



2013 Updating and Screening Assessment for The Royal Borough of Kensington and Chelsea

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

April 2013



THE ROYAL BOROUGH OF
KENSINGTON
AND CHELSEA

Local Authority Officer	Kyri Eleftheriou-Vaus
Department	Environmental Health
Address	Council Offices 37 Pembroke Road W8 6PW
Telephone	020 7341 5686
e-mail	Kyri.Eleftheriou-Vaus@rbkc.gov.uk
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Executive Summary

Under the government's Air Quality Strategy, all local authorities are required to assess air quality within their borough annually. Kensington and Chelsea Council has been doing this for almost two decades and continues to be seriously concerned about the impact of air pollution on health.

In 2000, the whole borough was declared an Air Quality Management Area (AQMA) on the basis that certain government air quality objectives, for nitrogen dioxide and particulate matter, would not be met. In 2003, the Council published its first Air Quality Action Plan (AQAP), which set out the steps the Council would take to work towards meeting these objectives. In September 2009, the Council published a revised Action Plan, which we continue to implement.

This latest progress report reviews air quality data collected in 2012 for the strategy pollutants; nitrogen dioxide (NO₂), particulate matter (PM₁₀) carbon monoxide, sulphur dioxide and benzene, 1, 3- butadiene, lead, benzo(α)pyrene (which is used as a marker for a complex group of hydrocarbons - PAH). Information on PM_{2.5}, and ozone is also included as these pollutants are also regarded as significant threats to health.

The second part of this report provides a summary of the implementation of the actions contained in the Air Quality Action Plan 2009 -2014 (Section 9). This reports good progress with most plans. We have continued to reduce emissions from Council buildings and vehicles and have been very active in encouraging cycling. With financial support from Defra and the Mayor of London we have also been able to work with businesses and several schools to raise awareness about the health impact of air quality and consider measures they may be able to introduce to reduce emissions and personal exposure to these.

It is of some comfort to note that the review of the monitoring data shows that most pollutants (excluding NO₂, PM₁₀ and ozone) remain well within their respective objective levels.

The situation for NO₂ remains a concern. Monitoring at the borough's five continuous monitoring sites show that exceedences of the annual mean NO₂ objective level have occurred at all sites apart from the North Kensington background site. No consistent pattern in the change in levels was observed at sites between 2012 and 2013 and long term trends show that NO₂ levels have increased at two continuous roadside locations. To meet the objectives, reductions of almost 60µg/m³ are still required at the worst affected road side locations, and reductions of nearly 35-40µg/m³ are required at some building façades on busy and congested roads. Exceedences of the hourly mean objective vary from site to site, from one at the North Kensington to 439 at the Knightsbridge site (compared to the 18 exceedences permitted).

Monitoring of PM₁₀ at our three sites shows that these have all met the annual mean objective since 2008. Two out of three sites met the daily mean objective, but the Earls Court site has not achieved this since 2010. Therefore it is likely that other sites may be at continued risk of exceedences.

The lack of progress in reducing NO₂ levels and the continued exceedence of the daily mean PM₁₀ objective level are seriously worrying, particularly given the substantial reduction needed to meet the objective levels for NO₂ and the EU time limit of 2015. We assume the government shares this concern and will be bringing forward more effective measures to address the problem on a national scale.

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1 Introduction

1.1 Description of Local Authority area

The Royal Borough of Kensington and Chelsea is a densely populated urban environment located to the west of central London. The borough extends from Chelsea Embankment in the south, through Kensington, Notting Hill and Ladbroke Grove up to Kensal Green to the north. It is bounded by Bayswater, Kensington Gardens and Belgravia to the east and by the West London Railway Line to the west. Kensington and Chelsea has less open space compared to other boroughs, however it has 26 public parks and open spaces, eight of which are categorised as major parks due to a combination of size and range of facilities. It is home to several major museums and part of the Imperial College campus.

Although the borough is geographically one of the smallest in London, at just over 4.7 square miles, it is one of the most densely populated areas in Europe – the current population is estimated at 190,000 people and there is a high population turnover estimated at over 20 per cent per year. The borough is primarily residential in character. In addition to residential accommodation, the borough is also home to internationally recognised shopping centres, 12,000 businesses and over 120,000 jobs, three of the most visited museums in the UK and the second largest number of hotel beds in any London borough.

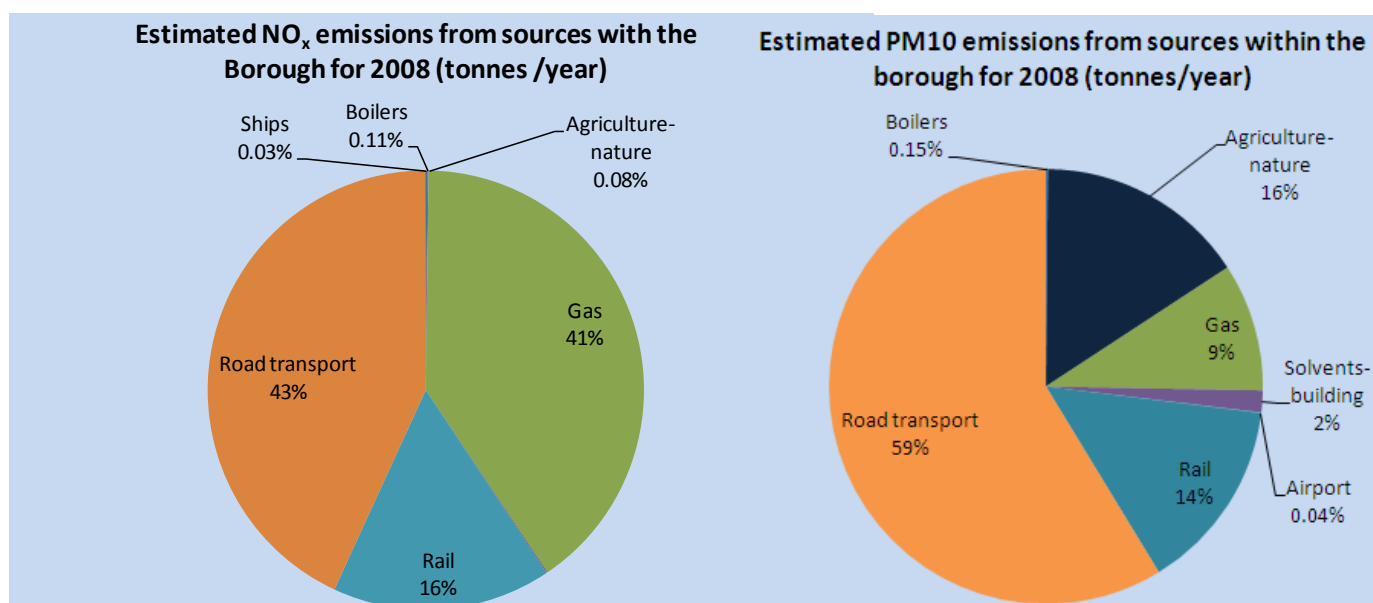
The borough has a large volume of commuter traffic; people both travelling across and into the area, and local residents travelling within and outside the borough. The area is relatively well served by the London Underground network with the Circle, District, Central, Piccadilly and Hammersmith and City Lines running through the borough. Although currently there is no over-ground rail service actually within the borough, the West London Line stations at Shepherds Bush, Kensington Olympia, West Brompton, and Imperial Wharf are easily accessible to residents and visitors in those localities. There is an extensive bus network.

There are 207 km (127 miles) of roads in the Borough. The Westway (A40), Cromwell Road (A4), the Earl's Court one-way system (A3220) and Chelsea Embankment (A3212) are all part of the Red Route network and Transport for London (TfL) is the Highway Authority for these routes they make up 12.5 km of the roads in the borough. The Council is the Highway Authority for all other adopted roads.

The available north/south or east/west routes are constrained by bridges which mean that these are heavily trafficked. They are also often major retail areas with heavy pedestrian flows. The transport infrastructure has changed relatively little since its major development in the nineteenth century. In the past fifty years, the two most notable changes have been the construction of the Westway flyover and the decline in the use of the River Thames. However the demands placed upon the infrastructure have continued to change; the movement of people, goods and services has increased, bringing more congestion to the road network.

Emission sources

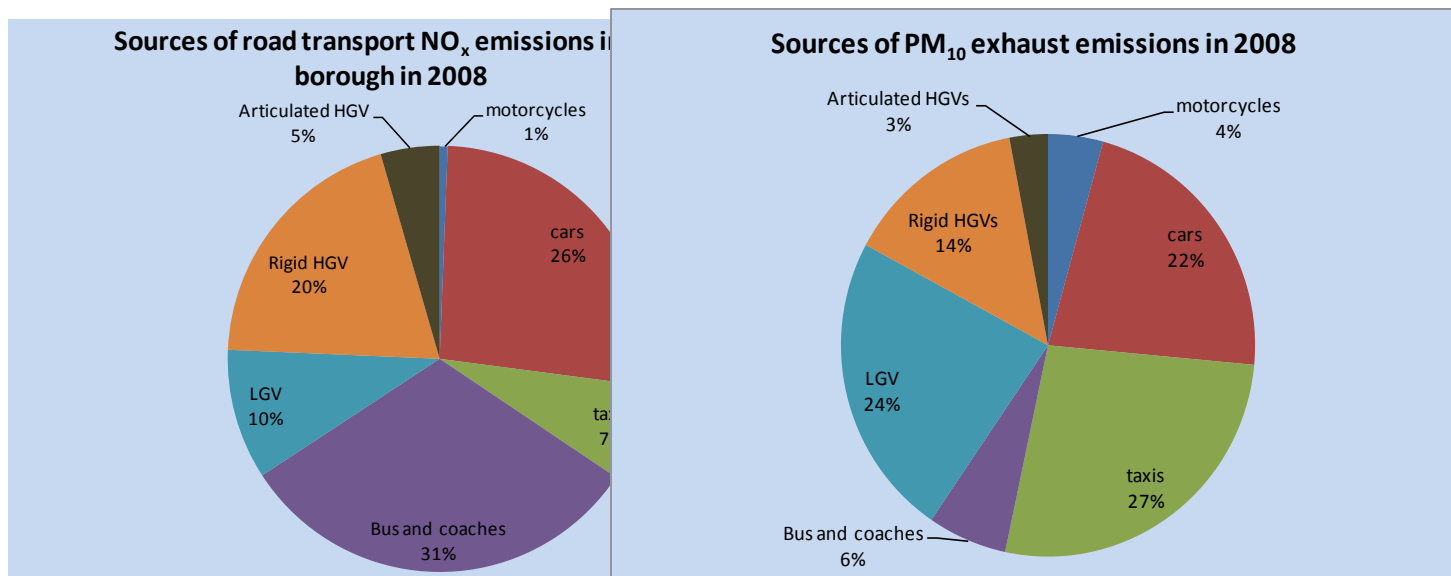
The emission sources of pollutants from within the borough are mainly from transport, residential and commercial activities. A large proportion of the pollution however arises from beyond the borough's immediate area including neighbouring boroughs, the metropolis as a whole and further afield from national and European sources. The contribution of NO_x and PM₁₀ from the various sources within the borough in 2008 (based on the 2010 LAEI, as the latest inventory was not available at the time of this reports preparation) is shown below. The predictions for 2008 are shown because we consider them to be more representative of current conditions.



Data source LAEI 2008 (published 2010) showing predicted emissions for 2008.

The most significant source of NO_x is road transport followed closely by gas emissions based on the predictions for 2008. The most significant source of PM₁₀ from within the borough is road transport; however the next most important source is agricultural and natural sources (this includes soils, domestic gardens, bonfire night, fireworks and accidental fires). Predictions for 2011 and 2015 indicate that transport emissions of NO_x are expected to decline significantly to almost half by 2015 compared to 2008. However there is increasing evidence and recognition that actual emissions from vehicles are not declining as predicted.

The charts overleaf look at road transport emissions in more detail, focussing on the contribution of different vehicle types to NO_x and PM₁₀ emissions. For NO_x, buses and coaches, followed by cars and heavy goods vehicles are the three biggest sources while taxis, LGVs and cars are the three main sources of exhaust emissions of PM₁₀.



1.2 Purpose of the report

This progress report fulfils the requirements of the Local Air Quality Management (LAQM) 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 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 and prepare an Air Quality Action Plan setting out the measures it intends to put in place in pursuit of the objectives.

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), and the Air Quality (England) (Amendment) Regulations 2002 (SI 3043). They are shown in Table 1.1. This table shows the objectives in units of microgrammes per cubic metre ($\mu\text{g}/\text{m}^3$), except for carbon monoxide, where the units used are milligrammes per cubic metre (mg/m^3). Table 1.1 includes the number of permitted exceedences in any given year (where applicable).

Table 1.1 Air Quality Objectives included in Regulations for the purpose of Local Air Quality Management in England

Pollutant	Concentration	Measured as	Date to be achieved by
Benzene	16.25 µg/m ³	Running annual mean	31.12.2003
	5.00 µg/m ³	Running annual mean	31.12.2010
1,3-Butadiene	2.25 µg/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 µg/m ³	Annual mean	31.12.2004
	0.25 µg/m ³	Annual mean	31.12.2008
Nitrogen dioxide	200 µg/m ³ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 µg/m ³	Annual mean	31.12.2005
Particles (PM₁₀) (gravimetric)	50 µg/m ³ , not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 µg/m ³	Annual mean	31.12.2004
Sulphur dioxide	350 µg/m ³ , not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 µg/m ³ , not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 µg/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

1.4.1 First round of Review and Assessment

Stages one to three

The Council completed the first round of Review and Assessment in 2000. It consisted of three stages which involved examining the sources of pollution, identifying the contribution of each source followed by a review of monitoring data, and finally a prediction of concentrations for the key deadlines using modelling. By

the end of stage three, after a process of elimination, the following conclusions were reached.

Table 1.2 Summary of results of first round of Review and Assessment

Pollutant	Assessment
NO₂	High likelihood the borough would exceed the annual mean and hourly mean objective along many of the major roads in the borough.
PM₁₀	High likelihood that the borough would exceed the 24 hour mean objective at a few locations.
SO₂	Virtually no likelihood that the borough would exceed the objectives for sulphur dioxide.
CO	No likelihood that the borough would exceed the objectives for carbon monoxide.

Following a major public consultation in the summer of 2000 a decision was reached by the full Council to declare the whole of the borough an Air Quality Management Area (AQMA). The Order making the declaration came into force on the 6th December 2000 and was based on exceedences of nitrogen dioxide (NO₂) and particulate matter (PM₁₀).

Figure 1:1 Map of AQMA Boundary



Stage Four

Stage four was carried out to check the results of the previous reports in light of the latest air monitoring results at the time and further modelling work. This was completed in August 2003. It also took into account the revised information gathered on road traffic emissions, which essentially acknowledged that the exhaust emissions of newer vehicles were not as clean as previously claimed. There were some differences between the modelling undertaken previously, but exceedences were still being predicted for both NO₂ and PM₁₀. In addition the further work eliminated any concerns regarding carbon monoxide and sulphur dioxide. Alongside this, the Council's first Air Quality Management Plan was produced, setting out 25 actions that the Council should take to work towards improving air quality.

1.4.2 Second round of Review and Assessment

An Updating and Screening Assessment (USA) was conducted as part of the second round. This was published in December 2003. The purpose of a USA is to identify whether any changes have taken place with the seven pollutants, highlighted in Table 1.1, since the previous assessment. A Detailed Assessment (DA) must then be undertaken if this is the case. We concluded that a DA was unnecessary. The following year we submitted a combined Air Quality and Action Plan Progress report.

1.4.3 Third round of Review and Assessment

A further USA was undertaken as part of the third round of assessment in April 2006. Each pollutant was dealt with individually and considered against the updated guidance checklist at the time. Progress reports are undertaken in years when USAs are not required.

1.4.4 Fourth round of Review and Assessment

An Updating and Screening Assessment was completed in 2009. The latest monitoring data was reported for each pollutant and we re-examined all sources using the checklists provided in the Department of Environment, Food and Rural Affairs' (Defra) Local Air Quality Management Technical Guidance LAQM TG (09) to see if any significant changes had occurred. Following changes to guidance issued in 2009 we concluded that a further assessment was required in relation to emissions from the Paddington to Swansea railway line. In 2010 a joint review and assessment report and action plan update report was produced. In 2011, the final part (a progress report) of the fourth round was published.

1.4.5 Fifth round of Review and Assessment

An Updating and Screening Assessment was completed in 2012 and forms the first part of the fifth round of review and assessment.

All reports since 2003 are available for download from the Council's air quality WebPages:

<http://www.rbkc.gov.uk/environmentandtransport/airquality/reportsanddocuments.aspx>

2 New Monitoring Data

2.1 Summary of monitoring undertaken

2.1.1 Automatic monitoring sites

We have automated continuous monitoring at five sites in the borough. Figure 2.1 shows the locations of these sites in the borough and detailed information about each is contained in Table 2.1. In addition, information is included for the West London and Cromwell Road sites that were operated by Defra because data from these are included in the report.

The West London site was closed by Defra in 2007, it is retained in the table as long term trends incorporate data from here.

In September 2012, following Defra's review on its air quality monitoring stations, it unfortunately decided to stop monitoring gaseous pollutants at the long running Cromwell Road site. It said that the site did not form to EU guidelines in terms of its proximity to the road junction. The Council was very disappointed that Defra took this view, given it does represent the pollution exposure experienced by a significant number of residents and visitors and therefore the Council took the decision to fund and oversee the monitoring of sulphur dioxide (SO₂) and carbon monoxide (CO) to the end of the year (to ensure a full years data) and continue with the NO_x analyser for the foreseeable (while funds allow), due to the continued exceedence of the NO₂ objective.

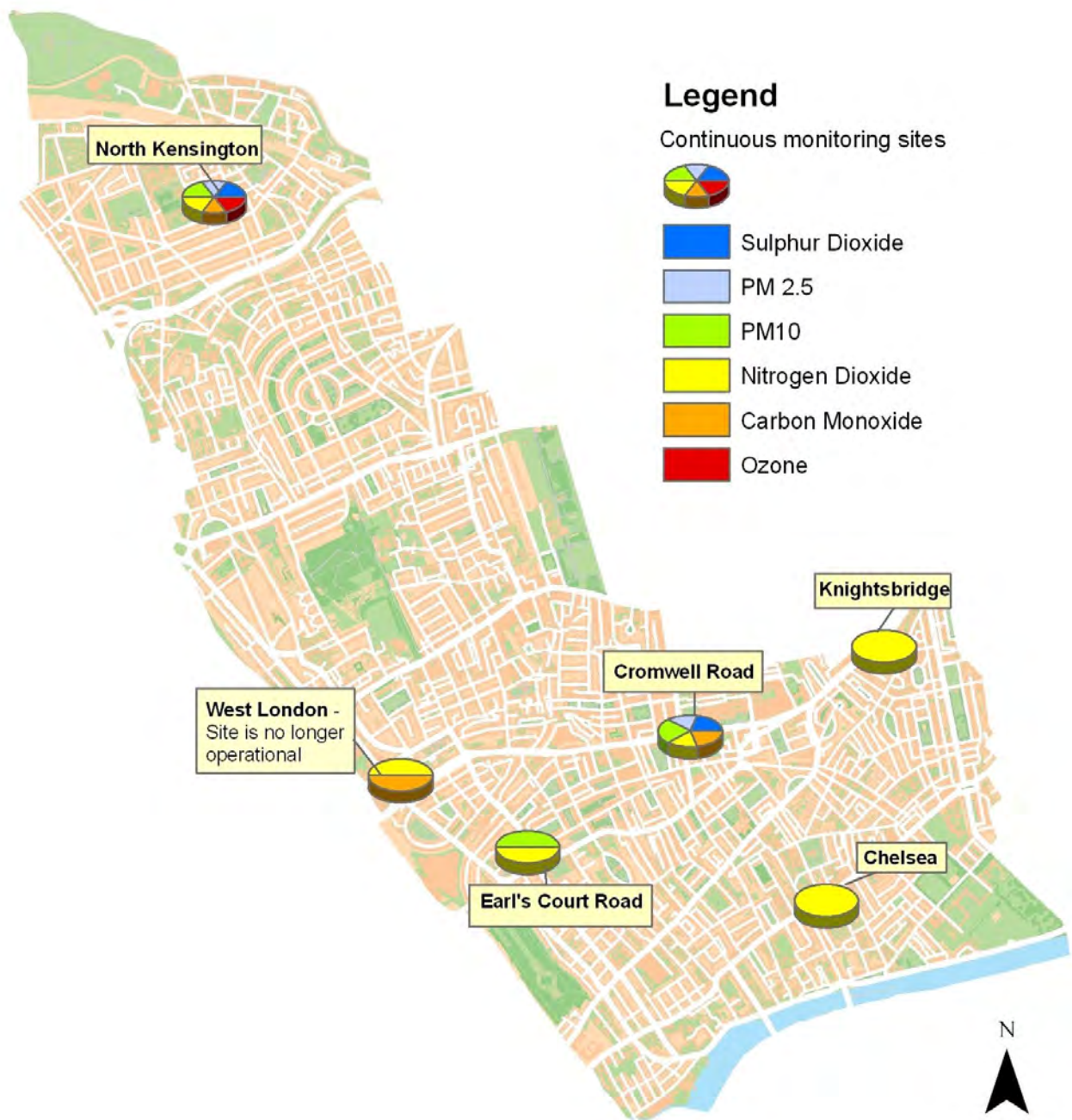
The Council also operates one gravimetric instrument, a partisol located at the Earl's Court site. This type of instrument samples air continuously, but does not provide real time data (see glossary in Appendix C) as the filters must be weighed manually.

