	92
RB5	R		10	91	93	94

Table 12 SO_2 data capture for year (%)

LAQN site	Type	2002	2003	2004	2005	2006
RB4	R	93	94	95	94	94

Table 13 PM_{10} data capture for year (%)

LAQN site	Type	2002	2003	2004	2005	2006
RB1	U	95	94	93	71	94
RB3	R	97	70		67	90
RB4	R	97	96	91	96	95
RB5	R		11	60	94	97

Table 14 Ozone data capture rate for year (%)

LAQN site	Type	2002	2003	2004	2005	2006
RB1	U	99	99	99	98	98

Table 15 Diffusion tube sites in LB of Redbridge

Site No	Location	EASTING	NORTHING
1	Mayfield School	546710	188830
12	Perth Terrace PABX	544380	187660
40	Ethal Davis School	546710	188830
6	Ilford Lane	543710	186080
7	Ilford Lane BP	544099	185009
15	Gardner Close	540810	188370
16	Fulwell Cross	544570	190420
21	Perth Road	543420	188320
22	Eastern Ave (westbound)	543450	188370
27	Central Reservation	543450	188390
28	Eastern Ave (eastbound)	543440	188410
33	Parham Drive	543500	188440
34	NCR North Royston Gardens	541810	188170
39	NCR South Wanstead Park	541880	188170
48	High Road Woodford	540060	190690

(Note: NCR is North Circular Road)

Table 16 2006 Bias corrected NO_2 diffusion tube results for LB of Redbridge ($\mu g\ m^{-3}$)

Site No	Site type	Annual mean
1	Background	28.2
12	Background	40.8
40	Background	30.0
6	Roadside	64.8
7	Roadside	62.5
15	Roadside	49.1
16	Roadside	55.0
21	Roadside	44.9
22	Roadside	56.7
27	Roadside	66.8
28	Roadside	42.2
33	Roadside	42.2
34	Roadside	47.0
39	Roadside	65.0
48	Roadside	45.3