Air quality data for 2012 has been included in the report where it is available but is largely provisional. The map overleaf shows continuous sites operating between 2006 and 2012.

Quality control and assurance

Calibrations of the monitoring instruments are carried out at fortnightly intervals by contractors. Automated data that we collect is subject to quality control and audit procedures by Kings Environmental Research Group (Kings ERG) and is disseminated via the London Air Quality Network (LAQN). In addition independent consultants carry out audits annually. An equipment servicing unit is also contracted to service equipment twice annually and to investigate and repair faults in order to maintain high quality data and good data capture. The North Kensington site is further scrutinised by Defra's contractors as it is affiliated to the Automatic Urban and Rural Network (AURN). Further information on data collection and quality control is included in Appendix A.

Figure 2:1 Map of automatic monitoring sites



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Ordnance Survey 100021668

Status: Final
Date: April 2011
Author: Environmental Quality



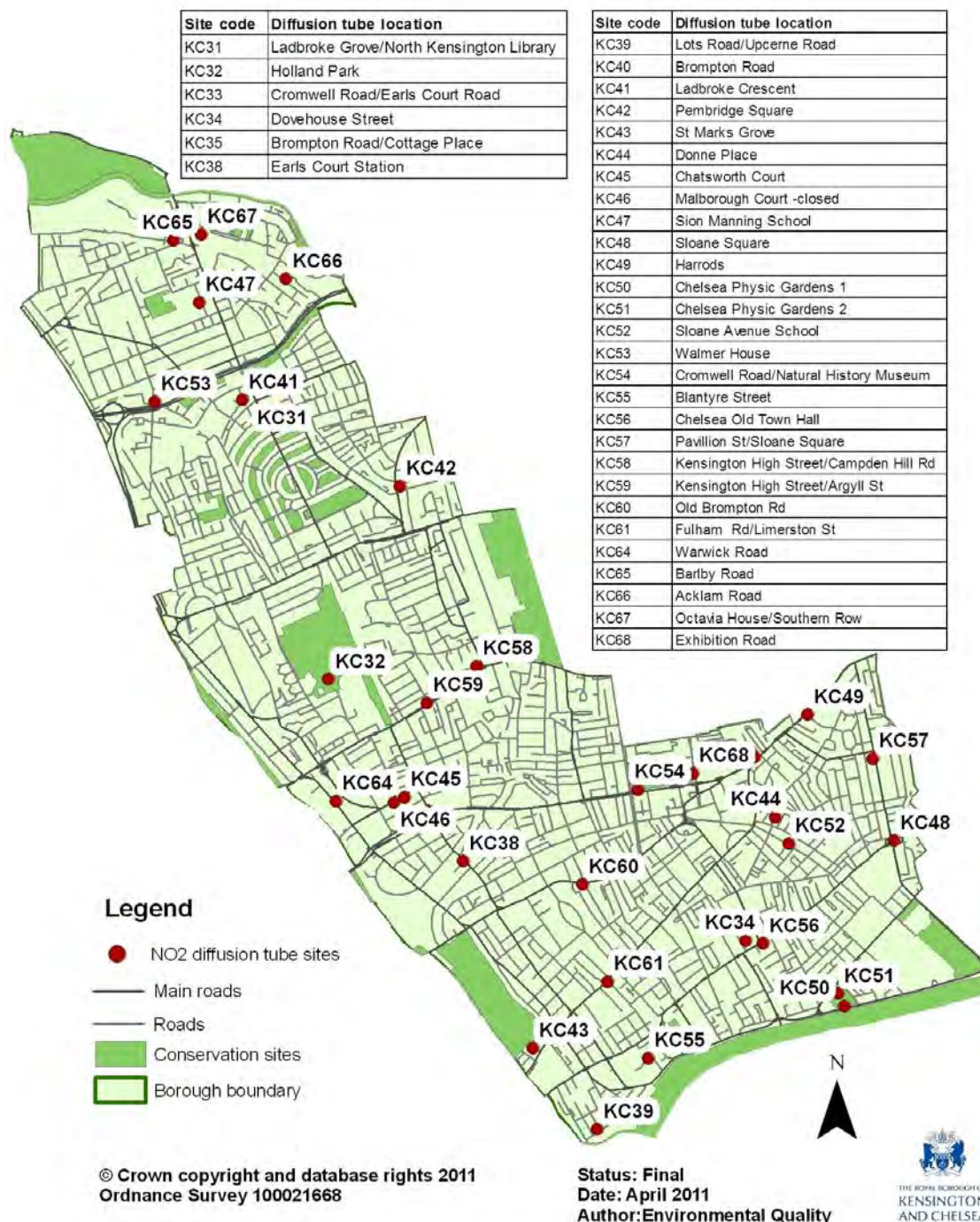
Table 2.1 Details of automatic monitoring sites

Site Code	Site Name	Site Type	OS Grid Ref		Pollutants Monitored	Monitoring Technique	In AQMA ?	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?
KC1	North Kensington	Urban background LAQN & AURN affiliate	X524045	Y 181752	Nitrogen oxides PM ₁₀ Carbon monoxide Sulphur dioxide Ozone Other Defra/ERG monitoring undertaken: PM ₁₀ & PM _{2.5}	Chemiluminescent FDMS and TEOM GFC Fluorescence UV Photometric FDMS and Partisols	Y	Y	N/A	N
AURN (till Sept 2012)	Cromwell Rd/ Cromwell Rd 2	Roadside, AURN	X 26524	Y 178965	Nitrogen oxides Carbon monoxide Sulphur dioxide Other monitoring undertaken: Lead and heavy metals	Chemiluminescent GFC Fluorescence UV Partisol	Y	Y	3.5m from Cromwell Road	N
From Oct 2012	Cromwell Rd 2	Roadside, AURN			Lead and heavy metals	Partisol				
KC2	Cromwell Rd 2	Roadside, LAQN	X 26524	Y 178965	PM ₁₀ PM _{2.5}	FDMS FDMS	Y	Y	Approx within 8m of Cromwell Rd and 5m of Queens Gate.	N
AURN	West London Closed in 2007	Urban background AURN	X 25026	Y 178741	Nitrogen oxides Carbon monoxide	Chemiluminescent	Y	Y	50m from Warwick Rd	N
KC3	Knightsbridge	Kerbside, LAQN	X 27518	Y 179395	Nitrogen oxides	Chemiluminescent	Y	Y	Located on the kerb of Hans Road and 4m from Brompton Rd	Y
KC4	Kings Rd Chelsea	Roadside, LAQN	X 27268	Y 178089	Nitrogen oxides	Chemiluminescent	Y	Y	Approx 8m from Kings Rd	N
KC5	Earls Court	Kerbside, LAQN	X 25695	Y 178363	PM ₁₀ gravimetric Nitrogen oxides	Partisol plus Chemiluminescent	Y	Y	Sited on the kerb of Earls Court Rd	Y

2.1.2 Non-Automatic Monitoring

Monitoring data for benzene and nitrogen dioxide (NO₂) is collected using passive diffusion techniques (in addition to continuous monitoring). The borough participates in the London Wide Environmental Programme (LWEP) offered by Bureau Veritas for the provision and analysis of diffusion tubes. Further details on the laboratory, method, bias adjustment and quality control are in Appendix A.

Figure 2:2 Map of non-automatic nitrogen dioxide monitoring sites



The diffusion tube site at Marlborough Court (KC46) shown above is no longer in use, but is still included in the map as historical data is available for the site.

The figure below shows all locations where benzene has been monitored, however only five sites are now in operation as the KC03 site was re-located in 2006 following the closure of the petrol station.

Figure 2:3 Map of non-automatic benzene monitoring sites



Table 2.2 overleaf provides further details of the 33 NO₂ and five benzene diffusion tube sites operating in the borough in 2011/12.

Table 2.2 Details of non- automatic monitoring sites

Site ID	Site Name	Site Type	OS Grid Ref		Pollutants Monitored	In AQMA?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Worst-case Location?
KC31	Ladbroke Grove/Nth Ken Library	Roadside	X 524342	Y 181271	NO ₂	Y	Y	3.5m	No
KC32	Holland Park	Urban Background	X 524784	Y 179599	NO ₂	Y	Y	380m	No
KC33	Cromwell Rd/ Earls Court Rd	Roadside	X 525355	Y 178841	NO ₂	Y	Y	1.1m	Yes
KC34	Dovehouse Street	Urban Centre	X 527164	Y 178103	NO ₂	Y	Y	26m	No
KC35	Brompton Road/ Cottage Place	Roadside	X 527192	Y 179185	NO ₂	Y	Y	8m	No
KC38	Earls Court Station	Roadside	X 525548	Y 178556	NO ₂	Y	Y	1.7m	Yes
KC39	Lots Road/ Upcerne Road	Roadside	X 526317	Y 177022	NO ₂	Y	Y	8.1m	No
KC40	Brompton Road	Urban Centre	X 527214	Y 179153	NO ₂	Y	Y	65m	No
KC41	Ladbroke Crescent	Urban Background	X 524294	Y 181200	NO ₂	Y	Y	70m	No
KC42	Pembridge Square Library	Roadside	X 525191	Y 180705	NO ₂	Y	Y	6m	No
KC43	St Marks Grove	Urban Background	X 525950	Y 177487	NO ₂	Y	Y	38m	No
KC44	Donne Place	Urban Background	X 527335	Y 178810	NO ₂	Y	Y	55m	No
KC45	Chatsworth Court	Roadside	X 525263	Y 178936	NO ₂	Y	Y	13m	No
KC46	Marlborough Court- now closed	Roadside	X 525157	Y 178892	NO ₂	Y	Y	8m	No
KC47	Sion Manning School	Urban Background	X 524046	Y 181758	NO ₂	Y	Y	8.5m	No
KC48	Sloane Square	Roadside	X 528011	Y 178675	NO ₂	Y	Y	7m	No
KC49	Harrods	Urban Centre	X 527516	Y 179395	NO ₂	Y	Y	4m	Yes
KC50	Chelsea Physic Garden (Gate)	Roadside	X 527726	Y 177727	NO ₂	Y	Y	4m	No
KC51	Chelsea Physic Garden (Met Station)	Urban Background	X 527690	Y 177800	NO ₂	Y	Y	92m	No

Site ID	Site Name	Site Type	OS Grid Ref		Pollutants Monitored	In AQMA?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Worst-case Location?
KC52	Sloane Avenue	Roadside	X 527411	Y 178659	NO ₂	Y	Y	2.6m	No
KC53	Walmer House	Urban Background	X 523792	Y 181189	NO ₂	Y	Y	12.5m	No
KC54	Cromwell Rd/ Natural History Museum	Roadside	X 526550	Y 178968	NO ₂	Y	Y	3.1m	No
KC55	Blantyre St	Urban Background	X 526608	Y 177429	NO ₂	Y	Y	100m	No
KC56	Chelsea Old Town Hall	Roadside	X 527268	Y 178089	NO ₂	Y	Y	9m	No
KC57	Pavillion St/ Sloane Ave	Roadside	X 527889	Y 179145	NO ₂	Y	Y	3m	No
KC58	Kensington H St/Kensington Church St	Roadside	X 525630	Y 179674	NO ₂	Y	Y	13m	No
KC59	Kensington High St/Argyll St	Kerbside	X 525342	Y 179464	NO ₂	Y	Y	0.7m	No
KC60	Old Brompton Rd/ Draycott Ave	Kerbside	X 526231	Y 178425	NO ₂	Y	Y	0.7m	No
KC61	Fulham Rd/ Limerston St	Roadside	X 526377	Y 177867	NO ₂	Y	Y	10m	No
KC64	Warwick Road	Roadside	X 524825	Y 178902	NO ₂	Y	Y	3.5m	No
KC65	Barlby Road	Roadside	X 523899	Y 182113	NO ₂	Y	Y	0.5m	No
KC66	Acklam Road	Railway	X 524541	Y 181893	NO ₂	Y	Y	16m	No
KC67	Southern Row	Railway	X 524056	Y 182148	NO ₂	Y	Y	38m	Yes
KC68	Exhibition Road	Kerbside	X 526863	Y 179060	NO ₂	Y	Y	0.5m	Yes
KC01	Ladbroke Grove/Nth Ken Library	Roadside	X 524342	Y 181271	Benzene	Y	Y	3.5m	No
KC02	Holland Park	Urban Background	X 524784	Y 179599	Benzene	Y	Y	380m	No
KC03	Warwick Rd - Petrol Station (forecourt) now closed	Petrol station	X 524911	Y 178736	Benzene	Y	Y	N/A	No
KC04	Dovehouse Street	Urban Background	X 527111	Y 178165	Benzene	Y	Y	45m	No
KC05	Pembridge Square Library	Roadside	X 525191	Y 180705	Benzene	Y	Y	6m	No
KC0X	Old Brompton Rd/Clareville Grove Petrol Station	Petrol station	X 526496	Y 178553	Benzene	Y	Y	N/A	No

2.2 Comparison of Monitoring Results with Air Quality Objectives

2.2.1 Nitrogen dioxide

There are two objectives for nitrogen dioxide (NO₂). A short term objective of 200µg/m³ not to be exceeded more than 18 times as a one hour mean, and a longer term objective of 40µg/m³ as an annual mean. The deadline for achieving these objectives was the end of 2005. The whole of the borough was declared an Air Quality Management Area in 2000 on the basis that NO₂ and PM₁₀ (to a lesser extent) would not meet their objectives.

Monitoring data

Automatic chemiluminescent analysers and passive diffusion tubes are used to monitor NO₂ in the borough. The latter method provides more limited data but does allow levels to be compared to the annual mean objective at a greater number of locations than would be practicable by continuous methods alone.

Automatic monitoring data

Continuous monitoring is undertaken at five sites in the borough. Details of these sites are included in Table 2.31. The automatic monitoring results are shown in Tables 2.3 and 2.4. Another site in London, Marylebone Rd, has also been included for comparison purposes. The results have been assessed against the annual mean and the hourly mean objectives. All sites are located at distances which are representative of residential building facades with the exception of Earls Court which is relevant for short term exposure.

Table 2.3 Results of automatic monitoring for nitrogen dioxide: comparison with annual mean objective

Site ID	Location	Within AQMA?	Data Capture for full calendar Year 2012 %	Annual mean concentrations (µg/m ³)				
				2008	2009	2010	2011	2012
KC1	North Kensington	Y	99	33	33	37	36	36
KC5	Earls Court*	Y	98	107	107	113	100	99
AURN	Cromwell Rd 2	Y	91	67	72	74	66	69
KC3	Knightsbridge	Y	90	94	89	91	81	90
KC4	Kings Road Chelsea	Y	98	93	93	91	91	90
AURN	Marylebone Rd	Y	94	115	107	98	97	91

*Data capture for Earls Court site in 2008 is 72%. Means should normally be “annualised” if monitoring is less than 9 months however this has not been undertaken. Source: Londonair.org.uk. Data in *italics* is provisional and should be treated with caution. **Bold** indicates an exceedence of the annual objective (Table 1.1).

Preliminary results for 2012 are shown in Table 2.3 (data for 2011 has been updated following that reported in the 2012 Updating and Screening Assessment with some concentrations being revised slightly upward after data ratification had been completed). The 2012 results show that exceedences of the average NO₂ annual mean objective level of 40 µg/m³ have occurred at all continuous sites in the borough apart from the North Kensington background site. The 2012 data also indicates that

mean concentrations decreased by $1\mu\text{g}/\text{m}^3$ at Kings Road and Earls Court but increased by 9 and $4\mu\text{g}/\text{m}^3$ at Knightsbridge and Cromwell Road compared to 2011 (however as this is based on unratified data the final concentrations may change). The exceedences at the most polluted sites still remain more than twice above the objective.

Figure 2.4 shows the longer term trend since 2000 in the borough (plus one other site in central London). Overall North Kensington and the Cromwell Road have shown an overall downward trend, though this has now stabilised. Over the same period the sites at Chelsea and Knightsbridge have statistically shown an increase in the annual mean level.

Figure 2:4 Trends in annual mean nitrogen dioxide concentration measured at automatic monitoring sites

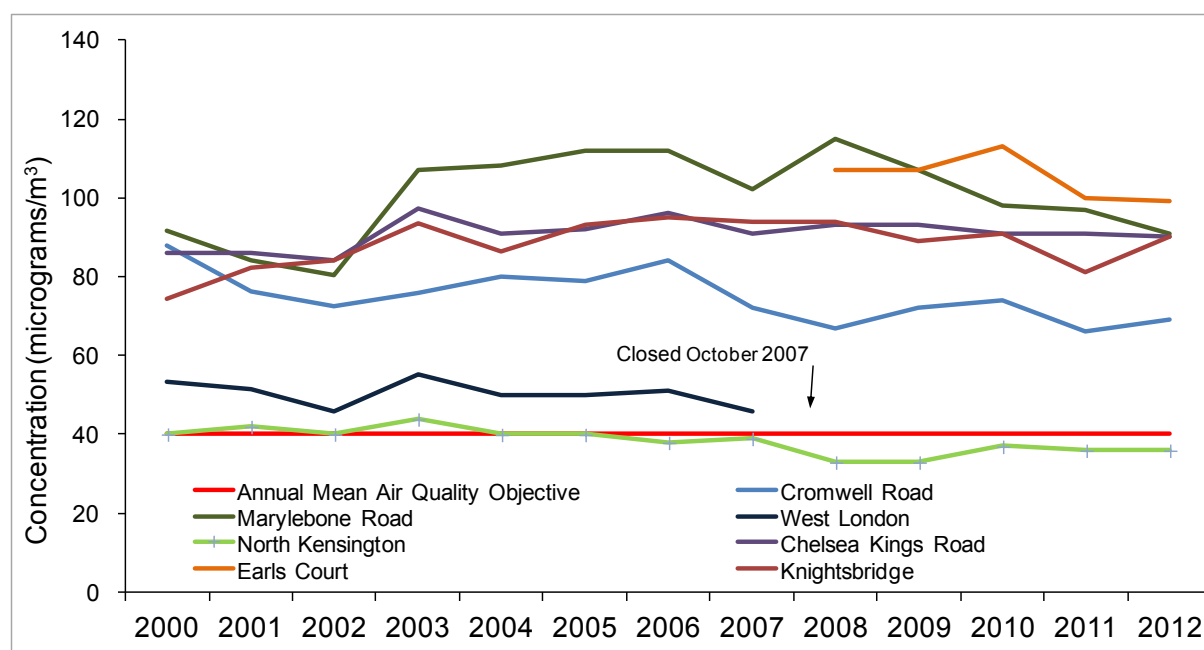


Table 2.4 Results of automatic monitoring for nitrogen dioxide: comparison with 1-hour mean objective

Site ID	Location	Within AQMA ?	Data Capture for full calendar year 2012 %	Number of Exceedences of hourly mean ($200\mu\text{g}/\text{m}^3$)				
				2008	2009	2010	2011	2012
KC1	North Kensington	Y	99	0 (122)	1	0	0	1
KC5	Earls Court*	Y	98	384 (242)	414	515	386	304
AURN	Cromwell Rd 2	Y	91	1 (147)	3	1	4	2
KC3	Knightsbridge	Y	90	519	358	307	181	439
KC4	Kings Road Chelsea	Y	98	122	72	63	76	53
AURN	Marylebone Rd	-	94	812	477	534	222	103

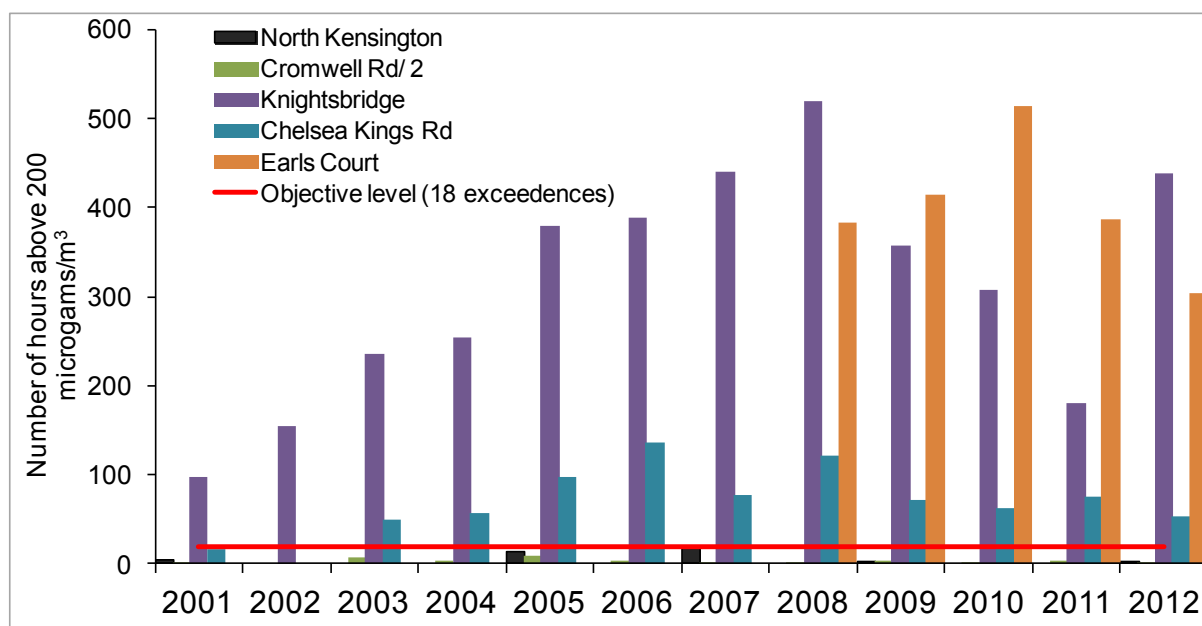
2012 data (in italics) is provisional and should be treated with caution. Source Londonair.org.uk. **Bold** indicates an exceedence of the hourly mean objective (Table 1.1).

Table 2.4 shows exceedences of the hourly mean (above $200\mu\text{g}/\text{m}^3$) for NO_2 . The preliminary data shows considerable variation from site to site, with one or two

exceedences at the background site and Cromwell Road to 439 hours at the Earls Court Site (only 18 exceedences are permitted). The significant differences in the number of exceedences illustrate that local site characteristics and vehicle fleet mix at each location play a very important part. Earls Court and Kings Road have shown a reduction in the number of exceedences compared to 2011 however three of the five sites in the borough exceed the objective by a very wide margin.

The chart below shows the number of hourly exceedences measured at sites in the borough since 2001 (monitoring at Earls Court began in 2008). As mentioned, the hourly objective should not be exceeded more than 18 times in a year. The highest exceedences were measured in 2008 at the Knightsbridge site and at the Earls court site in 2010. Though there have been some reductions in the number of exceedences, they still remain significantly above the objective level.

Figure 2:5 Trends in the hourly mean nitrogen dioxide concentration measured at automatic monitoring sites



All the sites are representative of public exposure for either one or more of the objective values.

Diffusion tube monitoring data

Diffusion tube data for NO₂ was collected at 33 locations in the borough in 2012. The details of all the diffusion tube sites can be found in Table 2.2.

Table 2.5 presents factored annual mean concentrations for 33 sites in 2012. The data is adjusted to take into account any potential difference between the continuous monitoring and the diffusion tube methods. The bias adjustment factor is calculated by Bureau Veritas using data collected through the London Wide Environmental Programme co-location study at a number of sites. The mean bias adjustment factor for 2012 has been calculated as 1.04. Details of the analytical laboratory and bias adjustment methodology are described in Appendix A.

Table 2.5 Results of nitrogen dioxide diffusion tubes

Site ID	Location	Within AQMA?	Data Capture %for full calendar year 2012	Annual mean concentrations ($\mu\text{g}/\text{m}^3$) Adjusted for bias					Change between 2011 and 2012
				2008	2009	2010	2011	2012	
DKC31	Ladbroke Grove/Nth Ken Library	Y	100	58.2	57.7	60.0	52.9	52.57	-0.3
KC32	Holland Park	Y	100	32.3	31.7	32.8	29.0	29.07	+0.07
KC33	Cromwell Road/Earls Court Rd	Y	100	85.3	90.9	91.2	83.6	84.21	+0.61
KC34	Dovehouse Street	Y	100	45.6	47.2	44.9	42.6	42.39	-0.2
KC35	Brompton Road/Cottage Place	Y	100	64.0	67.9	66.8	71.8	81.25	+9.45
KC38	Earls Court Station	Y	100	98.2	101.2	96.1	95.3	100.73	+5.43
KC39	Lots Road/Upcerne Road	Y	100	43.5	41.4	40.7	33.4	34.04	+0.64
KC40	Brompton Road	Y	100	49.5	51.6	49.5	49.9	49.07	-0.8
KC41	Ladbroke Crescent	Y	100	38.8	39.6	40.9	35.5	34.82	-0.7
KC42	Pembridge Square Library	Y	100	47.2	46.3	46.4	43.5	43.81	+0.31
KC43	St Marks Grove	Y	100	40.2	39.1	40.8	34.8	36.49	+1.69
KC44	Donne Place	Y	92	42.8	42.1	45.3	39.9	42.08	+2.18
KC45	Chatsworth Court	Y	100	50.7	50.5	52.0	51.7	50.53	-1.2
KC47	Sion Manning School	Y	100	36.0	35.6	37.1	32.3	33.83	+1.53
KC48	Sloane Square	Y	100	80.1	81.8	86.3	82.4	80.80	-1.6
KC49	Harrods	Y	100	76.1	79.8	79.0	70.6	80.00	+9.4
KC50	Chelsea Physic Garden (Gate)	Y	100	52.7	58.9	57.5	56.4	58.51	+2.11
KC51	Chelsea Physic Garden (Met Station)	Y	100	36.1	37.1	36.8	33.2	33.50	+0.3
KC52	Sloane Ave. nr Marlborough school	Y	100	60.2	59.4	59.4	51.5	56.46	+4.96
KC53	Walmer House	Y	100	47.0	49.6	49.4	46.3	48.49	+2.19
KC54	Cromwell Rd/Natural History Museum	Y	83	72.8	75.6	70.7	73.2	70.18	+0.22
KC55	Blantyre St	Y	100	46.9	43.2	44.3	40.6	41.67	+1.07
KC56	Chelsea Old Town Hall	Y	100	87.6	81.9	80.6	84.3	87.11	+2.81
KC57	Pavillion St/Sloane Ave	Y	100	55.5	55.0	57.7	52.5	53.55	+1.05
KC58	Kensington H St/Kensington Church St	Y	92	62.5	62.8	68.2	58.1	62.37	+4.27
KC59	Kensington H St/Argyll St	Y	100	86.9	86.1	82.2	83.0	83.43	+0.43
KC60	Old Brompton Rd/Draycott Ave	Y	100	72.2	76.4	78.9	69.3	68.64	-0.7
KC61	Fulham Rd/Limerston St	Y	100	61.0	60.0	63.5	60.5	54.89	-5.6
KC64	Warwick Rd	Y	92	51.2	51.7	63.0	49.0	49.58	+0.58
KC56	Barlby Road*	Y	100	-	39.6	40.8	38.8	38.01	-0.8
KC66	Acklam Road*	Y	100	-	43.4	45.9	43.5	39.94	-3.6
KC67	Southern Row*	Y	100	-	41.6	43.6	43.8	42.33	-1.5
KC68	Exhibition Road	Y	100	-	-	55.9	60.6	47.98	-13

Bias adjustment factor 2011=1.02, 2010= 1.06; 2009 = 1.00; 2008 = 0.98; (see Appendix A), KC47 and KC54 are the mean results of triplicate exposure. **Bold** indicates an exceedence of the annual mean objective of $40 \mu\text{g}/\text{m}^3$ (Table 1.1). Underlined figures indicate a risk that the 1-hour objective may also be exceeded. * period mean reported in 2009 (May 2009- March 2010)

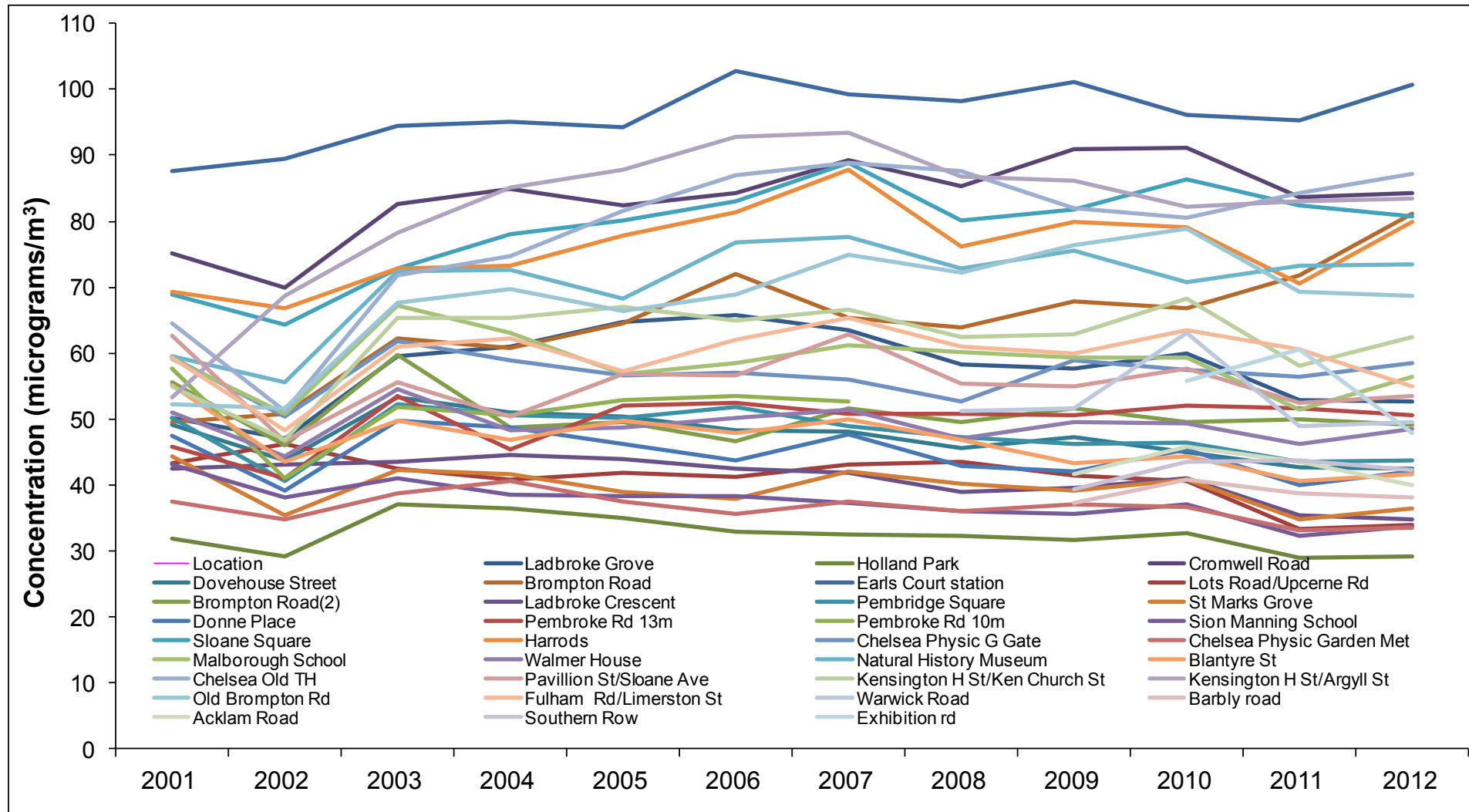
The results indicate that eight out of 33 sites were below the objective level. These include sites located at Holland Park, Chelsea Physic Garden and Sion Manning School. The remainder are above the objective level, with the highest annual mean concentration recorded outside Earls Court station. Of these, a further ten are at risk of exceeding the hourly mean objective (shaded cells), i.e. where the annual mean is above $60 \mu\text{g}/\text{m}^3$. This is consistent with the results from the continuous monitoring sites.

A comparison of levels measured in 2011 and 2012 showed no overall consistent pattern however just under a third of the sites had increased levels. Reductions (or smaller increases) in levels were mainly observed at background locations. Some of the busiest roadside locations experienced the most significant increases such as the Brompton Road and Earls Court sites.

However Exhibition Road, which was subject to the recent streetscape changes, has shown the greatest decrease of any site, by $13\mu\text{g}/\text{m}^3$ (from 60.6 to $47.9\mu\text{g}/\text{m}^3$) between 2011 and 2012. This is consistent with the measured changes in traffic flow which have resulted on the Exhibition Road following the implementation of the scheme.

Figure 2.6 on the next page illustrates the trend since 2001. Overall, many sites (mainly roadside locations) have recorded increased levels; there are however some signs of improvement but no clear indication of a consistent downward trend other than at a small number of background locations.

Figure 2:6 Trends in annual mean nitrogen dioxide concentration measured at diffusion tube monitoring sites (factored)



Overall nitrogen dioxide conclusions

Despite some improvements in nitrogen dioxide levels at some sites, the borough continues to exceed the annual mean objective by an appreciable margin. Reductions of almost $60\mu\text{g}/\text{m}^3$ are required at the worst road side positions and reductions of almost $35\text{-}40\mu\text{g}/\text{m}^3$ are required at building facade locations on busy and congested roads, e.g. at distances of 8m as typified by the Kings Road site. In less trafficked roads or where better dispersal characteristics exist, reductions of a few micrograms to $10\mu\text{g}/\text{m}^3$ are needed. Background locations such as parks and school grounds or roads which have „access only traffic“ are currently meeting the objective level.

The hourly mean is also exceeded at three out of four of the continuous roadside monitoring sites and is likely to be exceeded at approximately a third of diffusion tube monitoring locations. These are predominately the busier roadside locations such as High Streets. Hourly exceedences would have to be reduced by well over 400 hours to meet the objective level (of no more than 18 exceedences of $200\mu\text{g}/\text{m}^3$) at the worst affected location.

The extent of these exceedences continues to have serious health implications. At some individual sites, levels are more than twice the annual objective level. We continue to fail the government objectives and time is running out for this borough and other parts of inner London to meet the EU objectives by 2015.

2.2.2 Particulate Matter (PM₁₀)

There are two objectives for particulate matter (PM₁₀), to be achieved by 2004, which are incorporated in the Air Quality Regulations; 40µg/m³ as an annual mean and 50µg/m³ as a daily mean, not to be exceeded more than 35 times a year (see Table 1.1). The whole of the borough was declared an AQMA in 2000 partially based on exceedences of the 2004 PM₁₀ objectives at certain locations.

Monitoring data

Monitoring of PM₁₀ is challenging because of its complex and varied composition. In addition there are a wide range of instruments and methods that are available and these in turn produce variations in the way that particulate matter is sampled, resulting in differences in the measured concentrations. In recent years there has been much work on identifying methods „equivalent“ to the EU reference. These issues have meant that a consistent long term dataset has been harder to achieve as exists with other pollutants.

Automatic monitoring of PM₁₀ (using TEOM instruments) first began in 1995 in North Kensington (urban background site) and later from 1998 at the Cromwell Road site (roadside). These TEOM instruments were replaced and upgraded, respectively, to FDMS units in 2009 as they were no longer considered equivalent to gravimetric methods. The Council has also operated a partisol (gravimetric sampler equivalent to the EU reference method) at the Earls Court Road since May 2002. As the North Kensington site is affiliated to the AURN, Defra has also operated partisol instruments at the North Kensington site.

The monitoring data included in the report includes correction factors where applicable. Where TEOM data has been included the Volatile Correction Method (VCM) correction factors have been included. Partisol and FMDS data does not require any correction.

The North Kensington and Cromwell Road sites are representative of public exposure for both the long and short term objective values according to the definition in Defra’s LAQM TG (09) whilst the Earls Court site which is as a kerbside location is not considered representative. However it is important to note that this is not a reasonable conclusion as there is no known threshold level at which no health effects are detectable and current objectives are weaker than the provisional more stringent objectives which were not adopted.

Table 2.6 shows particulate data collected in the borough and at other central London locations (for comparative purposes) using various methods and adjustments between 2008 and 2012. Data capture for some sites are low due to changes in equipment or site issues) and is included for indicative purposes only. Comparisons with air quality objectives should be treated with caution where concentrations are close to the objective level, especially for 2012 data which is unratified.

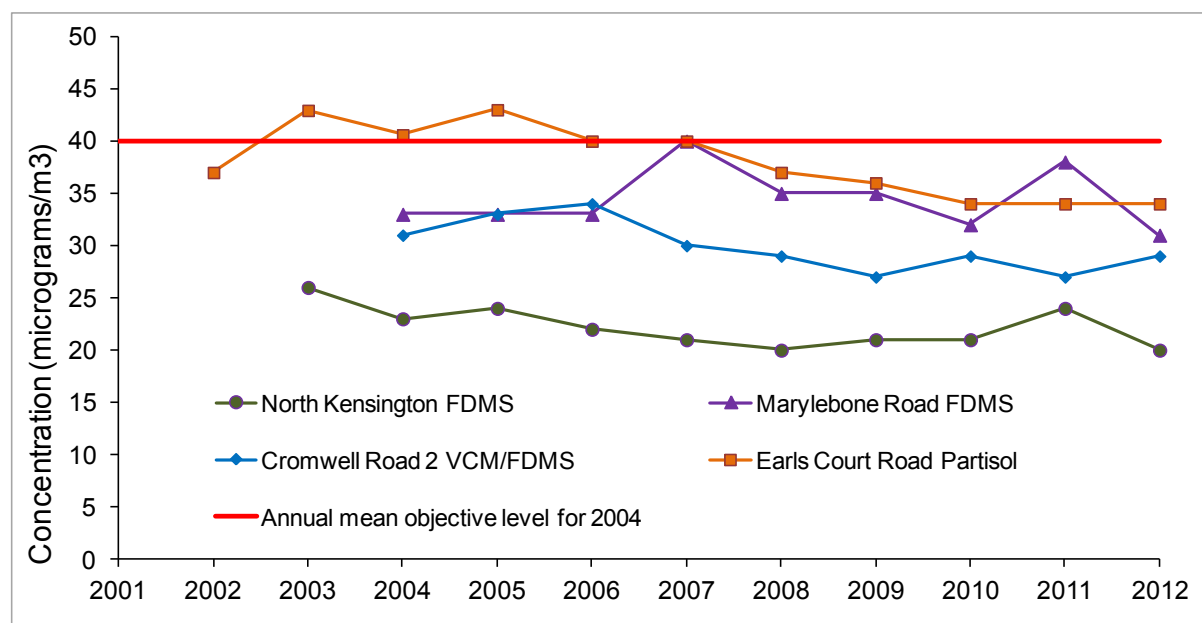
Table 2.6 Results of PM₁₀ automatic monitoring: comparison with annual mean objective

Site ID	Location	Adjst. Method	Within AQMA ?	Data Capture				Annual mean concentrations (µg/m ³)				
				2009 %	2010 %	2011 %	2012 %	2008*	2009	2010	2011	2012
KC1	North Kensington TEOM	1.3	Y	98	96	93	97	23	23	21	23	20
KC1	North Kensington TEOM	VCM	y	98	96	93	97	21	21	20	23	20
KC1	North Kensington FDMS	None	Y	86	64	84	81	20	21	21	24	20
AURN	N Kensington Partisol	None	Y	81	95	95	98	19	20	16	19	18
KC2	Cromwell Rd 2 VCM corrected /FDMS from 2010	VCM	Y	95	62	74	67	29	27	29	27	27
KC5	Earls Court Partisol	None	Y	95	98	87	96	37	36	34	33	34
AURN	Marylebone Rd TEOM	VCM	-	97	96	97	93	39	42	35	41	37
AURN	Marylebone Rd FDMS	none	-	96	91	93	85	35	37	32	38	31
AURN	Marylebone Rd Partisol	none	-	97	82	81	96	39	33	30	35	32

Data in *italics* is provisional and should be treated with caution. Very low data capture for 2008 partisol data at KC1 and Marylebone Rd

All monitoring sites within the borough met the annual mean objective level in 2012. However the concentration at Earls Court increased slightly between 2011 and 2012; Cromwell Road remained the same (however caution should be applied as data capture at this site has been affected by site issues). The concentration measured at North Kensington decreased slightly over the same period. The chart below (Figure 2.7) indicates that sites in the borough show an overall downward trend though more recently there is no clear trend.

Figure 2:7 Trends in annual mean PM₁₀ concentrations measured at automatic monitoring sites



The table below shows data for exceedences of the daily mean objective for three sites in the borough and other sites in central London. The data includes various monitoring methods. As with last year, all sites within the borough met the daily mean objective level apart from the Earls Court site. There continues to be a notable number of days above $50\mu\text{g}/\text{m}^3$ at North Kensington and Cromwell Road, 12 and 14 respectively, though this is well within the objective level.

Table 2.7 Results of PM₁₀ automatic monitoring: comparison with 24-hour mean objective

Site ID	Location	Factor	Within AQMA ?	Data Capture				Number of exceedences of 24 hourly mean $>50 \mu\text{g}/\text{m}^3$ - 35 are permitted				
				2009 %	2010 %	2011 [#] %	2012 %	90 th %tile shown in brackets where data capture less than 90 %				
								2008	2009	2010	2011	2012
KC1	N. Kensington TEOM	1.3	Y	98	96	93	97	8	1	2	4	1
KC1	N. Kensington TEOM	VCM	Y	98	96	93	97	9	6	3	15	6
KC1	North Kensington FDMS		Y	86	65	84	81	19	3	3	17	12
AURN	North Kensington Partisol	None	Y	81	95	95	98	N/A	7	2	14	11
KC2	Cromwell Rd2 TEOM/FDMS	VCM to 2010	Y	95	62	74	67	17	14	11	8 (42.1)	14
KC5	Earls Court Partisol	None	Y	95	90	98	96	52 (74.4)	43	30	42	43
AURN	Marylebone Rd TEOM	VCM	Y	97	96	97	93	68	37	46	76	44
AURN	Marylebone Rd FDMS	none	-	96	91	93	85	35	44	22	58	23
AURN	Marylebone Rd Partisol*	none	-	97	82	81	96	29	36	15	34	27

Data in *italics* is provisional and should be treated with caution. Very low data capture for 2008 partisol data at KC1 and Marylebone Rd

Figure 2:8 Trends in daily mean PM₁₀ concentrations measured at all monitoring sites

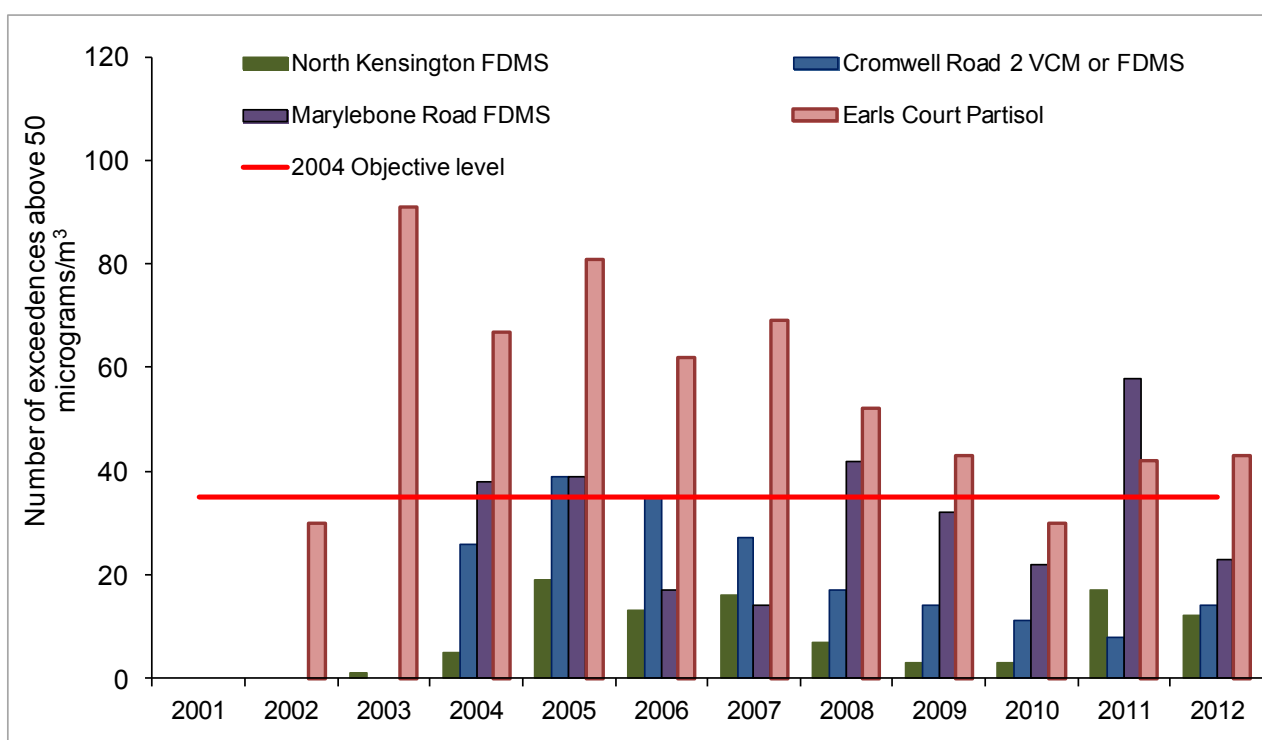


Figure 2.8 shows the longer term trend in daily exceedences. There is considerable variation from year to year but overall the number of exceedences had been declining between 2007 and 2010. However 2011 and 2012 saw an increase at some locations.

PM₁₀ conclusions

Monitoring at the three sites in the borough reveals that all sites, including Earl's Court, have met the annual mean objective for PM₁₀ since 2008. The daily mean objective has been met at the North Kensington and Cromwell Road sites but not at the Earls Court site. It is likely that there are other locations in the borough that are close to or above the objective level for the daily mean objective, but we are only able to comment on those areas where monitoring is in place.

2.2.3 Particulate Matter (PM_{2.5})

The latest Air Quality Strategy¹ set a cap of 25µg/m³ for particulate matter (PM_{2.5}) and a likely target of a 15 per cent reduction in annual mean concentrations at urban background locations by 2020. This reduction approach is a replacement for the indicative 2010 objectives set for PM₁₀ in the 2000 strategy and 2003 addendum. However, there is no requirement for local authorities to report against these exposure reduction targets. Nevertheless as the PM₁₀ annual mean objective now appears to have been achieved across London, this PM_{2.5} metric will become increasingly more relevant. Information on current levels has therefore been included below.

Monitoring data

Monitoring of PM_{2.5} is only undertaken at a relatively small number of locations in the London area. PM_{2.5} has been monitored in the borough by Defra, using a gravimetric instrument, at the North Kensington site since 2002. This monitoring was interrupted in October 2007 following concerns about the filters used in these instruments. Monitoring restarted in 2008 and is now additionally monitored with an FDMS instrument (a continuous method). It has also been measured at Cromwell Road since the autumn of 2009.

Table 2.8 shows PM_{2.5} data for sites in the borough and two other central London sites for comparison purposes. These results indicate that levels at these locations are currently within the cap level. Levels for 2012 have declined slightly compared to 2011. The concentration at Marylebone Road is 21.6µg/m³ which suggests that other locations may be close to the cap. Also it should be noted that the data is not fully ratified and should be treated with caution.

¹ Defra (2007) The Air Quality Strategy for England, Scotland, Wales, and Northern Ireland

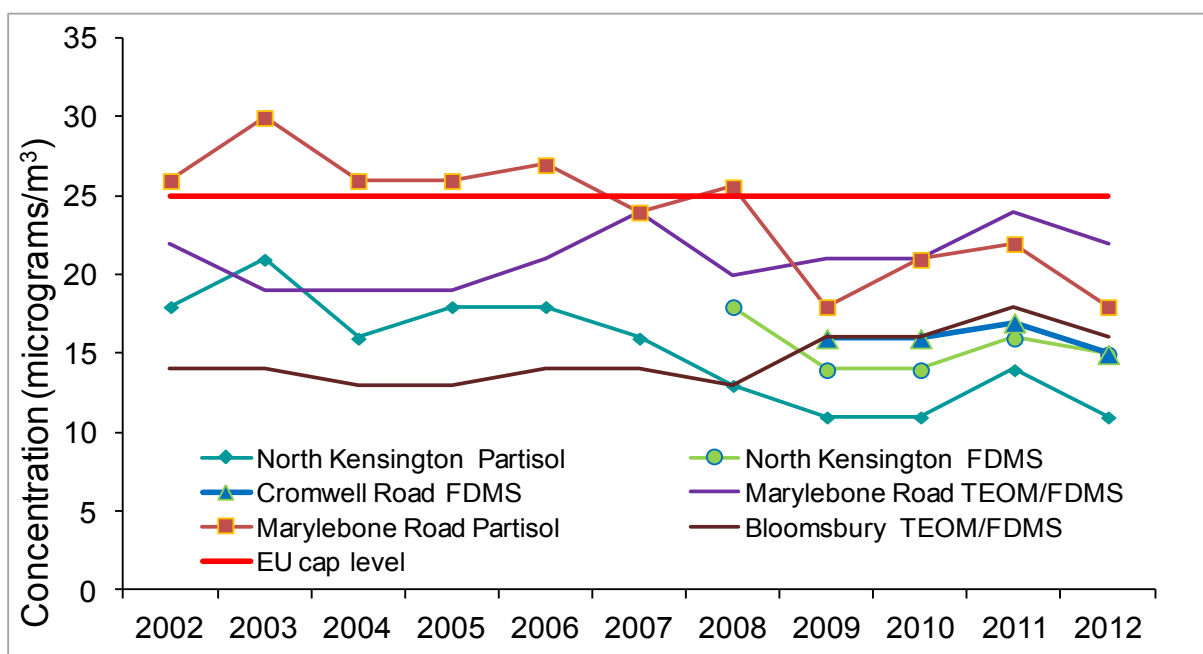
Table 2.8 Annual mean level of PM_{2.5} automatic monitoring

Site ID	Location	Within AQMA?	Data Capture %					Annual mean concentrations (Cap Level 25µg/m ³) (µg/m ³)				
			2008	2009	2010	2011	2012	2008	2009	2010	2011	2012
KC1	North Kensington FDMS	Y	4	97	93	92	89	18	14	14	16.4	14.5
AURN	N Kensington Partisol	Y	60	89	88	87	94	13	11	11	14	11
KC2	Cromwell Rd 2 FDMS	Y	No data	33	14	41	75	-	16	16	16.6	14.8
AURN	Bloomsbury TEOM/FDMS	-	88	91	89	98	98	13	16	16	17.5	16.2
AURN	Marylebone Rd FDMS	-	-	-	58	95	92	-	21	21	24.5	21.6
AURN	Marylebone Rd Partisol	-	58	81	28	82	80	25.6	18	21	22	18

*Monitoring of PM_{2.5} at Cromwell Road began in 2009. Data in *italics* (2009) is provisional and should be treated with caution. **Bold** indicates an exceedence of the hourly mean objective (Table 1.1). *Italics* represent unratified data.

The figure below shows concentrations have been below the EU cap level since 2002 for sites in the borough. Overall the levels in more recent years appear to be lower compared the period prior to 2008. This may be in part due to changes in the monitoring networks which affected the equipment and methods used, note for example, the difference in results measured by partisol and FDMS units at North Kensington.

Figure 2:9 Trends in annual mean PM_{2.5} concentrations measured at all monitoring sites



In addition to the cap there is also a requirement for a percentage reduction level based on the Average Exposure Index (AEI) to be calculated from the national average PM_{2.5} concentrations for 2009-2011. The average PM_{2.5} concentration for 2009-2011 was calculated as being between 13-14 µg/m³, based on data from Jan 2009 to Jul 2012 from 47 PM_{2.5} stations, this would require the UK to comply with a 15% reduction target for

2020². The estimated reduction that would be required is an average concentration of around $2.0\mu\text{g}/\text{m}^3$. It is therefore important that measures to reduce $\text{PM}_{2.5}$ are not deferred by an apparent meeting of PM_{10} objectives.

² PM2.5 Average Exposure Index Report for Defra and the Devolved Administrations AEAT/ENV/R/3241 ED57002030 01/12/2011

2.2.4 Sulphur Dioxide (SO₂)

Three objectives have been set for sulphur dioxide (SO₂), a one hour mean of 350 µg/m³ (not to be exceeded more than 24 times per year), a 24 hour mean of 125µg/m³ (not to be exceeded more than 3 times per year) and a 15 minute mean of 266 µg/m³ (not to be exceeded more than 35 times per year).

Monitoring data

Monitoring data is currently collected at two sites in the borough and is shown in the table below. Data from Bloomsbury (outside the borough) is also included. These monitoring sites are representative of levels at residential areas away from busy roads and at the façade of residential buildings near busy roads.

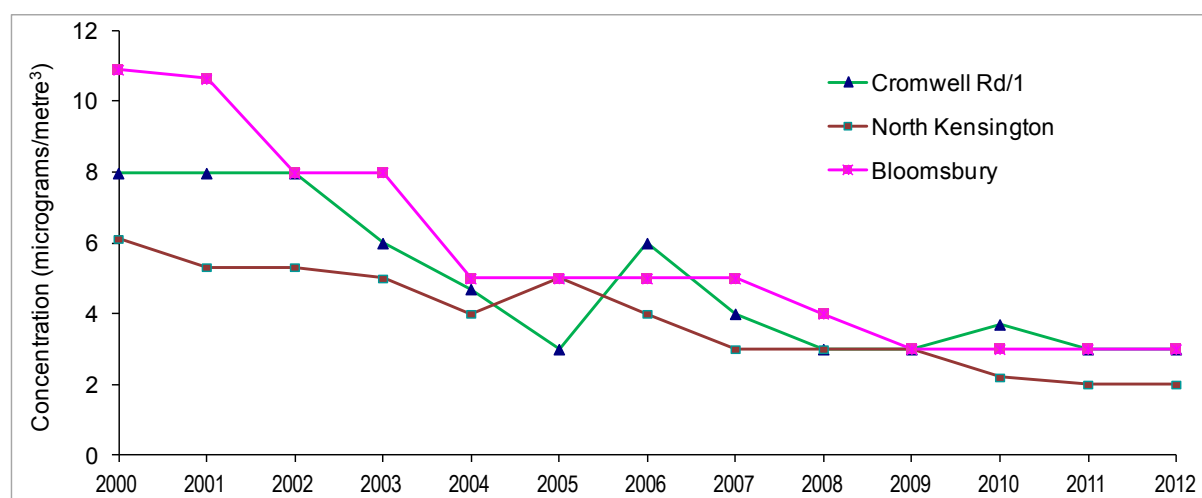
Table 2.9 Results of sulphur dioxide automatic monitoring: comparison with objectives

Site ID	Location	Within AQMA?	Data Capture 2012 %	Annual mean	Number of Exceedences 2012		
					15-minute Objective (266 µg/m ³)	1-hour Objective (350 µg/m ³)	24-hour Objective (125 µg/m ³)
KC1	North Kensington	Y	98	2	0	0	0
AURN	Cromwell Road	Y	69	3	3	0	0
AURN	Bloomsbury	-	98	3.1	0	0	0

There were three exceedences of the 15 minute mean at Cromwell Road in 2012 (compared to one in 2011) however this is well within the allowance of 35 breaches. No exceedences of any of the objectives have been observed in the past ten years at monitoring locations in the borough. Annual mean levels remained the same compared to 2011. Elevated SO₂ is most likely to occur as a result of plume grounding episodes arising from industrial sources in the East Thames area but none have resulted in any exceedences of the objectives.

Generally there has been a decline in annual mean concentrations over the longer term but more recently levels have tended to stabilise. The 15 minute, one-hour, and 24 hour mean objectives for SO₂ continue to be met in the borough.

Figure 2:10 Trends in Annual Mean Sulphur Dioxide Concentration Measured at Automatic Monitoring Sites



2.2.5 Benzene

Two objectives have been set for the assessment of benzene, a running annual mean of $16.25\mu\text{g}/\text{m}^3$ to be met by 31.12.2003 and a more stringent annual mean of $5\mu\text{g}/\text{m}^3$ to be achieved by 31.12.2010.

Monitoring Data

We currently undertake sampling at five locations using diffusion tubes, these include two roadside, two background, and one site in close proximity to a petrol station forecourt. The petrol station has operated stage two (in addition to stage one) vapour recovery since 2007.

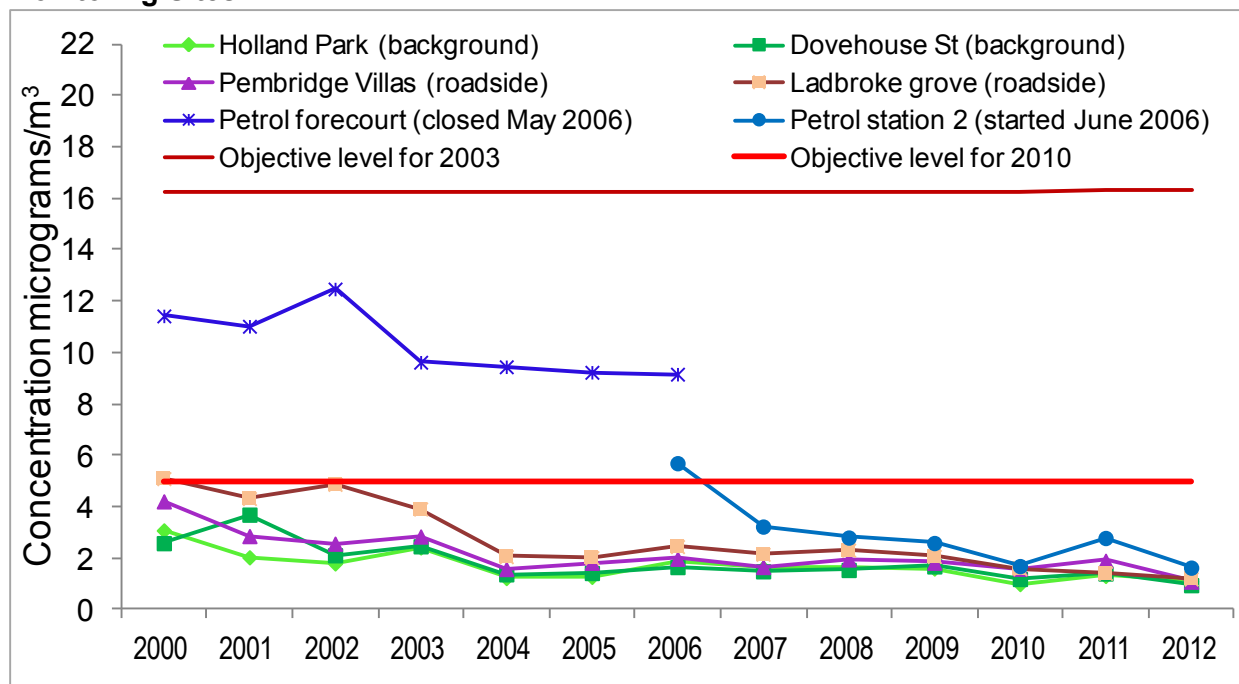
The highest levels of benzene have generally been recorded at the petrol station sites. The table below shows the 2010 objective has been met at all sites since 2007; the 2003 ($16.25\mu\text{g}/\text{m}^3$) objective has been met since 2000 (the measured annual mean is assumed to be the equivalent of the running annual mean). Results for 2012 show a decrease compared to 2011 at all sites. There was a loss of one sample at three of the sites in 2012.

Table 2.10 Annual average benzene levels using diffusion samplers ($\mu\text{g}/\text{m}^3$)

Year	KC01 Ladbroke Grove/Nth Ken Library	KC02 Holland Park	KC03 Warwick Rd Petrol St. (forecourt)	KC04 Dovehouse St	KC05 Pembroke Square Library	KC0X Old Brompton Rd/Clareville Grove Petrol station
2000	5.1	3.1	11.4	2.6	4.2	-
2001	4.3	2.0	11.0	3.7	2.9	-
2002	4.9	1.8	12.5	2.1	2.6	-
2003	3.9	2.4	9.6	2.5	2.9	-
2004	2.1	1.2	9.5	1.4	1.6	-
2005	2.0	1.3	9.2	1.4	1.8	-
2006	2.3	1.9	9.2	1.7	2.0	5.7
2007	2.2	1.6	Closed	1.5	1.7	3.2
2008	2.3	1.6	-	1.6	2.0	2.8
2009	2.1	1.6	-	1.7	1.8	2.6
2010	1.6	1.0	-	1.2	1.6	1.7
2011	1.4	1.3	-	1.4	1.9	2.8
2012	1.2	1.1	-	1.0	1.1	1.6

Figure 2:8 (overleaf) shows the longer term trend. After an initial decline all sites apart from the petrol forecourt /station sites have shown steady levels since 2004. The petrol station site declined more slowly with levels stabilising for most sites from around 2008 onwards.

Figure 2:8 Trends in Annual Mean Benzene Concentration Measured at Diffusion Tube Monitoring Sites



2.2.6 Other pollutants monitored

Polycyclic Aromatic Hydrocarbons (PAHs)

Polycyclic Aromatic Hydrocarbons (PAHs) are a complex mixture of organic compounds some of which are carcinogens. The Government has set an objective for these pollutants. It would be very difficult and expensive to monitor a selection of these pollutants, consequently, the Government has selected benzo(a)pyrene (b(a)p) as a marker for PAHs and set an objective based on this pollutant: 0.25ng/m³ ^(footnote 3) as an annual average to be achieved by the end of 2010.

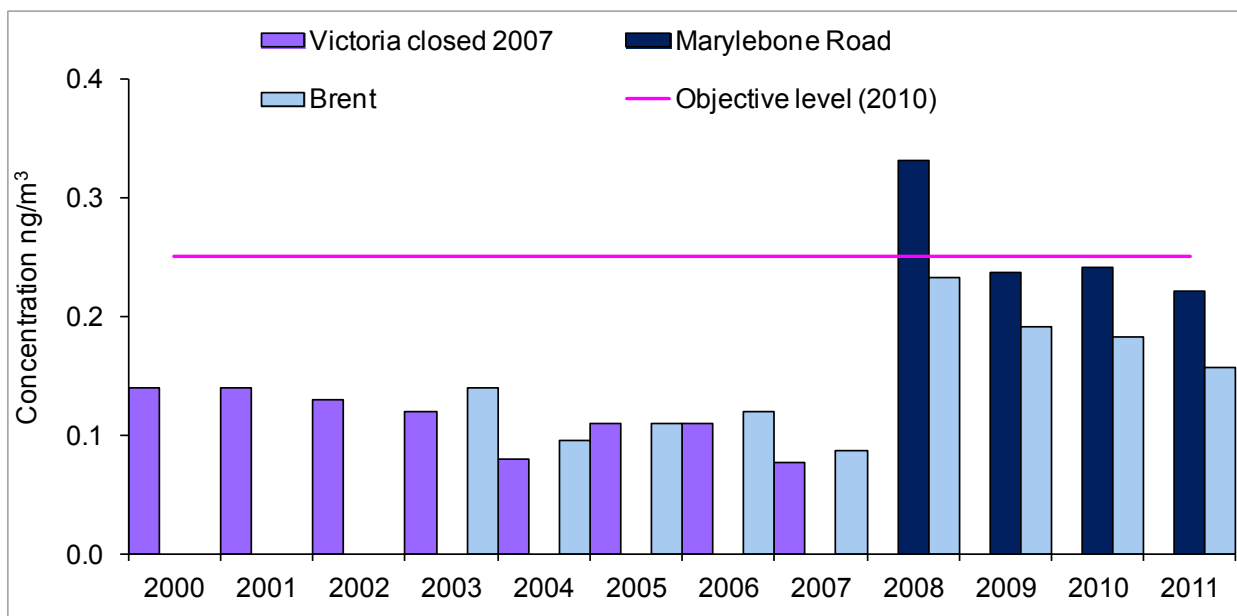
Whilst this objective has been set, it has not been included in regulations for local air quality management purposes. However, monitoring data from the London area (Brent, Marylebone Road and historically Victoria) has been included in this report. The main sources of b(a)p are industrial emissions, domestic coal and wood burning. Vehicles no longer appear to be a major source. This pollutant may become of increasing concern if the use of biomass or biofuels becomes more widespread.

The most recent data available from monitoring at sites in Marylebone Road and Brent are included in the chart below (monitoring at Victoria ceased in 2007). Only data up to the end of 2011 was available from the Defra data archive at the time of preparing the report. Monitoring methods at the Brent site changed between 2007 and 2008. The chart shows levels increased after this time. It is possible that this change in method is the reason for this. However, we cannot be certain as the monitoring at Marylebone Road only commenced at the start of 2008 and there is no long term data set available prior to then.

³ ng stands for nanogram. A nanogram is one millionth of a milligram or one thousandth of one millionth of a gram

Of the available data it appears that the objective was exceeded only at Marylebone Rd in 2008. Indications are that the levels of benzo(a) pyrene were below the objective level in 2010. The concentrations remained relatively stable between 2009 and 2010.

Figure 2:11 Trends in Annual Mean Benzo(a)pyrene Concentration Measured at Monitoring Sites in London



The monitoring method at Brent changed between 2007 and 2008. Marylebone Road monitoring began in 2008.

As the borough has no industrial processes and very little coal and wood burning, concentrations of b(a)p would be expected to be similar to the levels indicated by the above monitoring results and are therefore likely to be within the 2010 objective.

Ozone (O₃)

The objective for ozone (O₃) is 100µg/m³ not to be exceeded more than 10 times a year (calculated as the daily maximum 8 hour mean) by 2005. This objective is not included in the LAQM process as ozone reduction requires action at a regional and European level. However, due to its health effects, monitoring is undertaken at the North Kensington background site. Ozone formation is dependent on high temperatures and sunny weather as well as the necessary precursor pollutants such as oxides of nitrogen (NO_x) and volatile organic compounds. Unlike most pollutants, ozone tends to be higher at background locations away from busy roads, often the highest levels being reached in rural locations. This is because NO_x emitted from vehicle exhaust and building flues will react with ozone removing it from the atmosphere.

Figure 2:12 overleaf shows levels of ozone at a background location in the borough, in comparison to the objective level (as shown by the red line). There has been no clear overall trend between 2000 to the present. In recent years only 2009 and 2010 did not exceed the objective level.

Figure 2:12 Trends in the 8-hour ozone exceedences measured at automatic monitoring sites

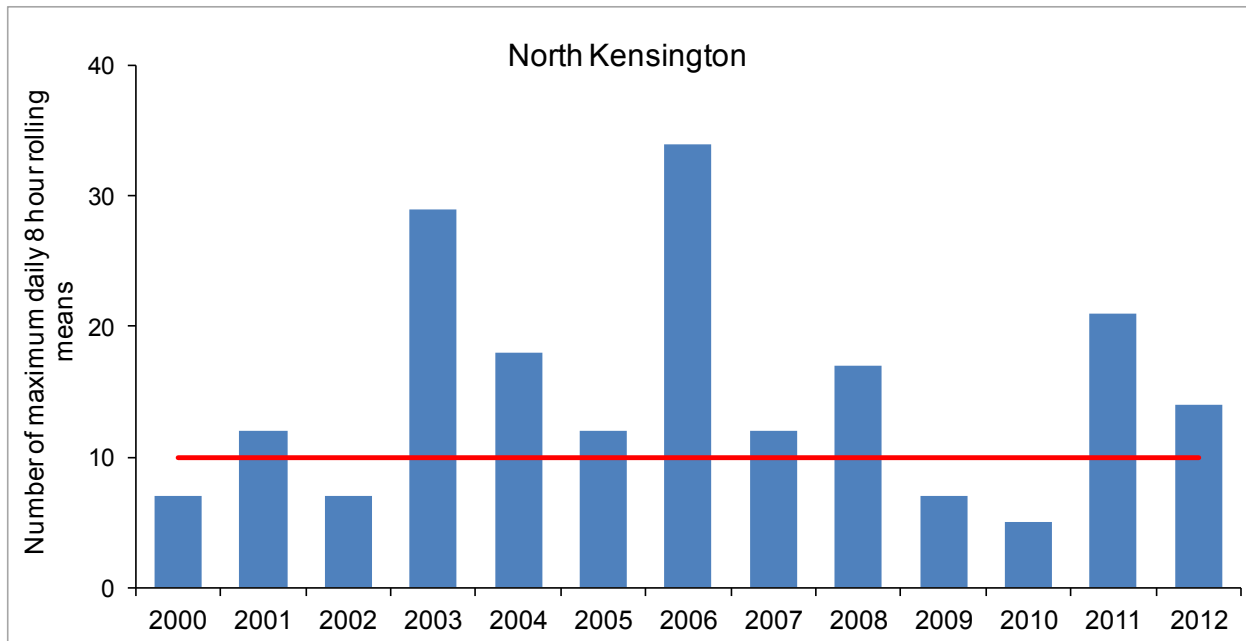
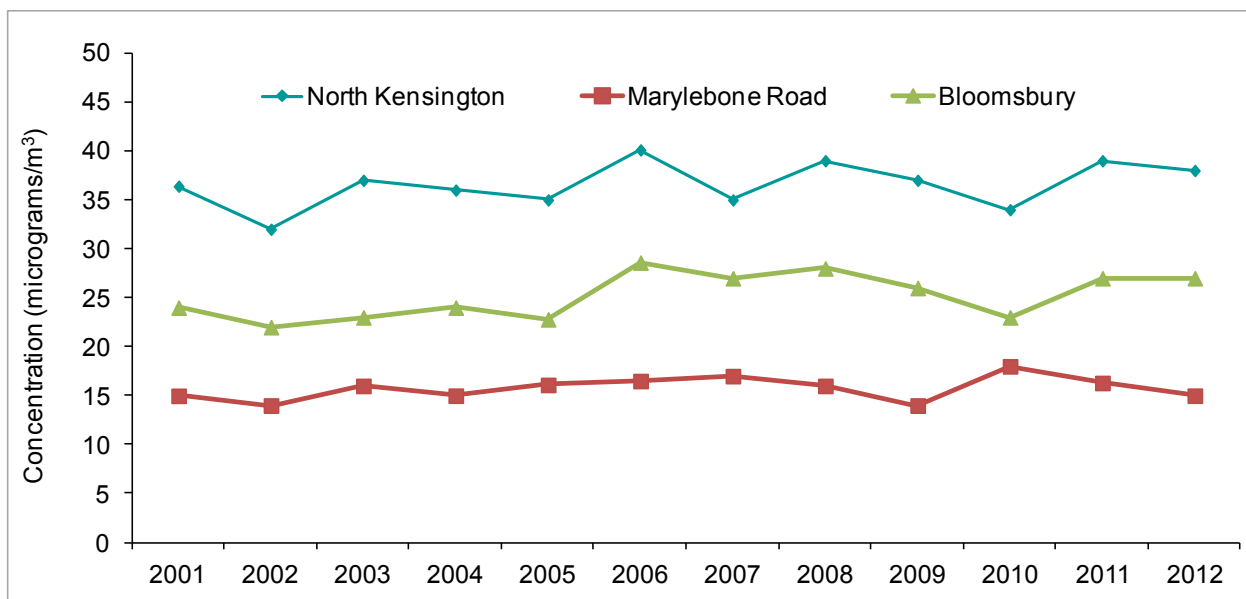


Figure 2:13 below shows annual mean levels of ozone measured at North Kensington, Bloomsbury (background site) and Marylebone Road (a roadside location site) from 2001. Marylebone Road and Bloomsbury are located outside the borough but are useful in showing a range of concentrations. Concentrations of ozone at the roadside location are lower due to its oxidation by traffic pollutants. This chart shows that, overall, annual mean levels have increased over the period shown.

Figure 2:13 Trends in annual mean ozone concentrations measured at automatic monitoring sites



2.2.7 Lead

There are two annual mean objectives for lead, 0.5 µg/m³ (to be achieved by 2004) and an objective of 0.25 µg/m³ (to be achieved by 2008).

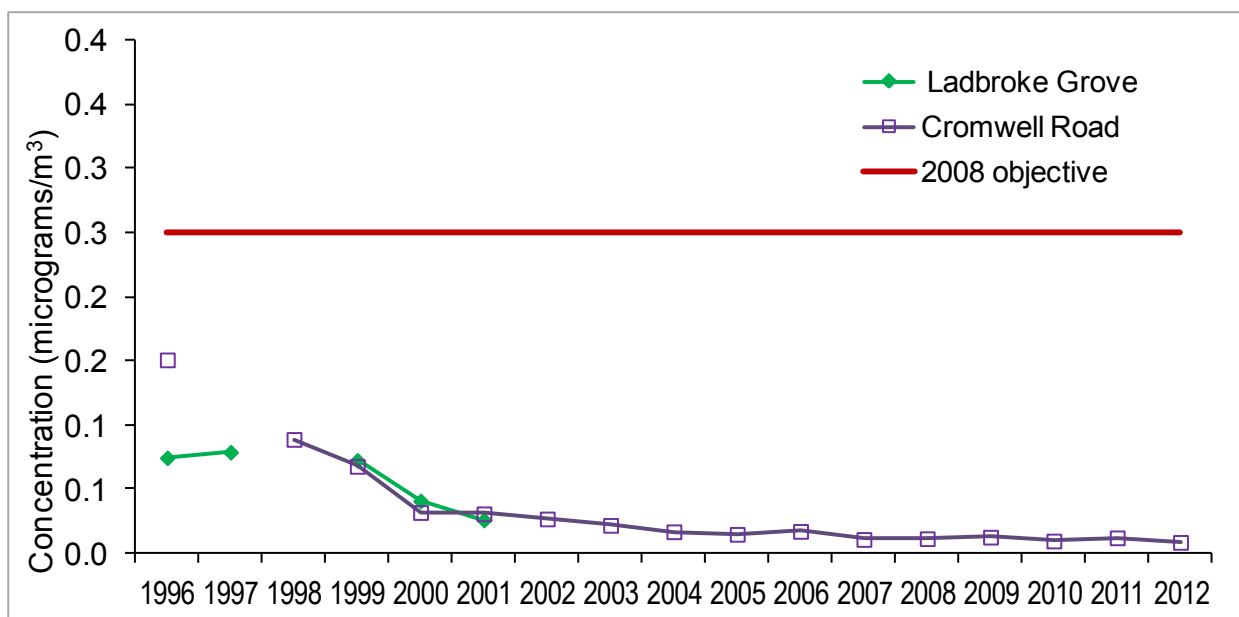
Lead monitoring in the borough is undertaken by Defra at the Cromwell Road monitoring site. Monitoring was previously also undertaken by the Council at Ladbroke Grove. When leaded petrol was phased out, monitored levels dropped significantly so the decision was taken to close the site at the end of 2001. Monitoring data is shown in the table below.

Table 2.10 Annual Mean Lead levels within the Borough

Year	Ladbroke Grove (µg/m ³)	Cromwell Rd (µg/m ³)
1999	0.073	0.068
2000	0.041	0.032
2001	0.026	0.031
2002	-	0.027
2004	-	0.017
2005	-	0.015
2006	-	0.017
2007	-	0.011
2008	-	0.012
2009	-	0.013
2010	-	0.010
2011	-	0.012
2012	-	0.009

The objectives for 2004 and 2008 have been met at the Ladbroke Grove site since 1992 and at the Cromwell Road site from 1994. The chart below showing long term monitoring data shows a downward trend between the late 1990s and 2000. However in the past few years levels have stabilised.

Figure 2:14 Trends in Annual Mean Lead Concentrations



2.2.8 Carbon Monoxide (CO)

The objective for carbon monoxide (CO) is 10 mg/m³ ⁽⁴⁾ as a maximum daily 8 hour running mean. CO monitoring data recorded in the borough since 2007 is shown in Table 2.11 including data from one other busy kerbside location from central London (Marylebone Road). Data recorded in 2012 shows we continue to meet the objective.

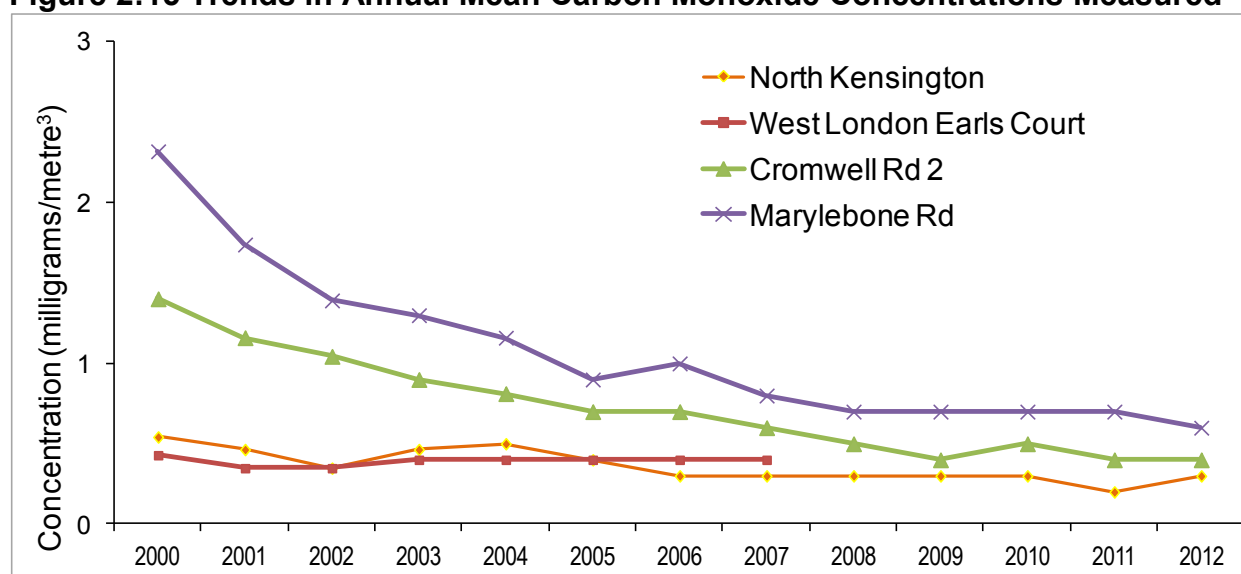
Table 2.11 Concentrations of CO in the Borough and at one central London site

Year	Site	Annual mean (mg/m ³)	Max daily 8-hour running mean (mg/m ³)	No. of hours above 10mg/m ³	% Data capture
2008	North Kensington	0.3	1.7	0	98
	Cromwell Rd 2	0.5	2.3	0	93
	Marylebone Rd	0.7	2.5	0	98
2009	North Kensington	0.3	1.7	0	98
	Cromwell Rd 2	0.4	2.3	0	97
	Marylebone Rd	0.7	2.5	0	98
2010	North Kensington	0.3	2.8	0	97
	Cromwell Rd 2	0.5	3.4	0	68*
	Marylebone Rd	0.7	2.7	0	96
2011	North Kensington	0.2	1.5	0	97
	Cromwell Rd 2	0.4	1.3	0	97
	Marylebone Rd	0.7	1.9	0	96
2012	North Kensington	0.3	1.2	0	99
	Cromwell Rd 2	0.4	1.4	0	97
	Marylebone Rd	0.6	1.6	0	95

* low data capture

There were no exceedences of the objective in 2012 at any of the monitoring locations in the borough. The maximum daily 8 hour running mean values remain well within the 10 mg/m³ objective level. Generally, annual mean levels at roadside locations are higher than concentrations at background locations. The figure below shows the longer term trend in annual mean levels, this demonstrates a fairly steady downward trend at most sites. Levels have generally stabilised in more recent years; though Cromwell Rd and North Kensington declined slightly between 2010 and 2011.

Figure 2:15 Trends in Annual Mean Carbon Monoxide Concentrations Measured



⁴ mg (milligram) = one thousand of a gram

2.2.9 1,3-Butadiene

Measurements should meet the 2003 objective as a running annual mean of $2.25\mu\text{g}/\text{m}^3$. 1,3-butadiene is not monitored in the borough, although data are collected by Defra. Whilst this is limited to a few sites within London, it can be used to indicate local levels (see table 2.12 below).

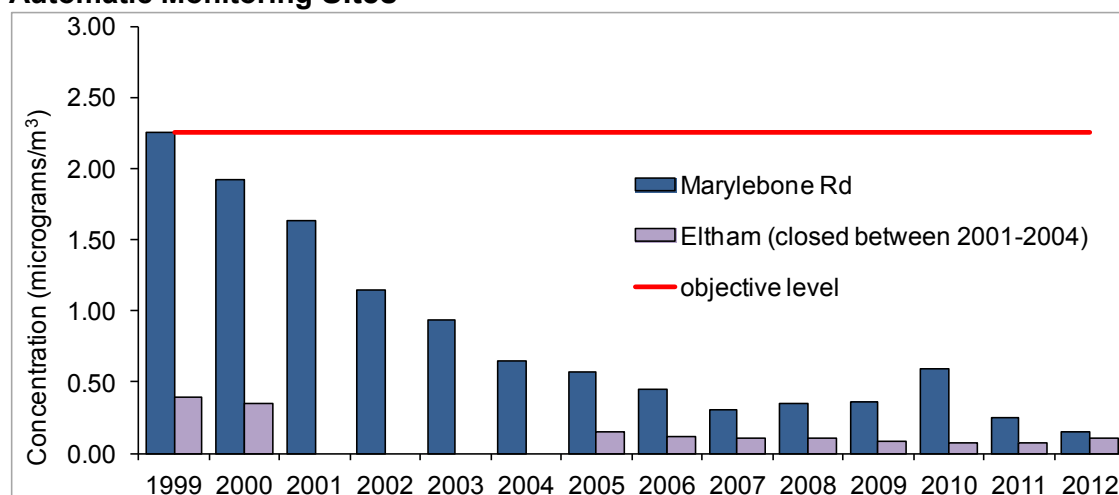
Table 2.12 Levels of 1,3-butadiene (maximum annual running means) in London

Year	Site	Annual Mean ($\mu\text{g}/\text{m}^3$)	% Data Capture
2001	Marylebone Rd	1.12	86
	Eltham	-	-
2002	Marylebone Rd	0.95	96
	Eltham	-	-
2003	Marylebone Rd	0.64	92
	Eltham	-	-
2004	Marylebone Rd	0.57	81
	Eltham	0.15	91
2005	Marylebone Rd	0.45	89
	Eltham	0.11	94
2006	Marylebone Rd	0.45*	71
	Eltham	0.09	80
2007	Marylebone Rd	0.31	78
	Eltham	0.10	83
2008	Marylebone Rd	0.35	80
	Eltham	0.10	82
2009	Marylebone Rd	0.36	83
	Eltham	0.08	85
2010	Marylebone Rd	0.59	71
	Eltham	0.08	80
2011	Marylebone Rd	0.24	44
	Eltham	0.06	64
2012	Marylebone Rd	0.15	90
	Eltham	0.10	88

*Incomplete data. Data in italics is provisional

Data for two sites with long term monitoring are shown in Table 2.12. The running annual mean concentration has been met at both locations since 1999. Overall levels have declined at these sites though an increase was measured at Marylebone Road (roadside) site between 2008 and 2010. Levels in 2012 continue to be low. These results indicate that there are unlikely to be any exceedences of the 2003 objective in the borough.

Figure 2:16 Trends in the Maximum Running Annual Mean 1,3-Butadiene Measured at Automatic Monitoring Sites



Summary of compliance with AQS objectives

Kensington and Chelsea Council has examined the results from new monitoring in the borough and other comparable sites over the last twelve months. Preliminary monitoring at the borough's five continuous monitoring sites shows concentrations of sulphur dioxide, benzene, lead, carbon monoxide and 1,3-butadiene meet the relevant air quality objectives.

Continuous monitoring shows that exceedences of the annual mean NO₂ objective level have occurred at all sites apart from the North Kensington background site. Exceedences of the hourly mean objective vary from site to site, from one at North Kensington to 339 at Knightsbridge (compared to the 18 exceedences permitted).

Monitoring of PM₁₀ at our three sites shows that these have all met the annual mean objective since 2008, and two sites met the daily mean objective level. However one site continues to exceed the daily mean objective. It is therefore possible that there are other locations in the borough that may be close to or above the daily mean objective level. Therefore no changes are proposed to the air quality management order.

Ozone also exceeded the daily maximum 8 hour mean objective but that does not form part of LAQM responsibilities.

3 New Local Developments

3.1 Road traffic sources

The redevelopment of the Earls Court (and West Kensington) Opportunity Area which includes a new internal road network area has been consented. No other new roads are currently planned.

3.2 Other transport sources

The Council is campaigning for a Crossrail station to be built in North Kensington. The case for a new station is strong and the Council has committed to underwrite the £33m construction costs. Currently a station is proposed at Old Oak Common.

3.3 Industrial sources

The Council has been notified about a proposal to install a pyrolysis and gasification plant at Imperial College. The plant will generate energy by pyrolysis/gasification and the thermal oxidation of waste arising from the South Kensington Campus. It is intended that it will process 400 tonnes of mixed municipal waste and 150 tonnes of clinical waste annually and will run continuously. The process will be classed as a small waste incineration plant and must have a permit to operate.

3.4 Commercial and domestic sources

We are currently undertaking a survey of larger premises that have been identified as likely to operate biomass and combined Heat and Power (CHP) plant. Biomass boilers are discouraged in the borough. Currently applications for major sites do not generally include proposals for biomass boilers. There are no new/newly identified commercial or domestic sources which have not been considered as part of a planning application. However CHP plant, which is not currently included in the requirements for updating and screening assessments, is being widely installed in existing and new buildings resulting in power generation in urban areas which emit much higher levels of NOx emissions per kWh than gas boilers.

3.5 New developments with fugitive or uncontrolled sources

There have been no new/newly identified uncontrolled sources in the borough.

Kensington and Chelsea Council confirms that there are no new or newly identified local developments which may have an impact on air quality within the Local Authority area.

4 Local / Regional Air Quality Strategy

In 2012, consideration of a draft Air Quality Policy Statement was deferred while the question of possible breaches of the European Air Quality Objectives was being decided. After a prolonged interval, at the beginning of May this year the Supreme Court ruled that the UK Government is failing to meet the objective for nitrogen dioxide (NO₂) and that subject to certain legal details being resolved, the Government is liable to face fines for ongoing infringements.

Until we learn the extent to which the Government will commit to taking substantial action to tackle the air pollution problem in London, and how much responsibility will be passed to regional and local government, it is difficult to give an air quality policy statement sufficient focus. Now that the Council's services are being organised on a bi-borough basis with the London Borough of Hammersmith and Fulham, advice on air quality policy is being discussed at officer level with our colleagues in the neighbouring borough, to prepare for Government announcements on the direction that air quality management may take in order to satisfy the legal requirements. This will ultimately inform a revised air quality policy statement which will be combined with the launch of the new five year Air Quality Action Plan in 2014.

5 Planning Applications

The Council ensures that air quality is a consideration from the early planning stages. Developers are asked to follow the guidance within the Council's Air Quality Supplementary Planning Document (SPD), adopted in June 2009 to ensure that our preferred approach is taken (for more information on the Council's planning policies see Section 6).

Major planning applications which have been granted permission during April 2012 – March 2013 and are subject to conditions or section 106 agreements that require a low emission strategy and that follow the best practice guide for demolition and construction phases include:

1. Revised Earls Court (and West Kensington) opportunity area
2. Silchester Garages
3. Kensington Academy and Leisure centre
4. Cremorne Wharf
5. Middle Row School

Other developments include Cromwell Hospital, Southern Row, 316-324 Kensal Rd, Cheval Place, Crowthorne road, Hans Place. We also include observations for adjoining applications in neighbouring boroughs.

Requests for the discharge of conditions on major sites are also a significant process which involves discussions with developers to ensure that low emission strategies are implemented, and that methods to control and monitor construction impacts are in place. In 2012/2013 this included the following sites: Former Commonwealth Institute, 536 Kings Road, Liscartan and Granville House, The Kensington Academy and Leisure Centre Site, Silchester Garages, Kingsgate House and Alpha Place. A number of development sites (that have been granted permission in previous years) are also the subject of on-going review of real time monitoring data. These include re-developments at: Holland Park School, De-Vere Gardens, Wornington Green, Chelsea Manor Street and the former Charles House.

In addition, to ensure air quality considerations are fully incorporated in the development proposals, including the energy strategy (which can have a considerable impact on air quality), early discussions are essential. To assist with this, we respond to site specific Supplementary Planning Documents, scoping reports, and take part in pre application discussions and provide written comments. The pre-application discussions that take place before formal applications are submitted for major and strategic redevelopment schemes can be useful to highlight the Council's position and drawing the developer's attention to the Council's AQ SPD. For example, in 2012/13 this included North Pole Depot, Crowthorne road, Southam Street and Maclise road.

In the last twelve months, air quality (along with other environmental impacts) has been given considerable attention to the proposed Thames Tunnel scheme.

6 Air Quality Planning Policies

The Council's Core strategy was adopted on the 8th December 2010, it sets out the vision, objectives and detailed spatial strategy for future development in the borough. The Council has a number of air quality objectives contained in Policy CE 5. „The Council will carefully control the impact of development on air quality, including the consideration of pollution from vehicles, construction and the heating and cooling of buildings. The Council will require development to be carried out in a way that minimises the impact on air quality and mitigate exceedences of air pollutants.“

The Council's latest Air Quality SPD adopted in 2009, sets out our requirements for reducing air pollution emissions from new development, conversions and change of use. The SPD is a significant material planning consideration when determining applications for planning permission and forms part of the Local Development Framework.

In assessing the potential impacts from the operational phase of developments, the Council is requesting low emission strategies to be submitted rather than considering air pollutant concentrations alone. The developer must submit a strategy for reducing emissions from all areas of the new development including transport, heating and energy use. The extent of the measures will depend on the location, size and traffic generated by the development and will need to be agreed by the Council. However a significant conflict that is emerging is the push for decentralised energy which is encouraging plant and novel combustion methods which generate more local pollution.

Developers are also expected to assess the impacts that demolition and construction works may have on local air quality by undertaking a risk assessment using the London Councils' Best Practice Guidance and expected to include appropriate measures in their construction management plans.

With our Planning colleagues we have also introduced an air quality action fund (as part of Section 106 agreements) as a means to counteract adverse effects of new developments, although our first priority will be to steer developers towards technology that reduces emissions. We currently have approximately £13K available to us from s106 contributions with a further £20K in the pipeline.

Policy CE5

To deliver this the Council will:

- a. require an air quality assessment for all major development;
- b. resist development proposals which would materially increase exceedences of local air pollutants and have an unacceptable impact on amenity, unless the development mitigates this impact through physical measures or financial contributions to implement proposals in the Council's Local Air Quality Management Plan;
- c. require that the Code for Sustainable Homes and BREEAM assessments obtains all credits available for reducing pollution and emissions, and improving air quality;
- d. resist biomass combustion unless its use will not have a detrimental impact on air quality.

In January 2012 Cabinet decided that RBKC would become a Community Infrastructure Levy (CIL) charging authority. It will allow financial contributions which will fund a wide range of infrastructure in the Borough to be collected when planning permission is granted. Measures to improve air quality are to be sought.

With the publication of the National Planning Policy Framework our policies and SPD may need to be reviewed to ensure that the policies are aligned. A draft Policy for Public Consultation on a Partial Review of the Core Strategy was undertaken before Christmas.

7 Local Transport Plans and Strategies

The Mayor of London published his Transport Strategy in May 2010 and asked all London boroughs to produce Local Implementation Plans (LIPs) to show how they will support the Strategy locally. Our LIP, which the Mayor of London approved in October 2011, sets out how we intend to implement the Mayor's Transport Strategy, as well as our other local transport-related priorities. We have prepared our LIP in line with LIP Guidance from Transport for London who will be assessing all LIPs on behalf of the Mayor of London.

Transport Objectives - Our Transport Objectives reflect local issues and priorities as well as the goals of the MTS and the challenges identified in TfL's evolving Sub-Regional Transport Plans. We developed them by reviewing the objectives of our current key strategies, such as our Local Development Framework (LDF) Core Strategy, our Community Strategy, our Air Quality Action Plan and our Climate Change Strategy.

Our Objectives are set out below:

- Improve accessibility to places and services, especially for those with special mobility needs
- Make it easier for residents to choose walking, cycling and public transport over private car ownership and use
- Improve the quality, reliability and inclusivity of public transport
- Reduce transport-related air pollution and carbon dioxide emissions
- Manage on-street parking and loading to achieve a better balance between the competing demands on kerb-side space
- Improve journey time reliability for all road users
- Improve the appearance and efficiency of our streets and places, and make them inclusive for all
- Reduce the number and severity of road accident casualties

An [Executive summary](#) of the document is available on the Council's Web Pages.

Funding through the LIP continues to be used for a number of air quality projects, including air quality monitoring along the Earls Court Road and Cromwell Road (monitoring PM_{2.5}). In 2012-13, the LIP provided match funding (approximately £80K) for a number of projects supported by Defra Grants, GLA CAF2 funds and the Council's own budget. This includes schools and business engagement projects along with some analysis on particular transport related issues. Further information on these will be included in the next progress report.

8 Climate Change Strategies

In 2008, the Council adopted a Climate Change Strategy⁵ covering seven years from 2008 – 2015. The Council has a Climate Change Programme, to implement the strategy. The focus is to „lead by example“, looking at our own internal carbon management, though we also remain committed to working with communities.

The Council has joined The Carbon Trust’s Local Authority Carbon Management Programme. With the Trust, we have established our baseline and an action plan. This major commitment led to the publication of the Carbon Management Plan in 2009⁽⁶⁾. This Carbon Management Plan commits the Council to targets of reducing CO₂ by 20 per cent by March 2014, 30 per cent by 5 March 2016 and by 40 per cent by March 2020 from 2007/08 level. Following the 2011/12 financial year, the Council had reduced emissions 12.9 per cent from the 2007/08 baseline.

The Council is committed to playing an important role in national and regional programmes and has set targets to help in the delivery of this agenda. There were four main indicators relating to climate change (NI 185, 186, 188, 194), but these were abolished by the new Government in 2011. Although NI186 data will be continued to be monitored and published by the Government, NI 185, 188 and 194 are no longer being requested by the Government to be monitored and published.

Emissions related indicators (NI 185, 194) have significant overlap with the data requirements of other schemes such as CRC Energy Efficiency Scheme and the council’s internal carbon management. In order to minimise any duplication of work the Council is currently reviewing the way we collect and report data to establish a more efficient way of managing the work. Additionally the Council recognises NI188, which is about coping with the effects of climate change, provides a useful framework for the Council to continue its work on adaptation with some limitations. Therefore the Council is also reviewing this indicator and will announce the modified framework to replace NI188 that’s tailored to the Royal Borough.

In December 2011 the Council installed 208 solar photovoltaic panels with a capacity of 50 kW on the roof of Kensington Town Hall. To date, this installation has produced more than 55 MWh of electricity, saving more than 33 tonnes of CO₂. Due to the Government-sponsored Feed In Tariff programme, the solar array also provides income for the Council. Work also continues to be done to make Council buildings more energy efficient. The new Kensington Leisure Centre is being built to BREEAM Excellent standards for energy efficiency. Our main contractors are also doing their part to reduce carbon emissions. This includes our waste management contractor which has made significant reduction in fuel consumption in the last two years.

⁵ RBKC (2008) The Climate Change Strategy 2008-2015
<http://www.rbkc.gov.uk/environmentandtransport/climatechange.aspx>

9 Implementation of Action Plans

Summary and conclusions for year four of the current five year plan

With only one year left to complete the current five year action plan and in the light of experience gained over the last four years, our thoughts are turning to where efforts should be concentrated in the new action plan which will be launched in the spring of 2014. The current plan has achieved some notable successes which will be highlighted in the final review.

Another year shows air quality conditions are little better (see earlier review conclusions) with a few signs of improvement such as the slight decrease in PM_{2.5} concentrations, and the substantial reduction in pollution levels on Exhibition Road since the introduction of the new streetscape.

However looking back over the past year there has been progress with most plans, with only one or two remaining static such as the lack of expansion in the car club. There have certainly been encouraging advances in tackling static emissions.

We now have much more data on the characteristics of heating plant in the borough produced by the boiler and CHP plant survey, which will enable future action to be more focussed particularly with regard to combined heat and power (CHP). Our reservations about the proposed use of biomass for boilers in the Commonwealth Institute redevelopment led to the proposals being withdrawn.

Progress with the „space programme“ upgrading the energy efficiency of Kensington Town Hall with photo-voltaic electricity generation and substantially improved insulation is realising savings in energy use with financial, air quality and climate change benefits. Council redevelopments elsewhere now have low emission (NOx) boilers and in some cases air and ground source heat pumps.

As boilers in TMO buildings are replaced, low emission “SEDBUK” boilers are being selected. Continuous improvements are being made to improve energy efficiency through better loft and cavity wall insulation. Further funding has been secured for installing heating and insulation for vulnerable householders and work is underway to help residents take advantage of the new Green Deal scheme by providing funding for assessments and running pilot projects.

Turning to vehicle emissions, the Council’s reorganisation of waste collections has resulted in a saving of 7,300 gallons of diesel fuel which is being reinforced by engine modifications and a device called Supatrak which monitors driver behaviour to encourage greater fuel economy. For residents’ parking, charges have been increased by 33 percent for the most polluting vehicles (Band 7) to encourage a change to smaller engine sizes. There are now two on-street electric vehicle charging points and a trial of an electric van for use in the parks is in progress.

The Council has been particularly active in encouraging cycling. The Mayor of London’s cycle hire scheme continues to develop with more docking stations in the borough (and

expansion into Hammersmith and Fulham and Wandsworth). Promotional work with schools has encouraged an increase in pupils cycling, or scooting to school from 15 to 19 per cent and resulted in 25 schools receiving TfL's travel accreditation and one school achieving gold level. This year even more training courses have been given in cycling proficiency, maintenance and repair. Although this has not been reflected in an increase in staff cycling to work, it is hoped that the Mayor of London's ambitious plans for a cycling grid of „super-highways“ and quiet-ways“ across the capital will induce more staff and other commuters to cycle to work and overcome their understandable safety fears.

Despite the recession, the Council successfully bid for £56,375 of funding for air quality related work from Defra grant funding which was match funded by the GLA, LIP and our own funds. In addition we have received £13,000 from developers through section 106 agreements to support air quality measures. Some of the funding has been successfully used to raise awareness of air quality issues by engaging businesses and schools in air quality improvement initiatives. So far we have targeted boiler renewal, taxi use, travel planning and consolidating deliveries. The commitment of businesses to take practical action means this work will be carried forward by the consultants who undertook the preliminary engagement. For schools we have been exploring opportunities to install green walls to reduce exposure to air pollution. Work on this continues.

The review of a wide range of existing and promising measures that are available to local authorities has resulted in a short list of 14 actions assessed for feasibility and cost effectiveness. The Council is studying this to help it decide on the kind of measures that should be included in the next five-year air quality action plan. Business and school engagement to stimulate practical action at local level is likely to be high on the list. The review also identified the provision of cycling infrastructure and expansion of car clubs as being most effective in driving local action.

Looking to the future, now that the public health function has been taken on by local authorities, fresh opportunities are being explored to raise the profile of the health impact of poor air quality including the damage to children's lung development. The Director for Environmental Health now sits on the local Health and Wellbeing Board, chaired by the Director of Public Health, enabling him to raise issues at a high level and coordinate joint work to tackle the local causes of air pollution. Regionally we are benefitting from increasing support from the Mayor of London. The ultimate success of that work will depend on continuing and perhaps increased central government support. The threat of fines by the European Court for breaching air quality objectives should focus attention on the economic and health damage being inflicted by the excessive levels of nitrogen dioxide and unacceptable levels of fine particles in inner London, and re-invigorate national action to remedy the situation.

Table 9.1 Action Plan Progress 2012-13

No	Measure	Focus	Lead	Planning phase	Implementation phase	Indicator	Target annual emission reduction	Progress in last 12 months	Estimated completion date	Comments relating to emission reductions
1	Review scope for PM _{2.5} monitoring	Review the scope of the current monitoring network to account for the increasing concerns for health effects of fine particles (PM _{2.5})	LA	2009	2010	At least one road side PM _{2.5} monitoring station in the borough by Dec 2010	N/a	PM _{2.5} monitoring has been undertaken at Cromwell Road (roadside) monitoring station since August 2009. The annual mean concentration was 14.8µg/m ³ in 2012. This is a slight reduction from 16.6µg/m ³ which was measured in 2011. Results are significantly lower at Cromwell Road than the Marylebone Rd site (a kerbside location). This is likely to be due to a combination of the difference in proximity to the kerb and the types and numbers of vehicles using the roads.	Installation was completed in August 2009. Monitoring is on-going	The monitoring of PM _{2.5} will help the Council in developing emission reduction measures specific to PM _{2.5} .
2	Public Health Collaboration	Work to strengthen collaboration with local health organisations and coordinate efforts in tackling pollution related illness and health inequalities by raising awareness of asthma and indoor air quality and the dangers of second-hand smoke.	LA	2009-2010	2009-2014	A number of joint initiatives on asthma and indoor air quality covering issues such as smoking, carbon monoxide and boiler emissions.	N/a	<p>Links with Breathe Easy groups were maintained.</p> <p>Smoking cessation and the smoke free service promotional activities are now the responsibility of the Public Health Team and are undertaken by a Tri borough Smoke free homes officer.</p> <p>We continue to attend events and distribute our Indoor Air Quality leaflets where opportunities arise. Promotional materials were distributed to local community groups at a Health and Well Being event organised by the Council.</p> <p>TfL produced a series of posters to discourage idling engines which the Council distributed and displayed in Kensington Town Hall and Chelsea Old</p>	Ongoing, unless otherwise stated	N/a

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								<p>Town Hall. (See action 20 for further details).</p> <p>The Council, in partnership with four other London boroughs, has made successful bids for Defra and GLA Clean Air for London funding. The Council is currently co-ordinating two projects: A schools engagement project (Clean Air for Schools Zones) and a business engagement project. The fund will be used for local air quality improvement initiatives such as green infrastructure in schools, a schools educational programme and the promotion of air quality issues to the local and business community.</p>		
3	Raising awareness	Continue to raise awareness of air pollution and its effects on health and promote air quality issues by participation in schemes such as airTEXT and Walkit.com, and working with schools.	LA	2009	2009-2014 (ongoing)	<p>No. of airTEXT users to reach target of 300.</p> <p>Provide presentations and awareness workshops to schools and community groups.</p> <p>Establish links with all schools in the borough.</p>	N/a	<p>The Council continues to implement this plan. This year we attended a Health and Well Being event to promote the airTEXT and walk-it.com services and the London Air webpage link to daily pollution data.</p> <p>Officers from our Transportation Department continue to promote idling engine awareness in schools through school transport plan initiatives. Awareness is focused on the contribution idling can make to poor air quality and its impact on asthma.</p> <p>RBKC has continued to work in collaboration with other London Boroughs and CERC to support and develop the</p>	<p>Monitoring of airTEXT subscription numbers ongoing until otherwise stated.</p> <p>General promotional opportunities will be ongoing (2009-2014).</p>	N/a

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								<p>airTEXT service and its promotional material. There has been a change to the method of subscribing (twitter feeds, Apps etc) and existing members have had to unsubscribe and then re-subscribe. Unfortunately, it is not yet possible to record the number of people subscribing to each Local Authority using the new methods of subscription so this total number is now unknown. Prior to the change, 255 people were known to have subscribed within RBKC - 13 recorded new subscribers during 2012/13.</p> <p>The Council's air quality web pages have been updated with the creation of several FAQs page. Five priority indoor air quality pollutants have been identified. The „Smoke Control and the Clean Air Act“ webpage has also been updated with information about authorised fuels and exempt appliances.</p> <p>The Council attended a pre Olympics event press launch to promote the new air TEXT website, leaflet and poster redesign to reflect new modes of communication. The launch also promoted the creation of Daily Health Bulletins with daily UV index, air pollution index, pollen and minimum and maximum temperature information.</p> <p>CERC will continue to send the Daily</p>		

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								<p>health Bulletins to all London Boroughs to be cascaded out to other public health organisations and workers. An page on the Council's intranet was created to upload and distribute Daily Health Bulletins to Council staff for personal use and to be cascaded to partner organisations outside the Council.</p> <p>New airTEXT business cards have been developed. These have been distributed to schools and the local community and link to air pollution forecasts and daily health bulletins.</p>		
4	Council and contractors' fleet	Improve emissions from Council and contractors' fleet by requiring the latest Euro Standard, where possible, increasing the number of alternatively fuelled "low emission" vehicles, fitting abatement equipment and providing green driver training.	LA	2009	2009-2014 (ongoing)	Achieve the emission reduction target from the NI194 baseline toolkit (2008/09).	8%	<p>In line with the Council's "Commercial Fleet - Managers and Drivers Manual", the use of an electric van is being piloted by the Council, to provide services for the Parks in the Borough. If the project is successful, it could lead to the lease of more electric vehicles.</p> <p>The Council's Carbon Plan for SITA is now being implemented. The reorganisation of the refuse collection service has reduced the amount of fuel used by 7,300 gallons. Additionally, all waste management vehicles have had their engines remapped to ensure they all operate at an optimum level. Vehicles have been fitted with CMS Supatrak fuel saving technology which monitors and manages driver behaviour, which increases fuel</p>	2014	<p>Use of the electric van by our parks contractor, is likely to have reduced NO_x and PM₁₀ emissions.</p> <p>As part of the Carbon Plan that was produced for SITA, rerouting and reduced collections have saved 170t of CO₂ per annum. This project is also likely to have led to a reduction in NO_x and PM₁₀</p>

No	Measure	Focus	Lead	Planning phase	Implementation phase	Indicator	Target annual emission reduction	Progress in last 12 months	Estimated completion date	Comments relating to emission reductions
								<p>efficiency and delivers more miles per gallons and lowers the carbon and NO_x and PM₁₀ emissions.</p> <p>The Council is continuing to keep up to date with advances in low emission vehicle technology by attending relevant events when they come up.</p>		emissions.
5.	Council staff travel	Continue to improve emissions from Council staff commuting and business travel and maintain an up to date Council Green Travel Plan.	LA	2009	2009-2014 (ongoing)	Green Travel Plan in place	N/a	<p>The Council's Travel Plan (2009-2012) reviews current modes of staff travel and sets measures and targets for increasing sustainable transport, e.g. cycling.</p> <p>Since 2008 the proportion of staff driving to work has decreased from 13.4 per cent to 5 per cent, but no further reduction has occurred in the past two years.</p> <p>The proportion of staff cycling to work as a main mode increased from 5.1 per cent (2008) to 7 per cent (2010) but decreased to 6 per cent in 2011 and remained the same in 2012. A growing barrier to choosing cycling may be the larger number of staff with a commuting time of more 60 minutes (and more than 90 minutes in some cases), suggesting a greater distance from work. Also in common with most London commuters, there is a justifiable perception among staff that cycling on the capital's main roads is dangerous. A number of cycling fatalities during the past year has reinforced this view.</p>	<p>The Travel Plan is in place- this measure is complete.</p> <p>The annual staff travel survey was carried out in Summer 2012.</p>	<p>A car user review has been carried out to look at ways to reduce Council CO₂ emissions in three main areas; fleet, car user allowances and taxi use. The findings continue to be implemented.</p>

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								The Council's staff benefit of a zone 1 and 2 travel card encourages staff to use public transport, but the cycling support schemes e.g. cycle training and cycle maintenance sessions do not seem to be inducing more staff to cycle to work.		
6.	Council and contractor buildings	Improve emissions from Council owned and/or leased premises by improving energy efficiency and increasing the use of renewable technology.	LA	2009-2010	2009-2014 (ongoing)	NI194 toolkit Reduction target in emissions from 2008/09 baseline level. On-site renewables in at least one Council building	N/a	<p>The voltage optimisation units (VOU) installed at Chelsea Old Town Hall, the Council Offices Pembroke Road and Kensington Town Hall have continued to reduce electricity consumption by over 10 per cent.</p> <p>The refurbishment of Kensington Town Hall is ongoing and will deliver better and more energy efficient offices. The refurbishment works are planned to be completed in 2014.</p> <p>Energy efficiency in schools is being addressed through a low cost/no cost pilot project with 9 schools that will deliver (by June 2013) a minimum of 10 per cent carbon reduction in each of these schools. Other projects with schools are in the pipeline for 2013/14.</p> <p>Since the Climate Change Programme began in 2008, various street lighting projects have been implemented to reduce energy consumption. New technology has been the key to reducing energy consumption such as the use of</p>	2009-2014 (ongoing)	<p>The energy efficiency improvements being made within Council Offices and schools in the borough will result in reductions of air pollutant emissions as well as reductions in carbon emissions.</p> <p>Although the improvements in street lighting aren't directly reducing air pollutant emissions</p>

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								<p>photocells to turn street lights on and off and replacement with LED's. So far there has been a reduction of 30 per cent of the Borough's street lighting carbon emissions from the 2007/2008 baseline. This is over 3000 tonnes of carbon.</p> <p>The Borough is in the top two best performing London boroughs when it comes to monitoring and reducing energy use and carbon emissions. This is based on the overall CRC table recently published by the UK Environment Agency. The Royal Borough is rated 55th overall out of over 2000 of the biggest private and public organisations in the UK.</p> <p>The amount of energy used by each main Council worksite and school is available for staff and public to view on our internal intranet site here: http://www.rbkc.gov.uk/environmentandtransport/climatechange/carbonmanagement.aspx</p>		in the borough, the reduction in energy consumption will reduce the amount of air pollution released in the location of the electricity generation.
7.	Social and TMO housing stock	The Council will assess its social housing and TMO building stock as part of work on NI194 and set targets for reducing emissions	LA	2009-2010	2010	Baseline year data collected and entered into the NI194 toolkit and target set.	N/a	<p>There is no longer a requirement for NI 194 to be reported.</p> <p>All domestic boiler replacements within TMO properties are SEDBUK A rated with low NO_x and CO₂ emissions.</p> <p>When central boiler plant is replaced the most energy efficient and low emission boiler is sourced for the available budget.</p>	December 2011	

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								Data is currently being collated on how many boilers have been replaced so far and will be reported in the next update.		
8.	Air Quality SPD and LES	Adopt a revised Supplementary Planning Document (SPD) which requires large developments to submit a Low Emission Strategy and implement mitigation measures in order to offset impact of the development.	LA	2009-2010	2009-2014 (ongoing)	Air Quality SPD adopted and requirements being implemented	N/a	<p>We request low emission strategies or set conditions for low NOx boilers and combustion plant assessment for all major applications. We also made observations on applications that are located in close proximity to the borough boundary.</p> <p>Negotiations with developers have led to a number of developments agreeing to the fitting of abatement equipment and in also agreement to install renewable technologies such as photo voltaic panels and air source heat pumps instead of CHP plant. Two of the Council's own developments have opted for high efficiency low NOx boilers / gas-fired absorption heat pumps with renewable technologies such as photovoltaic panels thereby reducing their emissions of NOx compared to CHP plant. A biomass boiler has also been removed from a new development following discussions with the developer.</p>	<p>Revised SPD was adopted in June 2009. Action complete</p> <p>Requests for low emission strategies are ongoing.</p> <p>Further revision of the SPD is likely to be required as a result of changes to the NPPF</p>	<p>Studies undertaken by Imperial college and AEA have shown potentially significant increases in NO_x emissions (of 4.3µg/m³) in central London as a result of the adoption of the decentralised energy strategy. Therefore significant reductions in emissions from new developments can be secured where developers agree to meet carbon targets by using more energy efficiency measures and non combustion renewable technologies.</p>
9.	Air Quality Action Fund	Make use of S106 obligations to	LA	2009-2010	2009-2014	Section 106 Planning	N/a	The Council's Section 106 Planning Obligations SPD sets out the approach,	The Section 106	N/a

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		require large new developments to make a one-off financial contribution to an air quality action fund.			(ongoing)	Obligations SPD adopted and contributions recorded.		<p>policies and procedures in respect of planning obligations. The document outlines the standard contributions for air quality and justifies the approach.</p> <p>To date, contributions for air quality have been sought and we currently have £13K available to us at the moment and a further 20K is in the pipeline. We are currently in discussions to include air quality monitoring and action plan projects in the planning infrastructure delivery plan which will inform the community infrastructure levy and how this money is spent.</p>	<p>Planning Obligations SPD was adopted in August 2010</p> <p>Action complete Requests for financial contributions will be ongoing.</p>	
10.	Green Developers Guide	Produce a Green Developers Guide which will provide guidance to developers on energy efficient building design and use of renewable technology.	LA	2009	2010	Green Developers guide in place. Energy assessment submitted with proposed developments.	N/a	The Green Developers guide was removed as an action from this plan after the completion of the Builders Advice section (see address in plan 11)	N/a	N/a
11.	Construction Emissions	Continue work to minimise emissions from construction sites by requiring all developers to follow the London Council's (2006)	LA	2009	2009-2014 (ongoing)	Planning conditions imposed on all large developments, requesting construction risk assessments.	N/a	Construction risk assessments continue to be requested for large developments. The contractors' construction method and environmental management statements are examined to verify that a suitable approach to dust and air quality management will be adopted (in line with the Mayor of London's Guidance).	2009-2014 (Ongoing)	

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		<i>Best Practice Guidance – The control of dust and emissions from construction and demolition as a minimum standard.</i>						<p>The Council's web based best practice guidance tool for builders and developers, covering air quality can be referred to using the link: http://www.rbkc.gov.uk/environmentandtransport/airquality/adviceforbuilders.aspx</p> <p>On planning applications, the Council adds a condition to permissions granted to ensure the development is assessed in accordance with the Mayor's Best Practice Guidance.</p>		
12.	Energy Efficiency	Continue to promote energy-efficiency measures in homes in the borough, within the Council's HECA and Affordable Warmth work.	LA	2009	2009-2014 (ongoing)	<p>100% RSL and TMO homes in the borough meet "decent homes" thermal efficiency standards.</p> <p>Year on year increase in the number of qualifying households taking grants.</p>	N/a	<p>This information is no longer collected by the Council; the latest figures from the Homes and Communities Agency show that 1.8 per cent of Registered Providers total housing stock in London did not achieve the Decent Homes standard.</p> <p>The TMO achieved the <i>Decent Homes</i> standard in 91 per cent of their properties in 2012-13. They also continue to improve thermal efficiency by undertaking loft and cavity wall insulation projects and communal boiler upgrades.</p> <p>A number of schemes are available to help people improve the energy efficiency of their living accommodation:</p> <p><i>Kensington and Chelsea 'Keep Warm Grant'</i> Financial assistance is available to homeowners and private tenants on</p>	<p>Uncertain exactly when 100% of RSLs will be achieved but will continue to work towards this.</p> <p>TMO continue to work towards meeting 100 per cent of stock meeting DH standard.</p> <p>The Keep Warm grant has been</p>	<p>The energy efficiency measures and heating upgrade work carried out with funding from the various grants available will be reducing local emissions of NO_x and PM₁₀ as well as CO₂.</p>

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								<p>benefits or low income to upgrade or install heating and insulation.</p> <p>The Council, in partnership with four other West London boroughs, made a successful bid to the Department of Energy and Climate Change for funding for two projects:</p> <p><i>(i) Fuel Poverty Fund</i> This is providing up to £140,000 for works to install heating and insulation in the homes of vulnerable and elderly residents in the borough. Works are currently underway and the money should be spent by the end of May 2013.</p> <p><i>(ii) Green Deal Fund</i> This is providing funding for up to 60 free Green Deal Assessments for residents of the borough. This will benefit them as they will have a greater understanding of works that will make their homes more energy efficient and access to funding to make those improvements.</p> <p>We will also be working with Octavia Housing to fund Green Deal pilot projects in two local properties. These will be used as case studies to help promote the Green Deal to residents throughout West London.</p> <p>The Council will use the Green Deal Pilots to inform their own policy on Green</p>	<p>retained despite the reduction in the overall grants programme and will continue into next year.</p> <p>May 2013</p> <p>May 2013</p> <p>May 2013</p> <p>Ongoing</p>	

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								<p>Deal and the Energy Company Obligation to ensure that we can meet the needs of our residents.</p> <p>The „RE:NEW energy saving scheme helped reduce CO₂ emissions from more than 1300 homes in the borough. Residents were offered free home visits from energy assessors Residents were given 2,194 energy saving light bulbs, 755 standby switches, 769 energy display monitors and 815 water saving showerheads.</p> <p>The Healthy Homes project continues to provide assistance to the elderly and vulnerable in the borough. This includes installing or updating heating systems and providing insulation and draught proofing.</p> <p>The Council still offers Smart Meters on loan from Kensington Central Library; these help people to identify how much energy is being used at home.</p>	<p>This current phase of the RE:NEW scheme has come to an end but advice and assistance are still available through the Healthy Homes scheme</p> <p>Ongoing</p>	<p>It is estimated that the RE:NEW scheme fitted measures in RBKC that will save up to 218,108 tonnes of CO₂ production.</p>
13.	Borough-wide Boiler Survey	Research emissions associated with existing heating plant in RBKC by carrying out a borough- wide boiler survey	LA	2009-2011	2011	Compiling an emissions inventory	N/a	A survey of large boilers and CHP plant in commercial buildings in the borough has been carried out this year. The size and output of each plant has been recorded, along with make and model, use and mitigation measures. The data will be used to gain an understanding of the likely emissions from large CHP plant in the borough, which will inform future		

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								policies relating to the installation of new CHP units. The information gathered shows that CHP plant is widely installed in many of the borough's larger buildings and supports the findings of a report commissioned by the borough into CHP. The findings have implications for the dispersal of emissions from such plant where pre-existing chimneys are used and the higher emission NOx rates from such plant.		The findings have implications for the dispersal of emissions from such plant where pre-existing chimneys are used. Also emissions of NOx are significantly higher than for CHP compared to efficient new boilers.
14.	Integrating air quality and climate change measures	Aim to identify the most effective emission reduction measures which provide the greatest benefits in terms of CO ₂ and air quality emissions.	LA	2009-2010	2011	Produce a NI194 toolkit/ policy changes	N/a	NI194 has been withdrawn. A consultant was commissioned to review the cost and benefits of individual measures that could be taken to improve air quality in central London. The findings of the review highlighted increasing cycle infrastructure and promotion as having the biggest CO ₂ , No _x and PM ₁₀ saving, (around 150,000, 249 and 18 tonnes/yr respectively) although this would be very expensive to implement. The second most significant saving of CO ₂ and air pollutants could be via the expansion of car club schemes (nearly 27,000 tonnes/yr), with campaign days saving slightly less (20,000 tonnes/yr).	2011	Each air quality measure is assessed for benefits per tonne CO ₂ reduced (NPV), £/tonne and the total CO ₂ reduction in tonnes. Figures are being finalised and will be reported next year.

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								<p>Apart from fitting DPF's on taxis, vertical exhausts on buses and Euro V requirements and engine reprogramming for buses, all the measures would lead to a reduction in CO₂.</p> <p>The following measure suggested in the report is being progressed:</p> <p>Engaging local businesses and schools to reduce their air pollutant emissions</p> <p>Environmental Health now attend the quarterly Climate Change Programme Board meetings, and this will lead to more joint working around the Council, which will result in the most effective measures for both air quality and climate change being implemented.</p>		
15.	Controlling Emissions from Biomass, Biofuel and CHP	Make use of planning conditions and obligations in order to set requirements for controlling pollutant emissions from biomass and biofuel boilers and CHP.	LA	2009	2009-2014 (ongoing)	Planning conditions or obligations.	N/a	<p>A detailed air quality assessment with dispersion modelling is requested for all major developments proposing to use biomass and biofuel. In addition discussions are held with developers to ensure that alternative non combustion renewable technologies are considered.</p> <p>Biomass was original proposed for the Commonwealth Institute but discussions with the Council have lead to the removal of proposals for biomass boilers in the new development. However the push for decentralised energy is resulting in significant number of CHP plant being</p>	2014	Potential emissions from the biomass boiler have been averted.

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								proposed. This presents risks to improvements in air quality (see comments in Action 8 relating to the decentralised energy strategy) as it is often suggested in preference to non-combustion renewable technologies despite the combined benefits that these measures can have for both climate change and local air quality.		
16.	School Travel Plans	The focus of this measure has now changed from requiring school travel plans in all schools (LEA and independent) in the borough to „monitoring travel plans within LEA and Independent Schools in the borough“.	LA	2009	2010	50% of all schools have an active travel plan (meaning that the school has submitted an updated travel plan document including mode of travel to school data)	N/a	<p>We continue to implement sustainable travel initiatives in our local schools. 71 per cent of schools (50 schools out of 70) in the borough reviewed their travel plans and received free training resources and funding from the Road Safety and Travel Plan Team. About 50 per cent of the schools are LEA and the other half are independent.</p> <p>The percentage of pupils cycling and scooting to school has increased from 15 per cent in 2011 to 19 per cent in 2012. Encouragingly 25 schools were awarded Transport for London’s Sustainable Travel Accreditation: 1 school received the gold level, 6 schools the silver level and 17 schools the bronze level.</p>	Target complete, but ongoing process – each school monitors their travel plan annually.	School Travel Plans promote sustainable transport through initiatives such as free cycle, scooter and pedestrian skills training. Facilities such as scooter and cycle storage areas are also installed in the schools. The modest but definite increase in pupils cycling and scooting to school points to the success of investing resources in school travel planning.
17.	Encouraging	Continue to	LA	2009-2010	2009-	Annual increase	N/a	The Council delivered 400 free adult	2014	Until the Mayor of

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	Cycling	encourage safe cycling in the borough by improving facilities and providing free cycle training to residents			2014 (ongoing)	in cycling numbers		<p>cycle training lessons (110 more than last year) and 600 children received cycle training. It also provided 100 free cycle maintenance sessions (Dr Bike) to the public and workplaces (nine more than last year) and delivered 20 cycle mechanic training sessions shared with LB Hammersmith and Fulham.</p> <p>A number of training sessions were arranged with police - „exchanging places programme“ to highlight the blind-spot dangers of large vehicles.</p> <p>£125,000 was invested in cycle parking e.g. cycle stands.</p> <p>Several initiatives to encourage social activities around cycling have been established e.g. All Ability Cycling Club, Bike Polo Group, and Bikeminded promotion campaign which involved four cycle tours – attracting 240 people.</p>		London implements his radical proposals to create a grid of bicycle „super-highways“ and „quiet-ways“ in the capital, and there is greater segregation of cyclists from other vehicles, there is unlikely to be a step change increase in the number of cyclists. Consequently the likelihood of a significant reduction in vehicle emissions from a mode shift to cycling remains uncertain.
18.	London Cycle Hire Scheme	The Council will support TfL in implementing a Central London Cycle Hire Scheme based on the Paris model.	TfL and LA	2009-2010	2010	50 docking stations installed in the borough	N/a	<p>A further 18 docking stations in the north and south of the borough have been added bringing the total to 86. The number should soon be double the original target.</p> <p>There are now more than 8000 cycles available for hire in the central London area.</p>	30 th July 2010 Action completed	This scheme aims to encourage bicycle use, especially for short journeys and has grown in popularity. They can help to reduce the impact of using cars for short journeys.

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								The scheme is expanding to the south and west of the borough into Hammersmith, Fulham and Wandsworth, which will make it even more attractive to riders hiring cycles in Kensington and Chelsea. Recently when the scheme expanded to the east of the City the average number of weekday hires rose by 50 per cent.		
19.	Car club Expansion	Double the number of on-street car club bays available in the borough and increase the number of low emitting vehicles in the car club fleet.	LA	2009-2010	2014	No. of car club members in the borough 200 on-street car club bays in the borough. 33% of the fleet within VED band A-B.	N/a	Following the merger of Streetcar and Zipcar there was apparently a drop in total membership. However this may have been because some members had belonged to both car clubs. The figures are rising again (5438 members in January 2012, 6453 in January 2013) although growth is steadier than in the past. Some 25 car club bays are being converted back to their original use, because there were too many bays for one operator. We are continuing to encourage the uptake of electric vehicles, but the current recession may be forcing the operators to be as cautious with new technology as they are about expansion. However more than 50 per cent of the fleet are within VED band A-B (Based on 118 vehicles with 12 month permits). Virtually all residents are within a three minutes walk of a bay.	2014	Although the slight contraction in coverage is disappointing, it remains the case that each car club vehicle takes at least 4 private vehicles off the road and reduces the mileage driven by its members.
20.	Idling Engines	Undertake an awareness raising	LA	2009-2010	2009-2014	Number of warnings and	N/a	The Highways Enforcement Team continues to conduct checks at known	Ongoing	When a vehicle is waiting for longer

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		campaign to inform drivers of the idling engines regulation and continue to monitor hotspots and use the available enforcement powers to encourage drivers to switch off their engines.			(ongoing)	complaints		<p>trouble spots. These areas include Kings road, Kensington High Street, Exhibition road and Cromwell Road.</p> <p>Areas likely to cause nuisance are also targeted such as cab ranks, bus stops, coach stops and areas around schools.</p> <p>Leaflets have been distributed to car/van/bus/coach drivers who are sitting in vehicles running idle engines.</p> <p>TfL has produced a series of posters as part of a campaign to discourage idling engines. These have been displayed in the car parks of Kensington Town Hall and, Chelsea Old Town Hall. Posters will continue to be distributed and displayed where opportunities arise.</p> <p>During 2012/2013, officers received 3 complaints of vehicles parked with idling engines running. Two of these complaints arose in the north of the borough while 1 complaint was located in the south. This is two fewer complaints than that received during the previous year. Complaints were associated with heavy goods vehicles,</p> <p>During 2012/2013 no Fixed Penalty Notices were issued (compared with five last year).</p>	Ad-hoc checks will continue throughout the year	than 30 seconds then engine should be switched off to stop emissions and fuel consumption.
21.	Investigate	Assess the	LA	2010	2011	Investigation	N/a	As part of the joint air quality best practice	2011	The existing

No	Measure	Focus	Lead	Planning phase	Implementation phase	Indicator	Target annual emission reduction	Progress in last 12 months	Estimated completion date	Comments relating to emission reductions
	the effects of a more robust LEZ	effectiveness of a number of scenarios for an alternative central London Low Emission Zone (LEZ) and lobby the Mayor of London to implement the most cost-effective option.				completed and results submitted to TfL and GLA.		<p>guidance commissioned on behalf of the Central London Air quality Cluster group three overall low emission zone scenarios, including taxi retrofit, high level exhaust for buses (two options) and a Euro V requirement for TfL buses have been considered.</p> <p>The borough was successful in bidding for funding to evaluate the effectiveness of the introduction of the latest stage of the London LEZ introduced in 2012. The study will quantify the impact of the latest stage of the London Low Emission Zone on NO₂, PM₁₀ and black carbon concentrations focussing on the Earls Court one way system which has a large number of light goods vehicles. Work began in 2012-13 and the study will be completed in 2013.</p>		<p>London LEZ has lead to a reduction in emissions but is being progressively strengthened eventually with an emphasis on NOx.</p> <p>These scenarios have the potential to lead to NOx reductions p.a. of 1,5t-2,7t (bus high level exhaust) and 204t (Euro V bus). For PM₁₀ reductions p.a. of 18t; 11.8t-21t and 1.3t respectively for the three scenarios.</p>
22.	Parking Charges	<p>Review the surcharge for diesel vehicles</p> <p>Review the graduated parking permits system to incorporate discounts for low emission vehicles (electric vehicles)</p>	LA	2009	2010-2011	Changes implemented to residents parking permit charges	N/a	<p>Residents parking charges are reviewed on a yearly basis. At the most recent review, the price of six of the seven bands was increased to reflect the increase in the Retail Price Index (around 2.6%). The price of Band 7 permits was increased to be 33% higher than those in Band 6 to provide further incentive to residents to choose less polluting vehicles.</p> <p>Electric vehicles continue to be charged at the lowest parking permit rate.</p>	The parking charges will continue to be reviewed on an annual basis.	The Council continues to reward residents who have chosen low emission vehicles such as electric, and place a surcharge on vehicles which are most polluting.

No	Measure	Focus	Lead	Planning phase	Implementation phase	Indicator	Target annual emission reduction	Progress in last 12 months	Estimated completion date	Comments relating to emission reductions
23.	Encourage the creation of electric recharging infrastructure	Actively encourage the creation of electric recharging infrastructure within the borough by requiring charging points to be incorporated in development and promoting grants to local businesses.	LA	2009	2009-2014 (ongoing)	Electric Charging Points (ECPs) installed by developers and on business premises: 50% of on-site parking spaces in new development with ECPs by March 2012 100% parking spaces with ECPs by March 2014	N/a	<p>The Council continues to require ECPs with all new developments. This is enforced through the use of planning conditions.</p> <p>The Council is currently requesting that ECPs are installed at around 20 per cent of on-site parking spaces in new developments. However we are urging developers to install passive provision for connection later on if demand justifies it.</p> <p>We introduced two on-street electric vehicle charging points in April 2013. The charging points are located in pay and display bays in Seville Street and Talbot Road and are operating as part of the Source London scheme. Each point will provide both a 13 and 32 amp charging socket.</p>	On target for completion of reduced Mayoral targets.	This is an ongoing commitment

10 Conclusions and Proposed Actions

10.1 Conclusions from New Monitoring Data

The Progress report has not identified any significant changes to the air quality in the borough, though some slight improvement in monitored levels of PM_{2.5}; NO₂ has shown no overall consistent trend; PM₁₀ continues to be exceeded at one monitoring location. In summary the results for nitrogen dioxide and particulate matter continue to exceed one or more of the Government's air quality objectives within the borough, therefore it is necessary to continue to maintain the AQMA. As no significant changes have been identified, no changes to the AQMA are required as a result of new monitoring data.

10.1 Conclusions from new local developments

New local developments have the potential to impact on air quality the council will continue to work to minimise these impacts however integrated policies are required to avoid the continuing conflict between some carbon reduction measures such as the push for decentralised energy in urban areas which will have a detrimental effect.

10.2 Other Conclusions

No new processes /fugitive emissions were identified. However an application for a permit for a gasification and pyrolysis plant under the Environmental Permitting Regulations 2010 is expected in spring 2013. The process will be classed as a small waste incineration plant. An air quality assessment will also be required as part of the planning process.

10.3 Proposed Actions

A review of the LAQM regime is due to be consulted on in the next few months. The proposals may affect the way that the review and assessment process is undertaken. However currently the next progress report is due to be completed and submitted in 2014, which will include a review of new monitoring data collected for the key strategy pollutants.

11 References

Maggs, R., Harrison, D., Carslaw, D. , Stevenson, K. (2009) Analysis of Trends in Gravimetric Particulate Mass Measurements in the United Kingdom

Defra (2007) The Air Quality Strategy for England, Scotland, Wales, and Northern Ireland

Defra (2009) Local Air Quality Management Technical Guidance LAQM.TG (09)

London Councils (2006) Best Practice Guidance. The Control of Dust and Emissions from Construction and Demolition

RBKC Local Implementation Plan (LIP)

<http://www.rbkc.gov.uk/environmentandtransport/transportandstreets/policiesandstrategies/localimplementationplan.aspx>

RBKC (2008) The Climate Change Strategy 2008-2015

<http://www.rbkc.gov.uk/environmentandtransport/climatechange.aspx>

Appendices

Appendix A: QA/QC Data

Appendix B: Glossary

Appendix A: QA:QC Data

Diffusion Tube Bias Adjustment Factors

NO₂ diffusion tubes

Bureau Veritas manage the data from the London Wide Environmental Programme (LWEP) diffusion tube networks, however the supply and analysis of the tubes is undertaken by Gradko International Ltd. The preparation method is 50% TEA v/v in Acetone and the analytical method is U.V. Spectrophotometry.

Factor from Local Co-location Studies

Bureau Veritas conduct an „in-house“ co-location study to establish an LWEP bias adjustment factor based on triplicate NO₂ diffusion tubes sampling concurrently located with continuous analysers for a number of local authorities. They employ the DIFTAB.xls spreadsheet to calculate the factor.

NO₂ diffusion tube bias adjustment factors for 2006 to 2012

Year	Mean Adjustment	Mean% Bias
2006	1.06	-4.00
2007	1.01	-1.06
2008	0.98	3.92
2009	1.00	1.14
2010	1.06	-5.00
2011	1.02	-1.20
2012	1.04	-3.00

Bias Adjustment Factor and % Bias of LWEP Co-Location Study 2012 Bias adjustment 2011

	Diffusion Tube	Continuous Analyser	Correction Factor (A)	% Bias based on continuous monitor (B)
Kensington, North Kensington	32	35	1.11	-10
LWEP Bloomsbury	45	45	0.99	1
Greenwich, Eltham	23	23	0.99	1
Croydon, London Road	60	66	1.11	-10
Greenwich, Blackheath	47	47	1.01	-1
Greenwich, Trafalgar	40	44	1.09	-8
Greenwich, Burrage	38	45	1.19	-16
Greenwich, Millennium	39	37	0.96	4
Kensington, Cromwell Rd	71	63	0.89	12
Croydon, George Street	44	44	1.08	-7
Overall % Bias				-3
Mean Bias Adjustment Factor			1.04	

Source: Nitrogen Dioxide Diffusion Tube Survey Annual Report 2012 Bureau Veritas

Choice of Factor

The LWEP factor has been selected as being the most suitable as it includes sites in the borough and is based on a large number of co-located automated and diffusion tube samplers.

Benzene diffusion tubes

Benzene data is also collected as part of the LWEP managed by Bureau Veritas. The tubes are analysed using desorption scanning gas chromatography/mass spectrometry (GC/MS). Comparison of the LWEP data with the calculated mean data for the Automatic Hydrocarbon Monitoring Network (AHMN) indicates that the concentrations recorded were very comparable. However there is no bias adjustment factor for benzene measurements.

PM Monitoring Adjustment**TEOM**

In the past TEOM data was corrected using a simple multiplication factor of 1.3. Co-located instruments (TEOM and Partisol) at North Kensington in the past enabled us to compare the results, this had shown that adjusting the TEOM data by a factor of 1.3 gave a reasonable approximation of the annual average as less reliable when applied to exceedences of the daily objective. However co-location studies have shown that the instrument was not equivalent to the reference method and the FDMS measurement device was developed to correct the problem and in comparisons was shown to be equivalent to the EU reference method. In 2008/09 Defra began the replacement of TEOM units with FDMS units on the particulate monitoring network. Government guidance LAQM TG(09) states that the Volatile Correction Model (VCM) should be used to correct TEOM measurements for Local Air Quality Management purposes.

Data has been collected from the London Air Quality Network (LAQN) website (www.londonair.org.uk) operated by King's ERG. TEOM measurements on the website are now adjusted by the CVC. The VCM uses FDMS purge measurements to correct TEOM measurements for the loss of volatile material. This method is now recommended in Defra's TG (09) as the preferred method for correcting TEOM measurements for Local Air Quality Management purposes. This correction has been undertaken for data in the Council's two TEOM sites from 2004. Data corrected using both the simple multiplication factor and the VCM method is included in the report.

QA/QC of Automatic Monitoring**Data collection, screening and validation**

Monitoring data is stored as 15-minute averages within the analysers. Air quality data, including full instrument status information, is collected hourly via modem by the King's ERG on the borough's behalf from the monitoring sites via the data loggers within the analysers. This data is stored within the LAQN database. Data is validated by a combination of automatic and manual checks. The procedures used comply with the validation requirements of the UK Automatic Urban and Rural Network (AURN) Management and Co-ordination Units. Manual validation is carried out daily. Data is ratified in three to six month blocks using service records, calibration records, and the results of inter-calibration and audit. Data is passed on to the Defra's Quality Assurance and Quality Control Unit for final ratification.

Routine calibration and independent checks

Local site visits are undertaken fortnightly at the urban background site and weekly for the roadside Tapered Element Oscillating Microbalance (TEOM-FDMS) for the purposes of calibration, filter changes and instrument cleaning. Equipment is additionally serviced at regular intervals. Routine calibrations are undertaken by contractors.

Independent calibration and audit is carried out by Defra appointed contractors as part of their AURN responsibilities for the North Kensington site and for the Cromwell Rd site through a separate contract. Calibration certificates are provided by AEAT. The National Physical Laboratory (NPL) undertake the London affiliate inter-calibration exercise. The following checks are performed for the oxides of nitrogen, sulphur dioxide and carbon monoxide analysers:

Analyser response factors: The analyser samples a stable „inter-calibration standard“ which has been validated against a network primary standard. The analyser also samples from a certified zero air source.

Analyser linearity: The analyser response to a series of known concentrations covering the analyser range is noted. A linear regression is then performed on the results.

Analyser „noise“ levels: This is the standard error of ten successive spot readings of analyser readings when fully stabilised on zero.

Nitrogen Oxides analyser converter efficiency: NO_x analyser converter efficiency is determined using Gas Phase Titration at a range of concentrations, this uses a high concentration of NO and a known amount of O₃ which is subsequently converted to NO₂.

Estimation of site cylinder concentrations: The concentrations are evaluated by sampling from the site cylinder and comparison to analyser response factors determined from the „inter-calibration standard“.

For particle analysers the following checks are performed: Mass transducer calibration: The mass transducer is calibrated by placing pre-weighed filters on it and noting the change in the frequency that is induced.

Analyser flow rates: Flow rates are measured by calibrated flow audit measurement systems. Leak checks are also carried out.

QA/QC of Gravimetric monitoring-Partisol

The Partisol operating at the Earls Court Road site since May 2002 is a gravimetric sampler which is equivalent to the EU reference method. Reference to the report has also been made to other Partisols operating in the borough by Defra. However the co-location trial⁶ raised concerns over the filter media used in these instruments and showed that an over estimation in measured concentrations resulted from the

⁶ Maggs, R., Harrison, D., Carslaw, D., Stevenson, K. (2009) Analysis of Trends in Gravimetric Particulate Mass Measurements in the United Kingdom

use of quartz filters. The filters used at the site are Teflon coated glass fibre (Emfab) filters which are not affected in the same way as quartz filters⁷. No correction factor is required for gravimetric instruments.

Verification of ambient temperature, verification of filter temperature, verification of ambient pressure and humidity, internal leak check, external leak check and flow verification are undertaken for the partisol at the time of audit and service.

QA/QC of Diffusion tube data

Nitrogen dioxide

The laboratory of Gradko International Ltd follows the Practical Guidance document "Diffusion Tubes for Ambient NO₂ Monitoring: Practical Guidance for users and laboratories (Feb 2008)" (AEA on behalf of Defra). The preparation method: 50% TEA v/v in Acetone and the analytical method is U.V. Spectrophotometry. Analysis is carried out in accordance with documented in-house Laboratory Method GLM6. Results are not blank subtracted

Uncertainty of measurement: 3.82%+/- Limit of Detection: 0.06mg/m³*

Gradko International Ltd participates in the Workplace Analysis Scheme for Proficiency (WASP). This is a recognised performance-testing programme for laboratories undertaking NO₂ diffusion tube analysis as part of the UK NO₂ monitoring network. The scheme is designed to help laboratories meet the European Standard EN48213.

The Laboratory performance was deemed satisfactory for 100% of samples that were submitted between Jan 2012 and September 2012 (WASP Rounds 116-118, 2012 WASP R116 WASP R117 WASP R118).⁷

They also participate in the Network Field Inter-comparison Exercise which complements the WASP scheme in assessing sampling and analytical performance of diffusion tubes under normal operating conditions. This involves the regular exposure of a triplet of tubes at an Automatic Urban Network site (AURN) site. These sites employ continuous chemiluminescent analysers to measure NO₂ concentrations. The results indicate that Gradko International Ltd diffusion tubes are well within the performance targets set by NETCEN.

Summary of NO₂ Network Field Inter-comparison Results, 2012

Annual Mean Bias		Precision	
Performance Target	Gradko Annual Mean Bias	Performance Target	Gradko Precision
+25%	1.3%	10%	Good

⁷ Defra's Local Air Quality Management Support Pages
[http://laqm.defra.gov.uk/documents/WASP-NO2-Scheme-for-Rounds-105-113-\(April-2009---June-2011\).pdf](http://laqm.defra.gov.uk/documents/WASP-NO2-Scheme-for-Rounds-105-113-(April-2009---June-2011).pdf)

Benzene

All benzene tubes were analysed by a UKAS accredited laboratory using desorption scanning gas chromatography/mass spectrometry (GC/MS). This method of analysis gives unequivocal identification of BTEX peaks. The analysis is carried out in accordance with the Gradko International Laboratory Quality Procedure GLM 4.

The accuracy of the Laboratory measurements are monitored by participation in the Laboratory Measurement Proficiency Scheme.

The measurement method used in the benzene survey was consistent with the sampling, analysis and QA/QC requirements of EN 14662-4: 2005 Ambient air quality – Standard method for measurement of benzene concentrations – Part 4: Diffusive sampling followed by thermal desorption and gas.

Appendix B: Glossary

AQMA - Air Quality Management Area - an area designated by a local authority where it is likely that the air quality objectives in the National Air Quality Strategy will not be achieved by the appropriate future year specified by each pollutants' objective.

AQAP - Air Quality Action Plan- a plan of initiatives that is being implemented to improve air quality.

Automatic monitoring sites- sites producing high-resolution measurements typically hourly or shorter period averages.

AURN- Automatic Urban and Rural Network- A Defra air quality monitoring network.

AURN affiliate- a monitoring site owned and operated by a local authority but included in the Defra network of sites.

AHMN- Automatic Hydrocarbon Monitoring Network

Urban background site- a sampling site in an urban location distanced from sources and broadly representative of city-wide background concentrations e.g. elevated locations, parks and urban residential areas.

Benzene- an aromatic hydrocarbon

1,3-Butadiene- colourless gaseous hydrocarbon

Carbon monoxide (CO)- gas formed by the incomplete combustion of carbon containing fuels

Defra- Department for Environment, Food & Rural Affairs

Diffusion tube- a small tube used to monitor pollutants by passively absorbing a pollutant over a specific time period, and is then collected and analysed

Emissions inventory- a comprehensive data set of pollution emitted from a variety of sources

FDMS- Fluid Dynamic Measurement System- an airborne particulate monitor based on TEOM technology measuring the core and volatile fractions of the collected mass

Fine particles- see Particles

Gravimetric method- a method of sampling particulate matter by collecting it on a filter which is then weighed later under controlled conditions, e.g. Partisol

HGV- heavy goods vehicle, a goods carrying vehicle of 3.5T (tons), or more, gross laden weight

8 hr running mean- an average taken over an 8-hour period, which progresses hour by hour

Intermediate site - a sampling site within 20-40 metres of the source/road

Kerbside site- a site sampling within 1 metre of a busy road

Lead (Pb) - one of the heavy metals that are a toxic and acts as a cumulative poison

LWEP- London Wide Environmental Programme- provision and analysis of diffusion tubes led by Bureau Veritas in a number of London boroughs

LAQN- London Air Quality Network - a network run by a consortium including local authorities, the Environmental Research Group- King's College, to co-ordinate air pollution monitoring

Microgram (µg) – a unit of mass equivalent to one millionth of a gram or one thousandth of a milligram

Milligram (mg) – a unit of mass equivalent to one thousandth of a gram

µg/m³- a microgram of pollutant in a cubic metre of air

Nanogram (ng)- a unit of mass equivalent to one thousandth of one millionth of a gram

ng/m³ nanogram of pollutant in a cubic metre of air

Oxides of nitrogen (NO_x)- a mixture of NO and NO₂

Nitric oxide (NO)- a colourless toxic gas arising from the combination of atmospheric nitrogen with oxygen in high temperature combustion

Nitrogen dioxide (NO₂)- a stable brown gas largely produced by the oxidation of NO. NO₂ is more toxic than NO

Particles- or fine particles, these are microscopic particles of varying composition, and for the purposes of this report the term „particles“ refers to a range of particle sizes from 10µ to 0.1µ

Pollutant specific guidance- issued by Defra, provides advice on review and assessment for each pollutant identified in the air quality regulations

Objective- we have used the word objective throughout this report. This is the term used by the Government to describe standards which have a set timescale (i.e. a target date) for their achievement

PM₁₀- particulate matter less than 10µ (micrometres) in diameter

PM_{2.5}- particulate matter less than 2.5µ (micrometres) in diameter

Roadside site- a sampling site between 1 metre of the kerbside of a busy road and the back of the pavement, typically within 5 metres of the road

Screening models- give a preliminary level of assessment and only require simple input data

Source apportionment- the degree to which various sources of pollution contribute to air quality problems

Sulphur dioxide (SO₂) - a colourless toxic and acid forming gas, it is the main product of the combustion of sulphur contained in fuels

TEOM- Tampered Element Oscillating Microbalance- a monitor to measure the mass of particles collected on a filter continuously

VCM- Volatile Correction Model- a model to correct measurements of PM₁₀ by the TEOM so that they can be used to compare against the EU Limit Value in the UK.